

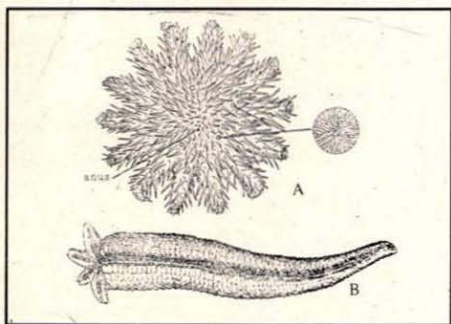
# Hornbill

Vol. 1994, No. 1



BOMBAY NATURAL HISTORY SOCIETY

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Entrance fee Rs. 50

Membership fees and annual subscriptions

Ordinary, individual Rs. 150. Life Rs. 3,000 (Rs. 5,000 with Journal).  
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# EDITORIAL

There occurred in Bombay an ornithological wonder which has not been witnessed in the past forty years. T.V. Sowrirajan, in his cover story, describes it for us and we share his excitement at his discovery, last April, of thousands of flamingoes at the mudflats in Sewri. The pink wonders, as he calls them, were seen at low tide in such numbers as could not have been imagined in this highly polluted industrial metropolis where human beings find themselves hard put to survive. We wonder what brought them here. A cataclysmic change in their own environment? Perhaps a subtle shift in the optimal conditions which determine their habitat, subtle now, but irreparable with the passage of time?

The twenty-fourth principle of the Rio Declaration on Environment and Development states, "Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development as necessary".

How flagrantly is the spirit of this principle flouted in the holocaust of the wars that are fought on our planet. Armed conflict destroys not only the warring nations, the effects are felt far beyond international borders. The images endure ... of seashore dwelling birds, oil-soaked and unable to feed or fly because of the all-pervading oil spills ... raging fires from oil wells and the pall of smoke that blackens the horizon for months to follow ... the barren landscape that is the soul-destroying outcome of chemical warfare ... are we still witnessing the biological fallout from wars which are already a fading memory? Research may prove this true, but do we have time enough to wait, and to learn our lessons by bitter experience?

We begin this volume, however, on an optimistic note. Enclosed with this issue of Hornbill is a membership form for *Par Avian*, a pen-friendship scheme for under-eighteens who are interested in wildlife. This has come to us from the Royal Society for the Protection of Birds, the United Kingdom partner of BirdLife International. *Par Avian* aims to promote the exchange of ideas and experiences between the young people of the world, in the belief that friendships fostered around the world may help in the cause of conservation and global cooperation, of international peace and the sustenance of a world order in which all living creatures, including man, may thrive.

GAYATRI UGRA

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Published and printed quarterly by A.M. Bhagwat for the Bombay Natural History Society. Printed at St. Francis Industrial Training Institute, Borivli. We welcome contributions on any aspect of natural history or conservation. Articles can be up to 3,000 words in length, and must be accompanied by clear, sharp photographs (prints or transparencies, either black and white or colour). Copyright for photographs used will remain with the photographer. Reg. No. R.N. 35749/79, ISSN 0441-2370



# ARE THERE FLAMINGOES IN SEWRI?

T.V. SOWRIRAJAN



*In the two million years since man arrived on this planet, the havoc we have wrought has despatched thousands of species to oblivion. Yet this mean environment continues to attract these beautiful flamingoes.*



**April 8, 1994:** It is a blazing, sizzling afternoon. The wind from the Arabian Sea is hot, loaded with humidity. A perfect weather for a chilled drink. And also for flamingoes, I would soon discover.

I am just returning from an inspection round of the Bombay Port's container yards that dot the east side of Bombay's sea front — from Ballard Pier to Wadala. As my jeep takes the last bend and gets onto the road that abuts the sea off the Sewri coast, I stick my neck out and scour the shore line. Craning my neck at this site has almost become a mannerism with me, for the mud-flat in front is highly productive in winter with hordes of waders, gulls and terns foraging on the food-rich shallows and mud.

As I start retracting my neck into the jeep after the customary gaze, something incongruous hits me like a stone. I freeze. There, on the centre of the vast mud-flat, about 2 km from where my jeep stands, is an island of pink and it is dissolving and coalescing ever so slowly as if in a television replay of a football goal.

Flamingoes! Not just one, but there seem to be at least a thousand in that mass. It is unbelievable.

At least for the last 20 years I know that there were no records of flamingoes in Bombay. Later on, when I check with the BNHS, I come to know that no flamingoes have been sighted in Bombay at least for the last 40 years and even then they were few compared with the present population.

More than anything, what boosts my scepticism is the location of the birds. On one side are the huge container depots and warehouses with their leviathan cranes, forklifts, long-bed trailers and heavy-duty trucks, raising a racket in the region of 250 decibels and spewing out all the oxides of carbon into the air. On the other side is the infamous Trombay industrial belt with its power station, chemical factories and refineries, disgorging gases and fumes of all hues and odours day in and day out.

Can such a mean environment attract flamingoes? I decide that the flamingoes must be a transitory flock. They must have alighted here for R and R — rest and recuperation — before continuing with their journey. They will be gone in a day or two. Flamingoes here today, gone tomorrow!

**April 9:** In order to reinforce my hunch that they are a transitory flock, I come to the office earlier than usual. I reach the Sewri sea front and look for them. There are no flamingoes at yesterday's spot. It occurs to me that this may be because of the high tide. If they are still there, they must be at the fringes of the

sea, so I decide to scout the entire coast line. No visions of pink! Though I am filled with disappointment, in a way I am happy. I do not want the flamingoes to be here, in this polluted gas chamber of a city. And so my hunch is right — it is after all a transitory flock.

Before setting a seal onto this conclusion, I want to come back to this spot during low tide again. If they appear only during low tide, where have they gone now, at high tide?

It is around 2.30 p.m. when I come to the Sewri water front. The pink streak hits my eyes. The flamingoes are there once again, magically returned during low tide.

Yet my still doubting mind tells me to watch for a few more days before letting the flamingoes out of the bag.

*Flamingoes are one of the most primitive living birds which evolved about 50 million years ago. Some palaeontologists believe that they are the link between the group of birds that comprise storks, herons, ibises, spoonbills and cranes (Ciconiiformes) and the group that includes ducks, swans and geese (Anseriformes).*

*Greater flamingoes are one of the tallest birds, reaching up to an average height of four feet. The lesser flamingoes compensate for their shorter stature by the richness of their colour. While the greater flamingo has light pink legs and a few streaks of pink on its feathers, the lesser flamingo has deep pink feathers and almost red legs, and a black bill. In the twilight they truly look like the flames from which their name has obviously been derived.*

*It is a delight to watch the flamingoes feeding. They have a long, tubular neck at the end of which is their amazingly structured bill with lamellae to strain the muddy ooze and retain the food particles.*

**April 10-14:** I go out of Bombay, to Kolhapur, to attend a BNHS nature camp at Radhanagari Bison Sanctuary. I cannot concentrate on the gaur. One thought keeps recurring, "Will the flamingoes still be there?"

**April 15:** Back to Bombay. Back to work. Back to Sewri. Afternoon. Low tide. Sure enough, the





What brings these beautiful creatures to the polluted environment of Bombay?

flamingoes are still there in all their pink glory.

**April 16:** Though the sighting of the birds is still from a respectable distance of two kilometres, I decide that the public should be told about this rare occurrence. I give a press report to PTI through BNHS.

**April 17:** Having leaked the news I am seized with terror. What will happen if people go to the site and see gulls and egrets instead of flamingoes? What if the flamingoes have flown away? The fear of being dubbed a hoax and a prankster begins to haunt me.

**April 18:** I want to be absolutely convinced that I have really been seeing flamingoes. For this confirmation I have to get closer. But how?

To walk two kilometres in knee-deep slush is an impossibility. A local fisherman cautions me that the mud-flat is unpredictable. At some places it may sink three metres. I explore another possibility, of approaching the birds from the sea. The snag here is that the birds are seen only during low tide and how do you take a boat out during low tide?

**April 19:** With each passing day, I feel restless and fidgety. There should be some way to go nearer. My friend Dr. Dasgupta keeps nagging. His photographic fingers are itching to shoot the birds. And on this sleepless night it all suddenly comes to me. No great brain wave. But a simple idea. Perhaps, that's why

the solution eluded me so far. Take a boat during high tide. Sail to the spot where the flamingoes usually come. Anchor at that place and get marooned purposely. Wait out till low tide. If the flamingoes are still there I should be able to see them from close up. Take the boat back during the next high tide. That means, spending at least 12 hours at sea, from one high tide to the next. I examine the idea a thousand times. It looks feasible.

**April 20:** I go to a few boat operators and broach the subject. The first two flatly turn down my proposal. They are not prepared to wait for 12 hours at this spot. Sewri coast is an unchartered territory, frequented by smugglers and bootleggers; they frighten me. The third one, after some initial hesitation, agrees. He will ferry me, provided I take care of the Customs, marine police and coast guard, who would hassle us constantly. I agree and the deal is struck.

*Of the world's five species of flamingoes two occur in the Indian subcontinent: the greater flamingo or *Phoenicopterus roseus* and the lesser flamingo or *Phoeniconaias minor*. Both species are found chiefly in four places in India. The largest population numbering about half a million nest and breed at the Great Rann of Kutch in Gujarat. Other permanent*





ULHAS RANE

A tranquil scene — is this a true reflection of the future?

flocks, relatively smaller in size, inhabit Point Calimere in the Thanjavur District of Tamil Nadu, Chilka in Orissa and the Sambhar Lake in Rajasthan.

Soda lakes, salt lagoons and tidal mud-flats form the habitats of flamingoes, for their food consists chiefly of crustaceans, worms and blue-green algae which are abundant in such alkaline waters. In fact, the pink colour of the flamingoes is due to the pink pigment found in the algae eaten by the bird.

Flamingoes have been seen in Maharashtra before, but not in such large numbers as they are present now in Bombay. Sporadically they were seen at Harishchandragad in Junnar District, Jayakwadi dam in Aurangabad and Bhigwan lake in Solapur District. Their numbers at these sites rarely exceeded 100 whereas the flock size seen at Sewri was more than two thousand!

**April 21:** I have to fix a date for the expedition.

Like a priest consulting an almanac to set a wedding date and time, I sit with the tide-table.

My requirements are a reasonable hour of departure and return or the boatman will not come, and a low tide time appropriate for photography. Since the mud-flat is on the east, the low tide should be some time in the late afternoon, say after 3.30 p.m. but before sunset.

April 24 looks to be an admirable date. High tide is at 10.55 a.m., low tide at 4.47 p.m., sunset at 6.35 p.m. and the next high tide at 11 p.m.

**April 22:** I do not want to go alone. Since I do not take photographs, I need a good photographer. Above all, I need my wildlifer friends who would share my enthusiasm and excitement. Finally I decide to invite my photographer friends Dr. Bibhuti Dasgupta and Dr. Haridas Shenoy, as well as Mr. Mehra, on this trip.

*Flamingoes are gregarious, moving great distances, specially at times of nesting. They nest on mud-flats, creating miniature craters in which they lay one or two eggs. Both the male and female take part in the hatching and chick-raising process.*

*Flamingoes feed the newly-hatched chicks with a red-coloured milk. A pouch in their gullet secretes this protein-rich milk which the birds bring to their mouth and dribble into the hungry, squeaking bill of the chicks.*

## F DAY : FLAMINGO DAY

**April 24:** When we arrive at Ferry Wharf the boatman is nowhere in sight. My heart sinks. After five minutes, which seems like five years, the boat operator's representative materialises. He says the boat is waiting. Our boat, "**Mon Victory**" is gently rocking on the oil-slicked water. What a romantic name for a creaking, fuming boat!

On the way we are intercepted by another boat with about 10 people in it, all in civilian clothes. They ask our boat to come up alongside. Our boatman explains to us that they are marine police. The police want to see the papers of the boat. Next the police want to know who we are. I explain our mission to them. They are not convinced. They express a desire to detain our boat. Being a Bombay Port man has its advantages. I flash my ID card. Seeing that they reluctantly let the boat go. Like the school bully they



warn the boatman they would take care of him later.

In about 40 minutes we arrive at the location where the flamingoes usually sojourn. But having arrived, I am not sure whether it is the right place. Before embarking on the trip I had taken my bearings from the land. I had identified a tall smoke stack with candy stripes as the landmark. From the shore it appeared that the flamingoes were in front of the smoke stack. But once we are on the water all places appear to be in front of the smoke stack. I am totally bewildered. I do not know where to park the boat.

My confusion is cleared by the flamingoes themselves. Dr Dasgupta cries out, "There they are". Even though it is still high water with about 2 metres depth, the flamingoes are already in the water. Their pink dazzles and coruscates in the midnoon sun and in their reflection in the water.

The flamingoes are about a kilometre from us, floating at the edge of the water. They are in a semicircular formation, from north to east. Our boat is anchored somewhere in between. I hope we are at the right spot when the birds start moving during the approaching low tide.

For the present there is nothing to do but wait. The low tide is still a good three and a half hours away. So we have an early and slow lunch, while the boatman snores.

It is about 2 p.m. Something curious is happening at the edge of the water. We see the flamingoes floating in 3 or 4 rows from the edge of the water. As the water starts receding, the flamingoes in the first row leisurely stretch their legs, start getting up and then stand. As the water withdraws some more into the sea, the second row of flamingoes do the same. Now the water is receding rapidly. The flamingoes keep pace with the decreasing tide by rising fast. The whole scene looks fascinating and comical. Now all the flamingoes are on their feet. There must be at least 2000 in all. They start moving longitudinally and laterally, so that each one of them will get an equal share of the mud surface to feed on.

A sizeable number of birds come walking towards our boat. They are now about 50 metres from us. Photographers do not know what to capture, which to reject. They are now about 30 metres from us and they are still moving towards us. Though the lesser ones outnumber the greater five times to one, there is no mistaking the taller and paler greater ones. My photographer friends have run out of film. They never expected that the birds would come so close. I look

behind and am instantly captivated by what I see. It is magical, ethereal and dream-like.

So far we have been concentrating only in front of the boat and as we turn around we see the birds on all sides, completely encircling the boat. There are so many of them all over, avidly feeding on the mud-flat. They look like cattle grazing in pasture.

The birds are now just 10 metres from the boat. We cannot help voicing our excitement loudly but the birds seem immune to our presence. Our commotion wakes up the boatman. He, too, is fascinated. The birds are now so close that he audaciously suggests that we feed them from our hands.

True. The birds are unbelievably close. We can see every detail of them. The almost scarlet blotch on the sides, the reddish legs, the near opaque eyes, the black and red bill with its walking-stick curvature.

It is a sight for the gods. The sight of the birds continuously ploughing through the soft mud, chasing one another playfully, walking on their twiggy legs, rising to the sky in a sudden splendour of pink and black.

We do not know how time flies. It is getting dark. In the twilight the birds look even more beautiful. As the orange light of the sun falls on them they look as if they are on fire. Even after the darkness has completely shrouded us, we keep staring into the black spaces. Every now and then we sense their movement and hear their "honk" call. The sound of their presence gets fainter and fainter and after a time it completely fades away. At that moment a horrible thought grips my heart like a tarantula.

We arrived on this planet two million years ago, many million years after the flamingoes. In this short span what havoc and destruction we have wrought on this earth, despatching thousands of species, great and small, to oblivion. As the depredation and annihilation continues ever more rapidly now, how long will it be before the flamingoes go the way of another pink beauty, the pink-headed duck?

I look up as if for an answer. The sky is littered with a myriad stars, blinking dully through the smog screen. The first waves of the high tide splash against the bow of the boat. It is time to pack up and go home. □

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*Mr. T.V. Sowrirajan is Dy. Manager, Docks Dept., Bombay Port Trust. He is a keen birdwatcher and member of BNHS.*



# WHERE SURVIVORS ARE PROSECUTED

Anirudh Chaoji

At the mere mention of Chandrapur District of Vidarbha, one tends to visualise armed Naxalites, the scorching summer or the hospitable Gond tribals who once ruled these areas. Not many are aware that this part of the country is covered with thick, deep jungles teeming with wildlife.

The Tadoba National Park, about 150 km from Nagpur, is one such place where wild bison still roam freely. Recently, we had the privilege of visiting this enchanting place.

After a change from rail to road at Nagpur and Chandrapur, we drove through the last stretch of 20 km of dense forest and thick bamboo undergrowth. The Youth Hostel dormitory was going to be our home for the next five days.

Our first evening was spent in appreciating the beauty of the water-lilies in the centrally located lake and pondering over the warning statements on the signboard next to the lake.

*Swimming in the lake prohibited.*

*Survivors will be prosecuted.*

This lake is home to crocodiles, who take adequate care to avoid the legalities of prosecution! It is also associated with numerous myths and legends of the bravery of the Gonds, dating back to the times when this area was conquered by the Mughal emperor Akbar and later by the Marathas in the 17th century.

Next morning, we walked into the forests, appreciating such winged wonders as the golden-backed woodpecker, green pigeon, racket-tailed drongo and the grey-headed fishing eagle.

One bird that we were delighted to see was the paradise flycatcher, whose Marathi name explains it all — *Swargiya Nartaki* — or the heavenly dancer. Its agile fairy-like movements, as it turned and twisted with its looping ribbon-like tail, presented a spectacular display of exquisite charm.

Besides the rich variety of birds, the dense growth of majestic trees like teak (*Tectona grandis*), beheda



**SWIMMING TOTALLY PROHIBITED  
SURVIVORS WILL BE PROSECUTED.**





A gaur skull is evidence of the elusive presence of the tiger

(*Terminalia bellerica*) and *ain* (*Terminalia tomentosa*) provide sanctuary, among others, to an animal combining grace and stealth with great strength — the tiger.

One evening, it was our turn to go on a long trek. However, intuition told me otherwise and we went towards Jamunbodi waterhole, one of my favourite haunts in Tadoba. From the machan near Panchdhara, we entered a narrow path lined on either side by thick bamboo undergrowth. We had not walked for even five minutes when I asked the others if they could smell what I could ... and soon we were on the trail of a big cat.

With every step, the signs only grew stronger. We had now been following the big cat for over an hour and were engrossed in tracking very fresh pugmarks, when my colleague Mihir suddenly came running up from behind and said "Tiger" Just about 10 m away from us, across the path, was the majestic beast conveying an unforgettable impression of power, dominance and an utter lack of fear. After the short *darshan*

that he gave us, he moved into the tall grass adjoining the path.

**T**igers, which once numbered over forty thousand in India, were reduced to a measly two thousand, before Project Tiger was launched to preserve this majestic animal and his domain. The launching of Project Tiger and the establishment of national parks and sanctuaries highlight the conflict that arises between man's material demands and his growing awareness of the need to reverse this process of destruction.

Named after the legendary tribal chief Taru, the Tadoba National Park, one of the earliest established national parks in India, has everything tiger country needs — large prey like the gaur, sambar, chital and wild boar, ample shade and enough water.

Though leopards provide competition to the tigers when it comes to food, it is the tiger with its heavy build and astonishing agility that dominates the proceedings. Tigers are even known to have killed and eaten leopards.





The leafless teak-dominated deciduous forests of Tadoba

**T**he leopard's habits bring it into far more frequent contact with man than the tiger. Its territory, unlike a tiger's, is not restricted to forests and heavy cover. It is equally at home near human habitation, where it preys on cattle, poultry and even dogs, but almost never on man, though man can be its easiest prey. However, the leopard's strength cannot be underestimated. Though it may appear feeble compared to the tiger, a leopard has unbelievable strength and is known to have carried a male chital up a tree to keep it safe from other predators.

On the third evening we were sitting in a small group on one of the two machans located at the periphery of the central lake. This machan is situated about 5-6 m beyond the water edge. There was a large dead log lying between the land and the water, which had to be leapt over like a trapeze artist to get onto the machan.

It was pitch dark now, and other than a few movements inside the forest, there was total stillness. And suddenly the silence was broken by a loud snort

from under the machan — a crocodile! ... It was only when the other group came and made sure that the crocodile had moved off that we decided to come down.

**A**long with tigers and leopards, the crocodile is at the top of the Tadoba food pyramid. It is yet another animal which uses strength and stealth to stalk its prey. Without being noticed, a crocodile can approach any unsuspecting animal which is drinking water. Sometimes the prey might just notice a floating log nearby and the next moment, with unbelievable speed and power, the ugly and fierce-looking reptile is pulling it underwater.

Tadoba also houses a crocodile farm where crocodiles are reared and bred in captivity. Here we learnt that the crocodile eggs lack the chromosomes that decide the sex of the offspring. Depending on the temperature of the surroundings, the young born may be male or female. Males are born at temperatures above 32° C and females at roughly below 30° C.

The forests of Tadoba with their thriving



predator population indicate a healthy forest as the predators keep a check on the herbivore population, which would otherwise have wiped out the forests. The gaur, sambar, barking deer, blue bull and the four-horned antelope are handsome herbivores of Tadoba. But none of them can surpass the spotted deer or 'chital' as it is called in Hindi. The sight of the chital bounding gracefully across the open patches of Tadoba is etched in my memory. Equally unforgettable is the sight of a sounder of wild boar with about

fifteen playful young ones bounding across the forest path.

The time had come to bid adieu to this forest and all its beautiful people who had hosted us. Soon we were driving back into the civilized world, where animals are not provided protection as in the Tadoba National Park, and where the survivors are prosecuted. □

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*Anirudh Chaoji is an active member of the Bombay Natural History Society. He is a keen naturalist and a prolific writer.*

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### LEOPARD KILLED BY TIGER

*K. Sankar, scientist at the Wildlife Institute of India, photographed this leopard carcass in Sariska Tiger Reserve. He watched a tigress near the Kalighatti water hole eating this sub-adult leopard on an evening in February 1988. The leopard had seven deep canine wounds on its head, nape and throat and its lower jaw was broken. The leopard may have been killed by the same tigress. In the Journal of the Bombay Natural History Society, W. Biscoe in 1895 and A.J.T. Johnsingh in 1979 have also reported leopards killed and eaten by tigers.*



# NEWS NOTES COMMENTS



## TIGER BURNING NOT SO BRIGHT

William Blake immortalised the tiger. But his subject may not be burning so bright after all. According to John S. Kenney, Charles W. McDougal and co-workers in a recent issue of *Nature* (June 1994), the period 1994-1997 will be critical for tiger conservation, especially for smaller populations. These scientists created a computer simulation model to explore the effects of poaching on the viability of

tiger populations. They found that as poaching continues, the probability of population extinction increases rapidly to a critical point after which even a small increase in poaching can doom the population to extinction. According to their model, a high level of poaching (about 15 tigers a year per population) can lead to a 70-90% probability of extinction. This scale of poaching occurred at Ranthambore Tiger Reserve in Rajasthan where the tiger population is believed to have declined from 44-46 tigers in 1991



Even the lord of the jungle has a relaxed moment



to 15-20 tigers in 1992.

Ninety-five percent of the extant tiger populations are made up of less than 120 tigers. For such populations, 3 more years of a low level of poaching (5 tigers per year) results in a probability of extinction of less than 5%, but if more than 10 tigers per year are killed per population, the probability of extinction is greater than 95%. These simulation results indicate the dire consequences of apparently small absolute increases in poaching to the small tiger populations. Of course, habitat loss is another major threat to the tiger. Which threat will decimate the tiger first?

There are somewhere between 2970 and 4300 Bengal tigers in India today and their future is severely threatened both by the illegal trade in tiger parts for medicinal potions and by habitat loss. To address the urgency of the tiger's plight, 12 tiger-nations met in New Delhi this March and set up a Global Tiger Forum whose Chairman is Kamal Nath, India's Minister for the Environment and Forests. China, Laos and North Korea were conspicuous by their absence at this meeting. This forum will coordinate measures to combat tiger poaching and to preserve tiger habitats. The Caspian tiger, the Javan tiger and the Bali tiger are already extinct. Only swift political action at national and international levels can save the Bengal tiger and its relatives. ■

### CHILLACHETTU: A NATURAL WATER PURIFIER

A tree called *chillachettu* in Telugu can be found in the Srisailem Tiger Reserve in Andhra Pradesh and elsewhere in the moist and dry deciduous forests of this eastern state. The local people have used *chillachettu* or *Strychnos potatorum* for years for the purification of drinking water. The seeds are ground into a paste which is added to the water, which soon clears.

Now scientists have discovered that a compound isolated from the seeds is effective in removing industrial pollution from water. It can effectively bind to toxic heavy metals such as cadmium and mercury as well as gold, silver, cobalt, copper and nickel. It is believed to be even capable of binding to uranium, thorium and other radioactive isotopes within nuclear waste.

The discovery of such useful properties in wild plants should help to save them and their habitats, and should not merely result in accelerated destruction in the race for quicker commercial gains. ■

### NEW SEA-TURTLE MASS-NESTING SITE DISCOVERED ON ORISSA COAST

A new sea-turtle mass-nesting site near the mouth of the Rushikulya river in Ganjam District of Orissa has been discovered by a collaborative field research project of the Wildlife Institute of India and the Orissa Forest Department. An estimated 200,000 Olive Ridley (*Lepidochelys olivacea*) females laid eggs between the 1st and 8th of March 1994, on this six kilometre stretch of coastal sand dune with natural vegetation. Sporadic nesting was recorded till the 24th of March 1994. With this discovery, Orissa has become the only maritime state in India which has three major mass-nesting sites of Olive Ridley sea-turtles. The credit for this discovery goes to Bivash Pandav, a researcher from the Wildlife Institute of India (WII), Dehra Dun, who has been working on the Orissa coast since November 1993 under the joint supervision of B.C. Choudhury, a scientist at WII, and C.S. Kar, a Research Officer of the Orissa Forest Department.

The other mass-nesting sites in Orissa are the world-famous Gahirmatha beach in Bhitarkanika Sanctuary and the beach near the mouth of the Devi river in Cuttack District. During the first mass-nesting season in February 1994, an estimated 600,000 sea-turtles had nested in these two nesting sites.

This discovery assumes importance in the light of the recent fragmentation of the Gahirmatha nesting beach, the anticipated threat to turtle populations due to trawler fishing near the Gahirmatha coast, proposed construction of fishing jetties and plans to settle Bangladeshi refugees in or near Bhitarkanika Sanctuary. The newly-discovered site is an undisturbed coastline which needs to be declared at least as a sanctuary as this is now the second largest rookery for the Olive Ridley sea-turtles. It is worthwhile to mention here that local villagers near this new discovery site report that large concentrations of sea-turtle nesting females take place here every year during the onset of summer.

The Olive Ridley sea-turtles nest in the undisturbed coastal stretches of India, normally close to the mouth of a river estuary and/or near coastal mangrove vegetation areas. Once they arrive on the shore or on the beach, they begin the egg-laying sequence after digging a nest pit. Covering of the nest by throwing sand using the flippers completes the process of nesting.



The urge for egg-laying is so strong that they pay no heed to any disturbance and, if not protected, many are caught and killed during this process as turtle eggs as well as meat are a much sought-after product for the coastal people. In recent years, large-scale conversion of coastal beach-fronts into *Casuarina* plantations as well as other developmental projects have considerably decreased sea-turtle nesting sites. Trawler fishing activities during winter months which coincide with the turtle nesting season also take their toll. ■

## FLAMINGO NESTING IN A GUJARAT CITY

A species like the flamingo which is still fairly common has a very tenuous breeding situation, nesting as it does in large congregations and in locations which are often extremely hostile to life in general. There have been reports of vigorous colonies deserting because of the drying of water in the Great Rann of Kutch. Yet during successful nesting years large numbers of young birds survive to offset years when no nesting occurs or breeding results in failure. To survive, the species have to be opportunists.

Being highly mobile, it is conceivable that when there is a large number in full breeding condition and given a rich food source in the vicinity, exploratory nest construction might easily culminate in actual nesting. This would help colonising of new areas for breeding.

Lavkumar Khachar reports seeing the the lesser flamingo flock at Porbandar, in Gujarat State, in July 1991, in prime breeding condition, with all

possibilities of their settling down to breed. Unfortunately the area, where they were building the nests, got submerged by a rapid rise of water caused by heavy rains. It may be noted that the birds were not in the least disturbed by the proximity of a busy road.

Visitors wanting to get close-up photographs were the main source of worry since the birds can become nervous and their breeding tempo disturbed. At Porbandar, this was being prevented by local birdwatchers involving the roadside tea stall owners who kept curious people from going too close to the nesting birds.

At this stage, he says, it might be worth making an inventory of all wetlands and salt pans in the State where large flocks of either species of flamingo spend long periods. By involving the local people, we may succeed in building up a popular sentiment in favour of the birds. Television should give coverage to the flamingo congregations.

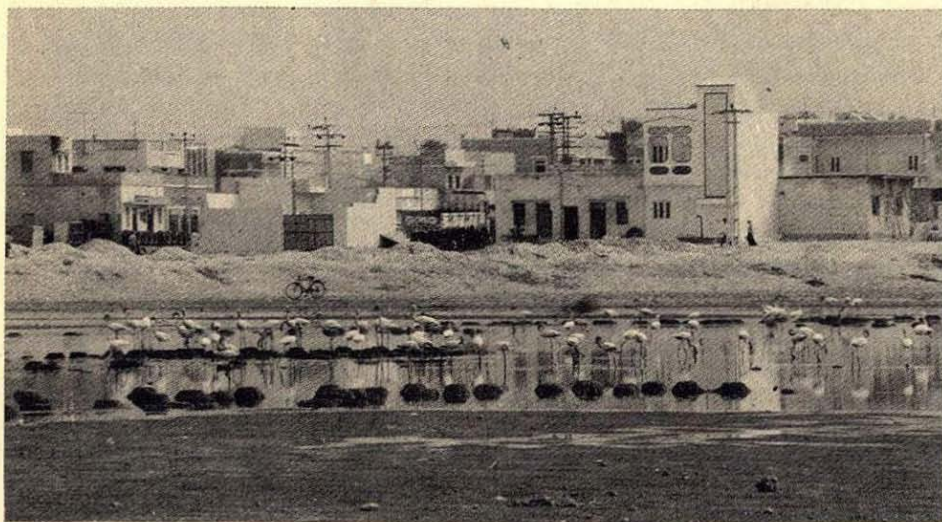
The lesser flamingo seems to depend on thick algal bloom which is caused by an accumulation of sewage-polluted water and since such locations are on the increase, we may have potential nesting sites evolving all over the State. ■

## FUNDS FOR CONSERVATION PROJECTS

BirdLife International and the Fauna and Flora Preservation Society, with support from British Petroleum, hold an annual competition for

conservation exploration projects. The field team should preferably include people from at least two countries, one of which must be the host.

The 1994 Expedition Award was for an elephant and rhino conservation project in the Way Kambas



Exploratory nesting of the flamingoes at the city's edge



National Park in Southern Sumatra. This area also harbours the Sumatran tiger, clouded leopard, white-winged wood-duck, pangolin, tapir, sunbear and other endangered species.

During the first three years of the awards, expeditions have gathered important data on an impressive list of globally threatened species, including butterflies on the Comoro Islands, cacti in Mexico, monk seals in Mauritania, weasels in Colombia, and more than 80 species of birds (8% of the world's threatened birds). In many cases, this is the basic information that is needed to get nature reserves declared in the right places: where the threatened species or the species with very restricted global distribution, are found.

For further information contact Michael K. Poulsen, BirdLife International, Wellbrook Court, Girton Road, Cambridge, CB3 0NA, U.K. Telephone (44-223) 277318; Fax (44-223) 277200. ■

## NEWS FOR ANGLERS

Many believe that sport-fishing is ecologically viable and could actually be used to promote ecotourism and protect the health of the inland waters.

Vijay Soni, member of an angling association from Delhi, has prepared an ecologically viable scheme for sport fishing in U.P. which was sent to the Chief Minister, U.P. This scheme can probably be applicable for all other states where sport-fishing occurs. We reproduce below an extract from this scheme.

"Since our scheme covers aspects of conservation, food and sport tourism, we have to involve all those who are concerned, such as ministries, departments, ichthyologists, anglers and villagers. In this day you cannot fence off areas from the rural folk as has been amply proved in other projects. We must involve them and give them alternatives for keeping away from poaching.

Our objective is, therefore, to have healthy rivers and lakes with good stocks of the endemic species and to breed fish in hatcheries located near natural waters for commercial sale and stocking of the waters. This should be done by the State Fisheries Department. Once induced into natural waters, the fish would have to be safeguarded. The waters should be divided into three categories, viz., sanctuary area, angling area and

commercial fishing area. Several zones of each category should be present in different water bodies.

An apex body should be formed at Lucknow headed by the Chief Secretary and comprise members from Departments of Fisheries, Forest, Tourism, Industry, Food, PWD, Irrigation, Army, ichthyologists, Anglers' Associations and NGOs. This body should set out the policy for all activities on water bodies from macro-projects like dams and canals to water sports and adventure tourism, commercial fishing, captive fish breeding, etc. They should direct concerned Departments to cooperate. It is desirable to have only one agency in charge of field vigilance, but it may be divided for practical purposes.

Commercial fishing contracts for commercial zone waters only should be given by this Committee. Angling zones should be leased out to Angling Associations under relevant terms and conditions to encourage sport fishing tourism. It is suggested that leasing fees for angling zones should be kept minimal, whereas anglers should be charged reasonably for permits. It should be obligatory for each angler to hire a local Ghilly (Shikari) at reasonable wages. This Shikari should have received some training by the Fisheries Department and be paid a nominal retainership throughout the year for guarding the waters. Small hatcheries or fish farms should be established by the Fisheries Department at various villages along the river. These should be run by the village cooperatives so that the entire village community benefits.

These hatcheries could easily be formed by channeling water from the main stream to a village pond and running it back into the river. The pond would be used for captive breeding and farming of fish species, like carp and mahseer. Once there is adequate fish availability, the pressure on natural waters would automatically decline and the village community would prevent poaching of the natural waters by their own village miscreants. However, local villagers would be allowed to fish in the angling zones with hook and line for sport and food, without payment of any charge.

Commercial fishing would be allowed under strict terms and conditions at reasonably profitable rates and the commercial fishermen should be obligated to sell 50% of his catch locally."

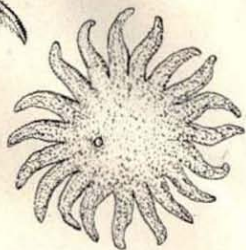
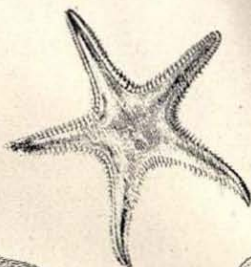
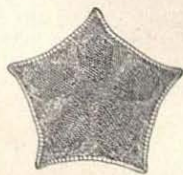
For further information and feedback, contact Vijay Soni, 43, Golf Links, New Delhi 110 003. ■







# SEASHORE LORE



## 16. Stars In the <sup>Sea</sup> Sky

### Beefsea

*Twinkle, twinkle, small sea-star,  
I know full well what you are;  
A case-study in geometry  
With perfect five-fold symmetry.*

(With apologies to Jane Taylor)

If you ask a person who knows almost nothing of marine life to draw a starfish, chances are that he will do a good job of it — a perfect five-pointed star, with the central disc merging into five tapering arms with broad bases. Scientists frown on the word “starfish”, as it conveys a meaning that it is related to fishes, so let us call them “sea-stars” instead.

Sea-stars, along with their cousins, have two peculiarities. They are *never* found in fresh water, but are exclusively marine. Secondly, they are not bilaterally symmetrical. You can cut a human being, a snake, a frog, or even a worm into two equal left and right halves. But sea-stars show radial symmetry, in which the organs of the body are arranged like the spokes of a wheel round a central axis. These arms occur in multiples of five.

The arms of a sea-star may be rather thin and long or thick and stubby, and sometimes, as in the biscuit sea-star, are even absent, only a five-sided disc being present. And while a typical sea-star has five arms, there may be many more in some kinds, as many as 20 or even 45 to 50. On the

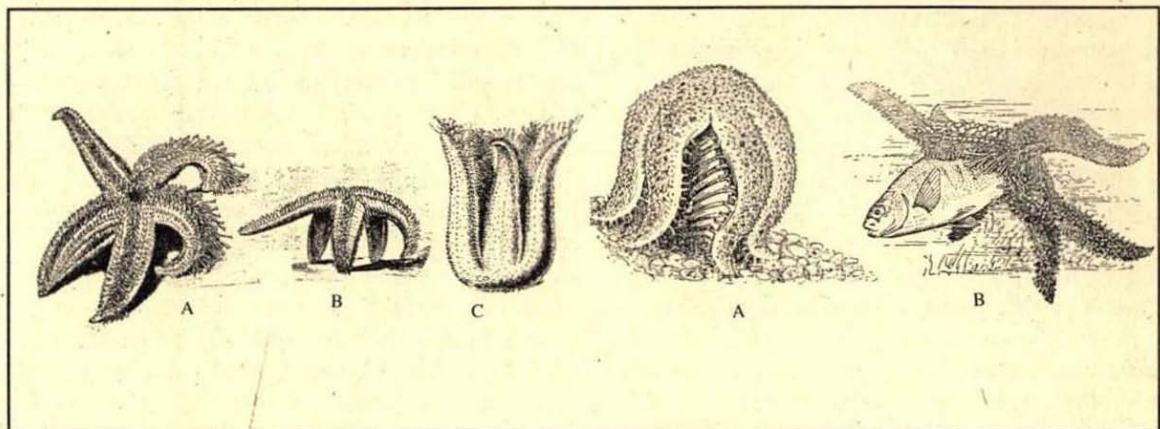
upper surface is a prominent round, red or orange, grooved pore-plate or madreporite, situated off-centre between two arms, and an anus. In many-armed sea-stars, there will be up to five pore-plates (rarely, as many as 16). The body is rarely smooth; there are warts, knobs, tubercles or blunt-ended spines. The roughness is due to limy plates or ossicles embedded in the skin.

Many sea-stars are prettily coloured — red, orange, blue, green, grey or brown, sometimes with mottled and banded patterns of contrasting colours. Their size varies from a few centimetres to 60 cm (from arm tip to arm tip).

If you turn a sea-star over onto its back, you will find in the centre, its mouth. From this, along each arm, runs a furrow called the ambulacral groove, lined on each side by hundreds of tube-feet in two or four rows. The tube-feet are tiny, transparent, hollow and finger-like, and usually end in a flat sucker.

A sea-star has the most ingenious hydraulic system devised by nature. From the pore-plate on the top of the body descends a hard limy tube called





Sea-star righting itself: a. somersault, b. tulip method, c. inverted tulip.

Sea-star opening a clam (left), and devouring a fish (right).

the stone canal. This empties into a ring canal, so called because it forms a ring around the mouth. From this runs a radial canal in each arm. A sea-star crawls slowly on the sea bottom by means of its tube-feet. These are hollow, and when sea water from the radial canals is pumped in, they distend, move outward and press against the sea floor. Now water is pumped out of the tube-feet, so that a vacuum is formed and the tips of the tube-feet, acting like suckers, stick to the sea bottom. Then, by contracting the muscles of the tube-feet and shortening them, the sea-star draws itself forward by means of the firmly anchored feet. Pumping water into them releases the tube-feet from the sea bottom, while water is pumped into another group of tube-feet which get attached to the sea bottom further on.

**A** man-made hydraulic system would require a complicated control system housed in a big control room, but the sea-star manages all this by a small brain, and hundreds of tube-feet. These tube-feet are controlled by nerves, and operate in regular succession, adhering and letting go one after another in a superbly synchronised manner. Some sea-stars, by flinging sand outwards with the help of their tube-feet, can bury themselves in the sand in a minute.

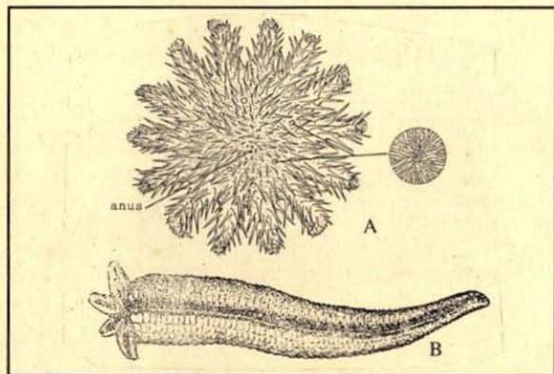
An upside-down sea-star can right itself in many ways. Usually it bends two or more of its arms until the arm-tips touch the sea floor. These then begin walking, so to speak, under the animal, bringing more and more tube-feet in contact with the ground, and finally it somersaults. Or the sea-star rises on the tips of all its arms to assume what is called the "tulip" position, and

then falls over. In the inverted tulip manoeuvre, the sea-star brings all its arms vertically up and rolls over.

**T**he sea-star moves slowly and cannot chase fast-moving prey. Its favourite food is shellfish, though if a fish is foolish enough to stray in its path and get caught by the tube-feet, well ... the sea-star does not mind eating it. Now, anyone who has tried to get a knife into a live clam or oyster knows how frustrating it is. So how does a sea-star open one? It grasps the clam with its tube-feet, brings it towards the mouth and humps itself over the clam. While the tips of the arms maintain a foothold on the sea floor, it turns the clam until the edges of its shell touch the sea-star's mouth. The firmly-attached suckers of the tube-feet steadily pull the two valves of the clam's shell in opposite directions. A clam's muscles can be ruptured in several hours under a continuous pull of 1000 to 2000 gm weight, whereas a sea-star can exert a pull of 1300 gm weight, before the tube-feet tear. So what the sea-star lacks in muscular strength, it makes up for in tenacity of purpose. A pull of over 900 gm weight suffices to open the clam in half an hour.

**I**magine yourself sitting in a restaurant when someone occupies the chair next to you, takes his false dentures out of his mouth, mashes up the food on his plate by clamping the dentures open and shut with his hands, and pops the dentures back into his mouth along with the mashed food. It's bad table manners, to say the least. Many sea-stars have an equally gruesome way of handling their food. After the clam or oyster has finally tired and relaxed





a. Crown-of-thorns starfish, showing madreporites (shown magnified on the right). b. Comet stage of *Linckia*.

its shell valves just a few millimetres, the sea-star pops its stomach out of its mouth, squeezes it into the shellfish and pours out its digestive juices into the shell. After some time, when the shellfish's tissues have been thoroughly digested, it puts its stomach back where it belongs and slurps the digested food in.

**T**he crown-of-thorns sea-star — so named because of its spiny arms — feeds on the soft parts of corals. It sits over a live coral, digests it, and then moves on, leaving the bleached white coral skeleton behind. A decade ago, there was an epidemic of these sea-stars, and vast stretches of coral reefs in the Pacific Ocean were left barren.

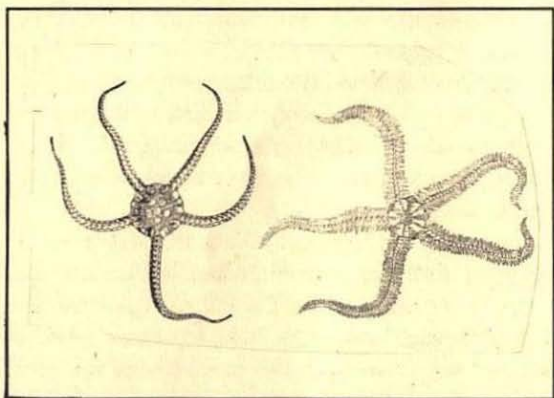
How nice it would be if, on injury to a limb, we could cut it off and grow another one in its place. The sea-star can do this. A sea-star which has lost one or more of its arms can grow a new one. Not only that; a detached arm, provided it has a part of the central disc sticking to it, can grow both a new disc and arms and become a complete new sea-star. One kind of sea-star, called *Linckia*, regularly breaks off an arm which then grows a miniature disc with four arm buds. This stage is called the "comet" form, and soon grows into the five-armed adult. Of course, sea-stars also reproduce sexually, releasing their ova and sperms into the sea. And they are very prodigal; a single sea-star may produce more than two hundred million eggs in a year! Luckily for oysters, only a few of these survive.

As sea-stars are fond of eating oysters, they are the bane of oyster-fishermen. Earlier, whenever these fishermen caught sea-stars in their nets, they would cut them into two and throw them in the sea, thinking that they had killed the sea-stars. Little did they

realise that they were actually helping to increase the sea-star population by doing so! Nowadays, they use "tangles" — iron bars to which are fixed many chains covered with frayed rope. The ropes catch on the rough spines of the sea-stars as the tangle is dragged along the sea bottom. When the tangle is brought up into the boat, sea-stars are brought to the shore and thrown on dry land. Sometimes lime is sprinkled on to the sea bottom; this does not harm oysters but burns the sea-stars.

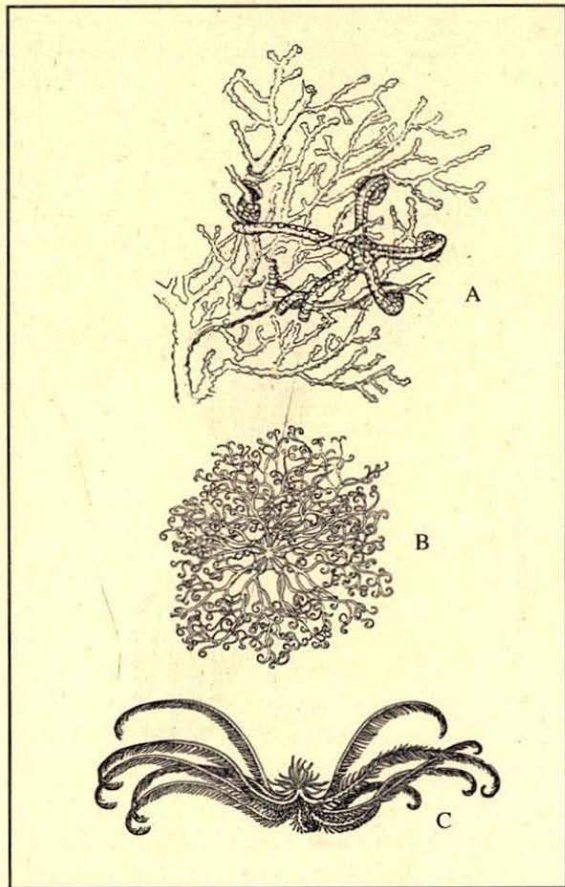
First cousins to the sea-stars are the brittle stars or serpent stars. They can be easily distinguished from sea-stars. While in sea-stars we cannot make out where the central disc ends and the arms start, these have a distinct button-like disc from which arise five slender worm-like arms. If you touch or catch one, the animal will shed part of an arm, a whole arm or even several arms. But this is no handicap; it can grow them again. Like a lizard breaking off its tail and running away while the wriggling tail distracts the attention of its hunter, the broken arm wriggles like a snake while the brittle star moves away to safety. But, unlike sea-stars, a broken arm cannot grow a new body.

**T**he tube-feet of a brittle star are small and are used for breathing and the sense of touch, not for walking. But it moves its arms quickly in a sinuous movement to crawl much faster than a sea-star. This snake-like movement of the arms gives the brittle star its other name — serpent star. Like the sea-star, the mouth is on the lower surface, but there are no grooves on the underside of the arms. The arms have a jointed appearance, and they may be smooth or thorny. Unlike the gruesome feeding habits of sea-stars, brittle stars take in mud, and the



Smooth and thorny brittle stars.





a. Brittle star on a sea fan. b. Basket star. c. Feather star.

diatoms and minute animals in the mud are digested in the stomach. There is no intestine or anus, and the undigested waste is thrown out of the mouth.

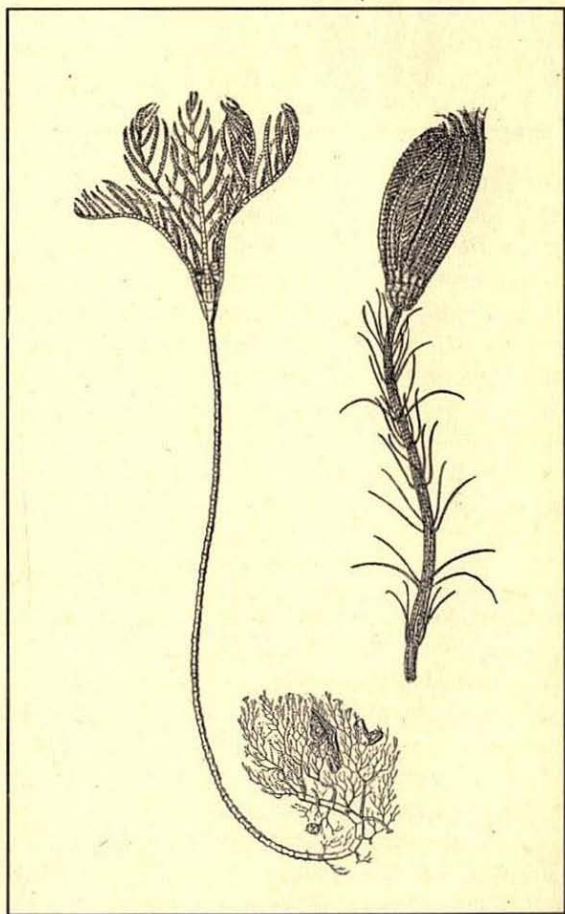
Brittle stars dislike light, so they are found under stones. Some live in the crevices of sponges, or on sea fans and hydroid colonies with their arms twined around the branches. Having the same colour, they are camouflaged.

The disc of the brittle star varies from one to three centimetres, with the arms usually three to five times as long. In the basket star (not found in Indian seas), the disc is up to ten centimetres wide and the five arms, after arising from the disc, divide and subdivide repeatedly to form hundreds of flexible branches which extend straight outwards or curl up tightly.

Another relative of sea-stars is the feather star. The name comes from the arms, which are bordered on each side by a row of short side branches, known as pinnules, giving the animal a fern-like or feathery look. There are usually ten arms, but some feather

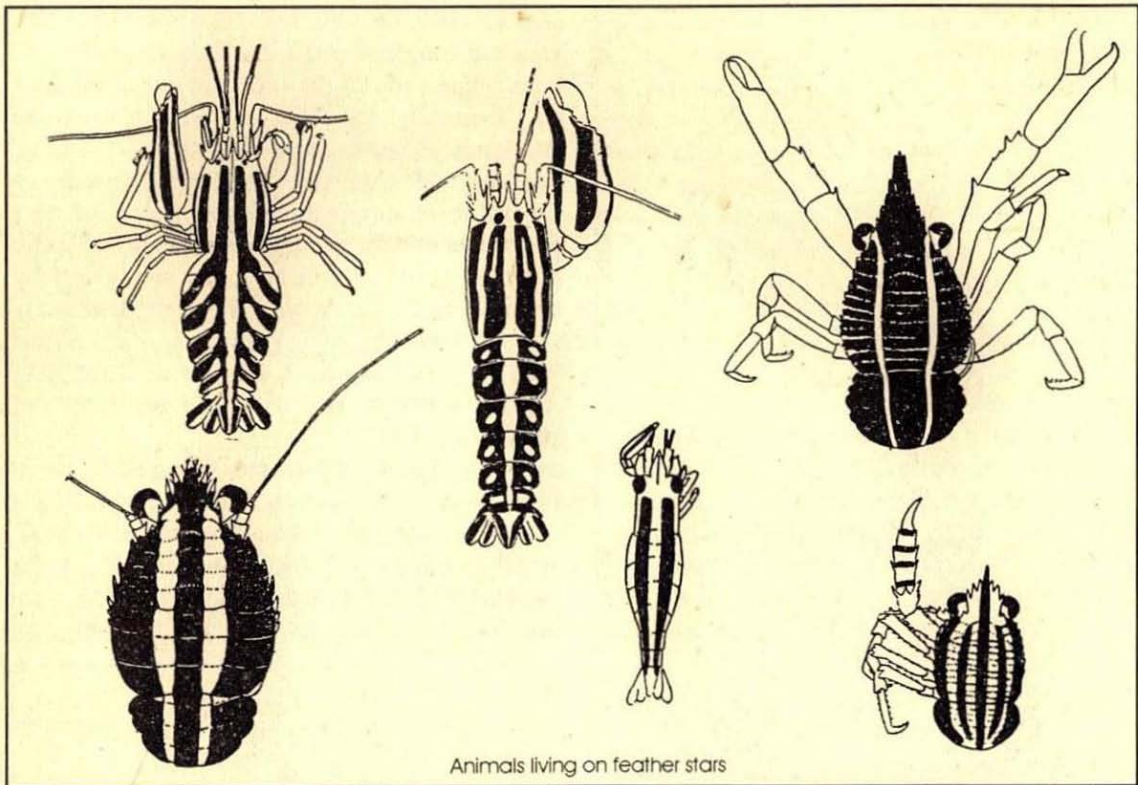
stars may have 40, 80 or even 200 arms. The mouth, anus and arm grooves called ambulacral grooves are on the upper side. On the lower side, where the arms start branching, are short, unbranched, hook-like attachment devices, called cirri, by which feather stars can hold onto a stone. They remain attached by the cirri to the stone, with the arms spread out more or less horizontally and their tips somewhat flexed. When detached from their hold, they swim gracefully by raising and lowering some of the arms alternately with the remaining arms. While arms 1, 3, 5, 7 and 9 are being raised, arms 2, 4, 6, 8 and 10 are being struck downwards. But the animal soon tires and attaches to a stone.

The arms of the feather star exude a sticky slime, to which diatoms, green algae and minute animals stick. Tiny hairs called cilia then propel this food-containing slime via the ambulacral grooves to the mouth. Like sea-stars and brittle stars, feather stars can also shed their arms when grasped, and grow



Sea-lilies.





Animals living on feather stars

new ones. Even if eight arms are lost, they can regenerate, but if all ten arms break off, then the animal dies.

Feather stars are even prettier than sea-stars, being white, cream, yellow, orange, green, bright red, wine red, maroon, purple, violet, brown or black. Many forms are striped, and have other animals, with a similar striped colouration for camouflage, hiding on their arms.

While feather stars are found in shallow seas, their cousins — the sea-lilies — live in deeper

water, from 200 to 5000 m. They look like feather stars stuck on the end of a long stalk, which may be 50 centimetres long. It is interesting to know that giant sea-lilies, with stalks 21 metres long, grew millions of years ago, as can be seen from fossils in rocks. Like the coelacanth fish which was believed to be extinct until a live specimen was caught off the coast of South Africa in 1938, the discovery of living sea-lilies, earlier known only as fossils, must have been one of a marine biologist's most sensational thrills. □

### INSTRUCTIONS TO AUTHORS

We welcome your articles, letters, comments, photographs and illustrations for *Hornbill*. Kindly send us material in the following format.

1. Original article, along with 2 xerox copies:
  - a) Text should be typed in double-space (article, letters, etc.).
  - b) Illustrations, if any, should be submitted as clear, glossy, black and white or colour photographs. Colour transparencies are preferable to colour prints. Hand-drawn illustrations should be done on high quality art paper in China Ink.
  - c) Captions for illustrations or photographs must be provided, typed on a separate sheet of paper.
2. A covering letter with a detailed list of all enclosures should be addressed to:
 

Hornbill Editorial Board, Bombay Natural History Society, Hornbill House  
Dr. Salim Ali Chowk, Shaheed Bhagat Singh Road, Bombay 400 023.



# Letters



✍ I want to draw your attention to a news item of the Times of India on the 7th of June 1994, about a plan of the Kerala Forest Department to plant trees in the grasslands of Sabarimala Hills. I request you to write to the Chief Minister, Forest Minister and Principal Chief Conservator of Forests of Kerala to abandon this plan, and protect the natural grasslands instead.

**Asad R. Rahmani**  
Aligarh

♦♦♦

✍ Kalpavriksh, a Delhi-based environmental NGO is currently working on setting up an environmental education network in Lakshadweep, an archipelago of coral islands off the south-west coast of India. A Teachers' Manual is being produced for use there. Biological information is available but we lack resource-free, innovative activity ideas on the biology and conservation of coral reefs which middle and high school students (ages 11 through 18) can carry out. We would be most grateful for copies of activity sheets, relevant references, etc., from people or organisations who have worked in the south/south-east Asian region. Resources from the Maldives would be especially useful. We will reimburse photocopying and postage for accepted material. Please respond latest by February 1995 to the undersigned.

**Sunita Rao**  
Project Coordinator  
C 17/A, Munirka  
New Delhi: 110 067  
Phone: 011-6828857.

♦♦♦

✍ I collect maps. They fascinate me, being at the same time precise and yet enigmatic. They enable wandering and recognition. This is their romance, best typified in R.L. Stevenson's most beloved book, 'Treasure Island'.

Good maps are treasures. And in our country they are as difficult to find as treasures always have been, mythically. Though the Survey of India produces excellent, cheaply-priced maps of considerable detail, these are locked away behind bureaucratic procedures. Maps produced by the Forest Department can be bewitchingly detailed; but they are not commercially available. Such tourist maps as are worth looking at lack character; they are featureless.

There must surely be people like me with a hunger for good maps and an amateur knowledge of map-making. I am writing this letter to seek out such people to exchange maps, techniques and paraphernalia with them. Perhaps, in time, we could go on to form an Amateur Cartographical Society. Would those interested please write to me at the following address, letting me have their reactions?

**Karl D'Souza**  
'Himmat' 17, St. Patrick's Town  
Sholapur Road, Pune 411 013.

♦♦♦

✍ This is in response to a letter from Mashkoor Hasan of Jabalpur, which appeared in the 1993(2) issue. It concerned the identity of a man-eating tigress mentioned in my article "Man-eaters" (page 13, Jan-Mar 1993). The correct name is the Mandali Tigress, not the Mandla Tigress, the error being an editorial one. This animal's man-eating career between 1880 and 1889 was concentrated on a ridge above Chakrata, between the Jumna and Tons Rivers. Many of her attacks occurred at or near the village of Mandali, and it was there she was shot by B.B. Ostmaston, as the tigress attacked his companion. A few days before that event the cat had entered a cabin in which 18 men were sleeping at Mandali. She managed to kill and carry off her victim without awakening the others.

**Charles McDougal**  
Kathmandu



## PARTNERS IN CONSERVATION

### CHIEF OF ARMY STAFF VISITS HORNBILL HOUSE

Maj. Gen. Bipin C. Joshi, Chief of Army Staff, visited the BNHS on the 5th of February 1994. The Indian Army's efforts in conservation of nature and natural resources and improvement of our environment have been one of the great success stories among the defence forces of the world. Now, there is an increased thrust in the armed forces for spreading conservation awareness among its staff at every level, and also initiating conservation schemes in various parts of the country, particularly in areas where army units are located. Although the army's association with the BNHS is almost as old as the Society itself, its recent collaborations in conducting educational workshops, improvement of natural habitats, and exploration of the wild is bearing fruit. Maj. Gen. Joshi's visit symbolises this rejuvenation and it will certainly make significant contributions towards 'greening the forces'.

Maj. Gen. Bipin Joshi announced that the 1.3 million strong army under his command would leave no stone unturned in safeguarding the ecological frontiers of the country.

"The fourth largest army in the world has been protecting the geographical boundaries of the nation so far. But now, I believe, the time has come to set up a task force to safeguard the environment under which it functions," Maj. Gen. Joshi said.

Speaking on the contribution of the Indian army towards preserving ecological systems, the General reiterated the Indian army's commitment to safeguard not only the 1.57 lakh hectares of land under its possession, but also offered its massive infrastructure to carry out any census required on flora and fauna in the country.

Elaborating on the army's involvement in protecting the ecosystems in the country, Joshi said that an ecological task force had been set up to restore



Humayun Abdulali, emeritus naturalist of BNHS with Maj. Gen. B.C. Joshi and BNHS President B.G. Deshmukh



the ecological balance in the Kumaon hills in Uttar Pradesh.

The Ministry of Environment had already set up an ecological Battalion to undertake this work. Gen. Joshi hopes that more such task forces could be formed to undertake the "greening" of the Aravalli range, the Chambal region and also to restore Punjab's wastelands which are the largest in Asia. He said that the Indian army was also involved in protecting the ripensings of the country by taking up an extensive afforestation programme.

Maj. Gen. Joshi explicitly did not want any credit or honour for the work he had undertaken. "It is a call of duty in the national interest," he said.

In many parts of our country, the army has set up extensive afforestation programmes. Some notable examples have been set by the Territorial Army Battalion in the Thar desert, Himalayas and in the Western Ghats. Tree plantation efforts in Kolhapur and Kota are just two other examples set by the army units. By drawing manpower from its pool of ex-servicemen, three battalions have been constituted as an ecological force with the sole objective of conservation of

and other natural resources, and afforestation of deserts and wastelands. The armed forces are also working towards reducing pollution and preventing the waste of energy by adopting environmental friendly methods.

The army has also contributed towards scientific knowledge in the field of India's natural history. A large part of the Society's collection of specimens is a result of the army's efforts.

to the Society's Journal originated from army forces personnel. Although most of these errors were corrected in the past few years, some of the officers continued the good tradition, particularly in the past two decades. It is now expected that more and more soldiers will contribute towards the cause. Whenever required, the armed forces have provided invaluable assistance to BNHS teams — often in extremely remote and inaccessible areas such as Kutch, Ladakh, Jammu and Kashmir, and the Andaman and Nicobar Islands. By initiating and implementing conservation measures in areas under the armed forces jurisdiction, BNHS will be extending its reach to the most vulnerable and environmentally sensitive areas of the country. □

## **The Bombay Natural History Society**

**mourns the sad demise**

**of**

**Gen. Bipin C. Joshi, PVSM, AVSM, ADC,  
Chief of the Army Staff**

**on**

**November 18, 1994**

**On pages 24 and 25 of *Hornbill* Vol. 1994, No. 1, the designation of Gen. Bipin C. Joshi was inadvertently printed as Maj. Gen. The error is deeply regretted.**

**Editors.**

The sighting of the Barasingha deer is one of the highlights of a trip to Kanha National Park, M.P., which was visited by BNHS members in January 1994.



# CONSERVATION NOTES

## THE SIEGE WITHIN !

### **BHITARKANIKA**

A controversial fishing jetty project at Talchua and the Talchua-Rajnagar road, with bridges on tidal rivers and creeks in the 672 sq. km Bhitarkanika Wildlife Sanctuary, in the Kendrapara District of Orissa, threaten to harm the unique mangrove forests of Bhitarkanika. This is the second largest mangrove forest in the country and is home to the world's largest rookery of Olive Ridley turtles at Gahirmatha. Besides, the sanctuary also harbours reptiles like the endangered leatherback and hawksbill sea-turtles, the saltwater crocodile, king cobra and python.

The mass-nesting phenomena popularly known as an "arribada" will be disrupted once the trawler traffic increases. Most of the schemes proposed will violate the Wildlife Protection Act (1972), the Forest Conservation Act (1980) and the Coastal Regulation Zone Notification issued under the Environment Protection Act (1986). Developmental plans envisaged without a proper Environmental Impact Assessment (EIA) will irretrievably damage the mangrove forest.

The jetty just 10 km from the rookery would lead to increase in fishing activity. The movement of trawlers would not only destroy the habitat, but thousands of turtles would drown in the trawlers' nets. Estimates by the Forest Department indicate that about 2000 turtles get injured or killed due to the trawling in the area. The scene can be visualised once the mechanised fishing activity goes up. On a conservative estimate, about 500 motorised vessels, landing about 50 tonnes of fish a day, would be frequenting the area. A resolution is being introduced in the Orissa assembly to denotify a large area of the sanctuary. In addition, more than 6000 ha of the sanctuary have been encroached upon by prawn farmers, the latest craze being tiger prawn farming. A commercial fishing complex has also been planned in the sanctuary's buffer zone.

WWF-India filed two petitions on 22nd April, 1994, in the Cuttack High Court. The first petition seeks a stay on all illegal activities, while the other pleads for the appointment of a committee to carry out an EIA of all developmental activity, determination of the actual area requiring protection and provision of requisite infrastructure and equipment to the concerned

authorities to enable them to enforce the laws protecting the environment. The court has directed the state government not to commission the jetty and to immediately constitute an EIA study group on the sanctuary. The case is slated for hearing on the 31st of October, 1994, after the State Government submits an EIA report on the commercial activities in the area.

### **BALUKHANDA-KONARK**

The Balukhanda-Konark Sanctuary in Orissa stands in danger of being denotified. A Rs. 862-crore beach resort complex has been planned over more than 900 hectares between Puri and Konark, lying within the Ganda Bangar Reserve Forest, which is part of the Balukhanda-Konark Sanctuary. Protagonists of the scheme on the Puri-Konark beach, whose status is presently within the Coastal Regulation Zone I (CRZ I), argue that it also includes environmental costs of about Rs. 564 crores, to buffer any environmental damage that may result. Taking a cue from these arguments and based on the anticipated financial benefits, the Orissa government has strongly recommended a case for the sanctuary's denotification. The crux lies in declassifying the area from CRZ-I (ecologically sensitive) to CRZ-III, where construction is permitted up to 200 metres from the high tide line. Accordingly, a bill was introduced in the Orissa assembly for denotifying the areas earmarked for the hotel project, but due to insufficient support in the assembly the bill fell through. The credit for this goes to Banke Behary Das, an ex-parliamentarian, and presently President of the Orissa Krushak Mahasangh, who did excellent ground work in educating the legislators about the environmental implications of the issue. Extensive deforestation will result, negating previous efforts, where crores of rupees have been spent to afforest the ecologically fragile Orissa coast. These efforts have checked erosion along the coast line and protected it from cyclones. In the initial stages, about 5.2 lakh trees will be felled and about 8 sq. km of the sanctuary will be totally cleared, further exposing the coastline to erosion. The denotification has been stalled for the moment, but how long can it stand up to the forces of realpolitik?

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Compiled by S. Asad Akhtar, Conservation Officer, BNHS.



## BOOK REVIEW

### ANNOTATED CHECKLIST OF THE BIRDS OF BANGALORE

Edited by Joseph George.

pp. 92. Published by the Birdwatchers Field Club of Bangalore. Price: Rs. 10.

This is a small, compact book with a map of Bangalore city and surrounding areas. Nine compilers have painstakingly gleaned all the information published on the occurrence of avifauna around Bangalore since 1828 (Jardine and Selby 1828) till recently (Shyamal 1994). It also gives a brief ecological review of the city and its changing avifauna scenario due to rapid habitat modification.

Three hundred and thirty species of birds are listed here out of which two hundred and twenty occur regularly in the area. A general account of the status and distribution of various species in the area is also provided. The main birding areas around Bangalore city, including the important forest areas and the water tanks where mid-winter water counts are conducted, have been briefly described.

This is the most exhaustive bird checklist for a particular city brought out so far in the country. It is a commendable effort on the part of the editor and the compilers to bring together all the relevant literature on the occurrence of birds in Bangalore. It is important to have an authentic checklist for all the areas which will help in understanding the local trends in populations of various species and the threats faced by them. As birds are good indicators of habitat quality, an exhaustive checklist like this will provide a good indication of changes in habitats over the years. I hope we will have checklist of other areas soon.

The birds listed in the list are both of the city and its surrounding areas. This is not reflected in the title. The title should read "Annotated Checklist of the Birds of Bangalore and its environs". The checklist would have been more useful if the birds were listed separately for urban, rural and forest environs. Similarly, those species which have definitely become extinct in the area, for example the great Indian bustard and the lesser florican, should also have been listed separately.

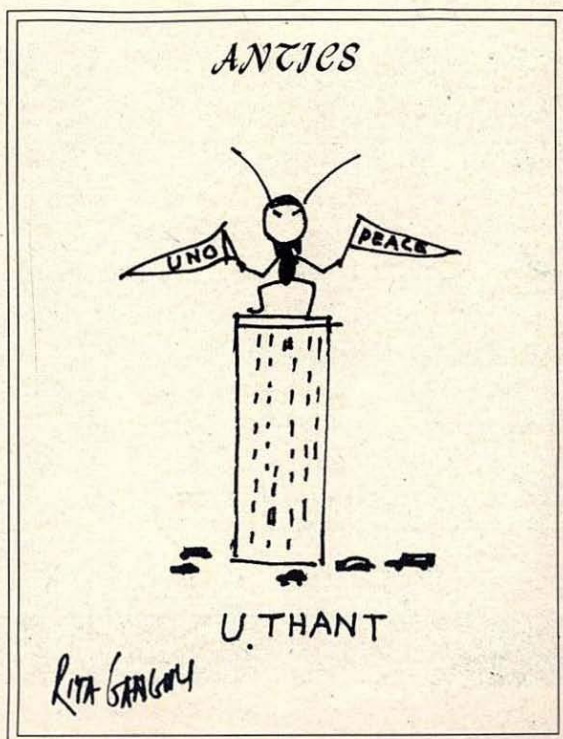
The various terms used for describing abundance and status have not been explained in detail. The

term "not too common" is very confusing and should be avoided. There are several species which have been included on the basis of just one sighting. Such sightings should be treated with caution. Difficult groups of birds such as nightjars should not be included on the basis of just one sighting. Records of birds well out of their known range should also be treated with abundant caution. Such species should be listed separately and they could be confirmed with subsequent sightings.

In most cases, the birds are listed to only the species level but in some cases subspecies are also listed as in the wagtails and some raptors. Uniformity should be maintained in classification. It is safer to provide identification up to the species level based on sight records.

On the whole, it is a very useful compilation of the sight records of birds and should be of great help to both amateurs as well as serious students of ornithology.

VIBHU PRAKASH





# RAREST OF THE RARE

## *Latidens salimalii*



HARRISON ZOOLOGICAL MUSEUM

*On the evening of 8th April 1993, scientists from the Bombay Natural History Society and the Harrison Zoological Museum were sheltering in one of the caves of the High Wavy mountains in Madurai District of Tamil Nadu, protecting themselves from wild elephants and wild bears, waiting anxiously for something to get trapped in the mist net which they had just set across the mouth of the nearby cave. It was 8.15 p.m. and the sky became full of nocturnal flying creatures — bats. The next moment three bats were in the mist net. The anxiety to identify these bats was increasing every moment. The fear of wild animals sped miles away and the next moment the scientists were at work. The torches glowed at the animals in the net and the struggle for the identification began. No tail ... no white edge to the ears ... and two incisors in each jaw ... it was Latidens ... Latidens salimalii ... one of the rarest fruit bats of the world.*

Manoj Muni



The discovery of the rarest of the fruit bats *Latidens salimalii* goes way back to 1948. A. F. Hutton, while surveying the reptiles and mammals of the High Way Mountains in Tamil Nadu, collected four varieties of bats — the flying fox, short-nosed fruit bat, painted bat and the yellow bat, and deposited them in the collections of the Bombay Natural History Society. Hutton collected only one of the several short-nosed fruit bats he captured, thinking it was very common in India. Later in 1972, Kitti Thonglongya while working on the Megachiroptera deposited in the BNHS noticed that this specimen had been mistakenly identified as a short-nosed fruit bat. It was in fact a new genus, *Latidens* and he named it *Latidens salimalii* after India's eminent ornithologist, the late Dr Salim Ali. This species entered the Guinness Book of World Records (1993) as one of the three rarest bats of the world. The other two are the small-toothed fruit bat *Neopteryx frosti* from Sulawesi and a hipposiderid bat *Paracoelops megalotis* from Vietnam.

Approximately one hundred species of bats, including Megachiroptera and Microchiroptera, are known from India, inclusive of the Andaman and Nicobar Islands. *Latidens salimalii* is one of the nine fruit bats known to occur on mainland India.

Both the genus and the species are unique to India. Its nearest relatives, Lucas' short-nosed fruit bat and the swift fruit bat are found in Malaysia and Indonesia.

The bat was forgotten till 1992. This species has always had an extraordinary appeal to us at the Society and the opportunity came very recently to visit the place where it was first discovered. The Society in collaboration with the Harrison Zoological Museum (HZM) has started a project to resurvey the mammals of India. One aim of the survey was to assess the status, diversity and fitness of bat populations throughout the Indian subcontinent, to provide fundamental baseline information for future biomonitoring programmes and an objective assessment of species whose populations have changed in number over time.

The field programme was planned in two parts. The first half included places like Madras, Madurai, Bangalore, Mysore, Seringapatnam, Goa, Sirsi, Jog and Gersoppa Falls in southern India and the second half covered visits to the Garhwal Himalayas. As we were to survey Madras and Madurai, a visit to the High Way mountains was an obvious necessity. It was however a very difficult task to find the exact location in the High Way mountains from where



The rediscovery team of Manoj Muni and Nikky Thomas





A view of the habitat of *Latidens* in the High Wavy Mountains

*Latidens* was collected earlier by Hutton as he had mentioned the collection site neither on the specimen label nor in his publication.

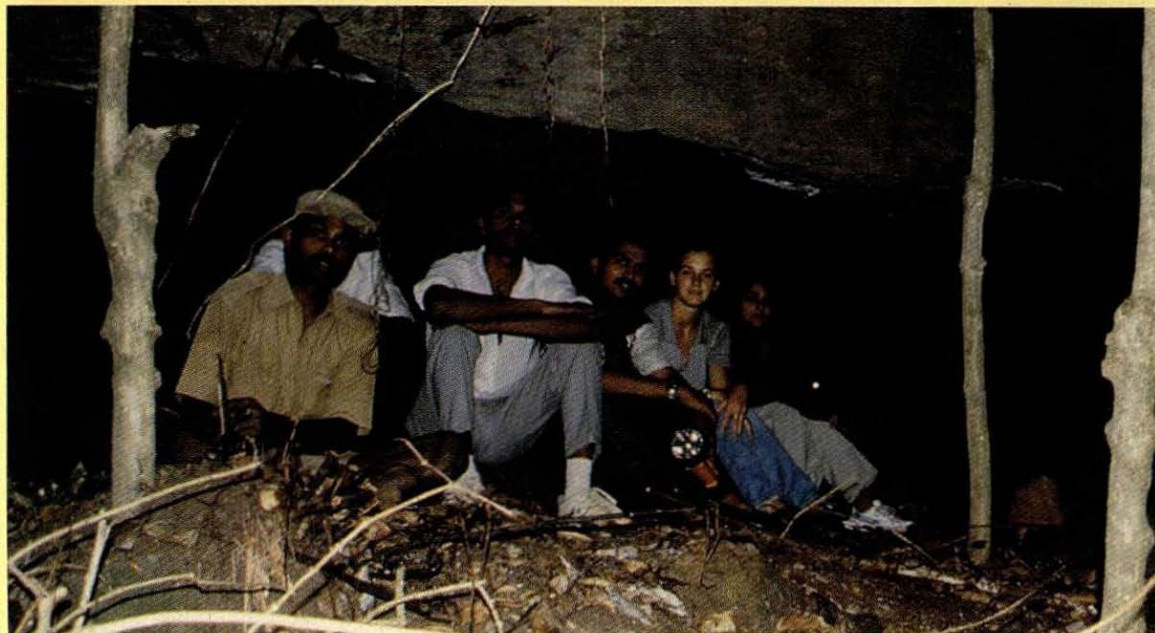
On the 9th of March, Paul Bates and Nikky Thomas from HZM, Vasant Naik, field assistant from BNHS, and I proceeded on the survey of the High Wavy mountains. Communicating in broken Tamil with the locals of the villages we were passing through and satisfying their curiosity as to the purpose of our visit to the tea estate, we reached the check-post. The High Wavy Mountains are situated in the south-west corner of Madurai District on the Travancore frontier. They consist of an undulating plateau, approximately 44 sq. km in area, with an average elevation of 1555 m though the highest point (Brooks Peak) is over 1950 m. As foreigners are not allowed to enter the estate, I left Paul and Nikky with Vasant at the check-post and proceeded to the office of the tea estate for obtaining special permission to conduct mist-netting operations in the area.

The road was very narrow and it was a steep climb. Every 4-5 km we had to stop in order to cool down the vehicle. The habitat of the area was as described by Hutton in 1948. "The plateau is covered with dense evergreen forest, with the exception of a grass-covered ridge overlooking the plains. There are quite a number of rocky patches in the jungle which are covered with grass, and the borders consist of hill-bamboo (*Ochlandra*

*travancorica*) or *eta* as it is known locally. It is also found along river banks and on the windswept ridges. A small area is under tea, cinchona and cardamom cultivation. The slopes of the mountain rise very steeply from the plains and can be divided into two belts; the first belt (365 m - 915 m) consists of light deciduous forest with a dense growth of elephant grass and the whole area contains huge scattered rocks and boulders. The second belt is of bare rocky grassland, devoid of trees, but with considerable patches of *Strobilanthes kunthianus* (sic). This belt continues up to 1220 m where the evergreen forest begins. With the exception of the Bombay Natural History Society's expedition in 1917, these hills were entirely unexplored and uninhabited until 1929, and even since then only a small area was really known".

After a tiresome drive of about 19 km I was about to reach Cloudland, the first division of the tea estate and the car broke down; driving further was impossible. There were no people around whom I could ask for help. Such incidents are normally expected in wildlife research. (I recollected an incident from the previous year when we were surveying bats in the Belgaum District of Karnataka. We were going to the Barapede Caves to look for another rare species





Waiting in eager anticipation for what the nets will yield

of bat — Wroughton's free-tailed bat *Otomops wroughtoni* — and our jeep caught fire.) Luckily, I saw a field supervisor of the tea estate passing by on his motorcycle, and he gave me a lift up to the estate's office. After a brief conversation with the manager of the estate about our aims of conducting field work in the High Wavy mountains, I received clearance in the evening at about 5 p.m. I was most worried about my colleagues, who had been waiting at the check post since morning. The car was already out of commission but we finally managed to organise an ambulance from the estate's hospital to bring up the people from the check-post!

Using the ambulance, we began the survey next morning. It was a unique experience, surveying wildlife using an ambulance. During the earlier survey Hutton recorded 56 species of mammals in this area. But we were concentrating on bats, especially *Latidens*. Day-time work included locating the diurnal roosts of the bats and the nights were spent conducting the mist net operations. We set the nets in every possible habitat and at different heights. They were set on the hills, in the valleys, across the streams, on the slopes, in dense forest, and in scrubby vegetation. The schedule was extraordinarily tight, as we had very limited time to spend in the High

Wavy Mountains. The bat movements in this area were extraordinarily low. However, we managed to collect two species of bats which are new records for this area. But no *Latidens*. It was very disappointing but we knew that it was not an easy task. We had absolutely no idea about the earlier collection locality as well as the altitude. On the 13th of March we left the area for our next collection centre, Bangalore.

While looking for bats in the Garhwal Himalayas we decided to visit the High Wavys once again for an extensive survey. The plans were communicated to Bombay and further arrangements were requested. Accordingly, on the 6th of April, Nikky and I reached Madurai once again. We hired a car from Madurai and reached the High Wavy Mountains.

Next morning we worked in the higher altitude range. In the evening we set the nets across one stream and went further down to set some more. While returning at around 8.30 p.m. we checked the nets once again and found five bats in the net. They were all lesser short-nosed fruit bats *Cynopterus brachyotis*. Working in the light of a single torch we tried to remove the animals from the net. We were about to remove the last bat when we heard the trumpet of a wild elephant. We ignored the trumpeting and continued to remove the last bat.



Soon we heard another trumpet from a nearby bush. Now was the time to run for our lives! It was pretty difficult, as we had only a single torch working and it was freezingly cold. Instead of running through the jungle, we decided to run through the stream as elephants find it difficult to run over the rocks of the stream. Jumping from one rock to another and frequently falling into the stream we reached the road where our car was parked. Though it was very thrilling, we decided to not take any more risks in the late evening and to return back earlier.

The next day, 8th April, we went to other areas and collected *Myotis* bats from the water tunnels. In the afternoon we decided to work at a low altitude and climbed down about 760 m into the valley. The previous day's experience had forced us to take some local adivasis with us. We were also accompanied by the assistant manager of the tea estate Arjun Sanadi and his wife Sheela. Walking through the trees and bushes, we reached the place where there was a small natural cave. We checked the halls and crevices in the cave but could not locate any bat in it. Thinking some of the bats use such caves as resting places while foraging, we set a mist net across the mouth of the cave. We went a few metres further ahead and saw another very narrow and shallow cave. Again no signs

of bats inside. It was already 6.30 in the evening and our local guides advised us to return back due to the presence of the wild elephants and bears in that area. But there was no point in leaving as we had already set a net. We decided to stay back up to 8.30 p.m., by which time most of the species of bats would be out. We were hiding in that narrow cave and waiting. It was 8.15 p.m. and we saw many bats flying around some of which fell into the net. We rushed to the net and took out the animals. The size of the bats made us sure that they were fruit bats. We looked for the other characters... no tail... no white edge on the ears... and a pair of incisors in each jaw... it was *Latidens*! For the first time live specimens of *Latidens salimalii* had been caught. The excitement of rediscovering *Latidens salimalii* after a lapse of 45 years was so high that the fear of wild elephants and bears went a thousand miles away from us.

It was the unique 'batting' experience of our lives, and the time that we spent in the High Wavy mountains has become memorable for all of us. □

*Manoj Muni is the Scientist-in-charge of the Mammal Section of the Bombay Natural History Society.*



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# NATURE ALIVE



The garden lizard *Calotes versicolor*

**S**trong reproductive instincts brought this female Garden Lizard (*Calotes versicolor*) to laboriously dig a 5-inch hole with her tiny forelegs. Finally, when satisfied with the depth of the hole, she positioned herself and began laying small, ovoid, white, leathery eggs one after another after every minute or two. That day she laid 23 eggs and then began to pull back the excavated soil into the hole. Later, she tamped the uneven soil with her snout to make it indistinguishable from the surroundings and walked

away as if nothing had happened.

The incubation period of *Calotes* eggs varies between 37 to 47 days. The young, on hatching, dig their way up. By the next year they are mature enough to breed. During the breeding season, males display territorial behaviour that often results in wrestling matches, but there are no death duels. The dark crimson colours which the males acquire in the breeding season gives them the misnomer of *Bloodsucker*.

## ACKNOWLEDGEMENTS

*We are grateful to*

**THE MEHTA SCIENTIFIC EDUCATION & RESEARCH TRUST**

*for financial support for the publication of Hornbill.*



Support conservation

## JOIN THE BNHS

The Bombay Natural History Society was formed 109 years ago, as a forum for exchanging information on natural history. Over the years, it has helped to shape the course of wildlife conservation in India. Its members and scientists have helped document India's diversity of wildlife; BNHS studies on little-known and highly endangered species have provided the basis for many conservation projects, and indeed for the establishment of some of India's best known sanctuaries and national parks.



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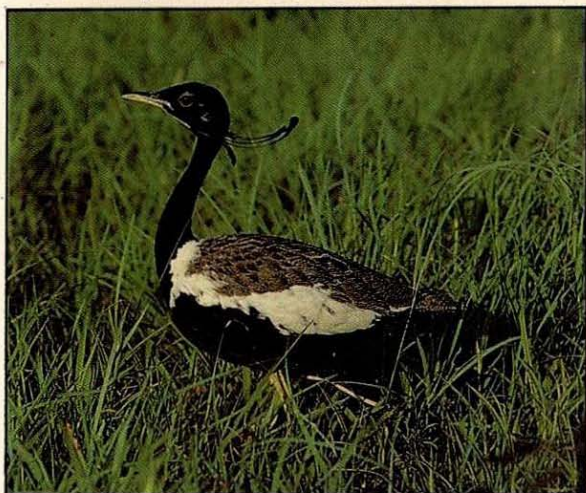
Access to India's finest library of wildlife and shikar books, including priceless volumes over a hundred years old, and available nowhere else. Outstation members too can borrow books.

The use of a reference collection — recognised by the government of India as a National Heritage Collection — of specimens of birds, mammals, butterflies and reptiles, built up over more than a century.

Today, the BNHS is Asia's premier conservation organisation, with members in over thirty countries and an international reputation as an authority on Indian wildlife.

The Society's work is not restricted to wildlife research. Its publications wing has produced a series of books on natural history, many of which are standard works of reference. It runs a nature education programme of over fifty years' standing, propagating conservation through film shows, lectures and nature camps for students, biology teachers and the Society's members.

BNHS members enjoy a range of activities — film shows and lectures on natural history, regular weekend bird-watching trips, and the opportunity to participate in environmental conservation campaigns, and even field studies in wildlife sanctuaries and national parks.



*The lesser florican is one of the world's most endangered birds. BNHS studies have focused on the critical factors involved in the conservation of such species.*

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