

# Hornbill



1999 (1) Jan - Mar

*about nature and us*

## Canids — Can we save them?



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*A.J.T. Johnsingh*

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# The Last Lap to Extinction

The Indian Wildlife (Protection) Act, promulgated in 1972, listed 41 mammals on its Schedule I of completely protected species. Twenty-seven years later, the Schedule covers 66 species of mammals. Other groups such as birds, reptiles, amphibians, fishes and insects (butterflies) are in an equally precarious situation. Whether there will be any species which is not on the endangered list or extinct in the first few years of the next millennium is a cause for serious concern.

Among endangered species, those with only a single existing population, namely the Kashmir Stag *Cervus elaphus hanglu*, the Thamin or Brow-antlered Deer *Cervus eldi eldi*, the peninsular race of the Swamp Deer *Cervus duvauceli branderi* and the Asiatic Lion *Panthera leo persica* are possible candidates for early extinction. The protected areas are the key to their survival. Unfortunately, though numerous, they are small in size and under considerable pressure from ever increasing human needs. The riverain forests and grasslands are an illustrative example. This habitat, which extended along the foot of the Himalayas and along the course of the rivers that emerge from them, is the most suitable for conversion into wetlands for the cultivation of crops. The loss of this habitat to human needs can be judged from a comparison of the past and present distribution of the Indian Rhinoceros *Rhinoceros unicornis*. It once inhabited the Indogangetic Plain as far west as Peshawar in what is now Pakistan, where the Moghul Emperor Babur hunted it 400 years ago. Besides the rhinoceros, four other endangered species are typical of this habitat, namely the Swamp Deer, Wild Water Buffalo, Pigmy Hog and Hispid Hare. One bird species, the Pink-headed Duck *Rhodonessa caryophyllacea*, which favoured this habitat is now extinct. Long term studies on the ecology of such endangered habitats, require urgent consideration. Unless these areas are sustained, and rehabilitated where degradation has set in, wildlife conservation in India is a lost cause.

Populations of endangered species occupying a specialized habitat, particularly where there is no possibility of increasing the area of such habitats, require urgent attention. Capture and translocation are the methods of choice if a similar habitat is available elsewhere within the country or in other nearby countries with similar climatic regimes. Species such as the Blackbuck have reached this point.

An area of serious concern is the fragmentation of habitats. Populations of animals such as the Wild Water Buffalo *Bubalus bubalis*, Gaur *Bos gaurus*, Elephant *Elephas maximus* and Tiger *Panthera tigris* have become isolated from one another. More species will develop isolated populations as corridors of contact are lost. Such genetic isolation needs careful evaluation.

The increasing human population has resulted in an increasing human presence in Indian Wildlife habitats, to the extent that there is hardly any forest area in India which is truly free of human intrusion. Those species which show a low tolerance for such intrusion have the least chance for survival.



J.C. DANIEL



E.P. GEE

# Among the Canids

.....  
A.J.T. Johnsingh  
.....

*The hills had resonated with the calls of the canids and hyaena for a very long time. Today, however, the hunters are the hunted. Immediate conservation measures are required to ensure their survival.*

IT WAS a late evening in April 1976. The sun, like a huge orange ball, was sliding behind the Western Ghats and visibility was gradually declining. I was sitting crouched behind a *Calotropis procera* bush in an open area, watching the earthen den of an Indian fox (*Vulpes bengalensis*) 12-15 m in front of me. A play area about 1.5 m near the den, made bare by constant use, and fresh droppings close to the den indicated that the den was in use. The wind was blowing in my direction and I was confident that the foxes would not be able to detect me if I remained behind the bush without any movement. I had taken my position around 4 pm; the sun was still hot then. After two hours, when I was about to call it a day, I saw four pups coming out of the den and playing. In about ten minutes, a vixen followed them. All the pups ran to her and suckled for half a minute when another vixen came out. The pups ran to her, and suckled for another two

minutes. Soon an adult male joined his family. It was difficult to explain this behaviour, as foxes are known to be monogamous, where a male and female stay together and raise their young.

In the same summer, on a dry hilly tract, about three kilometres to the west of the same land, hidden among rocks, in the bright light of a just risen full moon, I was watching a full-grown fox sitting and grooming itself, when a half-grown common Indian mongoose (*Herpestes edwardsii*) feeding nearby suddenly rushed at the



*Canis aureus* — the hunters have become the hunted today

KRUPAKAR-SENANI

fox and forced it to move away. Later, the fox followed the mongoose and charged at it twice. The mongoose ran off screeching the first time, but the second time it crouched defensively, and bristling its tail hairs fended off the attack. Interestingly, both had been observed for well over a month, living in the cave of a rock, with their den entrances hardly eight metres apart. Both the mongoose and the fox had a significant overlap in terms of habitat and food. Yet they existed in the same area in armed neutrality. These two incidents rush to my mind as if they had happened only recently, when I think about my early days in canid research.

### **Dhole, the wild dog of the Indian Jungle**

During my high school and college days one of the events my brothers, my friends and I eagerly looked forward to was our annual summer camp with my father in the Kalakadu hills. These hills are about 20 km from Nanguneri, a small town in Tamil Nadu, where I grew up, and later observed the Indian fox in the surrounding plains and in the adjacent desolate hills. We camped in one of the numerous caves in the hills, or in one of the plantations. Many of the coffee, cardamom and tea plantations, and other mountain crops eventually ceased to exist, as the Tamil Nadu Forest Department either bought them or stopped renewing their permits when the Kalakadu hills were first declared a Wildlife Sanctuary for the endangered lion-tailed macaque (*Macaca silenus*). Later a Tiger Reserve was declared, along with the adjacent Mundanthurai Wildlife Sanctuary. Our major activities

during the three to five day camp included climbing the adjacent mountain peaks, exploring the forests for wildlife, and swimming and fishing in the numerous cool and crystal-clear pools.

In May 1971, one morning, while camping in the Manjolai cardamom plantation at an altitude of 1000 m, I happened to meet Mr. J.C. Daniel from the Bombay Natural History Society and Mr. Romulus Whitaker from the Madras Snake Park. They were returning after spending a night in Neteri Forest Bungalow, at an altitude of 1500 m, which unfortunately is in ruins now. Mr. Daniel had come in search of the lion-tailed macaque and Mr. Whitaker to study the king cobra (*Ophiophagus hannah*). This meeting resulted in my going on a three month study on dholes, with Dr. Michael Fox, an eminent American canid behaviorist. Our study area was the forest around Cheetal Walk, the week-end home of Mr. E.R.C. Davidar, in the Sigur Reserve Forest, close to Mudumalai Wildlife Sanctuary. Mr. Davidar is a renowned naturalist of south India, well known for his surveys on the Nilgiri tahr and observations on



The Indian wild dog always hunts its prey in a pack.

DIVYABHANUSIN

dholes in the Sigur Reserve Forest. Dr. Fox wrote to me from St. Louis University, Missouri, that I could initiate the work in January under the guidance of Mr. Davidar and that he would join me in the beginning of February.

I will always vividly remember my first month in the forests around Cheetal Walk looking for dholes. Cheetal Walk is on the west bank of River Sigur, 6 km from Masinagudi on the way to Ooty by the old Ghat road. During the early 1970s there were vast, dense patches of full-grown bamboos (*Bambusa arundinacea*)



A.J.T. JOHNSINGH

The hyaena feeds on prey killed by others.

on both banks of the river which were perpetually used by many bull elephants (*Elephas maximus*). Some of them were declared rogues, notorious for chasing people at the slightest pretext. Incidents of man killing were also reported. Mr. Davidar arranged for Poosari Bunda, a tribal tracker about 60 years old, to take me around to see the dholes. Bunda, like all other tribals of the area, feared the elephants. His house was in Vazhai Thottam (banana garden), about 2 km from Cheetal Walk along the Sigur river.

Bunda avoided the elephants by waiting till the sun was up in the sky. Later I realized that early mornings are the best hours to look for dholes and encounter elephants. He would take

a round about but much safer route along the road and reach Cheetal Walk around 8 am. By this time I used to be ready with some light lunch and water and we would set out looking for dholes — Bunda, being armed with only a knife, wisely avoided all the valleys where large mammals, including the elephant and dhole, retreat when the day becomes warmer. He took me along the ridge tops where visibility was greater and, therefore, the chances of avoiding elephants better. This was the period when I had my first introduction to the elephant jungle and began to learn to walk there with fear and respect for the giant of the forest which runs faster than man and can fell a fleeing man by just trumpeting loudly.

It was on the fourth day, around 10 am, when we heard the repeated alarm calls of a sambar (*Cervus unicolor*) in the adjacent valley about 3 km from Cheetal Walk. Bunda said that it could be the dholes. I was desperate to see them and goaded Bunda to escort me into the valley. We debated for some time, discussed what we should do if we encountered an elephant, and finally descended into the valley. We walked in the direction of the alarm calls with Bunda leading, looking around very carefully with great fear in his eyes. Once in the dense cover we flushed a covey of grey partridge (*Francolinus pondicerianus*) which screeched and fluttered out of the shelter, causing Bunda to jump back suddenly and me missing a heart beat. We advanced silently for a distance of 300 m in the direction of the sound. Soon we came to an opening about 60 m wide with many large rock outcrops and there on one of the rocks, at a distance of 50 m, saw three dholes. Two were lying on their sides sleeping, and one raising its left hind leg was licking its belly. We watched them for 15 minutes, after which the dholes got up and



disappeared into the jungle. I did not realize then that two years later I would be studying dholes for my Ph.D. in Bandipur Tiger Reserve, Karnataka.

Dholes have been said to kill tigers, leopards and bears (presumably sloth bear *Melursus ursinus*) on occasion. The majority of these reports, however, are based upon circumstantial evidence and are merely sensational. There are several reports in hunting stories, relating instances of altercations between packs of dhole and tigers or leopards. In Bandipur, there was no evidence of either tiger or leopard competing with dholes over kills. Dholes, however, scavenged on leopard kills seven times and once on a tiger kill. Tolerance for domestic dogs varies from place to place. In Bandipur, domestic dogs were observed getting chased from the kills, while in Sigur, where domestic dogs formed their own packs to hunt, there were instances when both hunted together. Hyenas may be ignored by the dholes.

The malice and persecution directed at the dhole appears to be largely because it competes with sportsmen for wild game and kills. It has been repeatedly but wrongly asserted by several hunters in the past that the presence of dholes in an area will clear the jungle of all wild game in a short time and that they must be shot at sight. M. Krishnan was the first person to speak in favour of the dholes. He said that dholes and their prey are commonly found in the same area, and have co-existed for thousands of years without the extinction of prey species.

### What we can do to save them

The foremost fact that emerges from a critical study of the past and present ranges, and abundance of canids and the hyaena is that

both the range and the population of these carnivores have declined. A major reason for this could be that more wild-land is being brought under human influence, agriculture and urbanization, which is depleting the prey either by direct killing or by habitat alteration.

The persecution directed by man at these carnivores varies. The smaller canids like the fox and jackal, outside the protection of the Forest department, are hunted for their pelt and sometimes for the alleged medicinal properties of their flesh. As the present range of dholes is largely confined to the protected areas, they are



The most endangered canid — the wolf.

fairly immune from direct killing by humans. However, their kills are still stolen and their densities are often disturbed even in the best managed protected areas in the country. Hyenas, because of their nocturnal habits and scavenging mode of feeding, avoid conflict with man. But their alleged attacks on children in some localities of the country provoke the villagers to locate their dens and kill the young. Sporadic poisoning of tiger and leopard kills, on which hyenas subsist, also suppress their population.

The worst affected carnivore of this category is the wolf as it is, in most parts of its range, in a state of conflict with humans because of its predation on sheep and goats, and its tendency



A.J.T. JOHNSINGH

Quenching their thirst at a waterhole is a pack of dholes.

to attack children in some localities. As a result, adult wolves are trapped and killed, dens located and pups killed, in the trans-Himalaya and in peninsular India.

A combination of several conservation measures is necessary to ensure the survival of these carnivores. Since habitat requirements of each species vary, conservation measures should also be distinct for each species. The Indian fox, both the subspecies of the desert fox, jackal and the wolf range extensively outside protected areas. Unless there is public support these species will slowly pass into oblivion. Earning public support for the wolf habitat is going to be extremely difficult. Considering the remoteness of the wolf habitat, it is equally difficult to compensate all the livestock kills to prevent people from retaliation. Compensation involves several stages of official procedure, and villagers do not have the time and patience to wait for restitution. Their immediate reaction will therefore be to seek out pups, and if possible adults, and kill them. This does not mean that the scheme for compensation should be dispensed with. It should be expeditiously implemented wherever feasible, so that

people are not totally against wolf conservation.

An age old problem faced by dholes is the stealing of their kills by the local people. When I began my study on dholes in Bandipur in August 1976, stealing kills was rampant. This I could eventually stop with support from the Forest Department and co-operation of the tribals. Stealing kills forces the dhole to kill more, affecting

the prey-predator balance. If the kills are stolen during the breeding season, pup survival is affected. Special efforts should be made by the Protected Area managers to find out whether this nefarious activity exists. A concerted effort should then be made to stop the theft of kills as far as possible. Punishment should be severe for those found poisoning kills, as the poison not only kills the intended marauder, but also numerous other species which feed on these kills.

Whether it is the Indian fox trotting through the short grass in the dry plains of Tamil Nadu, a pack of dholes pursuing a fleeing chital in Bandipur, or a hyaena standing on the road blinking in the beam of a car's headlights before vanishing into the dense forests of the Gir — carnivores are elegant creatures and the end product of millions of years of evolution. We human beings are endowed with the power to destroy or to protect all forms of life, including ourselves, and should have the vision and will to ensure the future of our fellow creatures. ❀

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Dr. A.J.T. Johnsingh is the deputy director of Wildlife Institute of India. He is a well known wildlifer and has been associated with BNHS for a very long time.

## Conflict of Interest

At last we are hearing the right sounds from the Bombay Natural History Society, *Hornbill* 1998 (2)! Apart from forest dwelling humans being given benefits, or land being made available to their village and city counterparts, let us not forget that increase in population will destroy the forests as surely as they have everywhere else even if forest people lived at the gatherer or hunter levels. It is just a matter of simple mathematics and biology. One can ask a simple question, why should traditional Indian nomads be allowed to settle in the wilderness area? That apart, do we at the Society have a clear idea of what is to be done? It is wrong to say that animals have no vote. We, the members of the Society are voting for them. The tragedy is that we are not organised enough and over the years have allowed our concerns to be hijacked by conservationists and human interest groups. We tended to be too apologetic and we certainly are too casual, perhaps we have attempted to be elitists.

How many Indians have heard the Shamas singing at Matheran or watched the monsoon clouds build up against the Western Ghats? Little Hingolghadh and the coral reefs of the Gulf of Kutch became known because they were

systematically introduced to thousands of people. Declaring a place a Sanctuary or a National Park immediately keeps out those who would vote for the areas. The time has come when we at the Society should carefully reassess the laws which our members earlier in the century got enacted.

*Lawkumar Khacher,  
Gandhinagar.*

\*\*\*

## Variety is the Spice of Life

I would like to bring to your notice the cover picture of *Hornbill* 1998 (2). The colour of *Lagerstroemia* of this variety is mauve and not magenta as seen in the picture.

*Promila Chaturvedi,  
New Delhi.*

**Eds:** The colour of *Lagerstroemia* flowers varies from tree to tree.

\*\*\*

## Are coral reefs doomed?

In 1987, on a clear sunny day, all of a sudden there was a wall of water which flooded one-third of the Maldive Archipelago, causing tremendous damage to seafront property.

Are coral reefs around the world doomed to sink below the sea due to global warming and the melting of the Antarctic ice, raising the sea level? I refer to "Corals of Mumbai" *Hornbill* 1998 (3).

*Alpana A. Kothare,  
Mumbai.*

**Authors' reply:** Healthy corals grow upward as well as sideways. If their upward growth can keep up with the rise in sea level (which will be a gradual rise of 90 cm in a century), the corals reefs will manage to be just above the sea. If, however, the sea water also turns warmer, the corals will bleach and may even die.

The wall of water which all of a sudden flooded Male was not due to global warming but the after effect of a tsunami (popularly but wrongly called a tidal wave)—the result of an undersea earthquake somewhere along the *ring of fire* that encircles the Pacific Ocean.

\*\*\*

## Pollution? No Problem!

The BNHS's popular science magazine *Hornbill* is kept in my office rest room. It is read by all, helping in creating an awareness for nature among its readers.

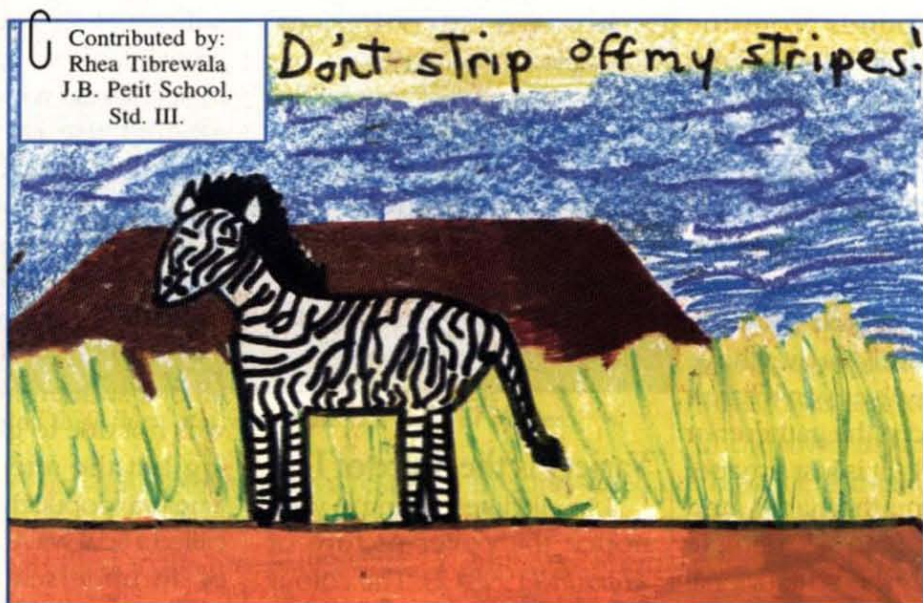
I work in Tiruppur which is the most polluted town in Coimbatore district. Even so, two pairs of night herons and four pairs of pond herons have built a nest on a neem tree in my office compound and are successfully rearing their chicks as I write this letter.

*K. Ramachandra Kumar,  
Tiruppur.*

\*\*\*

# The Young Naturalist

Compiled by V. Shubhalaxmi and Vibhuti Dedhia



**INDIA**  
is the only  
country where  
both, the lion  
and the tiger are  
found in the  
wild.

## Did You Know

**CHAUSINGHA**  
or the  
four-horned  
antelope is the  
only animal  
with four  
horns.

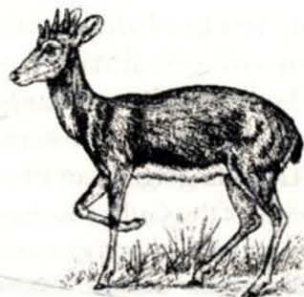
**PORCUPINES**  
have about  
30,000 quills  
on their  
body.

**THERE**  
are about 20,000  
species of  
butterflies all  
over the world,  
of which over  
1500 are found  
in India and  
150 in  
Mumbai.

**MUDSKIPPER**  
is an odd fish  
which can  
walk on  
land.



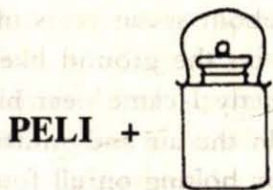
**POLAR BEAR**  
is the largest  
predator on  
land.



# name the bird

This picture puzzle reveals the names of some Indian Birds. The encircled characters belong to the name of a well known bird.

Can you identify it?



□ □ ○ □ □ □ □ □



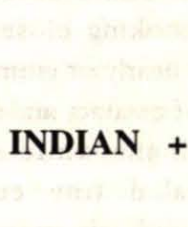
+



□ □ □ □ □ □ □ □ ○



□ □ □ □ □ □ ○ □ □ □



□ □ □ □ □ □ □ □ ○ □ □ □ □ □



+



○ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □



+ BIRD

□ □ □ □ □ □ □ □ ○ □ □ □ □ □

Answer: ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

*You are Right if you Think the ...?*

1. Cuttle fish is a

a. mollusc, b. fish

2. Plain Tiger is a

a. tiger with no stripes,

b. butterfly

3. Red Panda is a

a. cat-bear, b. true bear

4. Bat is a

a. bird, b. mammal

5. Lady bird is a

a. beetle, b. female bird

6. Fig is a

a. fleshy part of the flower,

b. fruit

7. Bombay duck is a

a. duck, b. fish

8. Flying fox is a

a. fox that flies, b. bat



Answers on Page 22

## *The leopard child*



was a small boy about seven years old, or less, squatted on the ground like a small animal; directly I came near him he put his head in the air and snuffed about, finishing by bolting on all fours to his father between whose legs he backed like a small wild beast retreating into a burrow. Looking closer at the child I saw he was nearly or entirely blind from some form of cataract and his body was covered with the white scars of innumerable healed tiny cuts and scratches. Struck with his appearance I asked the father to tell me all about the boy and he then narrated the following wonderful story which I fully believe to be true, but which my readers must accept or not as they think fit.

**B**efore discussing the subject of feline senses it may be of interest to relate a story of a leopard child which has not yet ever been published though it was pretty well known at the time.

In the North Cachar Hills, where the boy was found, Government taxation used to consist in part of labour, so much being supplied by every village for the upkeep of roads, rest-houses, etc. Sometimes men would petition for exemption from this labour on various grounds, and one day when questioning a man as to why he wanted exemption from such labour he told me that he had a little wild son to look after and as his wife had recently died he could not leave the village to work or the boy would run back to the jungle.

I accordingly went outside the court to see the wild child and satisfy myself as to the truth of the story. There sure enough outside

It appears that about five years before I saw father and son, the Cachari villagers of a village called Dihungi, had found two leopard cubs close to their village which they killed. The mother leopard had tracked the murderers of her children back to the village and had haunted the outskirts for two days. The third day, a woman cutting rice in some cultivation close to the village, laid her baby boy down on a cloth whilst she went on with her work. Presently, hearing a cry, she turned round and saw a leopard bounding away and carrying the child with it. The whole village at once turned out and hunted for the leopard and baby but without success, and finally they were forced by darkness to leave the boy, as they supposed, to be eaten by the leopard.

Some three years after this event a leopardess was killed close to the village by a sportsman who brought in the news of his success together with the information that the

leopard had cubs which he had failed to secure. On hearing this, the whole village turned out and eventually captured two cubs and one child, the boy of this story. He was at once identified by his parents, claimed by them, and their claim admitted by the whole village.

Subsequently, when visiting Dihungi I interviewed the head man and also the man who actually caught the child, and they both corroborated the father's tale in every detail. It appeared that at the time he was caught the child ran on all fours, almost as fast as an adult man could run, whilst in dodging in and out of bushes and the other obstacles, he was much cleverer and quicker. At that time he was only suffering from cataract to a slight extent and could see fairly well, but after he was caught his eyes rapidly became worse. His knees, even when I saw him and when he had learnt to move about upright to a great extent had hard callosities on them and his toes were retained upright almost at right angles to his instep. The palms of his hands and pads of toes and thumbs were also covered with very tough horny skin. When first caught he bit and fought with everyone who came within reach of him and, although even then affected in his eyes, any wretched village fowl which came within his reach was seized, torn to pieces and eaten with extraordinary rapidity.

When brought before me he had been more or less tamed, walked upright except when startled into extra rapid motion, was friendly with his own villagers, whom he seemed to know by scent, would eat rice, vegetables, etc., and consented to sleep in his father's hut at night. Clothes, being a Cachari child of tender years, he had not been introduced to.

His blindness was not in any way due to his treatment by the leopard — if the story is

true — as I found that another child, a couple of years older, and the mother also had the same cataract. At the same time, the defective sense of sight may well have intensified his sense of smell, as the loss of the one must have caused him to rely more on the other. When caught the child was in perfect condition, thin but well covered, and with a quite exceptional development of muscle. ❀

*E.C. Stuart Baker*

*July 1920*

### *Sword fish striking a ship*

**I** am sending you the sword of some sea monster which I am unable to identify, its history may prove interesting enough to find it a place in your museum, and it is as follows.

Last February, an Arab buggalow belonging to Muscat was on its way there from Cutch. A few days out it struck something on the port bow which the Nakodar thought was a rock. The craft was shaken up from stem to stern and after a few seconds those on board heard a loud report and she was free again.

She was making some water in the bows and the cargo lying there was shifted when this object was found sticking through the planks and firmly fixed. The leak was closed up and the buggalow reached Muscat safely. There I examined her, and the owner presented me with the sword. It evidently belongs to some huge fish which, after striking the buggalow and piercing a teak plank some five inches thick, managed to free itself at the expense of its weapon.

Its structure seems to be of bone and it is covered with minute denticles, many of which have been scraped off. ❀

*F.A. Smith, Capt., M.D., I.M.S.*

*June, 1902.*

# Indian Wild Flowers

Text and Photographs: Isaac Kehimkar

*A great many plants have been introduced into India from distant lands. Some have come as stowaways in cargo, or innocently as garden plants which eventually escaped.*

*While some of these aliens perished, others flourished to an extent that these invaders elbowed out the native plants, upsetting the ecology.*

## 47. BRAZIL JUTE

*Malachra capitata*

Hindi name: *Vilayati bhindi*

Though never utilized much, this coarse hairy annual was introduced from Brazil as a fibre-plant. Very common near marshy low-lying lands. Flowers seen from September to December are favourite with nectar seeking insects. Fibre resembles jute and is used in the making of gunny bags and coarse cloth. Leaves have anthelmintic properties.

## 48. COMMON FLOSS FLOWER

*Chromolaena odorata*

Hindi name: *Tivarh gandha*

Another invader from tropical South America, which was first brought to Sri Lanka a century ago as an ornamental plant. Later it was seen on the periphery of the Indian forests. This plant spread rapidly wherever forests were cleared. Large flowering clumps are conspicuous along the road from January to June.

## 49. CONGRESS GRASS

*Parthenium hysterophorus*

Hindi name: *Gajar ghas*

A native of West Indies, Central and North America, naturalised in India since the last four decades. The plant grows prolifically and flowers throughout the year and is highly adaptable. It can flourish and colonize areas where practically nothing else will grow. A known allergen of humans (and cattle), causes asthma, eczema and contact dermatitis.

## 50. HEDGE GLORY

*Ipomoea carnea*

Hindi name: *Besharam*

A 150-180 cm tall native of S. America, is often planted as a hedge around houses and farms. This stout straggly shrub with milky juice overruns the banks of lakes and ponds while choking the native plants. Caterpillars of the Death's head hawkmoth and tortoise-shell beetle larvae eat its leaves which are toxic to livestock.

## 51. COMMON LANTANA

*Lantana camara*

Hindi name: *Raimuniya*

This large, scrambling, evergreen, strong smelling shrub with stout recurved prickles is a native of tropical America. Probably the most widespread invader and has taken over large tracts of land. Its fleshy berries are edible and birds disperse the seeds. Flowers are a good source of nectar for butterflies and moths.

## 52. WATER HYACINTH

*Eichornia crassipes*

Hindi name: *Jal kummi / Pishach kumbhi*

Brought into Asia from tropical South America for its beautiful flowers. This innocent looking spongy, floating plant is now a major menace clogging canals and choking larger wetlands. Naturalised in India and in most warm tropical countries. An aggressive coloniser, that multiplies prolifically. All attempts to eradicate this invader have failed.



# *Alien Invaders*



**BRAZIL JUTE**



**HEDGE GLORY**



**COMMON FLOSS FLOWER**



**COMMON LANTANA**



**CONGRESS GRASS**



**WATER HYACINTH**



The Hangul Deer *Cervus elaphus hanglu*

LT. GEN. R.K. GAUR



R.D. PADIE

Some of these molluscs, when alive, yield Tyrian purple dye.



Phoenicians of Tyre boil Murex shells and dye cloth in it. (from the Bettman Archive)

## 32. Purple Pomp

Beefsea



# Seashore Lore

*Who has not heard how Tyrian shells  
Enclosed the blue, that dye of dyes,  
Whereof one drop worked miracles,  
And coloured like Astarte's eyes  
Raw Silk the merchant sells?*

**Elizabeth Browning**

As you walk along our shores, you may come across a prettily sculptured orange-brown shell. And if you had an entrepreneurial bent of mind and lived in 300 AD, you could have been a millionaire. For the shell is of the snail *Murex*—a member of a group which yields the famous Tyrian purple dye.

Next to gems and gold, Tyrian or royal purple was the most expensive commodity of the Phoenicians, who lived along the coast of the Mediterranean Sea. In 300 AD, a kilogram of silk dyed with Royal Purple cost over two lakh rupees. And no wonder, as 1,30,000 snails had to be used

to yield a kilogram of the dye. The name Tyrian purple comes from Tyre, a seaport west of Damascus, which was the principal city where the dye was processed. The dye was so vital to the economy of Tyre that the shell is depicted on many of their coins. It was obtained from the banded murex (*Murex trunculus*), the spiny murex (*Murex brandaris*) and the rock shell (*Thais haemastoma*). Before them, the people of Crete had discovered the dye as early as 1600 BC, and by 1000 BC. Tyre was well known for its dyed wool and silk.

The story goes that the dye was discovered accidentally by Melkart, the patron deity of

Tyre. He was strolling along the beach with a nymph named Tyrus when their dog bit a live Murex snail and got its mouth stained purple. Tyrus liked the colour so much that she told Melkart that she would not be his wife unless he gave her a robe of the same colour. Melkart managed to gather enough Murex snails to fulfill her desire, thus winning her love.

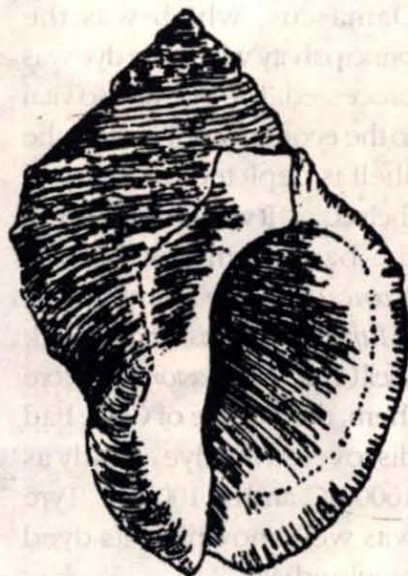
The snails were collected by using long ropes, with traps baited with mussels or frogs, at the end of the winter season. A gland, located at the tip of the shell yields just two drops of a yellowish-white creamy fluid. The glands of the murex were removed, while rock shells were

crushed, and 1 measure of salt added for 80 measures of the mixture. After allowing it to rot for 3-4 days in the sun, the pulp was kept in lead or tin (but not copper or brass) vessels to which a lot of water was added. Steam was passed through, allowing it to simmer gently for ten days, skimming off the impurities periodically. 80 parts of pulp would yield 5 parts of the dye. A sample of wool was dipped in it to test the colour, and the whole was heated until the dye attained the proper hue. As Murex produces a lustrous purple, while rock shells yield a drab but fast colour, 200 parts by weight of the former were mixed with 111 parts of the latter. To fix the colour of the cloth permanently, a mordant called archil was used. This was made by steeping lichens in stale urine, or an alkali obtained from a seaweed was used.

In the Roman Empire, royal purple was so much in demand that there was a dire shortage of murex snails. Thus only the rich could afford to wear clothes dyed with it. Later, only senators were allowed to wear it, and finally the cloth was restricted to the emperor. Roman ladies used the dye as lipstick and rouge. When Alexander the Great captured the city of Susa from the Persians, among the loot were more than 13,500 kg



*Murex palmarosae*



*Thais rudolphii*

of cloth dyed with royal purple. In 638 AD Phoenicia was conquered by the Saracens, but the dye making continued, and even in the reign of Charlemagne (768-814 AD) the merchants of Venice imported it into Lombardy. But thereafter the dye works of Phoenicia were abandoned. And the advent of synthetic aniline dyes in the late 19<sup>th</sup> century dealt a body blow to Tyrian purple. Yet it was used in the 1700s in Great Britain and western Europe for a much humbler purpose, to mark clothing at laundries. In Japan, dye was made from murex snails, but there too excessive collection must have led to scarcity, as in the tenth century restraints similar to those promulgated by the Roman emperors were observed.

In the Americas, shellfish dyes were used in Peru as early as 100 BC for cloth in which the dead were embalmed and wrapped. In Mexico, purple colouring matter was used to decorate pottery in pre-Columbian times. And in the 1500s, Spanish conquistadores found native Indians at Nicoya dyeing cloth with shellfish juice. The Mixtec Indians of Central America still use snails to get the dye, but they are more conservation minded; they milk the snails instead of killing them to obtain the dye.

The snail has better uses for the dye, which conchologists (people who study snails) call "punicin". It is creamy in colour, with the smell of garlic. It is probably used by murex snails to narcotise the limpets, clams and mussels on which the carnivorous murex feeds. It may also be repugnant to its enemies, as its eggs have a large amount of punicin to ward off potential predators. During the egg laying season, the amount of punicin in the snail's body is substantially reduced — a fact the Phoenicians knew, as they gathered the snails just before the egg laying season.

Apart from the use of its dye, the murex snail was also considered to be of medicinal value. In 18<sup>th</sup> century Europe, it was used for treating boils, ulcers, tumours and earache. An esoteric remedy was used to get rid of spots in front of the eyes! And women believed that if they placed the snail on their navel, they would have many children!

The dye finds its place even in the Bible. In the Book of Exodus, Moses is instructed how to furnish the Tabernacle: "These are the contributions you should accept from them; violet, purple and scarlet yarn, fine linen and goat hair." While the indigo plant gives a violet dye, and the madder root a red

dye, the "purple and scarlet" yarn was obviously dyed with Murex snails. At the naval battle of Actium, Anthony and Cleopatra sailed in a ship whose sails were dyed royal purple. The Roman writer Lucan tells of Cleopatra appearing at a banquet in a silk dress made in Tyre.

You too can try your hand at dyeing a handkerchief with the dye that was once the hallmark of royalty or aristocracy. Get hold of enough of the secretion from the mantle of our local *Murex* or *Thais* and dab it on a cloth. Do not be disappointed

if you see only a faint creamy-yellow stain on the cloth. Hold it in bright sunlight, and you will see a gamut of colours, changing from yellow to green, blue, red and deep purple. Wash the cloth in soap and water and you will obtain a bright crimson which, moreover, is colour fast. And do not be chary about displaying it; no one will hang or execute you, for once a commoner may have worn it on pain of death, but now there is no restriction on wearing a dye which was once a Roman emperor's prerogative! ❀

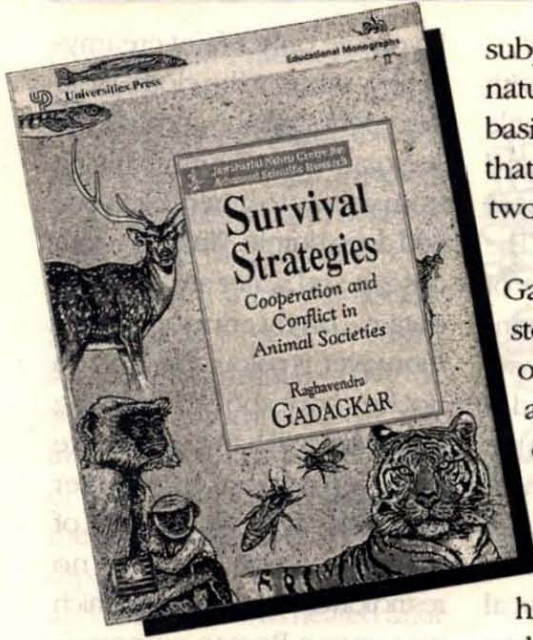
### WANT MORE INFORMATION?

Tyrian purple is obtained from many (not all) murices and purples of the family Muricidae. Murices are a heterogenous group, with vast differences in shell shape. Their shells are stout and heavy. The anterior canal is long and forms an almost closed tube. The largest Indian species is *Murex ramosus*. *Murex haustellum*, with its long beak resembles a woodcock's head, hence its popular name Woodcock shell. *Murex tribulus* — common off Mumbai — also has a long beak beset with many spines.

Among the purples (formerly family Thaididae, but now merged with Muricidae) are *Thais*, *Rapana* and *Drupa*. *Thais bufo* and *Thais rudolphii* are common at Mumbai, while *Thais carinifera* is collected here for food.

Both murices and purples are carnivorous and have gruesome feeding habits. They bore circular holes in the shells of non-burrowing bivalve molluscs and extract the flesh.

The photograph on page 18 shows (clockwise from upper left) the spiny *Murex tribulus*, *Murex adustus*, *Hemifuscus pugilinus* and *Thais carinifera*. *Hemifuscus* is not a muricid, but is included here as it resembles *Murex brandaris*, which lives in the Mediterranean Sea and from which the ancient Babylonians, Greeks and Romans obtained the Tyrian purple.



.....  
**SURVIVAL STRATEGIES**  
 — Cooperation and  
 Conflict in Animal  
 Societies

by Raghavendra Gadagkar.  
 Pp. i-xvi + 1-196, (21 x 15 cm),  
 Published by: Universities  
 Press (India) Ltd., 1997  
 Paperback price: Rs. 120/-

.....  
*Reviewed by:* Gayatri Ugra

In the words of E.O. Wilson, "SURVIVAL STRATEGIES is a highly readable update of the spectacular evolutionary productions of animal behaviour. The author, a leading contributor to the

subject, ranges smoothly from natural history to the genetic basis of the many phenomena that have surfaced in the past two decades."

Professor Raghavendra Gadagkar draws upon a vast storehouse of information on social behaviour in animals, particularly his own field of specialisation, i.e. insects, to write an eminently interesting book. He has illustrated

his ideas with well known and some lesser known examples, including cooperation in the social organisation of honey bees, evolution of melanistic forms in *Biston betularia* (Lepidoptera), bird migration and the conflicts between the queen and workers in social ants. The author has not only addressed many questions which would interest students of evolution, behaviour and genetics, but has also provided the interested, inquiring mind with a great deal of information free of jargon or pedantry. A gem from page 9: "When the food reserves of the (honeybee) colony fall to dangerously low levels, the

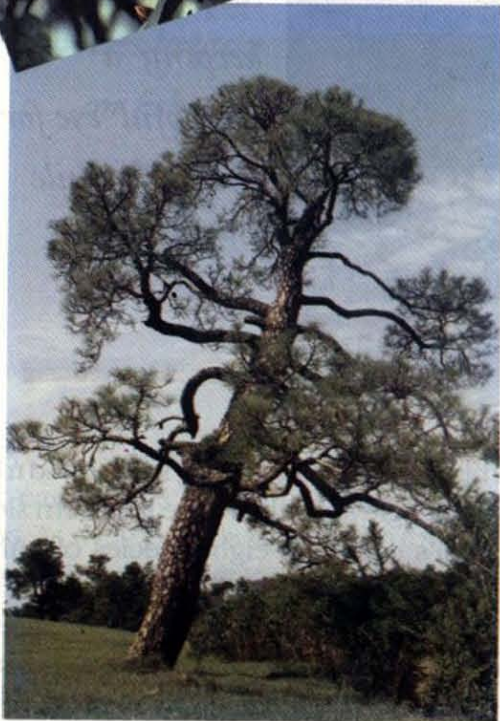
workers seize the drones by their legs and throw them out of the colony!"

The author has followed the maxim quoted at the beginning of the Preface "Nothing in biology makes sense except in the light of evolution." He says "Variety and diversity are the hallmarks of biological systems and ... there are many different ways that animals have developed for achieving a given objective." He concludes at the end of the book "Whatever the extent of variation, however, we can be certain that achieving a fine balance between cooperation and conflict is an invariant feature of the survival strategies of social animals."

Finally, a word about the production values. The Universities Press (India) Ltd. has brought out a series of Educational Monographs, of which this book is one. To this reviewer, accustomed to ploughing through page after page of indifferent prose, a skillfully written, competently edited and well printed book is a pleasure to read. ♡

<p><b>Answers for The Young Naturalist</b></p>	<p><b>You are right if you think the ...?</b></p> <p>1. a, 2. b, 3. a, 4. b, 5. a, 6. a, 7. b, 8. b</p>	<p><b>Name the bird</b></p> <p>Pelican, Spoonbill, Lapwing, Indian roller, Brahminy kite, Tailor bird, <b>Hornbill</b></p>
----------------------------------------------------	---------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------

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# In Corbett National Park

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Text and Photographs: **Rishad Naoroji**

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*The Crested  
Serpent Eagle  
keeping a  
watchful eye for  
the male while  
brooding its  
chicks.*

---

**F**rom June to September, with a base at Dhangarhi, I explored and surveyed areas for raptors outside the Park. There are some excellent habitats for wildlife (though not as diverse as within the Park) which provide a necessary and vital buffer to the Park against encroachment from the north, east and west. One of my favourite survey transects was the drive from Dhangarhi up to Bhounkhal at 1300 m, via Chimtakhal through excellent forest (which forms the northern buffer) on the southern slopes. I would recommend this route to any birder. From the topmost ridge to the north stretch the foothills upto the visible snow peaks 180 km away. Southwards, the forest slopes right down to the Park. To the east, the river Kosi and to the west the Ramganga, and the plains beyond — here can be seen diverse hills and forest birds. Among the raptors in winter

the black eagle, besra, shikra, kestrel, and rufous-bellied eagle soar above the southern slopes. Bonelli's eagle, all eight species of vultures (including the spectacular bearded vulture), lesser fish-eagle, Pallas's fish-eagle, serpent eagle, hen harrier, mountain hawk-eagle, kites, buzzards, and the Shaheen falcon can be seen. Another good bird-watching location, especially for forest raptors, is Kumeria at the base of the eastern forested slopes below Bhounkhal, on the Mohan-Ranikhet road. By mid September, early arrivals among the Pallas's fish-eagle, osprey, aquila and altitudinal migrants from the higher foothills begin to be sighted. Collared falconets appear, often in pairs (I would like to know from where?) and are frequently sighted till February. On 21st September, 1990 I saw my first brown dipper along the Kosi. It was fascinating watching its unusual method of foraging, walking submerged

along the riverbed, occasionally flicking over small stones for invertebrate prey such as the larvae of different fly species and other insects.

In early October, we undertook a memorable trek from Dhangarhi to the Sultan watch tower and back; a total of 24 km. At the outset we were

uninterrupted sighting. Circling above was a Shaheen falcon, repeatedly stooping at the pair. One of the eagles performed a tremendous stoop into the valley below through the forest canopy, perhaps after prey, or was it displaying? I could not tell. The Shaheen exhibited its mastery of

*Pallas's  
fish-eagle  
lives largely  
on fish and  
water birds  
and clepto-  
parasitism.*



regaled with a close-up view of two mountain hawk-eagles which are among my favourite raptors. As we approached the watch tower (the highest point in the Park) an osprey glided past. The canopy of some of the upper ridges is a mixture of *sal* and some *chir* pine. The view is spectacular, perhaps even better than the breathtaking one from Kanda. I noticed then how perspectives change from a height, and distances are compressed. To the north the view extended up to the Manila ridge, and in the foreground, the Kartikinow and Bhounkhal massif dominated just a few kilometres away. Mohan was almost at our feet, with the Kosi flowing immediately to the east. The high summit ridge above Bhalon village was clearly visible immediately beyond the Kosi. To the south behind us Ramnagar, and further south the plains. Suddenly a pair of rufous-bellied eagles hove into view, according us a close and

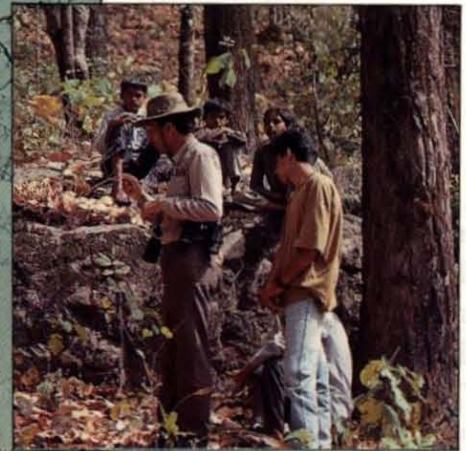
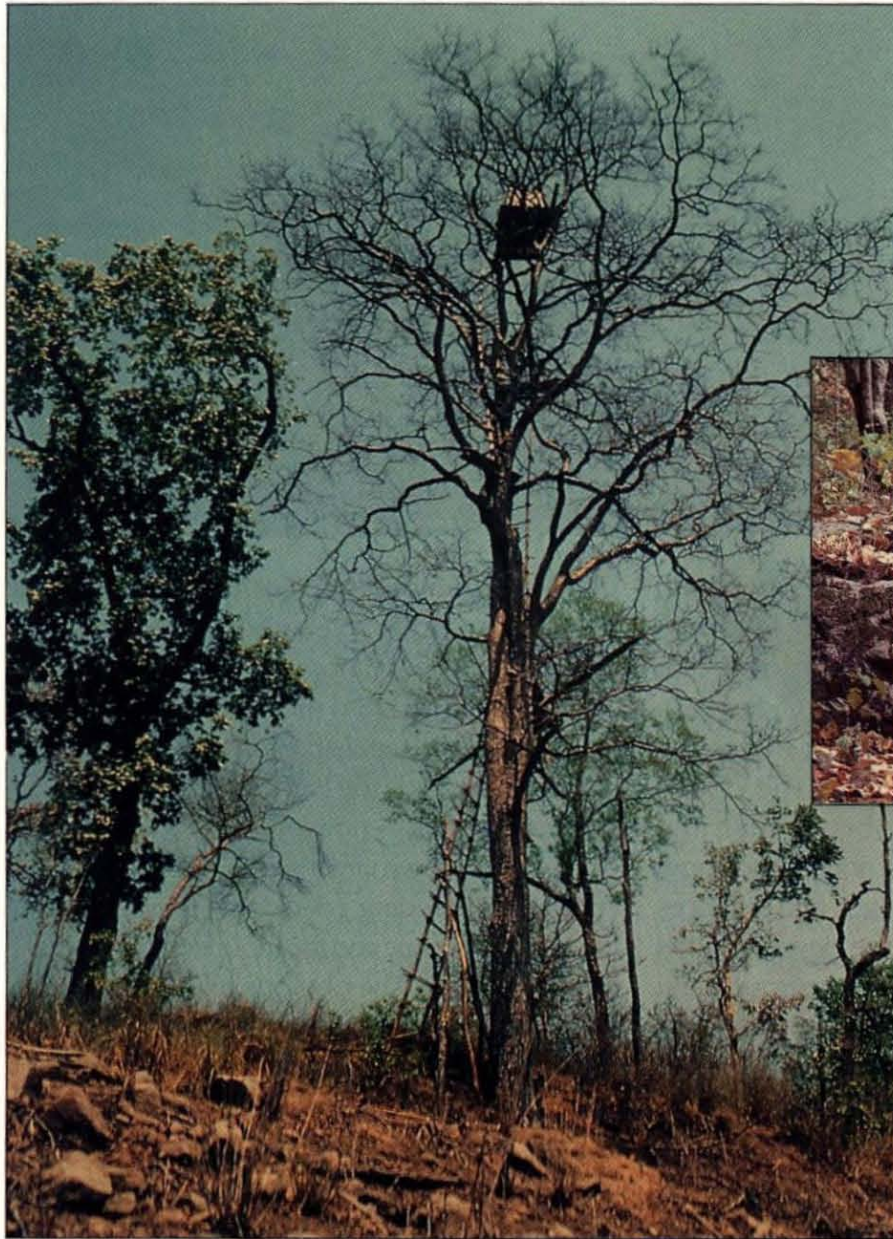
flight as only a peregrine can. We witnessed a swift, masterfully executed controlled dive through the upper canopy barely 10 m below us.

By February, I had moved permanently to Dhikala and had familiarised myself with the area within and outside the Park. The main task — an exciting prospect — now lay ahead: to locate nests of the lesser known target species that would soon commence breeding. I decided to concentrate on the lesser fish-eagle and the mountain hawk-eagle the first season. The obvious place to start was Gethia Rao, where two pairs were usually seen. Till end March, I had the pairs under constant surveillance, and new information on behaviour, such as hunting techniques (the species feeds solely on fish), unique courtship displays, the unusual vocalisation, copulation, interaction with different pairs and other species, territorial requirements and so on, was gradually recorded.

During this period, a pair of serpent eagles which eventually bred near Gethia Rao regaled me with behaviour never recorded before — even common species can give you a surprise. Many uncommon migrants were observed during this period such as the cinereous vulture, white-tailed eagle, and peregrine falcon. Also during winter

large numbers of Himalayan griffon were seen in the park. Came end February, and I located a Bonelli's nest where the pair were incubating. Occupied thus with observations and dawn to dusk nest-watches, the little spare time available was utilized atop the Dhikala watch tower, with a magnificent bird's-eye view of the Ramganga

and bordering *chaur*. It is ideal for watching birds, with a fair chance of observing the resident tiger of the area coming down to the river to cool off during the hot hours. I have observed some unusual interaction among raptors,



A.S. Negi, ex Field Director (right) helped construct the machan built to observe the breeding habits of eagles.

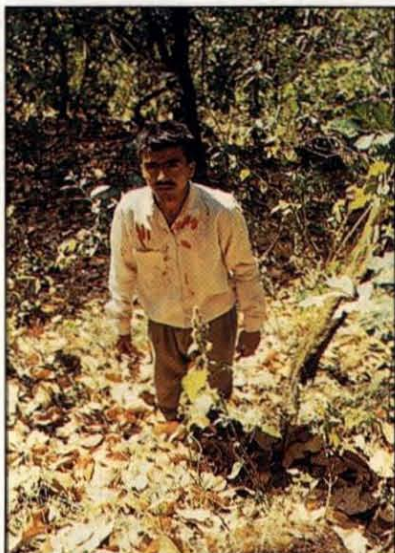
and obtained candid views of tiger with a telescope which are not likely to be seen from elephant back.

On 3rd March, 1991, I located the first of many nests of the lesser fish-eagle on Sambar road. The pair were incubating, the female for longer periods than the

male. Subsequently, another nest was found on Sambar road and one at High Bank.

As the studies on the lesser fish-eagle continued, the raptor checklist was steadily increasing to an impressive variety of species. By mid-March, a nest of the mountain hawk-eagle was located on a lopped tree. A fearless and pugnacious species, it unhesitatingly attacks intruders near the nest, even humans. My assistant once suffered a gashed scalp, and it didn't take much persuasion for him to wear a protective helmet and jacket on future nest-inspection climbs and on the machan some 20 m from the nest, which A.S. Negi, former Field Director, helped us to construct.

Due to degradation outside the Park, mountain hawk-eagles feed mainly on forest passerines eg. myna, tree pie, and parakeet, while those in the Park supplement passerine species with a fair amount of larger prey such as the kaleej, and red jungle-fowl. Two unusual interactions stand out vividly. We were approaching a nest (containing a downy chick) when a yellow-throated marten was sighted climbing up the nest-tree. Aware of its predatory activities on nests of the lesser fish-eagle, we watched with bated breath as it climbed into the nest. Unlike the shy and inoffensive lesser fish-eagle which deserts the nest at the approach of this predator, the brooding mountain hawk-eagle female took offensive action, driving home her talons thrice, with corresponding shrieks from



One bloody encounter with an eagle is enough to arm a field assistant with a helmet and leather jacket.

the marten as it raced down the tree-trunk. She returned to the nest only after ensuring that the marten was gone. Langurs, well known egg-predators of the lesser fish-eagle and serpent eagle were determinedly attacked if they ventured too close to the nest. On one occasion, a pair of spotted-winged stares made frequent forays to the nest, to collect the down that the nestlings had shed, belly feathers of adult, and other soft material to line their own nest.

Another moment that I clearly remember came towards the end of May when the mountain hawk-eagle fledgling was nest-independent. The female, which was by then accustomed to our presence was perched nearby. As my assistant and I walked past the nest-tree, we flushed a

jungle nightjar. As it flew from our feet the mother eagle attacked, closing in on it through the foliage, but missing it by a hair's breadth when her wing smacked into a branch. Incidentally, the habit this species has of nesting in badly pollarded trees, and its belligerence towards people makes it difficult to protect the nest from vandalism. I had to put a 24 hour guard for nest protection.

The next year, on 16th April, 1993, I observed the courtship and copulation of the collared falconet near Dhikala. This was a particularly important find as the breeding of the species had not been recorded in the Subcontinent. A charpoy or *khatia* was strung up between two trees (out of the reach of elephants!) about 25 m from the

nest. We could watch the behaviour, courtship, prey and incubation closely, and much new information came to light. Unfortunately, incubation was unsuccessful and the pair suddenly disappeared from the area. It would be interesting to investigate the breeding status and whether the species is locally migratory to Corbett, as it is mainly sighted between October to February.

I had earlier touched upon the complete lack of breeding success in the lesser fish-eagle. Since 1990, I had been monitoring nests of this species. The egg shells collected from a nest in 1991 on analysis showed significant amounts of chemical contamination, mainly DDT and dieldrin. In 1995, a concerted effort was made to determine the extent of chemical contamination through the prey base, and what effect it might have on breeding success, aside from predation. Samples of eggshell, dead nestlings, fish and water are currently being analysed. If results turn out positive, further investigation will be necessary and management techniques and policies will have to be implemented for the conservation of the species and the riverine system as a whole.

All my adventures and wonderful experiences over a six year period cannot be recounted within

*The natural beauty of the Park, its importance as a protected area harbouring a vast array of birdlife and animals, continues to lure naturalists and visitors alike to it repeatedly.*

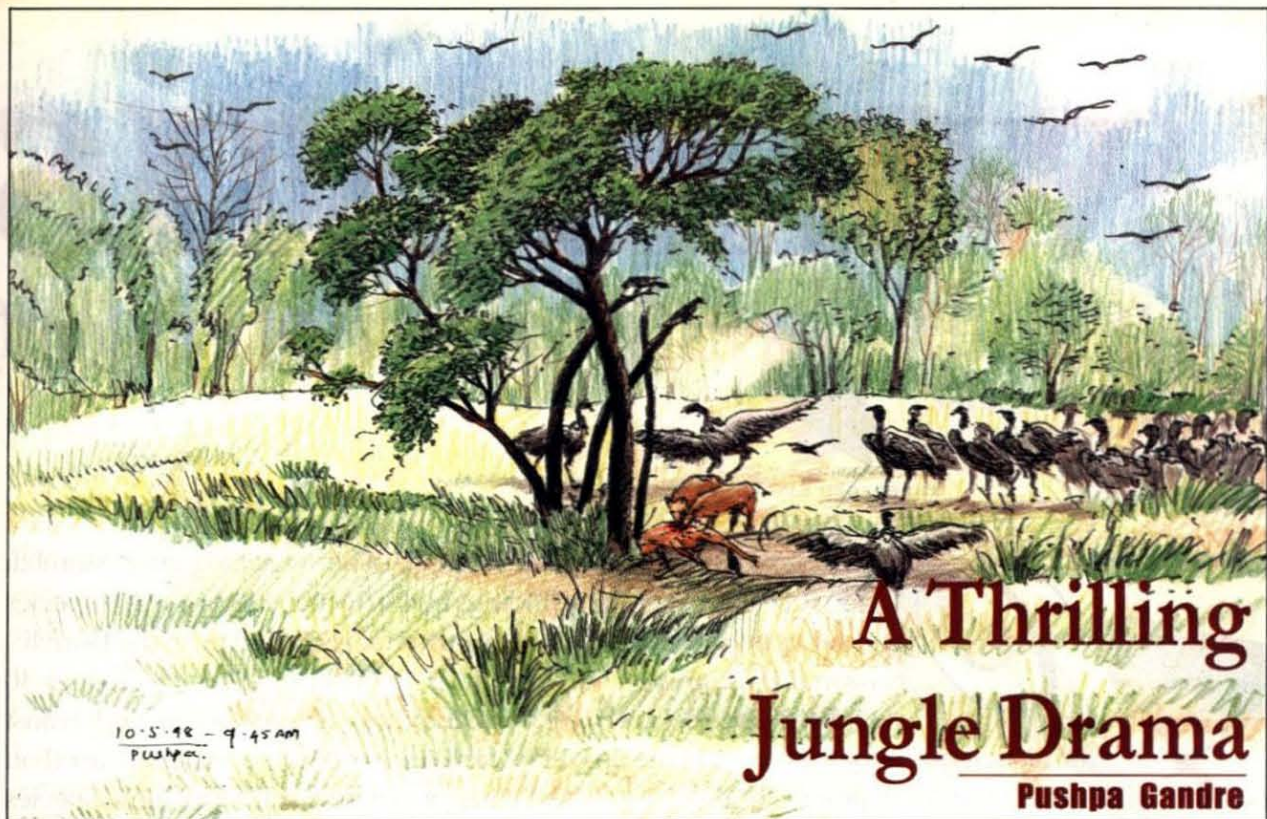
the confines of this article. The natural beauty of the Park, its great importance as a protected area harbouring a vast array of birdlife probably unrivalled in the Subcontinent (including 49 species of diurnal birds of prey alone; about 70% of the total raptor species found in the country), an impressive number of mammals, its riverine system with good numbers of both gharial and mugger, a variety of fish-eating birds and mammals, and the now threatened Mahseer should, in my opinion, make the

Park a worthy candidate as a world heritage site. Besides, the dedicated, courteous and helpful staff, the pleasure of having worked with three fine Field Directors since 1991, and the sheer beauty and magnetism of the Park will, I'm sure, continue to lure me and other naturalists and visitors to it repeatedly. In this, its Diamond Jubilee year, I hope the authorities will strive for a protected forest corridor between Chilla (Rajaji National Park) and Corbett. I also hope that Sonanadi Sanctuary and Sitabani Reserved Forest block will at some future time be included within Corbett Tiger Reserve. It must prosper and continue to be among the prime custodians of the country's irreplaceable natural heritage. ♣



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Their consistent support is greatly appreciated.*



## A Thrilling Jungle Drama

Pushpa Gandre

ON THE SPOT SKETCH BY THE AUTHOR

**W**hile travelling through the jungle of Kanha one morning, I witnessed an unforgettable incident. We reached Schaller's Hide when we heard the call of a tiger. Anticipating action we positioned ourselves near a brook, and watched keenly through our binoculars. After a while, some vultures flocked on a tree near the brook. Soon after, three jackals passed by our jeep and went towards the brook. After a few anxious moments, two spotted deer, may be they were the doe and its young, walked slowly and cautiously along the bank of the brook, watching keenly for any predators.

About an hour and a half later, all the vultures had flown away, and we had given up hope of any action from the tiger, when the three jackals returned from the brook. Sensing danger, the deer started running. Suddenly the young one fell in the grass because of a slope. Taking this opportunity, one of the three jackals pounced, and caught the young deer by the neck.

This sudden turn of events stunned us temporarily. Our driver stopped the jeep about

9m away, helping us to get a better view. I quickly sketched the incident, with my binoculars fixed on the scene. The kill appeared to be heavier and larger than the jackal. Even so, the jackal pulled the prey towards a tree which was high up on a slope. A yellow wattled lapwing broadcasted this incident before disappearing into the jungle.

Following this incident, the vultures started flocking again. About 25-30 vultures sat in a disciplined manner near the kill. The jackals started enjoying their meal after ensuring that it was safe from the vultures.

The impatient vultures, however, slowly approached the kill for their share. Finally, the female left her meal to prevent the vultures from approaching the kill. Later, the male stood on guard while the female enjoyed the kill. She carried away the hind portion of the kill to save it from the vultures. The vultures then disposed of the remains of the kill within no time and flew away. We returned each with his own memory of this thrilling jungle drama. ♡

# WHAT AILS OUR BIRDS?

## An account of some vanishing species around Mumbai

Sunjoy Monga



THREE-TOED KINGFISHER

Observations over the past quarter century of birdwatching in the Mumbai region reveal some gloomy findings for birdwatchers. Of the 269 species and subspecies of birds that I have thus far recorded from the Borivli National Park and its surroundings, I find populations of over 30 woodland species, and over a dozen others, having diminished. I must admit that this is merely an estimate arrived at from personal observations, based on sightings and call-notes. Though I am quite confident that populations of these species here are on the decline, it would be appropriate if this fall in numbers can be properly ascertained. Perhaps it would be fitting if birdwatchers across the country can look into possible declines of local avifaunal populations, inclusive of species mentioned here. The following list is not in any particular order and includes resident and winter visitors.

Indian treepie, white-bellied drongo, haircrested drongo, black-backed woodpecker, golden-backed woodpecker, rufous woodpecker, yellow-fronted pied or Mahratta woodpecker, grey junglefowl, red spurfowl, jungle bush quail, gold-fronted chloropsis, yellow-backed sunbird, Loten's sunbird, three-toed kingfisher, green wood pigeon, emerald dove, white-throated babbler, slaty headed scimitar-babbler, yelloweyed babbler, blackheaded cuckoo-shrike, large cuckoo-shrike, crested serpent-eagle, redbreasted flycatcher, verditer flycatcher, blue-headed rock thrush, osprey, scarlet minivet, tree pipit, ashy swallow-shrike, brown hawk-owl, barred jungle owlet, forest wagtail.

Numbers of some of the above mentioned (woodland) species also show a downtrend in the Karnala Bird Sanctuary, about 60 km to

the south of Borivli National Park. Besides, I've also been observing a gradual decline in the overall numbers of the winter-visiting leaf-warblers, though I must honestly admit that I am unable to identify all species of leaf-warblers with certainty in the field. Outside the woodland areas, the other species in Mumbai region which I find on the decline include the Caspian tern, turnstone, oystercatcher, eastern golden-plover, little tern, curlew and baya weaver, species which I used to see quite regularly till about the start of the nineties. In fact there is an overall decline in tern numbers too. I haven't sighted the winter visiting white stork now for over a decade anywhere around Mumbai.

I have not included here species which observations and records reveal to be rather sparingly found — species such as the heart-spotted woodpecker, pygmy woodpecker, Malabar trogon, and the Malabar whistling thrush, which are there but have always been in very small numbers and are invariably to be seen once in a while in certain select localities in the National Park.

Drastic habitat changes, especially along Mumbai's coastal tracts, along the numerous creeks and inter-tidal zones have no doubt contributed to a qualitative as well as quantitative decline of wetland and coastal biotic components. The reasons for a possible decline of woodland birds, especially in the National Park, despite a reasonably balanced habitat appears quite confounding and I am sure birdwatchers would agree that a careful, detailed record of the presence of these species in the Mumbai environs should be helpful. ✿



LOTEN'S SUNBIRD



HEART-SPOTTED WOODPECKER



LARGE CUCKOO-SHRIKE



YELLOW-BACKED SUNBIRD



RED SPURFOWL



BARRED JUNGLE OWLET



SCARLET MINIVET



OSPREY



INDIAN TREEPIE



EMERALD DOVE

Paintings: CARL D'SILVA  
© BNHS  
Birds not to scale



ZAFAR-UJ-JISAM

The prize-winning children with Raageshwari Loomba

As part of the BNHS's environmental awareness programmes, a Naturewatch Slogan Competition was arranged by the BNHS in collaboration with the Indian Express, which publishes Naturewatch/Bratline in the Express Newline section every Thursday. The slogans were judged by a panel of judges. The prizes were sponsored by the Express group of newspapers.

The prizes were distributed on 19th November, 1998 by the noted actress, VJ and singer Ms Raageshwari Loomba, at Hornbill House. ♣

## Book on Indian Shells Released

The Hon'ble Minister for Environment and Forests, Mr. Suresh Prabhu released the new publication of the BNHS **The Book of Indian Shells** by Deepak Apte, Education Officer, BNHS, on 13th December, 1998 at the Conservation Education Centre, Goregaon. The book is a useful field guide for the amateur shell collector as it covers more than 300 species of shells likely to be seen in India.

In his address, the Hon'ble Minister reiterated the need to incorporate **Ecological Security** as one of the basic objectives of our Five Year Plan, a concept suggested earlier by Mr. B.G. Deshmukh, President, BNHS.

The Hon'ble Minister also interacted with a group of children who had come to the Centre for a nature trail. Later, he planted a sapling of the Indian laburnum in the precincts of the Centre. ♣



SANJAY DESHMUKH

Mr. Suresh Prabhu with the author, releasing the book.

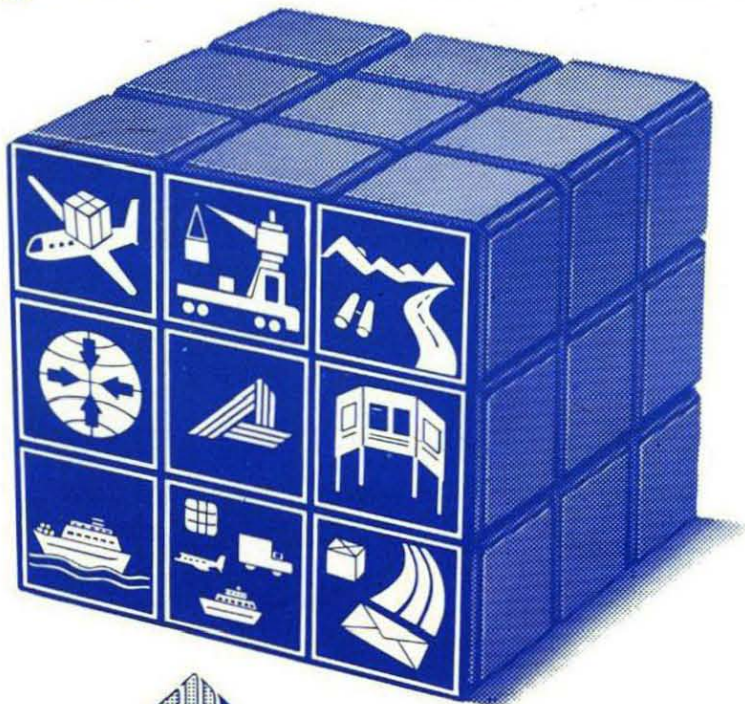


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