

HORNBILL

1996 No. 4

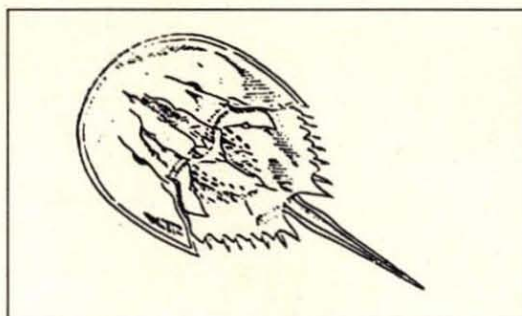


BOMBAY NATURAL HISTORY SOCIETY

2. Butterflying in Namdapha

Enter the enchanting world of butterflies in this northeastern Tiger Reserve, and you may find some revelations within.

— Vidya R. Athreya



10. Seashore Lore 24. Oddest Ancient Oaf Alive

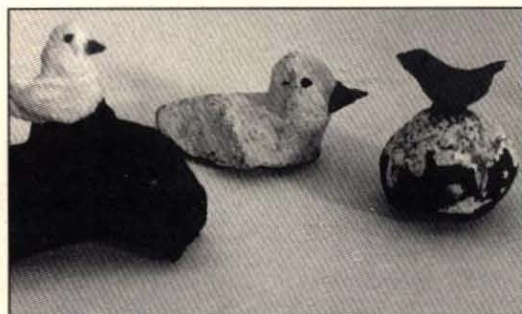
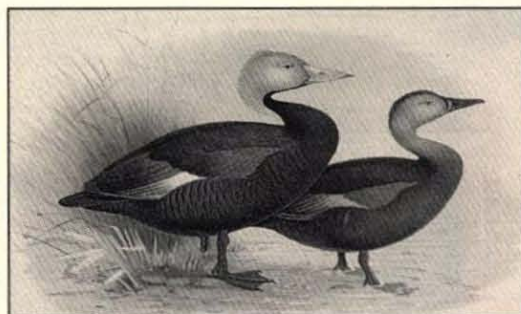
The horseshoe crab has survived almost unchanged for over 200 million years, and represents a dead-end in the story of the evolution of life on earth.

— Beefsea

26. Steps we need to take....

In 1979 the author addressed problems and prospects that continue to plague conservationists and naturalists to the end of this century.

— Sálím Ali



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The Society was founded in 1883 for the purpose of exchanging notes and observations on zoology and exhibiting interesting specimens of animal life. Its funds are devoted to the study of natural history in the Oriental region, and for nature conservation. Individual membership can be either in personal or official capacity. Membership is also open to scientific and educational associations and institutions as well as companies.

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For more information on the Society and its activities, write to The Honorary Secretary, Bombay Natural History Society, Dr. Sálím Ali Chowk, Shaheed Bhagat Singh Road, Mumbai 400 023. Tel.: 282 1811 Fax: (91-22) 2837615

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1996 (4)



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A Plea to Plunder

EVERY time I looked up for hornbills and hoolocks among the trees festooned with orchids, ferns and mosses, I had to hold back my cap from falling off—so tall were the trees in Arunachal Pradesh's Namdapha National Park. Often overcast or raining, there would be brief spells of sunshine. And then as if from nowhere, butterflies would descend to feed or bask. Gorgons, cruisers, sawtooths, jezebels, jesters, emperors, nawabs, saffrons, sapphires and many more. But sighting a Golden Birdwing fluttering among the canopy was most rewarding. All this is very exhilarating while inside the protected area. One step out, and the magic evaporates under the hum of the saw mills and whirring of the trucks ferrying the felled giants. There were trees everywhere—felled and awaiting to be fed to the saw mills.

The entire State's economy depends on the forest-based industries. From the tribal to the minister there is only one sole occupation—clearing of the state's total forest cover of 68,661 sq. kms. So far 14,491 sq. kms have been cleared away, which is almost a fourth of the State's forest cover.

Despite the warning from the Ministry of Environment and Forests, who has been monitoring the degradation in Arunachal, there has been steady increase in the number of saw mills.

The recent interim order of the Supreme Court to halt the dilution of the Forest Conservation Act, 1980 has sent the Arunachal Cabinet rushing to the Prime Minister's Office to plead for a special status for the State and not be governed by the Forest Conservation Act. Accedence to such a short-sighted and selfish plea will be suicidal for the State itself.

Weaning them away from the lure of green gold seems to be an impossible task. Unless a sincere drive is launched state-wide to reduce pressure over the last of these magnificent forests, Arunachal Pradesh may not remain for long as the State with the largest forest cover.

ISAAC KEHIMKAR

A fragment of a butterfly's wing, black on one side and white on the other, lies half covered beneath the fallen leaves. I pick it up gently and as the sun's rays fall upon it, the hidden iridescent blue shimmers into view.....



Butterflying

IN NAMDAPHA

Vidya R. Athreya

A FRAGMENT of a butterfly's wing, black on one side and white on the other, lies half covered beneath the fallen leaves. I pick it up gently and as the sun's rays fall on the black, a hitherto hidden iridescent blue shimmers into view. The light moves on, catching another facet in its beam, and along with it the blue fades away. It will be three months before I see the entire butterfly in all its finery. For now, I have only this piece of wing to keep. It belongs to the Purple Emperor, one of India's most beautiful butterflies.

I was in Namdapha Tiger Reserve, on my first trip to the fascinating northeastern region. I thought I had prepared myself for the diversity of the plants and habitats that this region boasted of, but what I saw took me completely by surprise — like the Dragontail butterfly I saw on the very first day. A large fly, I thought, as an insect sped past. Only when the swift whirring wings paused for a second, while the creature drank from a little forest stream, did I realise that it was a Dragontail — a small creature with a tail an inch or more in length and pale diaphanous patches on the forewings, a butterfly much valued by collectors. That was the first and the last time I

Overleaf: The Namdapha Tiger Reserve at sunrise, and one of its lepidopteran inhabitants, the Orange Oakleaf butterfly (Inset). Text & photographs: Vidya R. Athreya

saw it in the seventyfive days I spent in the Tiger Reserve.

Along with the Dragontail, the Large Yeoman and the Chocolate Albatross were taking their morning sip at the stream. It was fun watching the Albatrosses. Ten or more of these pale white and yellow butterflies would "follow-the-leader", dipping high and low at the same spot where the first one did, the entire train swerving suddenly before going its merry way. They looked like pieces of white gossamer, following one another till, suddenly, a few of them cut themselves out of the festoon to swirl about in a little one of their own. The Albatrosses were very common, and it was a dizzying experience to get caught in their eddy before they rushed away into the forest.

Butterflies are sun loving creatures, and sunlit damp patches always had a few butterflies basking or "mud-puddling." One of my camps at Namdapha was situated in a small clearing



The Grey Count represents the rich diversity of butterflies in Namdapha

that was flooded with sunlight on the rare cloudless days. My holidays were spent basking in the sunlight, along with the Chocolate Albatrosses, Common Maps, Tawny Rajahs, Black Princes, Jezebels and Orchid Tits. I would sit in the sun, watching these delightful creatures feed feverishly on the nutrients from the wet soil around the camp. Some of the royalty — Tawny Rajahs and Black Princes — had rather appalling taste in their choice of cuisine, and would feed only on the scats of carnivores that I had put out to dry!

The Eastern Himalayas, and northeast India in particular, are very rich in butterfly species. Fiftyeight percent of the butterfly species that occur

in the Indian subcontinent and Myanmar are found in northeast India alone. One reason for this phenomenal diversity is the region's unique biogeographic location at the junction of the Indian and Indochinese subregions. The great diversity of plants and habitats, and topography are major influences on butterfly distribution, diversity and abundance.

I was hoping to see the Batwings, Kaiser-i-Hind, Gorgons, Peacocks, Dragontail and many other species which are found within the Indian subcontinent only in northeast India. As it turned out, I saw a lot of butterflies, but was not able to identify many of them because there



The Purple Sapphire prefers non-vegetarian cuisine



The Tabby basking on a rare sunlit day



The Chocolate Albatross is seen flying in festoons

are so many similar species flitting about!

For instance, when I saw the Maplet, a small black and orange butterfly, it was basking in the sun and allowed me to have a good look at it.

After returning to base camp, I went through my field guide, only to learn that identifying these creatures is not so easy. Two kinds of Maplets were described: the Wavy and the Common. The only difference was that the Wavy Maplet had a wavy sixth line, out of nine lines that run parallel across the wings, unlike the Common Maplet in which the line was straight. Like most other butterfly species in this area, I never saw it again and could not identify it.

The high degree of similarity between closely related species was something I had not anticipated. I had been butterflying in the Western Ghat forests, which are the closest that another forest in the Indian subcontinent comes to the forests of the northeast. I had not faced this problem there.

To name a few, the Dragontail, Birdwing and Map had very similar species that coexisted with them in the northeastern forests. I realised later that the only way to identify them in the few sightings that I came upon by chance was to check out the differences beforehand and look immediately for these differing characters. To further complicate matters, this similarity was not confined to the closely related species in the same genus alone.

There were many species that were very similar in appearance to other totally unrelated species. This well-known tactic, which is called mimicry, was evolved to fool predators. Birds are probably the most important predators of adult butterflies and various wing patterns of butterflies may have evolved in response to predation pressure by birds. While some butterflies have resorted to such trickery and guile, other species are armed with chemical weapons to ward off predators. These species feed on plants containing certain distasteful compounds and store them in their body tissues, making themselves unpalatable to predators. Birds usually vomit out these species and from then on avoid eating them.



The tricksters pretend they have the chemical weapons by mimicking the unpalatable species in appearance and sometimes even in flight. A good example is that of the Zebra in the Tiger's skin! The Lesser Zebra (*Papilionidae*) is a large black and white butterfly which mimics the Glassy Tiger (*Danaidae*). The Tigers, also called the Milkweed butterflies, accumulate toxic compounds such as cardenolides and pyrrolizidine alkaloids in their tissues during the larval stages. On eating a Glassy Tiger, the bird, once bitten, is definitely twice shy and thereafter ignores similar looking butterflies. Thus the Zebras escape predation. Some of the mimics of the *Danaidae* family I came across during my visit to Namdapha were the Zebra, Circe, Courtesan and the Mime.

How did the Zebras and other butterflies come to imitate the Tiger in the first place? In the past, a random mutation would have resulted in a small number of Zebras having similar patterns (stripes?) and colours as the Tigers. These individuals would have had higher survival rates because of their resemblance to the noxious Tigers and would have left behind more offspring, of which the better mimics would have survived. This process continued until most of the mimics came to resemble the model, that is the species that was mimicked.

Not all species have the arsenal described above, or have evolved to pretend that they have the arsenal. They have to use other tactics to fool their predators. The Purple Sapphire, a small, colourful butterfly visited my sunlit camp one day. Its brilliant golden wings had flaming red borders and it seemed as if the edges of the wing were on fire. It basked in the sun for a while and for a brief second hovered over the others at the mud puddle before disappearing as swiftly as it arrived. This butterfly, as well as many of the other Blues, fool predators in a different way.

Not all butterflies feast on nectar.

The Purple Sapphire draws into its proboscis the body fluids of a dead crab!

They have small tails on the hindwings which look like antennae, and also a little eyespot at the base of each tail. When the butterfly settles down, the bird mistakes the tail and the eyespot for the head of the insect and grabs the butterfly from the rear end. A useless piece of wing is all that the bird is left with and the

butterfly escapes. If you look closely, sometimes you will find these butterflies bereft of the hind portion of their wings, evidence of such encounters. Then there are the butterflies that do not use any chemicals, mimicry or deception to protect themselves from their predators. They rely on the most common tactic of them all — that of camouflage. On settling down, their wings fold to merge into the surroundings. What seemed to be a butterfly now looks like a leaf. All of a sudden the leaf opens out to reveal bright colours, only for a moment before it flies off. The brightly coloured uppersides often startle the predators, giving the butterfly an extra few seconds to make good its escape.

During my last day at Namdapha, I went for a short walk along the road. Roads are good places for watching butterflies, which descend to bask in the abundant sunlight. In the short two kilometre walk, I saw a Dark Judy, Popinjay, Tabby, Black Prince, Bluetailed Jester, Punchinello and a few others — many of them for the first time. During my entire stay, I could identify only about 40 species of butterflies, a terribly inadequate list for Namdapha. Only on rare occasions could I stop to watch the butterflies sipping at the forest streams, searching for nectar-filled flowers. Most of all, I liked to watch these jewels glittering just for that one moment before they faded away into the darkness of the rainforest. □

Vidya R. Athreya, a BNHS member, is a committed conservationist whose interests include photography. She studied at the Sálím Ali School of Ecology, Pondicherry, and continues to pursue research on wildlife.

GREENING ORISSA

In connection with the appeal by the Honorary Secretary BNHS, I wish to inform you that I was involved with my family in a plantation programme in my native village Ankushpur in Gunjam district, Orissa. We selected 120 saplings of teak, cashewnut and amla from the social forestry office at Cuttack on 1st July, 1996. Though my family has been engaged in occasional plantation work in our village for the last eight years, no more than 50 trees have survived which include teak, neem, banyan and sissu. The odds against the trees range from natural calamities to cattle and the local villagers who need firewood. But this year we saw a few teak and acacia trees planted by the villagers themselves. We have decided to make this a regular activity. It is not very difficult to load the saplings in a vehicle, go to the village and engage a few workers to plant them, who gladly do so for a hundred rupees. This year many proposals for large scale plantations were put forth by the Government of Orissa as well as by the local NGOs. But all such activities are confined to rural areas, and as far as individuals and NGOs for city-based plantation are concerned, there is not much enthusiasm, but the efforts of the Youth

Movement Federation of India to introduce large scale plantation in Rourkela schools and government offices, are notable.

Sumitra Rath,
Orissa.



HILL STREAM FISHES

I read with great interest about the BNHS's hill stream fishes project in *Hornbill* 1996, No. 2. It would yield much information on Indian hill fishes.

The project could also document and analyse the traditional fishing methods of the local tribes. While working in the Periyar Tiger Reserve, Kerala, I was amazed to see the expertise of Manas tribals in catching upper stream fishes, including Mahseer. They use a local semi-aquatic plant to catch the fish. The plant is mashed vigorously by hand and its sap is poured into the stream to flush out the fishes. This is very effective, but could have an adverse effect on other aquatic animals.

Dr. H.S.A. Yahya,
Riyadh.



CENTIPEDE ALIVE!

I liked all the articles and photographs in *Hornbill* 1996, Nos. 1 and 2, especially that of the giant tiger centipede in the

feature *Nature Alive*. It is a great artistic work by Mahesh Sabne. The orange and black body segments seem almost real. The well defined details of the centipede against the rocky background are just great. It is yet another feather in *Hornbill's* cap. Kudos to Mr. Sabne.

S. Ninawe,
Nagpur.



A CORAL FROM MUMBAI

Regarding the colour photograph by B.F. Chhapgar of a live coral from Mumbai (*Hornbill*, 1996, No. 3), the coral has been identified by Dr. Cornell Rodrigues of the Marine Science Department at Goa University as *Goniopora stokesi*.

Dilzeen Z. Lilaowala,
Mumbai.



OF CRANES AND MEN

This refers to the note 'Of Cranes and Men' published in the *Hornbill* 1996, No. 2. In para 4 on page 25, the hooded crane seems to have been confused with *Grus antigone antigone* and *G. antigone sharpii*, which are the two sub-species of the sarus crane (*G. antigone*) and have nothing to do with the hooded crane *G. monacha*, which is a separate species.

Would you kindly make the position clear, confirming whether the stray record of 1994 pertains to the sarus crane or the hooded crane?

If the confusion is on my part, I express my regret.

Mashkoor Hasan,
Jabalpur.

We thank Mashkoor Hasan for pointing out the printer's devil. The text "The hooded crane has not been recorded for nearly a century, except for one stray record of the nominate race, G. antigone antigone" should read as follows:

"The hooded crane has not been recorded for nearly a century, while the sarus for nearly half a century, except for one stray record of the nominate race Grus antigone antigone".

— Editors



EVERY CLOUD HAS A SILVER LINING

Now that the dubious claim of petrol from a shrub has turned out to be a hoax ingeniously perpetrated by a charlatan, environmental conservationists will heave a sigh of relief.

Imagine the scenario had the hydrocarbons-from-herbs been a reality. Greedy get-rich-quick entrepreneurs would have picked up each and every leaf from the concerned tree, ruthlessly stripping the forests

of the species and sending it to an untimely extinction. Who in India has the foresight and the patience to grow the herb in a plantation where there would be only a limited crop, instead of deforesting vast tracts, with no twinge of guilt, to easily obtain the same with little effort and no investment?

While there was *brouhaha* in the media until the bubble burst, not one newspaper raised a voice of concern for the possibility of quick denudation of forests of this herb.

Priya C. Bhat,
Srinagar.



A BOUQUET OF CEROPEGIAS

I

Regarding the article on the flytrap flowers in *Hornbill* 1996, No. 1, I have gone through the highly illuminating and educative essay on these exquisitely beautiful flowers which were so far not known to me. I have not only come to know of a new variety of flowers, but was thrilled by the sheer joy of seeing the beautiful photographs of various types of the flowers, especially the photograph of *Ceropegia vincaefolia* on the cover which is simply enchanting. Also to be mentioned are *C. fantastica* and *C. oculata*. The unique

structures of the *ceropegias* stand out as a marvel of nature. You have aptly stated "Architecture in these flowers is a wonderful creation of nature." Judging from the difficulties in reaching these unique plants, to study them and to observe them is no mean task, which the author has undertaken. More power to him. Kindly let me know some more references about the species.

T.K. Majumdar,
Calcutta.

II

The article on flytrap flowers in *Hornbill* 1996, No. 1 made very interesting reading. Working in the Guhagar taluka near Dabhol creek, I have observed the species *Ceropegia attenuata* around laterite rocks within the Dabhol Power Project site. I carefully dug out the plant with the tuberous root and planted it in a tiny pot in our garden. I would be very grateful if you could kindly guide me in the proper care of the plant, especially nutrition. Flowers have bloomed since transplanting, but there are no signs of any seeds. Being a tuber is there any chance of propagation by seed?

The forests here are spread over undulating terrain. Can I look out for other *Ceropegia* species?

Lawrence D'Souza,
Guhagar, Ratnagiri.

24. Oddest Ancient Oaf Alive

As a beauty, I am no great star,
Others are handsomer, by far;
But my face — I don't mind it
Because I'm behind it,
It's the folks in front that I jar.

— *Anthony H. Euwer*

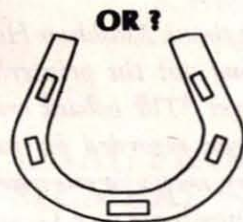
Beefsea

IF YOU happened to wade in the shallow sea along the shores of Europe some 200 million years ago, you would have seen a sluggish, armoured creature lumbering along on the sea bottom like a battle tank. It would have also been, to say the least, very odd, because there were no human beings then!

That creature, or its descendants, are still alive today. Untold millions of years before the mighty dinosaurs reared their heads in the primordial swamps, flourished, dominated their periods, and then became extinct, and while other close relatives finally left the water and became the first land animals, the horseshoe crabs — for these are the animals I am referring to — were seemingly so well adapted to their way of life that no improvement was deemed necessary by Mother Nature. That is why they are called living fossils.

Some species, from inconspicuous beginnings, become so successful that they breed rapidly to form large populations and spread across vast portions of the earth. After reaching a pinnacle of success, they decline equally rapidly and become extinct. In other cases, however, an animal takes a long time to reach its peak, but then persists for such long periods that it is still

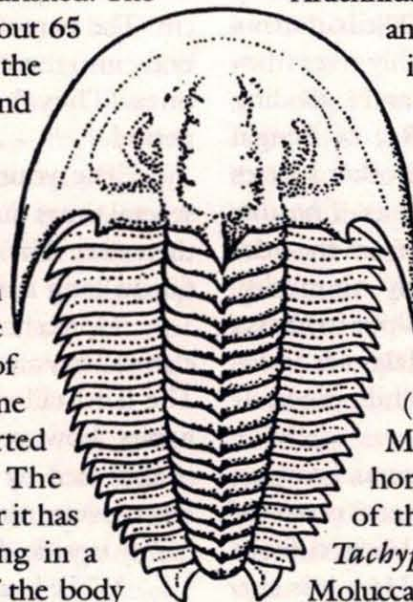
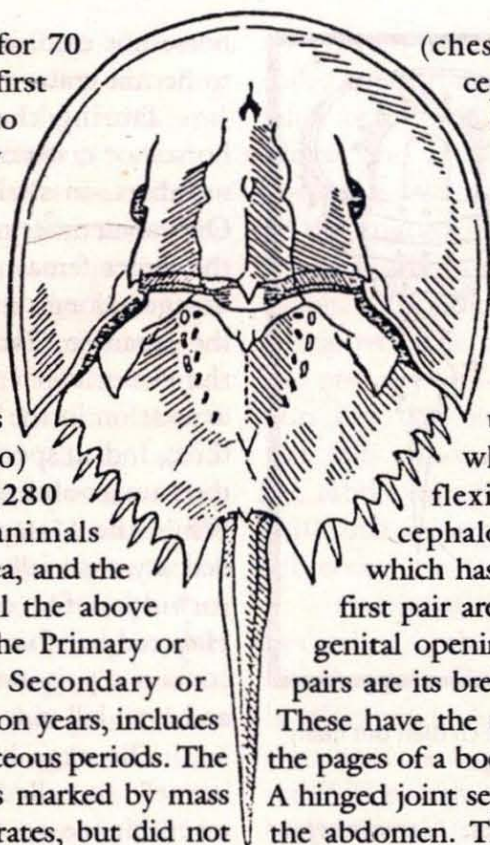
Seashore Lore



alive today. It's like the story of the race between the hare and the tortoise. The hare-type animals lead a gay but short life, while the tortoise-types evolved slowly but are still plodding along.

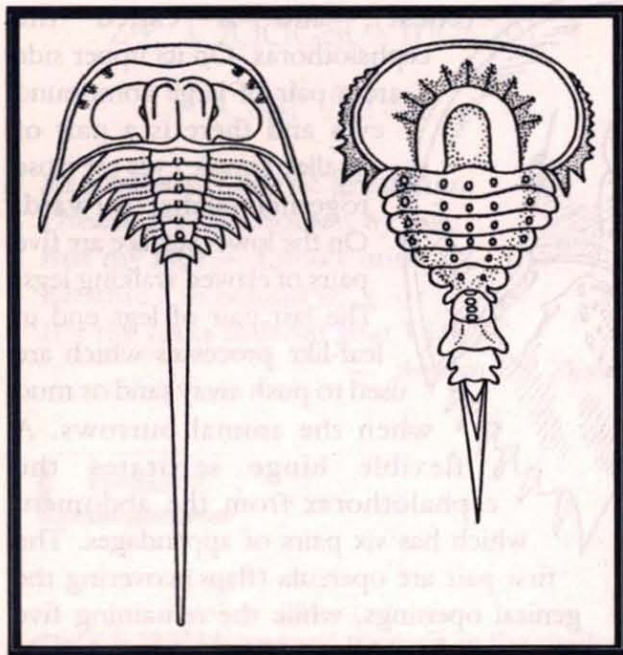
A classic example of a living fossil is the coelacanth — a fish which had its heyday during the Devonian period (405 million to 345 million years ago) persisted unchanged for 230 million years, and were supposed to have become extinct during the Upper Cretaceous period, because no fossils were seen in these recent strata. In 1938, a live coelacanth fish was caught off South Africa, proving that the fish was successful in evolution, lurking in the depths of the sea while palaeontologists (people who study fossils) had thought them to be long extinct. Life began on earth some 1500 million years ago. During the first 1000 million years, the earth was undergoing vast changes. New mountains rose, while older ones were levelled, so that there are few fossils found in this period — called by geologists the pre-Cambrian period — though some jellyfish, lamp-shells and worm tracks have been observed. This was followed by the Cambrian period (600 million to 530 million years ago) where various hard-shelled marine invertebrates are seen. In the next, Ordovician period, which began 530

million years ago and lasted for 70 million years, corals and the first backboned animals begin to appear. This was followed by the Silurian period, lasting for 30 million years, when the first evidence of vegetation on land appears. In the next, Devonian period, wingless insects first appear. This was followed by the Carboniferous period (345 million years ago) and the Permian period (280 million years ago) when animals started venturing out of the sea, and the first amphibians evolved. All the above periods together constitute the Primary or Palaeozoic era. The next, Secondary or Mesozoic era, lasting 150 million years, includes the Triassic, Jurassic and Cretaceous periods. The end of the Palaeozoic era was marked by mass extinction of marine invertebrates, but did not affect land plants and animals. Ferns and conifers now gave way to flowering plants and reptiles, including the giant dinosaurs, flourished. The last, or Coenozoic era started about 65 million years ago, and comprises the Eocene, Oligocene, Miocene and Pliocene periods (totally called Tertiary). Mammals, which had originated 180 million years ago, dominated the fauna, and the land-masses as we know them today were formed. Horseshoe crabs still occur today, but none of them are found in Europe. Some 60 million years ago, they started migrating to east and west. The horseshoe crab is aptly named, for it has a horseshoe-shaped body ending in a spiked tail. The front portion of the body is made up by the fusion of the head and thorax



(chest), and is called the cephalothorax. On its upper side are a pair of large compound eyes and there is a pair of smaller, simple eyes set close together farther forward. On the lower surface are five pairs of clawed walking legs. The last pair of legs end in leaf-like processes which are used to push away sand or mud when the animal burrows. A flexible hinge separates the cephalothorax from the abdomen, which has six pairs of appendages. The first pair are opercula (flaps) covering the genital openings, while the remaining five pairs are its breathing and swimming organs. These have the appearance of thin leaves like the pages of a book, and are called "book gills". A hinged joint separates the spike-like tail from the abdomen. The name horseshoe crab is a misnomer, for it is not a crab, but is related to spiders. Some zoologists place it in the Arachnida, the Class which includes spiders and scorpions. Others contend that it has sufficient structural differences to place it in a separate group of its own, called Xiphosura. The first written record of a horseshoe crab is in a book HISTORIA ANIMALIUM written by Joannes Jonstonius in 1558, where it is pictured under the name *Cancer mollucensis* (meaning "the crab from the Moluccas"). Five species of horseshoe crabs occur today — four of them in the Indo-Pacific region. *Tachypleus hoeveri* is found in the Moluccas and *Tachypleus tridentatus* from Indonesia to southern Japan.

The larval forms of the adult king crab (top) resemble the trilobites (above) which became extinct two hundred million years ago. (Not drawn to scale)



Close relatives of the king crabs which died out many millions of years ago.

Of the two Indian species, *Carcinoscopius rotundicauda*, growing to 30 cm. long (including the tail), is an estuarine form, being found in the Sunderbans and also in fresh water with hardly any detectable salt content 60 kilometres upstream from the sea in the Hooghly river from Digha to Canning (near Calcutta), and extending from the western shores of the Bay of Bengal (Hukitola in Orissa) to China. The other species *Tachypleus gigas* (earlier known as *Limulus moluccanus*) is marine, being found from the tide-line down to 15 metres on sandy or muddy bottoms, and extending from Gopalpur in Orissa and West Bengal to Indonesia, Malaysia, Indo-China, North Vietnam and the Philippines. It grows to 45 cm.

One species, *Limulus polyphemus* growing to 60 cm, is found on the eastern coast of North America in the Gulf of Mexico from Maine, USA, to Yucatan, Mexico. Here it is also called the king crab, but this should not be confused with *Paralithodes camtschatica* of Alaska, which is also called king crab but, like the

horseshoe crab, is not a true crab, being related to hermit crabs.

During the breeding season, pairs of horseshoe crabs can be seen, sometimes in large numbers, in shallow seas along the beaches. One, sometimes more, of the smaller males grip the larger female and hold tight to her, being dragged along until she is ready to mate. While the Japanese (*Tachypleus tridentatus*) as well as the American species scoop out a shallow depression in the sea bottom and lay their eggs there, Indian species carry their eggs stuck on to their under-abdomen in the form of a "berry". While the Malays consider the eggs to be a delicacy, especially to pregnant women, they are forbidden for devout Muslims, Dr. Bruce Halstead has found two of the Asian species to contain a poisonous alkaloid which can poison and even kill man.

The eggs hatch out into tiny "trilobite larvae", so called because of their superficial resemblance to the fossil trilobites. Over a thousand species of trilobite crustaceans are known from the rocks of the Cambrian and Ordovician periods, ranging in size from 3 to 60 cm. The name comes from the division of their body into three lobes — a central and two lateral ones. They became extinct in the Permian period.

The young of the horseshoe crab moult several times during the first year and once a year thereafter. The crabs mature at four years, and a 60 cm long animal may be ten years old.

Horseshoe crabs feed on marine worms and clams. They are fed upon by sting rays and sharks. The hard tail spike and the animal's burrowing habits, however, give some protection. The tail is also used by the animal to turn itself upright when overturned by waves. Otherwise, it is quite happy upside down.

While burrowing, the front edge of the head is used as a shovel, the forward edge being depressed and pushed into the sand. Additional thrust is obtained by flexing the rear portion of

the shell, aided by the five pairs of legs. Constant burrowing also helps to prevent settling of fouling organisms such as barnacles, hydroids and bryozoans and keeps the shell clean.

Curiously enough, the horseshoe crab has been involved in quite a few scientific developments of great value to mankind. Zoologists wondered what was the use of the large, complex, well developed compound eyes in a primitive animal which was a nocturnal feeder and burrowing much of the time. Then it was found that its optic nerve cells are cross-connected. When one cell is stimulated, another is inhibited proportionately, thus increasing the contrast of the image of the object seen by the animal. General Electric Co. developed an electronic video system based on this principle, to produce sharper television images. Improved radar systems incorporating this principle in which cells magnify or inhibit impulses in direct proportion are also in use.

Another peculiarity of the eyes is that the crystalline cones of the eyes can concentrate light tenfold — an adaptation to seeing in turbid water. Moreover, they are sensitive to infrared and ultraviolet rays and, like the honey bee, can detect polarised light. This is used for orientation on cloudy days when the sun is not visible. A little patch of clear blue sky is sufficient for the animal to find out the sun's actual position. This has been utilised to develop a compass for navigation in the polar regions, where magnetic compasses are not reliable and, due to the long twilight periods, the sun and stars are not visible and celestial navigation, therefore, not possible.

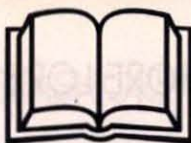
Horseshoe crab blood is now used in the pharmaceutical industry. Unlike human blood, which is red due to the iron-containing pigment haemoglobin, horseshoe crabs' blood is pale blue, caused by the copper-based pigment haemocyanin. While human blood has many kinds of white blood cells, horseshoe crabs' blood has only one kind, called amoebocyte.

Many bacteria contain potent poisons, called endotoxins, in their outer cell wall. If they enter our bloodstream, they can cause severe illness and even death. Any medicine to be injected — even distilled water — has to be free of the endotoxins. Their absence is tested by injecting a little quantity of the medicine into a rabbit. If the rabbit develops fever, the medicine is rejected. The test is cumbersome, expensive and not very sensitive. The amoebocyte lysate of horseshoe crab blood can be used for this test; in fact, it is a thousand times more sensitive than the rabbit test, being able to detect even one-billionth of a gram of endotoxin per ml. Moreover, it is faster and less expensive.

A cupful of blood is collected from a horseshoe crab, centrifuged to separate the amoebocyte cells from the fluid portion, which is discarded. After washing in saline, the amoebocytes are soaked overnight in distilled water. The active agent, called amoebocyte lysate, can be freeze-dried and stored until use. A very small quantity of the medicine to be tested is mixed with an equal quantity of the rehydrated lysate, and incubated at our body temperature for an hour. If endotoxins are present, the mixture will clot.

Upto one-third of the blood in a horseshoe crab can be safely removed. An animal can be bled three to four times a year without harming it.

Although horseshoe crabs are not found on the west coast of India, I have often kept live specimens for display at the Taraporevala Aquarium, Mumbai. But that is probably the only living fossil that I have handled. I was quite amused when I once received a letter from a budding research student — obviously not well read — asking for three female specimens of coelacanth fish to be sent to him every month! We had a hearty laugh, but I had to write him a letter in sober language, giving him the history of its discovery, its rarity and area of occurrence, ending with a tongue-in-cheek regret at not being able to meet his requirements. □



TREASURED ISLANDS — AN ENVIRONMENTAL HANDBOOK FOR TEACHERS IN THE ANDAMAN & NICOBAR ISLANDS. By Sunita Rao. Kalpavriksha-ANET, 1996, xi + 94 pp.

My first reaction on going through the book was, why wasn't I born half a century later, so that I could have appreciated it as a child? In those days we had very few such books.

The book is meant primarily for school teachers in the Andaman and Nicobar Islands to help them to create an interest in the environment among students. But it contains a wealth of information on this little known part of India and its heritage, making it a ready reference on subjects varying from the aborigines (tribals) to seashore life.

The themes in the book are (1) Oceans, (2) Corals and coral reefs, (3) Intertidal areas (rocky shores and sandy beaches), (4) Mangroves, (5) Tropical (rain) forests, (6) Humans on the islands (indigenous tribes) and (7) Island Alert (human impact on the environment). Apart from giving the salient features of the Bay Islands — made easy by a map — the Introduction also tells us how to use the book and explains various terms used in covering ecology and the environment.

This appetiser is followed by the main meal — the different habitats and ecosystems comprising the islands' varied environments. These are followed by classroom and field activities for children to sustain and reinforce the students' interest. Through simple make-it-yourself models and charts, serious matters such as overpopulation (human), pollution and deforestation are introduced to the children.

The book is well edited. The only flaws I could find were "forever" written as a single word (page viii), "have a lot TO teach us all" (page x), Endemic... has lead to (page xi) should read "led to", mangroves act like like (page 29) and "pictu" (page 60) for "pictures".

A few technical mistakes have crept in. On page 2, the tail fluke of the mother dugong is shown vertical; it should be horizontal. On page

4, sea snakes are said to "come ashore in hundreds for courting and laying eggs." Most sea snakes are viviparous and give birth to live young. They do congregate in large numbers during the breeding season, but far away from the shore and on the sea surface. Only one relatively primitive species, the sea krait (*Laticauda*), lays eggs in mangroves.

Page 24 describes hermit crabs as "crabs with a soft body and no hard covering". Actually, the cephalothorax has a hard outer skeleton, only the abdomen being soft. It is to protect this soft, vulnerable abdomen that the hermit crab tucks it into an empty snail shell. And the picture on page 25 captioned "Clam" is of a razor clam.

The statement on page 14: "Many *billions* (italics mine) of coral polyps connected together to form a coral colony" is obviously a gross exaggeration.

I was intrigued by the instructions (page 32, no. 3) to bring along insect repellent rubber chappals. Never heard of any. And I was amused to learn how the Onges (tribals) of Little Andaman Islands collect honey. They smear the juice of the leaves of a tree on their body before raiding a beehive, and keep some in their mouths to squirt it on the hive, which drives away the bees, which do not sting the Onges because of the juice.

Minor details are also given, the local government agencies and NGOs which can be approached for help, lists of trees, reptiles, birds and mammals. As an ichthyophile, I noted the absence of a fish list; these and corals have been fairly well surveyed and identified by other scientists! The cover and inside pictures are authentic and accurate. Any marine biologist worth his name will be able to identify the turkey fish, clown fish, parrot fish, moray eel, the staghorn, Borneo and brain corals, sea fan, giant clam, octopus, cowry, starfish and long-spined sea-urchin on the cover. Hats off to Mr. Rustom Vania, the artist. A really good book, well worth seeing not only by the teachers and children of the Andaman and Nicobar Island, but also by children (and adults) on our mainland.

B.F. CHHAPGAR

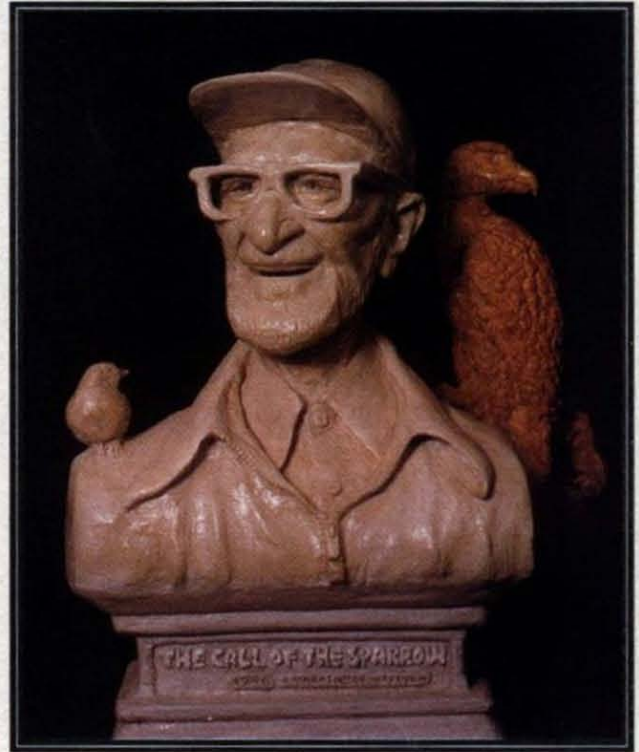
Treasures in Sandstone

IN honour of the late Dr. Sálím Ali and this year being his Centenary year, the BNHS organised Ms. Varashree Narayan's *Tribute to Nature* — an exhibition of sandstone sculptures of animals and birds. Varashree Narayan, 28, is a talented young sculptress trained by her mother, Padmashri Mrs. Mani Narayan. She has already held one solo exhibition and this was her second solo exhibition in honour of the late Dr Sálím Ali. The exhibition was open to visitors from 24th to 29th October 1996. It was inaugurated by Mr. J. W. Edmundson, First Secretary (CA) British Council Division, Mumbai.

In the preview of Varashree's creations, the noted art critic, Dyaneshwar Nadkarni has said:

"Varashree Narayan, a highly accomplished young sculptress, shows carvings of birds and animals from October 24 at the Bombay Natural History Society. The treatment of the animal wealth of the forest in terms of sandstone carvings is as unusual as it is novel. Varashree has cast her net wide and captured in stone a variety of animals including monkeys, cheetahs, kangaroos, bears and squirrels and birds such as hornbills, falcons and parrots. Her manner of carving is stylized but the bird or animal carved remains lifelike and vivid."

Varashree's craftsmanship on the stone is perfect. Though the medium is heavy, she has



"There's a strange providence in the fall of a sparrow"
— Shakespeare

conjured up light and airy creatures, inhabitants of the jungle. This is an exhibition which will be long remembered."

The *piece de resistance* was a bust of the late Dr. Sálím Ali, the legendary ornithologist and driving force behind the BNHS. Sculpted portraits of Dr. Sálím Ali are very rare, and it goes without saying that Varashree's work is a unique creation. □

Sálím Ali's India

THE long awaited publication SÁLÍM ALÍ'S INDIA was released on 2nd Dec. 1996. This hard-bound cloth-covered volume, 9.5"x 12.5" in size, contains 52 fine reproductions of antique colour plates from precious rare books in the Society's collection. Most of the lithographs are over a century old and they are selected from old classics like ORIENTAL FIELD SPORTS (1808),

ORIENTAL MEMOIRS (1812), SCENERY, COSTUMES AND ARCHITECTURE CHIEFLY ON THE WESTERN SIDE OF INDIA (1826), A CENTURY OF BIRDS FROM HIMALAYA MOUNTAINS (1832), BIRDS OF ASIA (John Gould, 1850-1873), GAME BIRDS OF INDIA, BURMA AND CEYLON (1879-1881) and Journal of Bombay Natural History Society. The volume also contains interesting articles and real life episodes

DEATH ON WATER



□ SNEHAL PATEL — Nature Photography Contest entry

A brief 'nuptial dance' is the sole purpose of the adult mayflies' ephemeral life



Mr. S.P. Godrej releases the book, with BNHS president Mr. B.G. Deshmukh

by eminent writers like Dr. Sálím Ali, Jerdon, James Forbes, Captain Basil Hall, S. M. Edwards, Douglas Dewar, Thomas Williamson, Sir J. Emerson Tennent, Major Henry Shakespear,

Ernest Young, Jeevanji Jameshedji Modi, Prof. P. R. Awati, J. C. Daniel and Humayun Abdulali.

Gleanings from the old volumes of the JBNHS are among the other interesting articles.

Of the 52 colour plates, 22 reproductions are from the monumental series of illustrated books, BIRDS OF ASIA by John Gould (1850-1873). Five plates are from the early lithographic work of Elizabeth Gould, from A CENTURY OF BIRDS OF HIMALAYA MOUNTAINS (1832). SÁLIM ALI'S INDIA contains three landscapes of old Mumbai and three paintings from James Forbes' ORIENTAL MEMOIRS. A map of Mumbai from the 18th century is also depicted.

The book release function at Godrej Bhavan was made all the more enjoyable by the venue — a terrace garden atop a multistoreyed building which contains several trees and even an orchid, actually in bloom on the day of the book release. The book is available for sale at Hornbill House and through the Oxford University Press at bookshops. □

Art from Waste



SHEKHAR SHIVESHWARKAR

These colourful birds were produced by participants at the workshop

WASTE material can be converted into interesting and attractive objects, instead of throwing it out as trash. Paper, glass, plastic, rubber, wood and metal wires can be transformed into useful educational material, to create interest and awareness about nature and wildlife and even

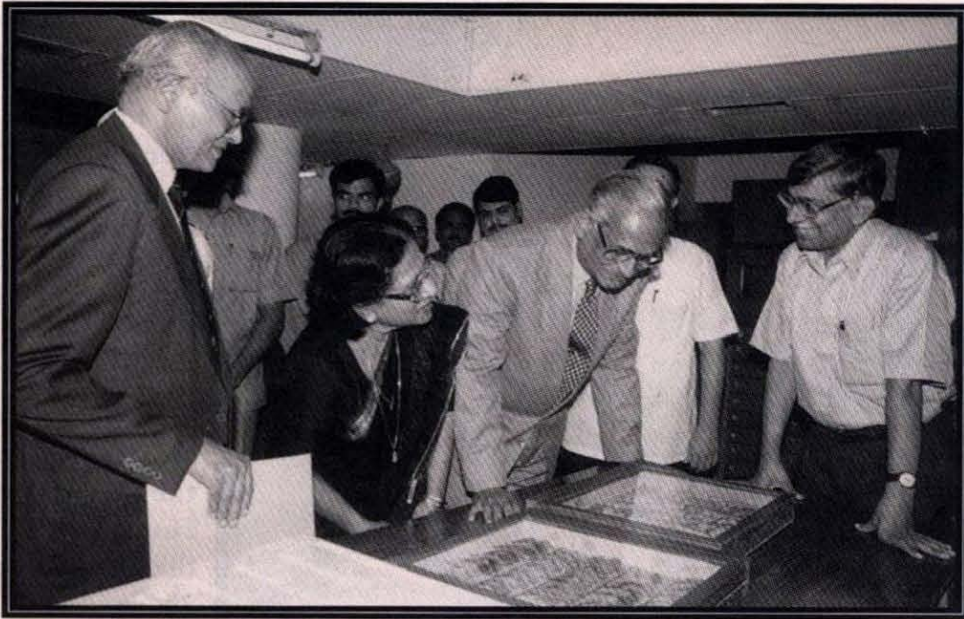
for the sheer aesthetic pleasure.

This was the theme of the three-day workshop organised by the BNHS at its Conservation Education Centre, at Goregaon in Mumbai. The workshop introduced participants to environment education, use of waste materials

for creative interpretation, creating articles from waste, interpretation of produced articles and the wonders of tribal art. Mr. Bhalu Mondhe, a well known sculptor, painter and photographer conducted this workshop. Mr. Mondhe has been conducting such workshops since 1971, in India

and abroad. His long association with modern art and indigenous tribal art made this workshop an unusual and interesting experience. Nature lovers, teachers, students and professionals from varied backgrounds attended the workshop. □

Concluding the Centenary



Dr. and Mrs. P.C. Alexander were shown the natural history collection by the Curator Mr. N. Chaturvedi. Mr. B.G. Deshmukh looks on

As the year long Birth Centenary celebrations of Dr. Sálím Ali came to a conclusion, the Indian Posts and Telegraph released a postal stamp to commemorate his 100th birthday on 12th November 1996. Indeed it was a tribute befitting the towering achievements and inspiring life of the grand old man of Indian ornithology. The stamp was released by H.E. Dr. P. C. Alexander, Governor of Maharashtra, at Hornbill House. Mrs. Ackamma Alexander also graced the occasion.

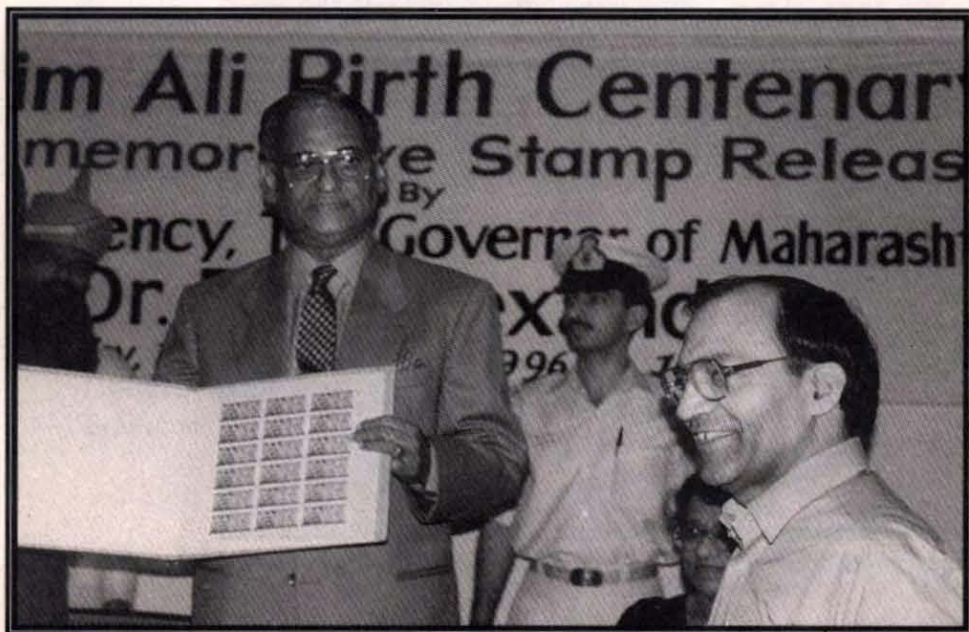
The set consists of two stamps, one having a denomination of Rs.11.00 depicting the breeding colony of painted storks at the Keoladeo National Park at Bharatpur, which Dr. Sálím Ali was responsible for saving from being drained

out and the other with Dr. Sálím Ali's portrait of a denomination of Rs. 8.00. The special cancellation depicts Sálím Ali's favourite bird, the Baya weaver bird approaching its nest. Mr. J.P. Irani, Sálím Ali's favourite artist who illustrated several of the bird plates in Sálím Ali's books has designed and painted the stamps, special cancellation and the First Day cover. The special cancellation and sale of the stamps and First Day covers was arranged at Hornbill House. The stamps are now available at the GPO.

Dr. and Mrs. Alexander showed a keen interest in the National Heritage collection of natural history specimens at the BNHS. □

(Continued on page 30)

DR SÁLIM ALI CENTENARY YEAR



The stamps and first day cover were released by His Excellency the Governor of Maharashtra, Dr. P. C. Alexander

function as the Sálim Ali Centenary Committee. Under the guidance of the President and the members of the EC, the following programmes were arranged:

□ The Sálim Ali Centenary Year was officially launched on 11th November 1995 by the Mayor of Mumbai, Hon. Mr. R. T. Kadam. On this occasion the updated 2nd edition of **A Pictorial Guide to the Birds of Indian Subcontinent** was released by the Mayor.

□ The **Sálim Ali National Bird Count** was arranged

THE Centenary Celebrations started in October 1994, when the Director, Dr. Jay S. Samant asked the Curator to submit a tentative programme which could be arranged during the Centenary Year of Dr. Sálim Ali. Accordingly, the list of activities which could be carried out during the year was discussed in the Office Bearers Meeting and finalised. A small Working Group including the Director, Mr. N Chaturvedi, Curator and the PRO, Mr. Isaac Kehimkar was formed to initiate various activities. Subsequently, it was decided that the whole Executive Committee (EC) would

all over India on 11th November 1995. In Mumbai, the Bird Count was conducted at the Sanjay Gandhi National Park, where the Principal Chief Conservator of Forests, Mr. A. R. Raddi was the Chief Guest and Mr David Elcome from the RSPB, UK, was the Guest of Honour. Several forest officers including the Conservator of Forests, Mr. A. K. Nigam, Park Manager, Mr. A. R. Bharati and members of the EC, Mr. Humayun Abdulali, Dr. R. Reuben, Mr. M. R. Almeida, Mr. Sunjoy Monga, Dr. A. M. Bhagwat and Dr. J. S. Samant, students and reporters from various

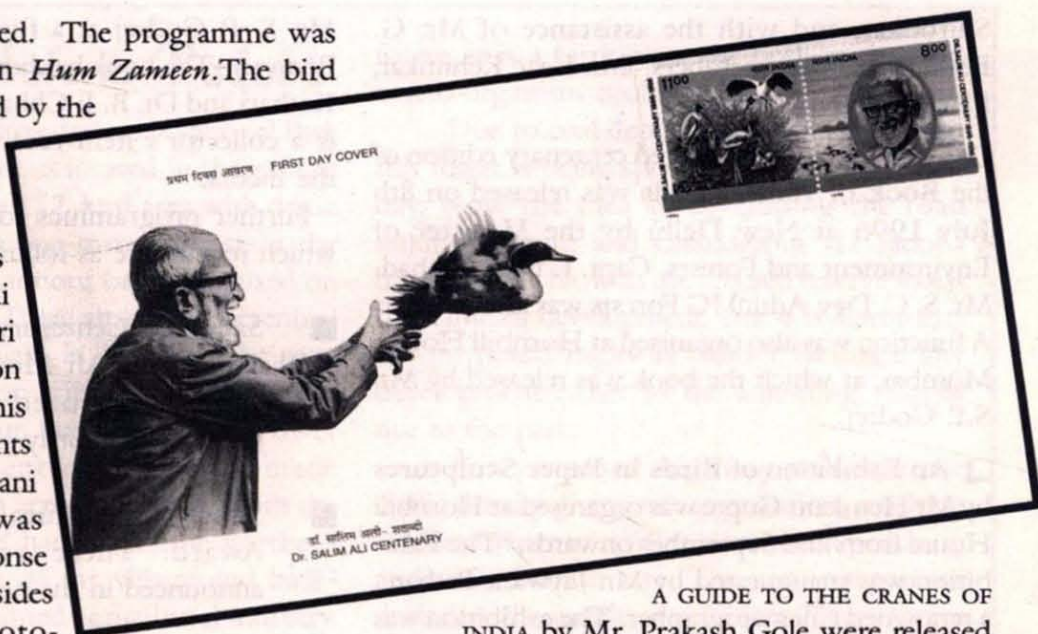
newspapers participated. The programme was covered by Zee TV in *Hum Zameen*. The bird count was coordinated by the

Conservation Officer, Mr. Asad Akhtar.

□ **The Rare Books Exhibition** was inaugurated by Sawai Bahadur Maharao Shri Pragmulji of Kutch on 15th December. On this occasion, a set of 4 prints was released by Maharani Preetidevi. There was excellent public response to the Exhibition. Besides the books, photographs of the late Dr. Salim Ali were also displayed. The Exhibition was organised under the guidance of Dr. Ashok Kothari, Chairman, Library Sub-Committee and Dr. B. F. Chhapgar, EC Member.

□ **Rangoli of Birds:** an exhibition was inaugurated by Mr. Govind Swaroop on 22nd January. Rangoli being a unique medium to exhibit birds, the Exhibition by the artists of Rangavali Kala Darshan received excellent response.

□ **The Salim Ali International Seminar on Conservation of Avifauna of Wetlands and Grasslands** was organised at the Indira Gandhi Institute of Developmental Research, Mumbai. The Seminar was inaugurated by Mr. Mohan Dharia, Ex-Deputy Chairman, Planning Commission, while Dr. M. S. Swaminathan delivered the keynote address on "Building a National Ecological Security System". Ninety papers were presented and many resolutions were passed on the concluding day. The Seminar was followed by a tour to Jayakwadi, one of the Ramsar sites. During the Seminar a special issue of *Hornbill* dedicated to Dr. Salim Ali, two new BNHS titles, *A WEEK WITH ELEPHANTS*, edited by Mr. J.C. Daniel and Dr. Hemant Datye and



A GUIDE TO THE CRANES OF INDIA by Mr. Prakash Gole were released along with ORNITHOBOTANY OF BAYA by Mr. Satish Kumar Sharma, Range Forest Officer, Rajasthan. Considering the limited resources available, the Seminar was a grand success. The PROCEEDINGS of the Seminar are under preparation.

□ **Dr. Salim Ali Centenary National Painting Contest for children** was organised on 25th February 1996. The programme was conducted at various centres all over India with the active participation of our members. Prizes were given to the winners on 5th June 1996, World Environment Day, by the Chief Guest, Mr S. P. Godrej. On this occasion an Exhibition of posters *Himalayan Vision* was also arranged with the assistance of the British Council Division.

□ **The Salim Ali Centenary Nature Photography Competition** was held during May-June 1996. On 20th June the Prize Distribution and an **Exhibition** of selected photographs was organised. The prizes were given away by the Chief Guest, Vice Adm. Vishnu Bhagwat, FOC-in-C, Western Naval Command. The prizes were sponsored by Mr. Ajit Kerkar, Chairman, Indian Hotels Co. Ltd. The Exhibition and Competition were arranged under the Chairmanship of Mr. Adhik

Shirodkar, and with the assistance of Mr. G. Bodhe and other members. Mr. Isaac Kehimkar, PRO, was the Convenor.

□ The revised and enlarged centenary edition of the **Book of Indian Birds** was released on 8th July 1996 at New Delhi by the Minister of Environment and Forests, Capt. J. N. P. Nishad. Mr. S. C. Dey, Addnl IG Forests was also present. A function was also organised at Hornbill House, Mumbai, at which the book was released by Mr. S.P. Godrej.

□ An Exhibition of **Birds in Paper Sculptures** by Mr Hemkant Gupte was organised at Hornbill House from 2nd September onwards. The Exhibition was inaugurated by Mr. Jaywant Pathare, a renowned cinematographer. The exhibition was highly appreciated by all visitors.

□ The **Sálím Ali Centenary Bird Stamp Exhibition** was organised from 17th September onwards. The Exhibition was inaugurated by Mr. R. Narasimhan, Chief Post Master General, Maharashtra. Many members exhibited their stamp collections during the Exhibition.

□ **A Tribute to Nature**, a mimesis in sandstone in honour of Dr. Sálím Ali was presented by Ms. Varashree Narayan. This was inaugurated by Mr. J. W. Edmundson, First Secretary (Cultural Affairs), British Council Division, on 24th October 1996.

□ **Release of Commemorative Postal Stamp** in honour of Dr. Sálím Ali on 12th November 1996. A set of stamps and the First Day Cover, designed by Mr. J.P. Irani, with a special cancellation was released by the Governor of Maharashtra, Dr. P. C. Alexander while Mrs. Ackamma Alexander was also present. The Chief Post Master General, Maharashtra Circle, Mr. Aggarwal presented the stamps to the Chief Guest who also visited the BNHS natural history collection.

□ **Sálím Ali's India**, a new BNHS title, was released on 2nd December 1996, by

Mr. S. P. Godrej at a function held in Godrej Bhawan. The book has been edited by Dr. Ashok Kothari and Dr. B. F. Chhapgar. The book which is a collector's item received wide publicity in the media.

Further programmes for the Centenary Year which remain are as follows:

■ **Sálím Ali Centenary International Award and Sálím Ali Memorial Lecture:** The awardee has been decided and will be announced shortly.

■ **Sálím Ali Naturalist/Young Biologist Award:** These awards will also be announced in the near future.

■ A special issue of the Journal of the BNHS, Vol 93 (3), September-December 1996, is in press. Dedicated to the memory of the late Dr. Sálím Ali, all the articles were written by special invitation.

Acknowledgement

I am thankful to the guidance and encouragement received from our President, Mr. B. G. Deshmukh. I am also thankful to the EC under whose aegis these programmes were conducted successfully. The Photography Exhibition was possible due to active support from BNHS members, especially Mr. Adhik Shirodkar. The Rare Books Exhibition and the book, **SÁLÍM ALÍ'S INDIA** were possible due to the active involvement of Dr. Ashok Kothari and Dr. B. F. Chhapgar. The successful completion of all these activities was possible due to active involvement of the BNHS staff, especially Mr. Isaac Kehimkar, PRO who worked in coordination with the Organising Secretary.

N. Chaturvedi,
Organising Secretary,
Sálím Ali Centenary Celebrations Committee.



□ Black Hole in Tadoba

TADOBA, the first declared National Park in Maharashtra, is located in the eastern corner of the state, a 117 km² area with dense semi-evergreen bamboo-mixed forest in the valleys and open deciduous bamboo-mixed on the plains and hills. There are several perennial water holes and nullahs in Tadoba. The river Erai is dependent on tributaries rising from Tadoba. Chandrapur Super Thermal Power Station is dependent on the water made available by the dam across this river. Both the river Andhari and Chandei on the northern edge are the lifeline of the village and backbone of the well-planned agricultural industry. Ramdegi, a temple of Lord Shiva, is on the banks of the river Chandei. Naleshwar and Chargaon dam are also dependent on the Tadoba tributaries.

Tadoba plays an important role in the sustainability of the village life, agricultural industry and industrial growth in Chandrapur district. There are about 40 tiger and 32 leopard, beside sloth bear, wild boar, wild dog, sambar, chital, gaur, jungle cat, barking deer, chousinga, nilgai, threatened species like leopard cat, flying squirrel and hyena.

The park acts like a gene bank providing biodiversity inputs to the degraded land and

forest, it is a birth-place for both micro- and macro-organism ecology.

Due to coal deposits and mineral wealth this forest is being spoiled ecologically day by day. Now the idea of developing the road linking Chimur and Chandrapur via Tadoba has come as a blow to the secured reserve forest the name of development. But it is learnt that the proposed highway cannot facilitate any development either to the adjoining villages nor to the park.

The proposed highway will increase traffic density giving rise to pollution, resulting in disturbance to wildlife; increase in poaching and deforestation rate. The very purpose of declaring the jungle as a Project Tiger reserve is foiled. The highway, if diverted from Khadsinghi via Shegaon Astha-Mudholi-Kondegaon to Moharli would be a boon for more than one hundred villages.

It is an earnest request to all nature lovers to make an effort to protect Tadoba forest by writing a protest letter to the concerned authorities, asking them to review the proposal. Let us protect the left-over forest and safe-guard its wildlife, and show in practice what we preach! □

*For details contact:
Rhino Nature Club,
Urjanagar.*

□ Rediscovery of Edward's Pheasant

THE Edward's pheasant, which was last seen many years ago and feared by biologists to have become extinct, has been "re-discovered" in Vietnam. Living in thick forests on flat land, a male and a female were caught alive by farmers who brought them to be seen and authenticated by experts. Unfortunately, while catching the female its leg was broken and it soon died, setting at rest any chance of captive breeding. If, unfortunately, no more live specimens exist, this may be the last female of the species to be seen alive. □

Quoted from a BBC newscast.

□ INSA awards 1997-98

Applications are invited for partial financial assistance to participate in important scientific international conferences abroad in 1997-98. Scientists are requested to apply in the prescribed proforma which is available from the Office of the Executive Secretary, Indian National Science Academy, Bahadur Shah Zafar Marg, New Delhi-110 002.

Categories: (1) For International Council of Scientific Unions (ICSU) and its affiliated bodies to which the Academy adheres (ICSU Conferences); (2) For international agencies (Non-ICSU Conferences); and (3) For applicants who are interested in partial travel assistance only for participation in any international conference abroad. Under this category the applicant must be below 35 years.

Category 1: A scientist who has been invited to deliver a plenary lecture/preside over a session of a scientific conference or whose paper has been accepted for presentation and who will also be provided maintenance allowance during his/her stay abroad and partial travel expenses by some agency, will be given preference. INSA's financial support is limited to a maximum of 50% international travel, 50% maintenance allowance for the duration of the conference and 100% registration fee, wherever necessary. The prescribed application form duly completed should be despatched latest by 31st January each year.

Category 2: A scientist who has been invited to deliver a plenary lecture/preside over a session or whose paper has been accepted for presentation and who will also be provided maintenance allowance during his/her stay abroad and partial travel expenses by some agency, will be given preference. INSA's

financial support is limited to Rs. 15,000/- only. Application should be received at least three months prior to the date of commencement of the Conference.

Category 3: A scientist who requires partial travel assistance only for participation in any international conference/regional meeting and is below 35 years of age may send his/her formal request on a prescribed application form atleast three months prior to the date of commencement of the conference. Eligibility criteria are:

- (a) His/her age should be below 35 years on the date of commencement of the conference.
- (b) He/She should hold a doctorate degree or should have registered for Ph.D. with two or more publications in research journals and may be in regular employment or otherwise active in research.
- (c) His/her paper should have been accepted for presentation.
- (d) The award is for a maximum amount of Rs. 10,000/- to meet partial travel expenses. The remaining travel expenses and local hospitality has to be borne by the organisers or some other recognised agencies.

Candidate selected will be supported partially for their travel cost, jointly by INSA, COSTED (Committee on Science & Technology in Developing Countries) and CSIR. The applications will be screened once in a quarter during the year. Applications under this category may be sent directly to the Scientific Secretary, COSTED, 24 Ganchi Mandap Road, Madras-600 025, Phone: (044) 419466, 416614, Fax No: 91-44-4914543. □

□ **Mormons in my Garden**

SANDHYA Thulsidas, a student member of BNHS is keen on butterflies and shares some observations with us:

On a visit in August to my village (Vakkom-Trivandrum district) in Kerala, I happened to see a pair of Blue Mormons regularly visiting the garden in front of my house.

This is supposed to be the second largest swallowtail butterfly in peninsular India - almost twice the size of a Common Mormon. It came to my notice that these two preferred to land repeatedly on the orange flowers of *Ixora coccinia* and feed on the nectar.

Another interesting feature I noticed was that these butterflies visited the garden only in the afternoon, and made about 5-6 visits between 12 noon & 1 p.m.

I don't know if this observation reflects any particular relationship of the Blue Mormon with the time factor, but people who are interested in taking photographs of these beautiful creatures are sure to find this time specificity to their advantage. □

□ **Salim Ali Stamps released**

WITH the calls of the ring dove and babblers forming the background music, a function was held at Sundarvan, the Nature Education Centre run by the Centre for Environment Education, Ahmedabad. Conservationists, bird watchers and philatelists had gathered to witness the release of stamps to mark the Centenary of Dr. Salim Ali. Mr. J. Urfi who welcomed the gathering recalled that Dr. Salim Ali had inaugurated Sundarvan in 1976. Mr. Lavkumar Khacher, a tireless crusader for conservation, lamented the degradation of our environment and the general apathy on conservation issues. He released the stamps, accepting the album from S. Theodore Baskaran, Chief Postmaster General, Gujarat Circle. Mr. Baskaran said that Dr. Salim Ali's Book of Indian Birds had converted many to bird watching. Mr. A.N.D. Nanavati, ex-Hon. Secretary, BNHS, recalled his days with Dr. Salim Ali. The stamps have a unique design called Setenant in which two stamps of different denominations form one composite design. This is a singular honour reserved for rare occasions. □

□ **Duties of BNHS Members**

*Are you an active member,
the kind that would be missed?*

*Or are you just contented
That your name is on the list?*

NOW, as on many occasions in the past, our editors need contributions from members of a popular nature. The Society is a mutual one, the more the Society benefits, the more the member benefits. The Society is finding it difficult to procure voluntary contributions of a popular nature. Again and again we have stressed that no lofty literary attainments are necessary for writing... If only members would take the trouble to send us notes of anything that has excited their curiosity. The cultivation ... of the habit of observation and an enquiring mind is what is wanted and is not difficult to acquire.

In 1952 the present writer made a note, 'The real basis of a successful journal and a successful Society is more co-operation from many members who do not actually help the Society. The duty of membership goes considerably further than just reading the *Journal*. It is hoped this appeal may have useful results. □

R.W. Burton Lt. Col. (Retd.).

Dec. 11, 1955

Reprinted from *JBNS* Vol. 53

Sálim Ali on Conservation

Steps we need to take...

REHABILITATING a dying species needs a detailed study of its habits and habitat. Only then can we experiment to evolve satisfactory methods of ensuring a species' survival.

Animal species that have become extinct in recent years have been edged out by human actions. What is not realised is that each organism plays a specific role in nature. The removal of a species leads to the weakening of the ecological fabric. The balance may be upset in many ways; it might drag other species to their doom or boost their number to such a degree that they become pests.

How exactly a species helps in maintaining the ecological balance is not always obvious. With our present-day sophistication it is not always possible to find out the multiple roles an organism plays. The Chinese experiment to exterminate sparrows to protect crop grains is a good example of miscalculation. Sparrows eat grain and therefore, in certain situations, can become man's serious competitors for food. Thus, killing all sparrows would apparently mean increased crop yield. Based on such experience, they planned a mass sparrow extermination programme in China. What they hadn't calculated was the major role that sparrows play in containing insect crop pests. Adult sparrows can and do eat grain, but during the breeding season, their diet and the food brought to the nestlings consists mainly of soft-bodied insects and grubs. The insects and grubs also provide the liquid requirements of the

young birds which cannot get enough water otherwise. The growing baby birds have voracious appetites and the parents have to work all day long and make several foraging trips to keep them from starving. Thus, when a sparrow visits a grain field, it is unreasonable to assume that it is there only to eat grain. An analysis of the stomach contents of birds would be a better guide to a bird's diet. The Chinese experiment boomeranged. When the sparrow's numbers declined, there was a tremendous increase in insect population, which led to a great loss of crops.

Similarly, the heron was believed to adversely affect trout fishing in Kashmir. But the heron looks for food in shallow waters and trout live in deeper water. In reality, the heron helps the trout by devouring its egg predators.

Not all instances of removal of species have results as dramatic as in the Chinese sparrow experiment. But the fact that a species is dying out indicates that something is going wrong and the diagnosis needs detailed investigations. It is unwise to tamper with the natural processes.

There are many reasons why some species are dying out. One of the major causes for their decline is that their special habitats are being destroyed, and so many of them have nowhere to live. A marsh bird, for example, is specially adapted to hunting and living there; it may be entirely dependent on certain marsh organisms for its food, or it may have evolved to build nests in certain types of trees or in particular areas. Similarly, a forest bird may have evolved specially for living and hunting in its niche. It might even

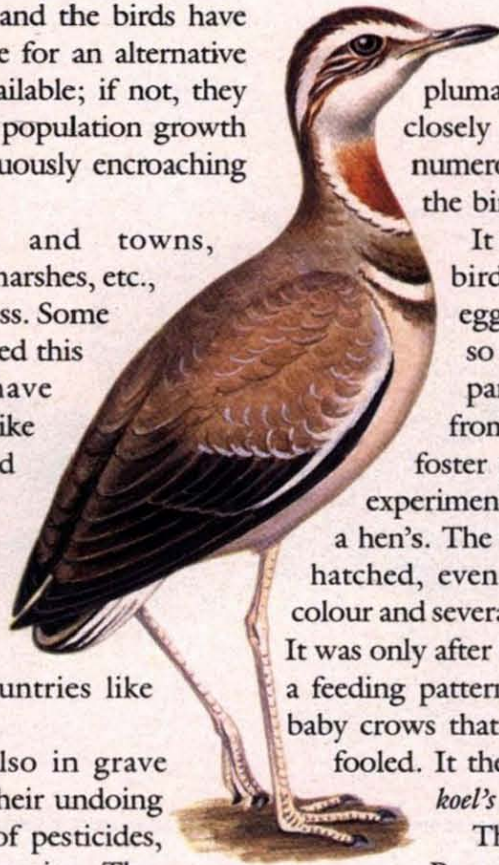
Condensed from Science Today, February 1979

have evolved special protective coloration. Remove the special habitat and the birds have no foothold. They may leave for an alternative accommodation if one is available; if not, they will have to perish. Human population growth and development are continuously encroaching on their territory.

Expansion of cities and towns, deforestation, reclaiming of marshes, etc., have left many species homeless. Some birds like the crow have turned this to their advantage and have become pests. Game birds like partridges, quail, ducks and bustards are indiscriminately hunted on a commercial scale for food. Excessive egg-collecting by hobbyists has helped in pushing some species to extinction in countries like England.

The birds of prey are also in grave danger all over the world. Their undoing has been the increased use of pesticides, along with their habitat destruction. These birds are at the apex of the food chain and get the full blast of any toxin that might be used. For example, pesticides used on crop pests accumulate in the crop-eating pests like mice, insects, etc. From them the toxins pass on to their predators: snakes, frogs, etc., and these animals are then preyed upon by others and so on. And the toxins keep accumulating in each organism.

Pesticides which contain cumulative toxins may lead to the death of the bird or affect its breeding efficiency. Toxic chemicals have led to the thinning of egg shells of many species. Thus, when the bird tries to incubate the egg, the weak shells crack under its weight. The eggs of many species that are especially endangered have been artificially incubated and

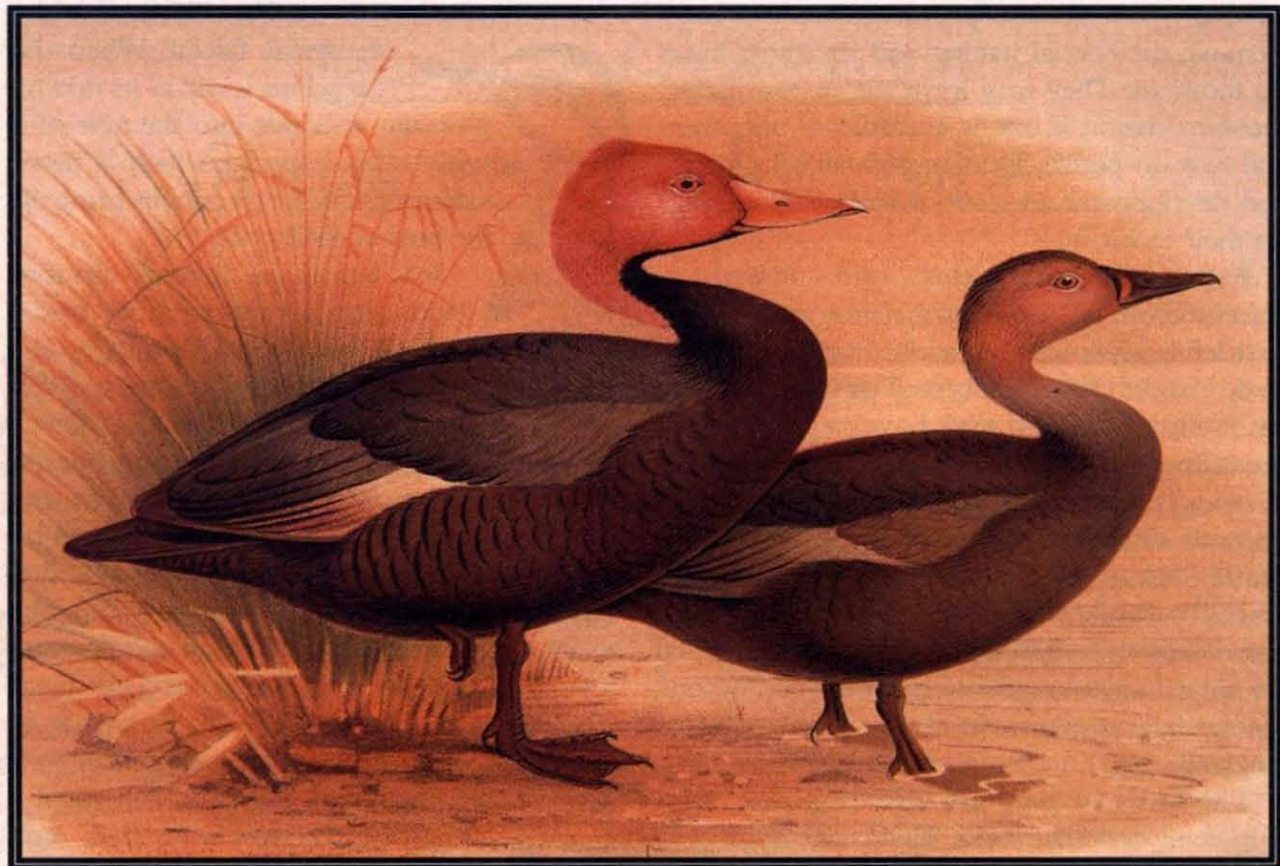


The Jerdon's Courser was thought to be extinct until 1986, when it was rediscovered by a BMS scientist in Andhra Pradesh

hatched. This has been done with the peregrine falcon. When the baby bird is still in its downy plumage, it is put into the nest of a closely related species which is more numerous. The foster parents bring up the bird as their own.

It is remarkable how we can fool birds into accepting other birds' eggs. The *koel* does it regularly, and so does its cousin the cuckoo. The parasite's baby is often so different from their natural offspring, but the foster parents fail to see this. In one experiment, a crow's egg was replaced by a hen's. The crow dutifully sat on it until it hatched, even though it was of a different colour and several times larger than its own eggs. It was only after the chick hatched and exhibited a feeding pattern totally different from that of baby crows that the crow realised it had been fooled. It then killed the chick. But, with a *koel's* egg, the crow never finds out.

The International Council for Bird Preservation (ICBP) has several groups — bustard group, crane group, pheasant group, and so on — to study the problems of each species and to suggest specific rehabilitation methods for each. The crane group has come up with an interesting method of increasing the breeding efficiency of the bird. Their studies show that cranes generally lay two eggs, but only one offspring survives. The second egg is laid three or four days after the first. But the bird begins incubating immediately after laying the first egg. As a result, the first egg hatches before the second. The first offspring, being older, has an edge over its sibling. It manages to get all the food that the parents bring in and it may ultimately kill the younger chick. Or the younger one may die of starvation. To avert this, one



Beyond redemption — the pinkheaded duck is now almost certainly extinct.

egg is removed from the nest and artificially hatched and the chick is hand raised. Thus, the International Crane Foundation has helped breeding success to go up by 100 per cent instead of only 50. The US has about 13 species of cranes; nearly all of them have been successfully bred this way.

Perhaps we could use this technique to preserve our endangered Tibetan blacknecked crane in Ladakh. Theoretically, it should be possible, but there are too many practical problems. When the egg is taken from the nest for artificial raising, it should have been incubated by the parents for about three weeks. Thus, it is necessary to keep a close watch on the nesting pair which, in those far-flung and remote areas, is scarcely possible. The real position of the Tibetan blacknecked crane is difficult to assess. The main habitat of the bird is Tibet. In the present condi-

tions, it is not possible to get information about the bird's status there, and so we do not know how the bird is faring in Tibet.

The Pink-headed Duck

And then, there is the case of the pink-headed duck. The last one was spotted in Bihar before the turn of this century. There was a report that four or five pink-headed ducks were spotted by someone on the Chinese side of the India-Burma-China border. The person wrote to the WWF that the birds visit the place every winter. However, this person had got his report from another who said that the spot was some three days' journey from the border. He promised photographs of the bird if the WWF sent him a camera with some specific attachments. Now this is too expensive, and is it worth spending all that money on a wild goose chase? All we can surmise

is that the report is probably true since he distinguished it from the white-winged wood ducks; these, too, are regular winter visitors (whose number also continues to decrease).

But we cannot always rely blindly on a layman's description. For example, the Bombay Natural History Society issued posters of the rare birds, Jerdon's courser and Blewitt's owl, requesting the public to report if they came across them. Despite the clear description and pictures, there were several wrong reports claiming that the birds had been spotted. Every time a report was followed up, it was found to be a bird of the more common species resembling the rare one. This is undoubtedly on account of our general lack of interest in nature. If only our schools took greater interest in the subject!

Reviving 'Extinct' Species

A keen interest in nature has helped to revive some bird species in England. At the end of World War II, when many towns were destroyed and the wilderness once again reigned supreme after the blitz, several birds that had not been seen for many years came back. One of them was the avocet. This slender black and white marsh bird was last seen in England more than a hundred years before the end of the war. It had once bred freely in England. With the removal of human disturbances, it came back. First, one pair was located. It was quickly identified and many societies came forward to protect the bird. A 24-hour guard was set up against egg thieves. (Egg collectors are a major menace in the UK.) The birds had come from Germany and Holland and they now breed well in England. These birds had fled England when the marshes had been drained for human settlements.

The redstart (which means red tail in Dutch) was another bird that was rehabilitated similarly by the war. When these birds came back, the starling population, which had reached pest proportions, began to reduce on its own; the pigeon and sparrow populations, too, reduced.

Can we revive species by recreating their lost niches? To a certain extent we can. For example, Bombay, when it was smaller, cleaner and less congested, had several beautiful song birds. Today most of us see only crows. There has been a crow population explosion due to the unhygienic garbage disposal methods. Generally, crows lived only outside human settlements where garbage was thrown. Today our streets and footpaths are littered and the birds have their heyday. Not only do they live off the filth and spread it around, but they also kill the pretty song birds and eat their eggs. Crows indicate the sanitary condition of a city. Why, even the National Park in Borivli, Bombay is now infested with crows because picnickers are careless about throwing refuse. If we had an efficient municipality, we won't need crows, nor will there be that many. We cannot easily get rid of this pest. Using poisoned bait may affect other animals and birds since the crows tend to carry off their food to eat and often drop it elsewhere. If we can curb this pest by improving sanitation and increase the greenery, the other birds may yet return.

Another pest is the rose-ringed parakeet. They cause immense damage to crops. They eat fruits, taking a bite here and there and destroying them by thousands. They live off the fat of the land as the field mice do. In their huge numbers they are extremely destructive. We have suggested to the President of the International Council for Bird Preservation to can parakeet meat. The ICBP is wary of commercialising any bird product. After all, commercialisation has spelt the doom of partridges, quail, etc. But if parakeets will have to be killed as pests, why waste their meat?

Perhaps we could restore the natural ecological balance by scientific methods. How many species will have died by then we are not sure. □

Salim Ali

OBITUARY

K.P. SHIRODKAR
1938 — 1996

KP. SHIRODKAR or KPS as he was known in the office joined the BNHS in 1963 as despatch clerk, but was soon transferred to the Publications section where he was to look after the Society's Journal for the rest of his career with the BNHS. He retired in July 1996 as Asst. Editor of the Journal. Shirodkar's meticulous attention to detail and careful editing and proof reading helped to maintain the standards of the Journal which he produced single handedly: a commendable job considering that each volume varied from 500 to 600 pages. As a person, Shirodkar was respected as a man of few words who, though warm and friendly, kept very much to himself and his comments were respected. The Society extended his service for an year to enable him to train his successor. Unfortunately he died in an accident. We share the sorrow of his family in their tragic loss.

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Even a Monitor can be a Beauty

RANJIT MANAKADAN

WNE always had the impression that monitor lizards were drab and not colourful creatures. That is quite true, but here is an exception that disproves this misbelief. The young can be quite colourful, strikingly blotched, striped, or dotted, as in the case of many snakes. This colour pattern falls into the category of disruptive cryptic colouring, an adaptation to escape from predators. The adults are drab so they can successfully use ambush techniques to obtain prey.

This specimen was photographed at the Rollapadu Wildlife Sanctuary in Andhra

Pradesh. Protection and habitat improvements intended for the great Indian bustard have benefited many other species, such as the blackbuck, wolf, Indian fox, blacknaped hare, lesser florican and monitor lizard. Prior to the Forest Department's jurisdiction over the area, any monitor coming in the path of a human being would end up in the pot. The flesh of the monitor is believed to toughen the back muscles. This is far from likely, but the monitor is killed nevertheless. Being included in Schedule I of the Wildlife Act, it is protected, though only on paper, on par with the tiger. □

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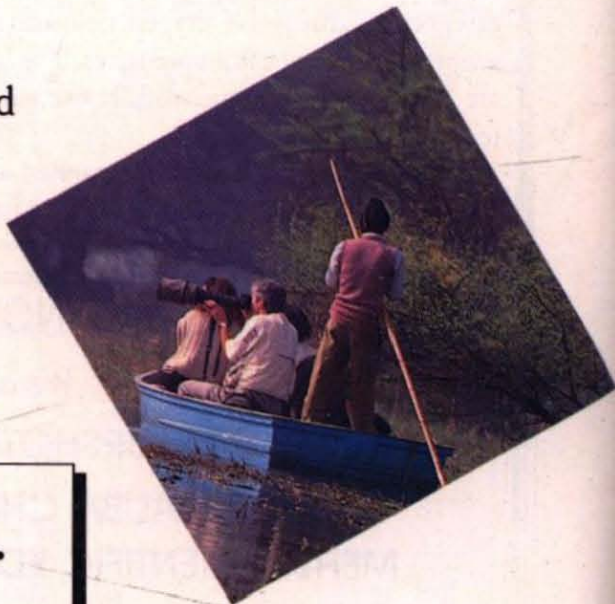
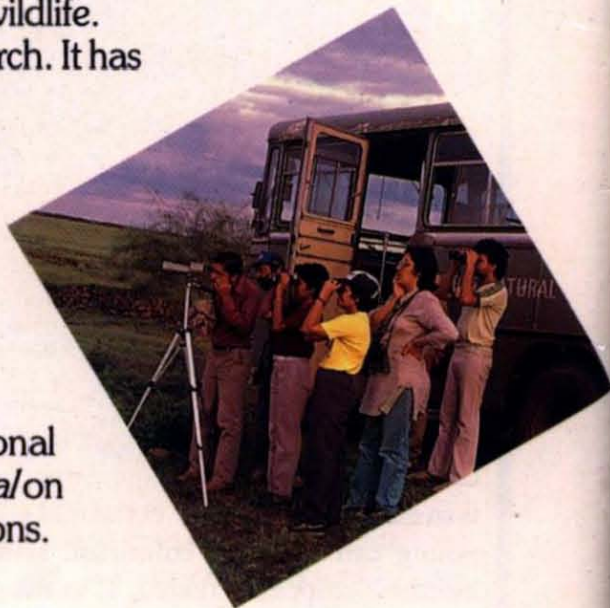
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