

1989 (1)

# Hornbill



BOMBAY NATURAL HISTORY SOCIETY



COVER PHOTO: Great Indian Bustard by Asad R. Rahmani

The endangered Great Indian Bustard (*Ardeotis nigriceps*) performs an elaborate courtship display, which serves both to attract females and to warn off other adult males.

During the breeding season, adult males separate from the flocks to establish territories. One or two elevated spots within the territory are chosen as display sites; often the same site is used year after year.

Each morning and evening, the cock struts around on its favourite spot, head held as high as possible. Slowly it puffs and gulps in air, causing the gular pouch to inflate. The chin feathers are erected; the tail is cocked; wings are partially drooped.

Every 14 seconds on an average, the cock makes a booming call which, though not loud, carries far — upto a kilometre or even more in the calm mornings and evenings.

#### **Acknowledgement**

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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 advancement of the study of zoology and botany in the Oriental Region. The Society also promotes measures for conservation of nature.

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Write to: The Honorary Secretary, Bombay Natural History Society.

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# Editorial

## Self Deception

In 1965, I had, with the assistance of colleagues from the Society and with the help of George Schaller, investigated the status of the Peninsular India population of the Indian Wild Buffalo in Bastar. After many days of endeavour we did not find evidence that there were more than 250 wild buffaloes in Bastar. Bastar was then really wild country and had not been "developed". Since then, from time to time members of the Society have monitored the buffaloes of Bastar. As a continuation, a resurvey of the area was done in 1988 over a period of a fortnight. Actual sightings were ten and it was estimated that less than 100 now exist in Bastar. The reasons are not far to seek. Uncontrolled destruction of forest cover coupled with encroachments, fire and hunting have devastated the habitat and the very existence of this population.

Unfortunately, our report has been received with anger and well-simulated scepticism. It is very disheartening that we, as a nation, appear to be unable to look at hard facts; the wish to deceive ourselves with illusory estimates of numbers and situations appears to be strongly entrenched.

By the time we get over our illusions it may be too late to save our endangered species and their ecosystems.

# The Problem of



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# P L E N T Y

ASAD RAHMANI

We have heard so often about the problem of disappearing species that it is difficult to imagine a scenario where we have a problem of plenty—too many wild animals in an area. While this overabundance may gladden the heart of animal lovers, it may not be a healthy development, especially if the needs of the animal in question conflict with those of the local people.

In a country like ours, where more than 80 percent of the population is rural, no conservation movement can survive for long without the support of the people who live in or around conservation areas. Naturally, they will cooperate only as long as they themselves benefit, or at least are not adversely affected by conservation measures. Unfortunately, just the opposite is happening in many of our newly-created protected areas. The best example is the blackbuck and its

burgeoning population.

The blackbuck, *Antelope cervicapra*, (the only member of its genus) is endemic to India, Pakistan and Nepal. At one time, it was the most common wild ungulate in the Indian countryside. It is a creature of the open—rolling grasslands, light scrub land, cultivated fields — areas easily accessible to hunters. There were few shikaris living in the Deccan or northwest India who had not shot a blackbuck. For many, it was the first animal with which to begin big-game hunting; later they would graduate to more scarce or difficult species. So great was the hunting pressure that, in spite of the tremendous breeding capacity of the blackbuck, it started to decline at the beginning of this century. However, in our vast country, there were always some areas where the blackbuck was safe. Being the fastest Indian ungulate it could



outrun its predators; but with the advent of the jeep in the mid-forties, the balance tilted in favour of man.

Within a decade, the blackbuck had disappeared from a greater part of the country. No more was there safety in remoteness; the jeep could go anywhere in the blackbuck habitat. The oft-quoted figures based on the estimate of the Wildlife Preservation Society of India are that in 1948 there were 80,000 blackbuck in India, but by 1968 only 8,000 were left. Like the figure of 40,000 tigers 50 years ago (which is purely a figment of the imagination) the blackbuck population estimates are not backed by proof, and I think it is time we discarded them.

However, whether the figures are right or wrong, there is no denying the fact that the blackbuck numbers

declined rapidly. At one time in the sixties, it was feared that the species may not survive. One so-called 'sportsman' described how he and his friends killed 14 blackbuck near Delhi by chasing them in a jeep. This was done when blackbuck were already a protected species! So much for 'sportsmanship'.

The blackbuck lives in open country, where control on poaching is not easy, and the butchery went on unhindered. In most places, it stopped only when there were no more blackbuck to be killed. The Wildlife (Protection) Act of 1972 came just in time, and gave the remaining blackbuck and other wildlife much-needed legal protection.

The blackbuck is still widely present (though scattered) in 13 states of our country. M K Ranjitsinh, in

his doctoral dissertation on blackbuck in 1982, estimated their population in India as between 22,000 and 24,000. Based on my field notes and on data gathered from fellow-naturalists and forest officials, I believe the population now is somewhere between 29,000 and 38,000. This big gap between estimated minimum and maximum numbers is mainly due to the rather questionable official and non-official figures from certain regions. Interestingly, the population increase is not seen so much in the well-known blackbuck areas

antelopes increased from 100-150 animals in 1981 to nearly 800 in 1988 (official figures are higher still). According to a short note published in the Journal of the BNHS, the 3042 hectare Alliyamangalam Reserve Forest, 145 km. southwest of Madras, had 5 blackbuck in 1966. A few more animals were later introduced. By 1982 the population had gone up to 92. In the same state, in the Vallanadu Reserve Forest in Tirunelveli district, a population of 30 in 1980-81 had increased to 100 in 1987. The state forest department



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Blackbuck: in line for trouble?

(Velavadar, Tar Chapper, Ranibennur, Point Calimere) but in recently-declared sanctuaries like Karera (Madhya Pradesh), Rekhuri and Nanaj (Maharashtra), Vallanadu (Tamil Nadu) and Sorson (Rajasthan).

For instance, in the Karera Bustard Sanctuary, in 1982, when we started our work on the bustard, I estimated the population as 50-60 blackbuck; by 1988 it had increased to 500-550. Similarly, in Nanaj the

has proposed Vallanadu as a blackbuck sanctuary.

During our work on the Great Indian Bustard and floricans, I had the opportunity to travel to most of the blackbuck areas, as the bustard and the blackbuck share the same habitat. During the last 7 or 8 years I have seen populations increase rapidly in numerous areas which have been adequately protected. Herds are flourishing in many ma-

for afforestation plots in Solapur, Ahmednagar and Aurangabad districts. Blackbuck are seen in 13 districts of Maharashtra; total population is estimated to be between 4500 and 5000. Gujarat has the famous Velavadar Blackbuck National Park in Bhavnagar district, and 15 other places besides. In Dhankaniya veedi in Botad Taluka, I saw nearly 300, including a few white mutants.

The biggest concentration of the blackbuck is seen in the two Bishnoi areas in Jodhpur district: Dhawa-Doli and Guru-Bishnonian. According to a census carried out by the forest department, there are nearly 10,000 blackbuck in these two areas. Scientists of the Central Arid Zone Research Institute in Jodhpur estimate the population as somewhat less, but agree that it is still the largest in India.

Ironically, it is the population increase of the blackbuck which may again put the species in jeopardy. Being an animal of open grasslands, the blackbuck adapts well to crop fields, which can be considered pseudo-grasslands. While the animals seem content with this change, the farmers are not. Crop yields are meagre, and the farmers unwilling to share them with the antelopes. Conflicts are increasing in direct proportion to blackbuck numbers. This problem has become extremely acute in bustard sanctuaries like Karera and Nanaj which were developed in agricultural areas. The blackbuck (in some areas

chinkara also) benefitted greatly from this protection. Here the antelopes live right in the middle of crop fields and private lands. Earlier, their numbers were kept down by hunting, but now the locals do not kill the animals because of fear of the law. But for how long? Our populism-hungry politicians will not take long to find a new vote-bank of disgruntled farmers. Crop damage by blackbuck has already become a major local issue in Karera and Nanaj—the two places I know intimately. Recently, one of the first orders issued by a forest minister of Madhya Pradesh (his term, fortunately, was brief) was to force his department to catch and transfer the blackbuck from the Karera Bustard Sanctuary. The officers protested that the time given was too short and that, moreover, summer was not the best season to catch these delicate animals. The minister would have none of this, and senior officials of the department were hustled off to Karera to 'supervise' the operations. Professional trappers were summoned and put to work. The result? They caught only one blackbuck, and that one eventually died of exhaustion and shock.

But the fact remains that some solution must be found to this growing conflict between rapidly increasing populations—blackbuck on one hand, and human beings on the other. Some people have suggested that shooting should be allowed in areas with an abundance of the





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animals. This would be premature; though numbers have increased in some areas, the overall population in India is still low. Unless we have 15 to 20 areas where healthy populations (above 1000 animals) are present, it would not be desirable to cull the population, even in areas where it is found in large numbers.

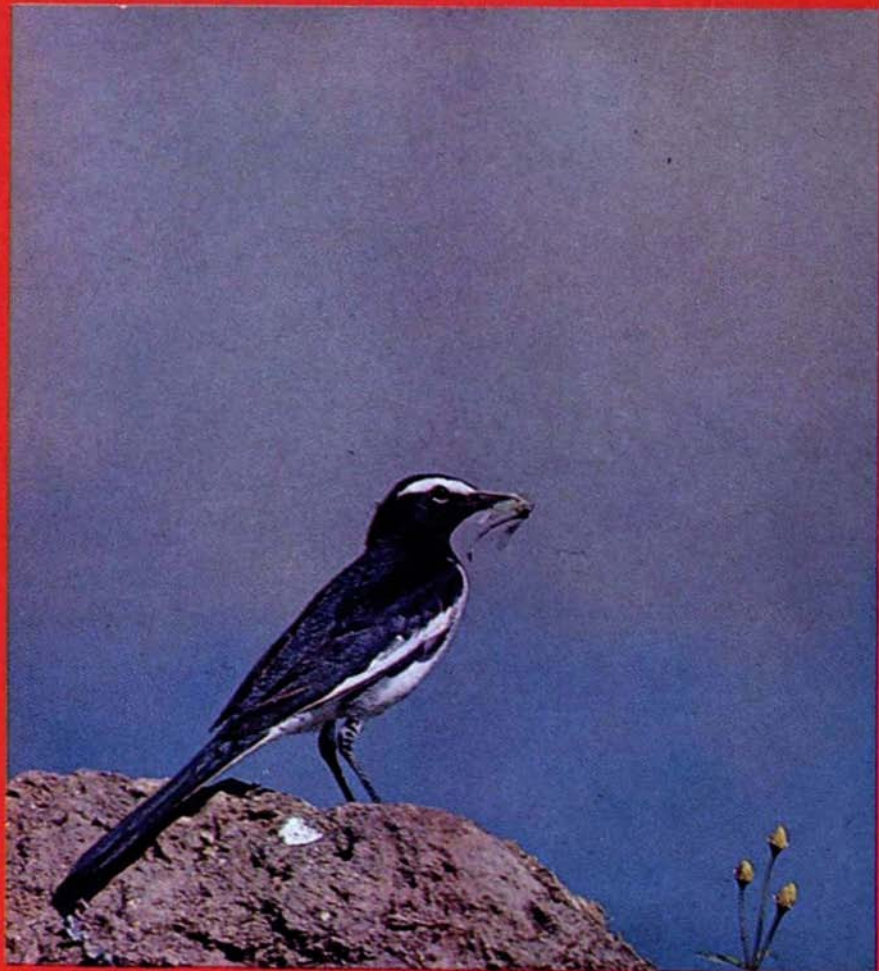
I believe that the most important issue today is to scientifically study the degree of crop damage by blackbuck, and the way to minimize it. Studies using modern methods like radio-telemetry and collar marking should be undertaken to find out the home range and movement of the blackbuck. We should also start experiments to evolve safe methods to catch the blackbuck in

sufficient numbers. They could then be translocated to sanctuaries or to new blackbuck centres in non-agricultural areas. For example, the excess blackbuck from Karera could be released in Kuno-Palpur sanctuary, which is about 150 km away. Keoladeo National Park near Bharatpur is left with a relict population of 15-20 blackbuck (possibly suffering from inbreeding). It could become a potential release site for blackbuck from certain over-populated areas like Tal Chapper and Dhawa-Doli.

The main argument against capture and translocation is that it is both costly and risky. Blackbuck are delicate animals, and most of them die during the operation. Tranquilization has been tried on many species in Africa and America, it is time we tried it in India, under Indian conditions. At the most, we will lose a few dozen animals during the early experimental stages. But once the technique is perfected, it will save hundreds of others.

As more and more land is opened to agriculture the problem of crop damage by wild animals will become more severe. Therefore, a new conservation strategy based on modern methods has to be evolved. Till now, we have concentrated mainly on protection *in situ*, but in the future, wildlifers will find it increasingly necessary to "manage" wildlife. By removing problem animals they can prove that they care as much about people as about wildlife.

# BIRDWATCHING



T.N.A. PERUMAL/SANCTUARY

## At 60 kmph

**BHARAT BHUSHAN**

*Homo sapiens birdwatcherii* is ritually a stealthy subspecies. This trait is developed, after much practice, to avoid frightening away the birds being watched. Occasionally, however, he moves swiftly, indulging in his passion at 60 kmph.

At 60 kmph? Yes; there is nothing like birdwatching to convert a long, tedious road journey into a fascinating nature trail. Watching birds on foot does not quite prepare you for watching them from a speeding vehicle. When you whizz past at 60 kmph, the bird is gone in a flash. You barely have time for a glimpse, and in conditions that make identification harder still. You see them in silhouette, often in a blur. They may be in direct sunlight or in shade or in flight from one to the other.

You cannot be content with on-the-road observations, but also have to look out for birds perched on trees or cables, for those that live near roadside jheels, and the ones soaring high overhead. But, with a little practise, identification becomes progressively easier. With the help of only fleeting glimpses of wing or tail, and a keen eye for silhouettes, you can soon tell the species apart. You can even begin predicting accurately which birds you are likely to see, and when and where. This makes identification not only easier but a lot more fun.

As you drive along the highway, there are some obvious birding high spots that strike you in the eye: the changes in the avifauna, sometimes gradual, sometimes abrupt. Suddenly, you notice a newcomer whom you hadn't seen for the past ten minutes. On the other hand, one species vanishes after being in constant sight for ten minutes. And ten minutes by vehicle is a considerable distance. In that time, you might

have skirted past a village, crossed a river, or driven by a jheel. As you approach a town or village, and when you leave it behind you, differences in the avifauna are apparent. The assemblages change and usually, though not always, the species differ outright. Outside a village one frequently sees Spotted, Ring and Little Brown Doves, Black Drongos, Grey and Rufousbacked Shrikes, Jungle Crows, Small Green Bee-eaters, Bank, Brahminy, Common and Pied Mynas, Redvented Bulbuls, Roseringed Parakeets and Blue Jays or Rollers. As you make the transition from uninhabited areas to dwellings, the bee-eaters, doves, bulbuls, and rollers slowly drop out from the scene. They are replaced by House Crows, House Sparrows, Blue-Rock Pigeons, Pariah Kites, Palm and House Swifts. In the midst of the inhabitation itself, the jungle crows, black drongos, the two species of shrikes, brahminy and pied mynas are scarcer, for this is kingdom of the house crow and the house sparrow.

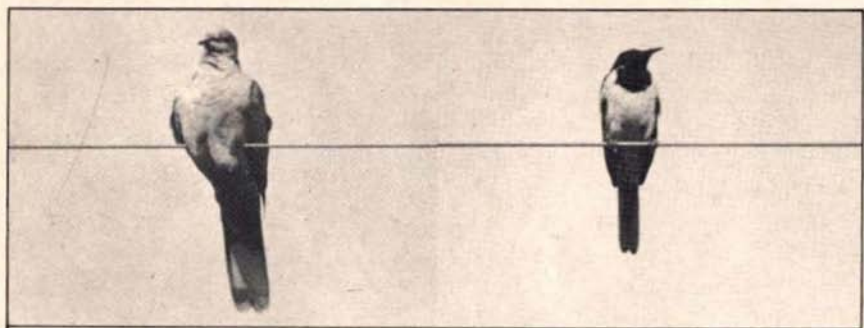
We were travelling across Bastar, Madhya Pradesh (somewhere between Jagdalpur and Bijapur) in mid-May 1987. Temperatures were touching 48° C, and we stopped for a break under the shade of a roadside mango plantation. Our clothes were drenched with sweat; the glare of the sun reflected off the black tarred road dulled our senses further. At that point we would have welcomed even a mirage of a refrigerator stocked with cold

drinks. The spell cast by the weather was broken by the only sight that could be welcome to a birder.

It was a flash of golden yellow, taking off from a mango tree and jetting across to a tall roadside eucalyptus. Golden Oriole! Soon we began noticing the other animals moving about and foraging in the intense heat. We saw several pairs of Indian Robins flitting in and out of the bushes and the roadside culverts. Then the very cryptic forest calotes, *Calotes rouxi*, males in their brilliant plumage, resting on the shady sides of the mango trees, heads downward; and strangely silent common mynas and Koel, some resting, others flitting about in the foliage.

ding on the habits, or occupations, of the townspeople. I always found blue-rock pigeons in larger numbers wherever stored grain is freely available in towns. The bank mynas are to be found where cooked food is available, near hotels and dhabas. The common myna, I think, acts as a common link between the blue-rock pigeon, bank myna, house crow and sparrow. It can be seen occupying all the urban niches of the othes. The roseringed parakeet is one bird which can be seen in a variety of places, urban or feral, wherever suitable nesting holes and tall evergreen trees abound.

Along the way you come across birds feeding in the middle of the road, seemingly unconcerned. Even



Fly-by-wire technology? Pied wagtail, ringed dove

This scene is found in several other places as well. Varying levels of temperature, rainfall, and day-length allow the adept bird watcher to maximise on local bird lists. The affinity of opportunistic bird species to human settlements is one of the high points in a birdwatch. The proportion of blue-rock pigeons, common and bank mynas varies depen-

when you approach, they merely move to the side of the road, into the mud and the grassy ridges, flying away only when you are very close to them. This group includes house and jungle crows; spotted, turtle, ring and little brown doves; common, bank, brahmyny and pied mynas; and the Redwattled Lapwing, which usually occurs in pairs.

Of this bunch of squatters, the doves give you the best opportunity for observation from close range. You can approach a pair to within a couple of feet before they fly off, and even then they do not move very far away; a short glide, and they feel safe enough to land once more.

Most villages have jheels nearby. While the banks are often crowded with birds, you do not have luxury of leisurely observation. Even more irritating at times is the glare of the sunlight reflected off the water. The birds that you can identify in such circumstances would be the ones on the bank nearest to the road, mostly the Little and Cattle Egrets, Blackwinged Stilts, redwattled lapwings and the domestic variety of mallard from the nearby village. At the water's edge, or on a jutting pole or rock, you might be able to make out the Little Cormorant with its characteristic silhouette. The Pied Kingfisher would be hovering at a certain height. The Whitebreasted Kingfisher, in contrast, would be sitting still, on a branch or on a cable wire nearby. If your vehicle has been slowed down by the hundreds of cattle and sheep being herded between village and grazing ground, you are more likely to spot the Common Kingfisher or make out the different species of wagtails.

There is a shallow jheel at Nandalur, Cudappah district, Andhra Pradesh, along the Madras-Hyderabad highway. If you travel regularly down this road at different times of the year, the seasonal

changes in the avifauna are very distinct. During winter, after the second monsoon that hits south India, the water spread is vast, and one can see thousands of wintering waterfowl. In the morning, the birds can be identified easily. But if you happen to pass by at noon or in the evening, the sun is in the west, and you see only silhouettes. Strangely, it is the evening scene that makes you stop for a second look. You see the shimmering water surface, with thousands of dark floating blobs. From the road, you can identify the grey herons, egrets, shovellers, flamingos and the brahminy kites by their distinctive silhouettes, but most of the other water-fowl are indistinguishable. In summer, the

Black drongo



AUTHOR

jheel dries up and only a small pond in the centre remains. The migratory birds have flown north, leaving behind the grey herons, egrets and brahmyny kites. You see them at the edge of the pond, waiting patiently for the village children to conclude their (not too successful) fishing operations.

Apart from the halts at the occasional jheel the road itself has a lot to offer the birdwatcher. It is lined with shrubs, bushes and plants in various grades of succession as and where influenced by the human hand. Many birds use them as lookout posts (grey and rufous-backed shrikes, small green bee-eaters and redvented bulbuls). Depending on the season, the smaller bushes show off the pied and collared bushchats, with the redstarts perched on their topmost twigs. The bigger bushes, along with other plants next to them, occasionally house nests of the weaver birds. The weaver birds themselves will usually be found in the fields nearby, along with redvented bulbuls and various other munias.

The large grey, jungle, common and yelloweyed babblers can be found in the bushes and shrubs too. All the babblers, except the yelloweyed species, can be seen flitting from one bush to another; their call is loud, incessant and characteristic. In the ground below the bushes and shrubs is seen the Indian robin. It is usually found on rocky outcrops interspersed between bushes. Both the male and female

can be seen hurrying into the rocks and bushes as the vehicle approaches. Also the grey partridge and the Jungle Bush Quail. Coveys can be seen darting across the road, or scampering past the bushes if you go too close.

The unfortunate part is that the tree stretches on both sides of the road are interrupted for long intervals. Some stands of trees are well grown and well cared for, but these stretches are few and far between. Most of the roadside plantations nowadays are in monoculture. One can see stretches of Eucalyptus, planted in rows three to five deep, suddenly interspersed with peepul, banyan and other wide-canopied trees. As such, the variance of avifauna along such stretches is very often noticed.

I distinctly remember a halt under a banyan tree once, in 1982, between Shivpuri and Indore; it was all I could do to tear myself away to continue the journey. By simply standing at one place and tilting my head up to look into the foliage, I counted six coppersmiths, two golden orioles, three female and two male Koel, two house crows, one Sunbird, and two roseringed parakeets. They were all busy eating the figs, and ignored us completely. I must have spent about fifteen minutes at that spot. Fifteen minutes, without moving a step in any direction; six arboreal species, eighteen individuals, all in one range of view! We were lucky we chose that particular tree to stop—except



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Pied mynas at nest

for the crows and parakeets, none of the other birds were seen on the roadside.

A frequent sight in north India is the gathering of Whitebacked, Neophron and Longbilled Vultures around fresh carcasses of cattle. The groups are anywhere from from 50 to 400 strong, growing larger with each passing minute. If you are lucky, you may see a King Vulture as well. At one such spot, we stopped to take photographs. The birds were so intent on feeding that we were able to get to within four feet of them without disturbing them. Yet, the moment two pariah dogs

arrived to share the spoils, the birds moved away.

In the late evening, as you speed towards the nearest town for your night halt, you can look back on a day well spent. Your vehicle flushes a nightjar from its roadside roost in the near darkness, and you notice that its eyes seem to glow in the dark. Nightjars usually prefer to remain seated on the ground, roosting in the centre of the road, and this does no good their road-safety record. By then, you have completed a full day of birdwatching, dawn to dusk, at 60 kmph.

# NARMADA VALLEY PROJECT

A PLEA FOR RATIONAL THINKING

A. N. D. NANAVATI

A lot of emotionalism has been generated over the question of the Narmada Valley and its so-called Development Plan. The plan, as envisaged, will submerge, and therefore destroy, vast tracts of land in the river basin, both forest and agricultural, as well as some portions claimed to be barren. All this destruction will be total and irreversible. If it fails to achieve the desired effect, there is no way of returning to the status quo that existed earlier. It is therefore essential that we consider the question rationally before taking such an irrevocable step.

What are the problems we are trying to remedy? The main problem appears to be one of availability of water to areas which are suffering from lack of water, for several years past; especially in Saurashtra and Cutch. Unfortunately, even the official plan document does not claim that the project will be able to provide water to all these areas. In fact, only a few talukas in 12 districts will get water from the irrigation canals, when these have been completed. The rest of Saurashtra and Cutch will continue to suffer, unless alternative strategies are evolved.

Before we think of remedies we have to consider what has caused this situation. On enquiry one finds that this problem has progressively worsened over the last two decades. Before that, there was enough water in these areas; there was no surplus, but people did not have to buy their drinking water. This water came from the catchment area of the Narmada, where the forest cover held the soil together. The rain water trapped in this soil was gradually released and found its way through small rivulets and tributaries, to maintain the flow in the river throughout the dry season. As a result of deforestation of the catchment area, the rain water is not held; both soil and water run off immediately into the river, causing flooding in the wet season. And since there is no water trapped in the soil to replenish the river, drought occurs in the dry season.

There may be other contributory factors, but most people will agree that this deforestation and loss of soil from the catchment area is the major factor responsible. When a river system **which has been an effective lifeline for centuries** is rendered ineffective due to one ma-



The positions of the photographs on page 15 have been interchanged. The one on top shows the plot *after* the dams were built.

change which has taken place, it surely makes sense to try and reverse this change by restoring the forest cover, rather than going in for grandiose, multicore projects which will produce further irreversible damage, and whose efficacy — even on the basis of the government's figures — is extremely doubtful. (I do not here refer to the government's predictions, which are based largely on illusory premises, but on the actual figures provided in the project proposal, which can be analyzed critically by anyone interested in doing so.)

Restoration of the forest cover will require two steps,

1. Building up the water reserves of the catchment area.

2. Afforestation of the catchment area with mixed indigenous forest species.

To accomplish the first objective, it will be necessary to construct a series of small dams, bunds etc., on the small rivulets and tributaries of the Narmada. These can be easily constructed, with local labour, for a fraction of the cost of a large dam. Once the water-holding mechanism is established, afforestation can proceed, and it is likely that we will see the results of this activity within a period of 10-15 years. (The construction of a series of major dams and canals is estimated to take 20-30 years). Such water-retaining dams, bunds and tanks are traditional rural practices, whose efficiency is easily seen. Two outstanding recent examples are the Baliraja and

Atgaon dams in Maharashtra, both constructed with local labour, with obvious beneficial results. Around the Atgaon dam, farmers have been able to change from a one-crop to a two-crop annual cycle because of improvement in ground water retention.

Afforestation will raise certain problems because there has been encroachment on what was once forest land. But to buy out and resettle the people who are involved in agriculture on this land will be a very small problem, compared to resettlement of the lakhs of persons who are to be displaced by the giant dams which have been planned. Once we have taken these measures



*Above:* Before the Atgaon dams were built...

*Below:* ...and after. This plot was irrigated, without canals, with well-water obtained from replenished ground-water.



to reforest the catchment area and restore the perennial flow of the river, we can then better assess the shortfall of water, the needs of the population where water supply is still deficient and then consider whether any larger dams are necessary, and how many, and where these can be located. The Narmada Project Proposal envisaged initially 3000 minor dams, 125 medium dams and the 3 major dams which are currently contemplated. These would be built, in steps, in that order, so that first the catchment area, and then the water table, is restored; the need for further action could then be assessed. We are forgetting the essential first steps and trying to go on to the final step, without adequate preparation, which will result in silting up of the reservoir and failure to achieve the objectives — as has occurred in almost all the major dams constructed so far in the country.



Small crib dam in Ratnagiri district, Maharashtra, built cheaply with local labour.

As regards power, the government's predictions appear to border on fantasy. No account is taken of the experiences with other dams built for hydroelectric power, where maintenance and transmission losses take up half or more of the theoretical power generation capacity. Our approach to power generation is not yet clearly defined. For domestic use, power from small 1 MW generators on small streams, as has been successfully tried in Nepal, appears to be one economically feasible alternative. Another is the use of 50 MW solar generators. Power for industry would require larger generators, but there are many alternatives and many intermediate solutions which can be explored and their costing worked out. A mammoth power generator with long transmission lines and the inevitable transmission and maintenance costs is the only method which has so far been considered. Unless alternatives are studied and detailed costing done, we cannot decide which is preferable and best suited to our needs.

In short, our planners have studied only one method; they have hypnotized themselves, and are trying to hypnotize us, into believing that this is the only solution. That this is not correct should be obvious from the fact that, for generations, the river—**without any large dams**—was able to meet our needs. Having understood the causes of the change, common sense dictates that we must first remedy the changes in the catchment area which have led

to the present situation, see how far this restoration helps us, and only then explore other possible approaches. In any event, a mammoth dam which will destroy a large proportion of the catchment area that still remains (thus destroying all possibility of revival of the river system as it was in the past) appears to be a suicidal step from which there would be no going back.

There are many factors, ecological, social and economical, which must be considered before

finalising our plans. They are, however, beyond the scope of this article, which is written simply as a plea for common sense and rational thinking. If the cause of our predicament is the loss of forest cover, let us engage our energies in restoring that cover, rather than in further destruction of the forests, with vague plans for afforestation (of very doubtful efficacy) involving much larger tracts of land, some of which do not exist, except in the imagination of the planners.

## **Red Alert Maps**

The BNHS is planning to publish a series of large-scale maps of different parts of India, highlighting

- Conservation problem spots: the problems include wildlife status/depletion; exploitation of forest cover; water problems caused by deforestation; dams and loss of habitat.
- Areas already protected as national parks and sanctuaries; areas which need to be protected.
- Location of various Non-Governmental Organisations (NGO's) at different levels.

The cause of conservation needs help—but first it needs accurate information. These maps, we feel, will be of help to conservationists and to concerned laymen. As our store of information grows, the maps will be regularly revised and updated.

BNHS members, professionals in different capacities, government and forest department officials, NGO's.... anyone interested in wildlife and the environment is requested to send us information that we could use in preparing these maps. When you write, please give, in addition to the names of areas, brief notes justifying their inclusion.

Correspondence to be addressed to: Bharat Bhushan, Conservation Officer, BNHS.

# News, notes & comments

## MANGROVES:

Mangroves occupy over 6740 sq. km in India (about 7% of the world total). 80% of these are in the Sunderbans in West Bengal (4200 sq. km) and the Andaman and Nicobar Islands (1190 sq. km). The National Mangrove Committee has identified several areas for mangrove conservation schemes: North Andaman and Nicobar; Sunderbans; and parts of Goa, Orissa (Bhitarkanika and the Mahanadi delta); Andhra Pradesh (Krishna Estuary and Coringa); Karnataka (Godavari delta); Tamil Nadu (Pichavaram and Point Calimere); Maharashtra (Achra/Ratnagiri); Gujarat (Gulf of Kutch); Kerala (Vembanadu).

## BROW ANTLERED DEER:

Brow-Antlered or Sangai Deer, *Cervus eldi*, are facing extinction due to poaching and habitat destruction. Captive animals, on the other hand, have bred successfully. According to official sources from the Wildlife Institute of India, captive deer would be released in phases to regenerate wild populations. The first releases would be into the Pabitara Sanctuary in Assam.

## MORE EUCALYPTUS? GREAT SCOTT!

Scott Paper, an American firm, is a world leader in disposable paper

products (toilet paper, handkerchiefs and napkins). Sales in 1988 were \$4700 million, and are expected to rise sharply in the next few years. To meet that demand, the firm plans to establish what will become one of the world's largest monoculture plantations, to supply wood-pulp. 250 million Eucalyptus trees will be planted (presumably after clearing the existing vegetation) in a remote 345,000 acre tract in Indonesia. That is 1423 sq. km, or very nearly the size of the Kanha National Park. 21 million seedlings will be planted each year for the next 14 years. When the trees are ready to be harvested, the firm will build a pulp mill with a capacity of 1000 tons *per day*.

## APPLIED ORNITHOLOGY — 1990 SYMPOSIUM

The International Ornithological Congress was set up in Ottawa in 1986 to encourage research on practical and conservation aspects of ornithology. The Standing Committee on Applied Ornithology is a part of the Congress and first met in Hungary in 1987. The committee consists of twenty five ornithologists from all over the world, and has two co-chairmen, Dr. Russell Peterson (U.S.A.) and Professor Dr. Valery Ilyichev (U.S.S.R.). On the basis of suggestions made by members, and by a

number of other scientists, it was decided to recommend for inclusion in the programme of the IOC in New Zealand in 1990 a plenary session on bird conservation. The following symposia topics were proposed: problems of collisions between birds and man-made objects (aircraft, powerlines, cars, lighthouses); transmission of diseases to man, agricultural animals and wild species by birds; population explosions in wild bird species (their causes, ecology, genetics, population dynamics and control); and international bird conservation. The committee also supported suggested symposia on control of damage by birds to agriculture, and on captive breeding of wild bird species.

Greater exchange of information between scientists, especially on unpublished papers and research in progress, is needed, but cannot be organised internationally until it has been arranged at national level.

Working groups may be set up by the Committee to work on some of the topics listed. Anyone who would like to help, or who has suggestions for the work of the Committee, is invited to write to one of the co-secretaries, Dr John Temple Lang, at avenue P Hymans 113, bte 19, B-1200 Brussels, Belgium.

#### NATURE EDUCATION SCHEME:

A four-day camp for biology teachers was organised at Keoladeo National Park, Bharatpur, in November '88. The aim of the camp was to train teachers in imparting

environment education to students. The subjects covered were birds (identification, feeding and nesting habits, parental care, display etc.); aquatic plants; and nature games. Participants also visited the BNHS Ecological Research Station at Bharatpur. 28 teachers took part, and the general opinion was that more such camps should be conducted in the future. Most participants in this camp were keen to enroll in the next.

As part of the World Forestry Day Celebrations, an essay competition was organised for school-children (Std. VIII to X). The topic: "Why preserve forests?" There were nearly 300 entries; 161 in English, 75 in Marathi, 24 in Hindi and Gujarati. The prize distribution was held on World Forestry Day, 21st March.

#### TOUGHENING UP:

"Stating that afforestation was the need of the hour, Mr. N.T. Rama Rao said that the sports meet for the Forest Department was started after the Telugu Desham Party came to power, to embolden them to face the danger in forests."—Indian Express, Hyderabad, 28-2-89.

#### POLAVARAM PROJECT:

The Polavaram irrigation-cum-power project has been denied clearance on environmental grounds by the Union Ministry for Environment and Forests. The project would have submerged 637 sq. km.

and 250 villages in Andhra Pradesh, Madhya Pradesh and Orissa. Besides the people and the land, there is also history to consider: archeologists have unearthed several megalithic settlements, with tools and dolmens, in the area. The local tribes (Gonds, Koyas and Konda Reddis) still follow their ancient tribal customs.

The project was planned to save the century-old Dowlaiswaram anicut built by Sir Arthur Cotton. Among the other benefits postulated: 720 MW of power, irrigation of over 7 lakh acres in East and West Godavari districts, water for the Vishakapatnam steel plant, drinking water for Vishakapatnam city, diversion of water to the drought-prone Rayalaseema region, creation of navigation facilities and flood-control on the Godavari. Cur-

rent costs are estimated as Rs. 2,665 crores (compare this with the Rs. 115 lakhs allocated to develop sanctuaries in Andhra Pradesh, which will be the main "beneficiary"). The Central Water Commission had asked the State government to treat the 3 lakh sq. km. area of the project by planting trees and building check dams to prevent soil erosion and silting. The state government said it didn't have the money, and that, further, it could not provide alternative land to those whose lands would be submerged.

The project was once dropped because of the large submersion area, then re-started. The Ministry's decision (in November '88) to deny clearance is a wise one. But is it permanent?

## BNHS Calendar 1990

We need colour transparencies for the 1990 calendar. Slides will be blown up to a size of either 6" x 4" (horizontal composition) or approximately 8" x 10". BNHS will pay Rs. 500/- (yes, five hundred) per slide selected. Transparencies will be handled with the utmost care. Once the selection is made, the slides not chosen will be returned immediately, and the selected slides as soon as possible after processing.

- Topics : Any subject related to natural history — animals, birds, insects etc., trees, scenery/habitat shots. We are particularly interested in
- Photographs of endangered species (including plant species).
  - Photographs of water (rivers, waterfalls, the sea,...) and of wildlife photographed in or near water (drinking at waterholes, waterfowl, fish, aquatic insects, etc.)

Please send in your slides **at the latest** by 30th July.

#### FINANCIAL ASSISTANCE FROM INSA:

The Indian National Science Academy provides financial assistance to scientists participating in conferences abroad. Grants are awarded in 3 categories:

1) For conferences sponsored by the International Council of Scientific Unions (apply before 31st January each year).

2) For conferences sponsored by other agencies (apply at least 3 months before the conference). INSA support is limited to 50% of travel, maintenance allowance and registra-

tion fee for category 1, and to Rs 5,000 for category 2.

3) The INSA-COSTED (partial) travel grant for scientists under 35 provided a) they hold PhD's b) their papers have been accepted for presentation c) local hospitality and partial travel expenses will be borne by the hosts or some other agencies (apply at least 3 months before the conference).

Applications must be in the prescribed proforma, which is available with the Executive Secretary, INSA, Bahadur Shah Zafar Marg, New Delhi 110002.



E.P. GEE COLLECTION



Brow antlered deer — will zoo-bred animals help save the species in the wild? (p. 18)



# CLOSE ENCOUNTERS OF THE BIRD KIND

S. M. SATHEESAN

Pilots dislike bad weather, and with good reason. Against the fury of the elements, even the largest airliner is helpless. But when the weather is fine, another kind of danger threatens: birds. The threat of collision between bird and aircraft is something every pilot must live with. These collisions, also known as bird-strikes, can cause colossal damage to aircraft, and, if the plane happens to crash, to buildings and property on the ground as well. Aviation has suffered in this "feather storm", and authorities often issue precautionary warnings to pilots and ground staff. A sampling from notice-boards at airfields around the country: "Don't underestimate feather-weights.. Check the feather forecast first; clear the runway of birds before take-off.. Small birds can hit big planes hard.."

Bird strikes have to be as old as flying itself; after all, man asked for it when he encroached onto the birds' realm. But the first one recorded was in 1912, when Carl Rogers was on a coast-to-coast flight across the USA. The aircraft was destroyed, the pilot killed. Since then the problem of the bird strikes has multiplied many-fold, for several reasons: higher flight speeds, a huge increase in air traffic and the introduction of wide mouthed jet engines.



AUTHOR

*Gyps bengalensis*—the eye of the storm

How the impact of a bird weighing a few kilograms at the most can seriously damage an aircraft becomes apparent when you go into the physics of the problem. When a bird weighing 1.8 kg (slightly less than the average weight of an Egyptian or Scavenger Vulture), flying at 20 kmph, hits an aircraft moving at 480 kmph, the force of impact is about 14 tons. When the speed of the aircraft relative to the bird doubles, the impact force does not double — it quadruples. At 1000 kmph (roughly the cruising speed of an airliner) the same bird at the same speed would have an impact force of 57 tons — enough to damage almost any part of the aircraft. The aluminium skin of a Boeing 737, for example, is only 0.8 mm thick at most places. Now move up to the heavier weights; a 4.5 kg Whitebacked Vulture, for instance...

Almost every part of the aircraft is susceptible to damage. But most often, it is the engine which suffers. Jet engines operate by sucking in air from the atmosphere (to be com-

pressed, ignited and expelled to push the aircraft forward), along with any bird that comes too close. The compressor consists of several "stages", with between 30 and 40 blades in each stage. Since the blades are set very close together and rotate at high speeds a bird is likely to damage more than one blade, sometimes more than one stage. And a single compressor blade in one stage of an Airbus engine costs about Rs. 1,00,000/- in foreign exchange.

In the past decade over 2000 bird strikes have been recorded in India, and the losses can only be imagined. During a period of 75 days, July to mid-September 1988, the Indian Airlines suffered more than 48 bird

hits; the loss was estimated as Rs. 1.9 crores. And this does not include the lost time, and frayed nerves, that passengers must endure. With each aircraft operating 4 or 5 sectors every day, one accident sets off a chain-reaction of delays.

Contrary to popular belief, an aerodrome is not just a series of concrete strips and hangars; it is also home to a variety of bird species. Within the aerodrome area there are patches of dense vegetation and/or small ponds and marshes, especially during the monsoon. Roosting and breeding sites are available, as is a wide choice of food. Fruits and seeds, insects, crabs, beetles, snails... fish, frogs, snakes... even small mammals like

Vultures feeding on carcasce — outside airport limits, but still dangerous.



rats, gerbils and hares. And, of course, smaller birds on which the raptors prey.

Besides the food, the airport, by virtue of its large open and relatively undisturbed area satisfies another prime ecological requirement—safety. Often, birds which find food outside bring it back to the aerodrome and feed at leisure, using the runway as their dining table!

The hazard potential of a "problem bird" depends on several factors; the size and weight of the bird, its flocking habits, the extent to which it uses the "facilities" that the airport provides, both around the runway and in the approach funnel (the space used by aircraft when they take-off or land).

Which species is the most hazardous? Vultures (25%) and Pariah Kites (20%), between them, account for nearly half of all bird strikes. Among vultures, the single biggest culprit—because it is the most commonly found in India—is the Indian Whitebacked Vulture, *Gyps bengalen-*

*sis*. Vultures are especially problematic because of their large weight, their ability to ride thermals to high altitudes, and their flocking habit. A group of them forms an impenetrable column in the sky, a living barrier which pilots approach (when flight paths intersect a thermal) only at their own risk.

Many other species cause problems too — raptors, parakeets, doves, egrets, crows, even predominantly ground birds like partridges, lapwings. Besides these, even terrestrial mammals (pariah dogs, cattle, Nilgai) have struck aircraft during take-off or landing. And, at least once, so has a fish! In March '87, a Boeing 737 was struck by a fish that had been dropped by an eagle (possibly a Bald Eagle, according to the Journal Bokmakierie, where it was reported.)

Bird-aircraft collisions usually occur at low altitudes, mainly during take-off and landing (150 m and below), rather than in cruising flight, and very rarely at altitudes above



AUTHOR

500 m. But there are exceptions — in 1973, a Ruppell's Vulture, *Gyps ruppelli*, hit a plane flying at 1120 m over Abijan in West Africa. The introduction of vertical take-off and landing (VTOL, such as the Indian Navy's Sea Harrier) or short take-off and landing (STOL) aircraft, technology and cost permitting, will probably reduce the problem. Such aircraft have short or non-existent take-off and landing runs, and would consequently spend much less time in the danger zone on or just above the runway.

Military aircraft are more at risk than airliners, because of their frequent low-level exercises. At least 25 IAF planes have been completely written off in the past 10 years, and several pilots have lost their lives. A world-wide analysis has shown that, with civilian aircraft, loss of life in bird strikes is very rare. But statistics do not help victims. Last September an Ethiopian airliner crash-landed after bird ingestion. There were 104 people on board. 31 were killed, 74 injured, and 2 were reported missing.

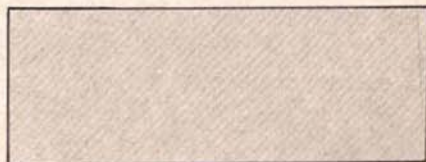
No time of the day — or night — is free of risk. Non-raptorial flocking birds (crows, mynas, parakeets and waterbirds) fly from roosting to feeding sites around sunrise and back at dusk. Soaring raptors are active during the warmer hours of the day, when the thermal bubbles on which they soar are available. At twilight and at night there are the nocturnal birds like owls and flying mammals like bats.

Which month of the year is the most dangerous? Study a decade's statistics, and the answer is clear — October. The number of bird hits depends on the number of birds, which in turn depends on the availability of food. When the southwest monsoon sets in, the vegetation quickly grows luxuriant. The number of insects that the area can support increases, and since most "problem birds" feed directly or indirectly on insects, so does the number of birds — and the danger of a bird strike.

At which Indian airports has the problem been most serious? Delhi tops the list, with the largest number of bird strikes in the past decade. Next, in turn, come Bombay, Calcutta, Hyderabad, Madras, Trivandrum, and Bangalore. The four international airports, which between them account for half the total, suffer not only because of heavier traffic, but also because food is available, in the form of garbage, to scavenging birds.

*Since 1980, the BNHS (investigators—late Dr Sálím Ali and Dr R.B. Grubh), with the support of the Aeronautics Research and Development Board, has been working towards solutions to the problem. The government has accepted the recommendations made by the BNHS; though they have been implemented only in part, bird strikes at Bombay airport have dropped considerably.*

—Ed.



## Information wanted

■ I plan to do my doctoral research in India, studying the phenology and reproductive biology of wild dioecious figs (gen. *Ficus*) and their associated fig wasps.

First, however, I need to locate a site containing a wild population (at least 15 trees) of any one species of dioecious fig. Do you know of any suitable sites in India? I would prefer a protected site (Reserved Forest, Sanctuary, etc.) so that I could study the trees over time without arriving one day to find them all cut!

I enclose a list of the dioecious figs found in India; a population of 15 or more trees of any one of these species would be ideal for my study. The species names were obtained from the limited literature available in the U.S.; so the names may be different now. I would also welcome hearing about any other dioecious

fig species that are not on this list.

<i>F. adenosperma</i>	<i>F. hirta</i>
<i>F. asperrima</i>	<i>F. hispida</i>
<i>F. aurata</i>	<i>F. lanceolata</i>
<i>F. auriculata</i> ( <i>F. roxburghii</i> ?)	<i>F. macrocarpa</i>
<i>F. clavata</i>	<i>F. obscura</i>
<i>F. diversifolia</i>	<i>F. palmata</i>
<i>F. erecta</i>	<i>F. pomifera</i>
<i>F. exasperata</i>	<i>F. racemosa</i>
<i>F. foveolata</i> ( <i>F. laevis</i> )	<i>F. ramentacea</i>
<i>F. gibbosa</i>	<i>F. scandens</i>
<i>F. glandulifera</i>	<i>F. septica</i>
<i>F. glomerata</i>	<i>F. sikkimensis</i>
<i>F. guttata</i>	<i>F. squamosa</i>
<i>F. heterophylla</i>	<i>F. variegata</i>

AVIVA H. PATEL  
50 Kothanur  
Bagalur Road  
Bangalore 560080. OR

P.O. Box 249118  
Department of Biology  
University of Miami  
Coral Gables, Fl 33124, USA.

■ We are trying to track butterfly migration. We request readers who have observed any unusual movement of butterflies in a particular direction to give us the following details:

- Species involved,
- Direction and height of flight
- Speed, Wind velocity, weather conditions
- Date and time of observation
- Details of feeding, mating, egg laying, resting place at night
- Any other details available.

We are particularly interested in the migration of the Blue Tiger and

Common Crow butterflies, which were seen migrating around Mysore and Bangalore during April and May in the north-east direction. Any information would be of great help.

J.N. PRASAD,  
Nature Club Adviser,  
Merlin Nature Club,  
13, 8th Cross, 30th Main,  
Sarakki, I.T.I. Layout,  
J.P. Nagar 1st phase,  
Bangalore 560078.

# SEASHORE LORE

Starting with this issue, HORNBILL will carry a series of articles on sea-shore life, both in and out of the water.

## I: Cinderellas Of The Sea

### BEEFSEA

As schoolchildren, we were fascinated by the tale of Cinderella, whose fairy godmother, with a touch of her magic wand, changed her ragged dress into one of bejewelled splendour. An equally miraculous change of "dress" takes place in the marine angelfishes (subfamily Pomacanthinae).

There are many species of angelfish in the Atlantic, Pacific and Indian Oceans, but surprisingly, the young of all of them are confusingly alike. All start life as dark blue fishes with a few vertical stripes (a few Atlantic species have yellow stripes). As they grow, the number of stripes increases and their configuration also changes. Soon, light blue stripes appear between the white ones. Thereafter, as the fish grows, this colour pattern disappears, to be replaced by completely different colour patterns, which are different in the various species.

We have three species of angelfish in Indian seas. The Emperor Angelfish, *Pomacanthodes imperator*, is probably the prettiest, as you can see in the accompanying colour picture. It is also the smallest of the three, growing to 20 cm. In the young, the stripes are highly curved into in-

complete hoops, at the centre of which is a white ring. India's leading fish expert, Francis Day, mistook the young for a different fish, and named it *Holacanthus nicobariensis*. He could not imagine that it was the young of the purplish-blue adult with its 20 to 25 horizontal stripes, a black patch on the chest and throat and a violet-black band across the eyes which gives it the appearance of a masked bandit. The Koran Angelfish, *Pomacanthodes semicirculatus*, is aptly named. While the tail in the young of the other two species is translucent, here it displays a series of white bars on a blue background. In a few specimens, these vaguely resemble the Arabic words "Shan-e-Allah", meaning "Glory of God". The stripes in the young are not so curved, being only arched. The adult is not prettily coloured, but grows to a whopping 38 cm.

Why are the colours of juvenile and adult so different? The adults feed mainly on sponges and sea squirts (tunicates), though they may also take in sea fans, sea mats (Bryozoa) and hydroids. Little is known about the food of juvenile angelfish in our seas, but some juveniles of Caribbean angelfish are

known to pick up parasites from the body of other species of fish. The conspicuous yellow stripes on the bodies of such "cleaners" are said to draw the attention of fishes wanting to be cleaned.

Though angelfishes are considered to be coral reef dwellers, Bombay boasts one species, the Blue-ring Angelfish, *Pomacanthodes annularis*. It might surprise you, but once—just once—I came across a live brain coral at Cuffe Parade (before it was reclaimed), and we do see bits and pieces of dead coral on Bombay's shores.

While the colouration of the adult and young of the Emperor and Koran angelfishes were known to scientists, I had the pleasure to be the first to correctly identify the young of the Blue-ring Angelfish. It was a chance discovery; I got a specimen in a state of transition, so that it had the vertical, slightly arched, white stripes of the juvenile as well as the electric blue curved bands of the adult, on a body which was mostly bronze coloured (adult colour), but still retained its earlier navy blue at the periphery. The famous ichthyologists Rüppell, Bleeker, Günther and Day were not so fortunate, and all of them mistook the young for a different fish, which they called *Holacanthus striatus*. The adult grows to 35 cm.

When handling angelfishes, be careful. The adults have a long, dagger-like spine under the gill-cover, and I have cut my hand badly several times while catching them.

Angelfishes are not gregarious, and we usually see a solitary individual, or a mated pair. The male selects a home, and will chase and fight off any fish venturing into what it considers its territory, especially males, of its own species. The bright colour serves to advertise its presence, both as a warning to trespassers as well as to attract conspecific females. It is a thrilling sight to see two males sparring, circling each other like boxers, fins quivering, lashing their tails and trying to tear off pieces of skin from the adversary. Usually, however, no harm is done, and the vanquished fish signals its surrender by turning pale and fleeing.

Since the colours in the two sexes are alike, how do they tell each other apart? A male defending its territory will rush towards any fish of its own species with hostile intent. If the intruder is a male, it will either fight or flee. However, a female will respond differently, by subtle signals such as a quivering of her body or a clamping of the fins.

As with most fishes, angelfish lay a prodigious number of tiny (0.7 to 0.9 mm) eggs. On any given day, a female may release 25,000 to 75,000 eggs; over the entire course of its spawning cycle, up to 10 million eggs may be shed. Of course, a vast majority of these will be eaten by predators: three to four weeks after hatching, when the young fish (15 to 20 mm long) settle to the bottom, only a few will have survived.

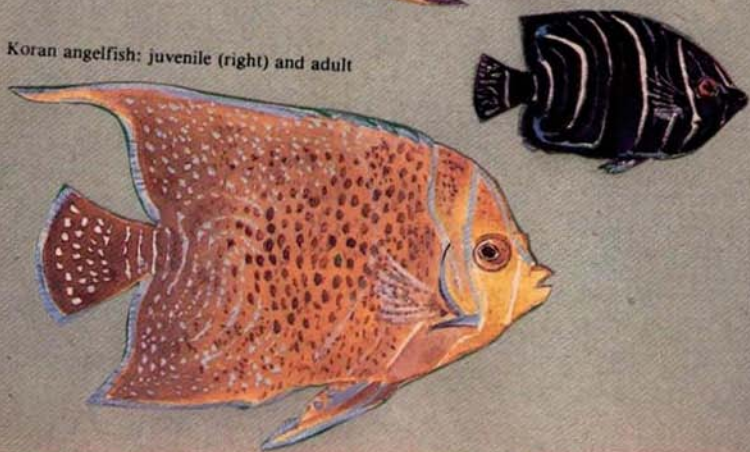
Blue ring angelfish: juvenile (left) and adult.



Emperor angelfish: juvenile (left) and adult



Koran angelfish: juvenile (right) and adult





# Feedback

Sir,

It is not only to forests that dams pose a threat. When the proposed dams on the Narmada river are completed, the finest sources of knowledge about the history of animals will vanish: some of India's richest pre-historic sites and oldest fossils will be submerged. Over the years many archaeological teams exploring the area have found hundreds of fossils of animals now extinct. Fossil hunters have traced out remains of pre-historic animals resembling the hippopotamus and rhinoceros.

The fossilised tusks of a 500,000 year-old elephant-like species called a stegodon have been found here. In 1982, a geologist discovered a 150,000 year-old skull, the oldest human skull ever found on the Indian sub-continent, lying partially exposed on the river bank near Hoshangabad in Madhya Pradesh. The famous Narmada Elephant (height 16 feet) is also supposed to have lived here. It will not be possible to dig out all fossils found in this area in the next 10 years, by which time the waters will have started rising.

Yours sincerely,

RAJIV SAXENA,

Hanuman Nagar, Phalka Bazar,  
Gwalior 474009, Madhya Pradesh.

Sir,

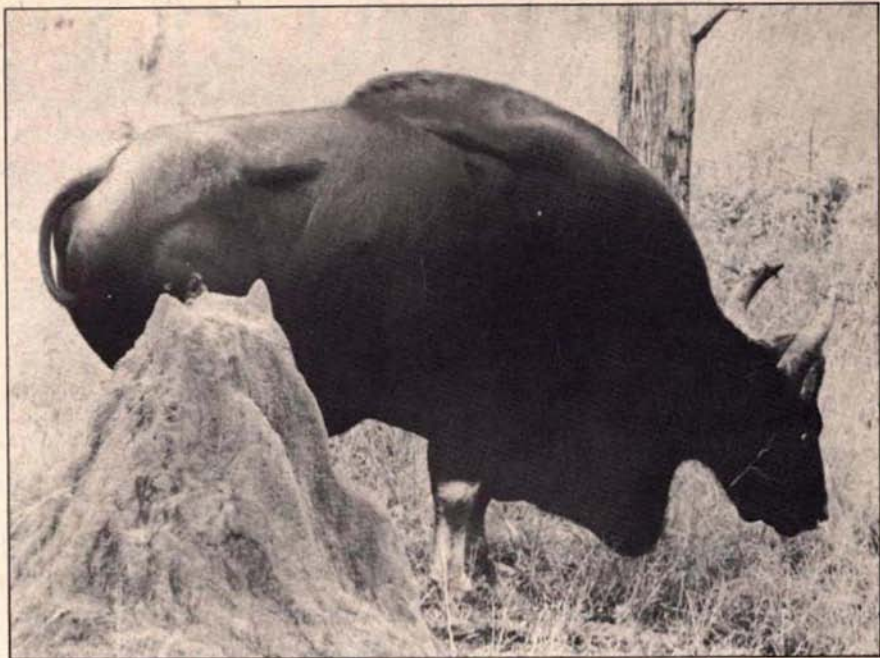
In one of your reports on the 1988 Wetland Bird Census, you have expressed concern about the decline in the population of Sarus Cranes. I have been a bird-watcher for the last 15 years and I feel that including the Sarus crane as a wetland bird would not be correct. In all my observations on Sarus cranes in Rajasthan, including Bharatpur Bird Sanctuary, I have rarely observed this bird in water. In fact, at Bharatpur I have always seen it on clear land and in the forest.

In December 1985, during my visit to the Sariska Tiger Reserve, I observed a pair, along with two chicks, in an agricultural field, following the farmer while he was tilling the soil. They were feeding on insects/worms which came to the surface as the field was ploughed. I also photographed the family. I feel that a separate census for this bird should be organised to ascertain its status. Greater stress should be laid on the areas adjoining villages, which I feel is the real habitat of this bird.

Yours faithfully,

ALOKE GUPTA,

SB 186, Bapu Nagar, JLN Marg,  
Jaipur 302004, Rajasthan.



AUTHOR

Sir,

For close on four decades, as and when opportunity offered or could be contrived, I have studied wild gaur in various parts of India — practically wherever they are found except in Assam and further north-east. And still, reading Mr. A.R.H. Bulu Imam's account of gaur, gayal and mithun in India in *Hornbill* 1988(1), I was unable to follow him in places.

The poor development or non-development of the dewlap in gaur, alleged in various texts, is a conclusion based on inadequate observation. In some bulls, especially in the southern reaches of the Western Ghats (where gaur attain their best development: the gaur of Bihar are small-sized in comparison, as also in

M.P.), some old bulls have dewlaps that would not disgrace a big zebu bull. As in zebus, in cows the development of the dewlap is much less pronounced. The photograph below shows the dewlap clearly.

Gaur bulls when full grown are usually a warm black: some, which are notably large, are Vandyke brown, a very few light raw umber — never "chocolate coloured", not even the cows. And what do these words mean: "Both animals have a distinctive white patch on the forehead"? I have never seen or photographed a gaur with such a patch or star or blaze.

Yours truly,

M. KRISHNAN,

52, Dr. Radhakrishnan Road,  
Madras 400 004, Tamil Nadu.

# AN EXPERIMENT OF NOTE

AJAY SHEKHAR



*Music, they say, soothes the savage beast. It would be easier (and altogether safer, especially if musician and animal held differing opinions on what constitutes good music), to choose captive beasts to test this assertion. WH Clark did just this, at the London Zoological Gardens. An extract from his note, published in the Journal of the BNHS in the 1890's....*

At the first sounds of the flute, most of the monkeys ran away, and the piccolo excited loud and angry screams from all sides. The violin was the clear favourite. We then decided to take the opinion of some of the largest and least vivacious animals, and selected a young African elephant. As this animal had shown the utmost dislike to the violin on a previous occasion, the flute was employed to open the concert, and with complete success. The elephant stood listening with deep attention, one foot raised from the

ground and its whole body still — a rare concession to the influence of music from one of the most restless of animals. As long as the flute continued it remained motionless and listening. But the change to the piccolo was resented. After the first bar, the elephant twisted around and stood with its back to the performer, whistling and snorting and stamping its feet. The violin was less disliked, but the signs of disapproval were unmistakable.

The deer were strangely attracted by the violin and showed equal pleasure in the flute; the gemul deer, for instance, ran up at once to listen to the latter, their ears and tails in constant movement at every change in tone or tune. Even the ostrich seemed to enjoy the violin and the flute, but showed marked signs of dislike for the piccolo, writhing its neck and walking uneasily up and down its enclosure. The ibexes were startled at the piccolo, first rushing forward to listen, then taking refuge on a pile of rocks from which, however, the softer music of the flute brought them down to listen at the railing.

The wild asses and zebras left the hay with which their racks had just been filled, and even the tapir which lived next door got up to listen to the violin. The flute set the Indian wild asses kicking with excitement. But the piccolo had no charms for any of them, and they all returned to their interrupted breakfast.

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