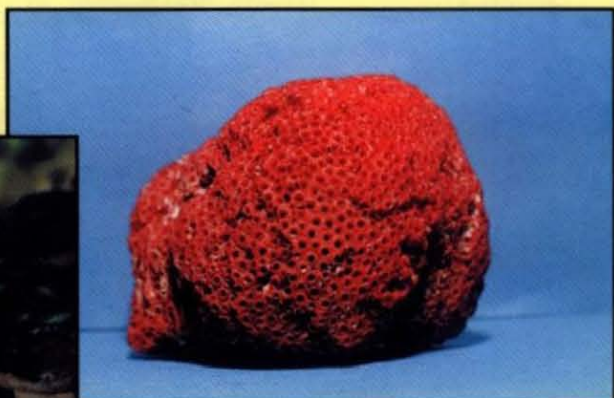
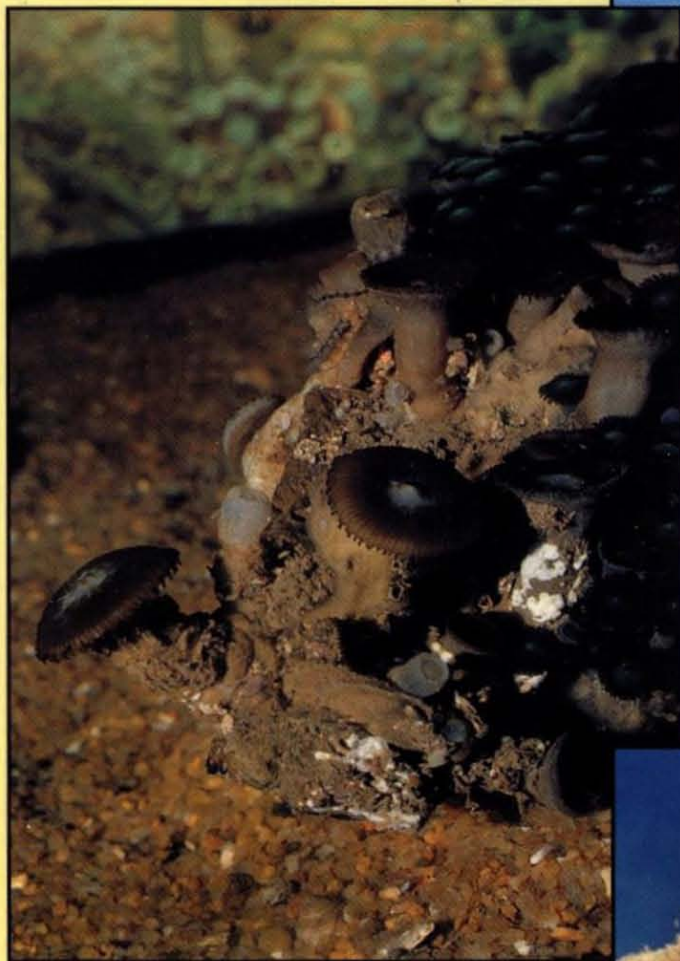


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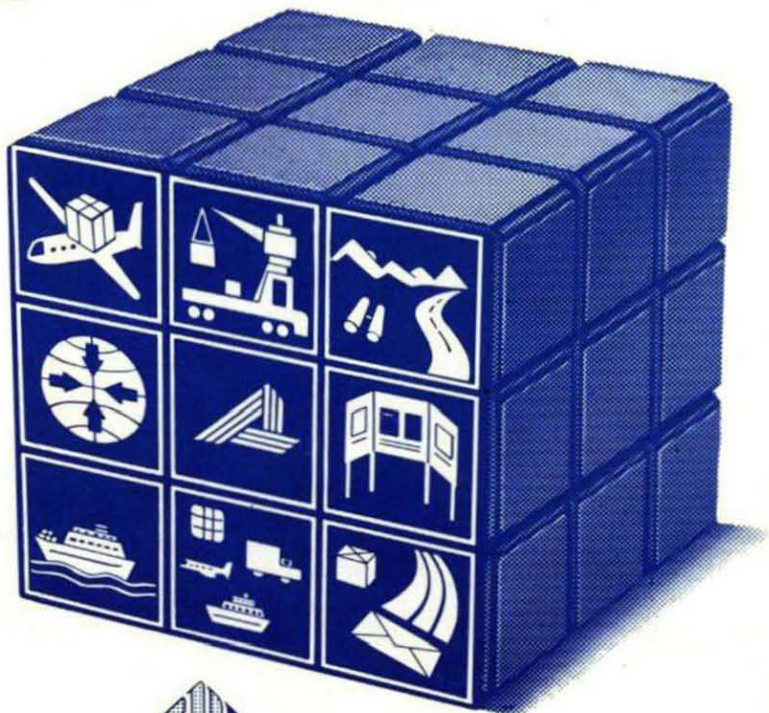
The Corals of Mumbai

The Young Naturalist
Indian Wildflowers
Trekking in Manali



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Corals

Published and printed quarterly
by J.C. Daniel for the

Bombay Natural History Society,

Printed at Stusa Mudra Pvt. Ltd.,

Lower Parel, Mumbai.

Reg. No. RN 35749/79,

ISSN 0441-2370.

C O N T E N T S

4.

The Corals of Mumbai

— *Deepika Bhardwaj* and *B.F. Chhapgar*

Wading along Mumbai's seashore we can see the corals of this island city. Some of them are fairly extensive though not forming reefs.

The Young Naturalist

— *V. Shubhalaxmi* and *Vibhuti Dedhia*

With this issue we begin a new series for the newcomer to the world of nature.

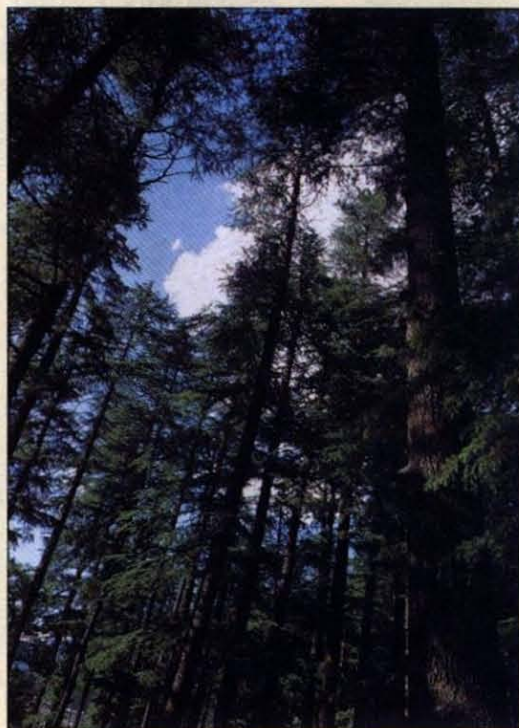
20.

24.

A Naturalist in the Northwest Himalaya

— *M.A. Wynter-Blyth*

Concluding the author's nature trail in the northwest Himalaya at Manali.



Other Features...

10.	Book Reviews
12.	Miscellanea
19.	Response
22.	Indian Wildflowers
29.	News briefs
30.	The Birdwatcher

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) 283 7615.

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VIEWPOINT



HALF a century ago, when India attained Independence, there were 360 million Indians in a country with an enormous potential for development. Today we number over 960 million, having gained an incredible 600 million in population in 50 years, which is more than the population of most countries in the world. It is estimated that three Indians are added to the population every five seconds.

Only Kerala and Tamil Nadu have reined in this runaway human regeneration. In the process, we have devastated our abundant natural wealth to such an extent that it is questionable whether

The most endangered species in India

India can sustain Indians. Some statistics, even though they are a decade old, may substantiate this anxiety about survival.

In India, land urgently in need of rehabilitation because of wind and water erosion, salinity and alkalinity, now exceeds an area of 100 million ha. The Chambal Valley, with 4 million ha ruined by erosion ravines, is a classic example of what can happen elsewhere.

Another pressure on land is urbanisation. The urban Indian population is the fourth largest in the world and continues to grow. Agricultural land is taken up to meet the demands of urbanisation. From 1950 to 1980, approximately 1.5 million ha of the available land had been lost in this manner. Firewood remains the main source of energy for cooking in India, particularly in villages. As much as 250 million tonnes of wood is lost from forests and since 1947, we have lost 53,000 sq. km of forests, an area larger than Punjab (*India Today* Aug. 10, 1998). Urban India uses over 20 million tonnes of firewood worth over 5000 million rupees, more than was spent on afforestation from 1950 to 1980. Water conservation is another cause for concern. India still uses only one tenth of the rainfall it receives. Floods create havoc each year but we still lack an effective policy of flood control and



CEC-BNHS

water conservation. Ground water reserves, which were once 10 times the annual rainfall, have been so over used that in many areas the water table has fallen far below economically retrievable levels. The rivers have been so polluted that safe drinking water is a rarity. No other life form in India has the catastrophic problems that face man, with an environment pauperized by the insatiable needs of an ever expanding population. It is indeed a curious paradox that unlike other endangered species, numbers will be the ruin of us.

J.C. DANIEL

POEMS IN (LIME) STONE

THE CORALS OF MUMBAI

Deepika Bhardwaj & B.F. Chhapgar

.....

B.F. CHHAPGAR AND R.D. PADTE



Top: Close-up of coral shows extended polyps with tentacles around the mouth.

Left: A colony of soft corals from Mumbai.

Bottom: The corals of Mumbai are not as colourful as people expect.

B.F. CHHAPGAR AND R.D. PADTE



B.F. CHHAPGAR



Sailor, come ashore,
What have you brought me?
Red coral, white coral,
Coral from the sea.
I did not dig it from the ground,
Nor pluck it from a tree;
Feeble insects made it
In the stormy sea.

Christina Rossetti

Corals live in shallow seas where the water is warm, undiluted with fresh water, clean and free of silt. With its severe pollution and muddy sea bottom, one would not expect Mumbai to have any corals. Yet there are coral patches at several places in southern Mumbai, some of them fairly extensive though not forming reefs.

The first clue that corals could be around is the presence of typically coral-reef dwelling fish such as the collared butterflyfish (*Chaetodon collaris*) and bluering angelfish (*Pomacanthus annularis*) in Mumbai's rock pools. Also found is the parrotfish, so named because the teeth in each jaw are fused together to form a beak like a parrot's. The beak is used to break off pieces of live coral for food.

B.F. CHHAPGAR



Top: A head of *Goniopora stokesi* from Mumbai.

Right: Unlike most corals, the skeleton of the organpipe coral is coloured.

Bottom: A coral skeleton shows the cups with partitions which once held the live coral.

C.M. NADKARNI



R.D. PADTE



While wading in Mumbai's seashores, we often see pieces of dead, beach-worm coral on the island's western shores. At Cuffe Parade — once having the most prolific variety of marine life in Mumbai, before it was reclaimed — I even came across a live star-coral with a dome some 20 cm across. This conclusively showed that Mumbai still had live corals, and that they were not just a fossilised memory of bygone pristine seashores.



B.F. CHHAPKA AND R.D. PADTE

Sea bed showing mushroom-like soft coral (*Zoanthus*) from Mumbai.

The predominant coral at Mumbai is *Goniopora stokesi*. Though live corals have all the hues of a rainbow, the colour is in the living tissues; once the coral has died and its tissues decayed, only a white skeleton remains. There are a few exceptions, though, like the red coral, black coral and organpipe coral where the skeleton too is coloured. The skeleton shows a honeycomb-like structure of adjacent polygons with radiating partitions inside them.

The unit of each coral colony is a tiny animal called a polyp. It has a hollow tubular body, on the top of which is the mouth surrounded by many tentacles. The polyps live together as a colony and secrete a cup-like skeleton made of limestone (calcium carbonate) inside which the polyp can withdraw. The tentacles have stinging cells which

can shoot out a hollow thread containing poison. Tiny animals drifting nearby are stung and paralysed by the stinging cells. The tentacles, now acting like fingers, grasp the prey and push it into the mouth. Polyps are about 8 mm tall.

We can get a better idea of the structure of a polyp if we look at a sea anemone. This is a solitary animal but much larger and built on similar lines as the polyps.

The polyps of reef-building corals harbour within their tissues minute one-celled algae (plants) called zooxanthellae. Each polyp has thousands of these, and they have never been found in the sea water outside a coral's body. It is these zooxanthellae which impart the typical colour to a live coral. Unfortunately, the colour of our local corals is a dull light violet brown. When corals are starved or kept in the dark, the polyps throw out the zooxanthellae from their body and thus appear bleached. Giant clams (*Tridacna*) also shelter them in their body.

Many corals, when exposed to ultraviolet light, glow in the dark, and the colour thus seen is different from its colour during the day.

Most corals belong to the Octocorallina, where the tentacles are eight or in multiples of eight. Their relatives called Alcyonaria or, in plain language, soft corals or dead men's fingers, secrete limy spicules but these, instead of forming a hard coral-like skeleton, are scattered within their tissues. An exception among the Alcyonaria is the organpipe coral (*Tubipora musica*), growing in the Indian and western Pacific Oceans, which has a hard, maroon skeleton of parallel tubes united by platforms. Sea fans and whip corals are also Octocorallines, but grow in one plane and have a soft skeleton made mainly of the protein gorgonin. The semi-precious Red Coral of the Mediterranean Sea and Japan is related to sea fans.

Sea anemones and Black Corals belong to the Hexacorallina, in which there are never eight but either more or less tentacles.

In Mumbai, the corals are spaced out and not overcrowded. But in reefs where favourable conditions lead to overcrowding, boundary disputes occur which are settled silently, but mercilessly, at dead of night. Adjacent colonies of the same coral species just lay down a boundary wall of limestone between them — a “no man’s land” to be crossed only at one’s peril. Neighbouring colonies of different species resort to more aggressive warfare. Long filaments from the polyp’s gut are shot out at night from the mouth or, sometimes from temporary openings in the polyp’s body wall. They spread over the nearest polyps of the enemy and digest their tissues. The filaments are withdrawn back into the polyp at the crack of dawn, leaving behind a bare patch of dead coral some 10 mm across.

Sometimes the corals under attack go on a counter-offensive. Over a period of time which may be weeks or even months, the victims develop specialised defensive tentacles, called sweeper tentacles, having bulbous tips loaded with stinging cells. These tentacles are longer than the mesenterial (gut) filaments of the enemy, so that they keep the aggressor at bay and even cause the eventual retreat of the leading edge of the aggressor coral.

While corals may be able to face the unwelcome attentions of hostile corals, they may not be successful with a host of other enemies. Some sponges (*Cliona*) and date mussels (*Lithophaga*) bore into corals by dissolving the limy skeleton by an acid secretion. The young of giant clams (*Tridacna*) burrow into the coral and pass their entire life here, enlarging their burrow as they grow. The long-spined sea urchin (*Diadema*) makes tunnels some 7 cm deep and 3 cm in diameter and takes shelter at the bottom, and so do some worms.

In the last three decades, a more sinister enemy has appeared on the scene. This is the crown-of-thorns starfish, named after the prickly



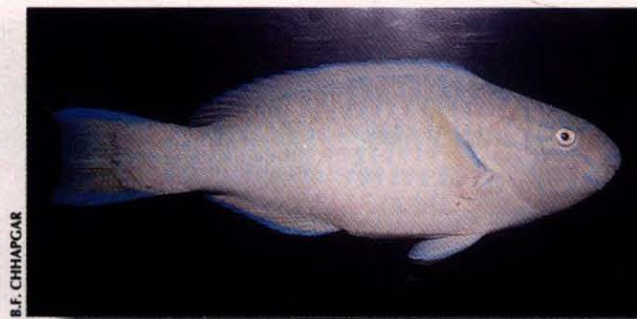
B.F. CHHAPGAR AND R.D. PADTE

The sea anemone (*Paracondylactis indicus*) is a large, solitary, soft bodied cousin of corals.

spines that cover its (upto 23) arms. Attaching itself to live corals, it extrudes its stomach out of its mouth and spreads its digestive juices on the coral's living tissue. As it moves on, it leaves behind a patch of dead coral which is then prone to erosion by waves or overgrowth of sea weeds. In six hours, it can eat an area equal to a dinner plate, or over five square metres in a year. It was uncommon upto 1960, but since then there has been a population explosion, and in four years it laid bare 360 sq. km of coral reefs.

Finally there is Man. Corals are killed off by pollution due to fresh water runoff, sewage, and deforestation leading to soil erosion, with the silt laden water settling over and smothering live corals. The use of sodium cyanide to stun fish and catch them for food, using dynamite to kill fish

and blasting the limestone corals for use in cement factories are other deprecable acts of human greed. On a smaller scale, wilfully collecting corals for souvenirs or thoughtlessly walking over live corals or by anchoring his boats over them, man leaves behind a



Mumbai's parrotfish has a powerful beak used for crushing coral.

trail of destruction. At Mumbai, the then Curator of the Taraporevala Aquarium, who was instrumental in re-discovering live corals in a new area in 1994, kept the information under wraps. Unfortunately, his successor gave wide publicity in newspapers and television and unwisely gave the location where they were found. This has resulted in hordes of citizens ransacking the area, carrying away the corals and devastating the marine life in the region.

The reproductive organs of corals are situated on the septa (partitions) inside the polyps. Each polyp packs its eggs and sperms into a compact round mass, usually pink coloured, but sometimes green or brown. A few days after full moon, these are shot out into the water, all together, by thousands of polyps. Floating to the sea surface, they form streaks, and a couple of days later, the egg hatches into a larva called planula. This swims for a few days and then settles down at the sea bottom within a week, although it can swim about for up to three months if conditions are not suitable for settling. The planula crawls on the sea bottom until it finds a suitable spot, and then grows into a polyp. This polyp will then bud other polyps to start the future coral colony.

While the original polyp grows upwards, increasing in height, small individuals bud off from its sides. Here the original polyp forms

the apex of the colony. In others, the apical polyp is the youngest, having budded off from an older polyp immediately beneath it. In brain corals (*Meandrina*), the division of the polyps is not complete; instead of the surface of the colony being studded

with round pores containing the polyps, it is covered with meandering sinuous grooves fringed with septa, looking like the convolutions on the surface of our brain.

In some cases, instead of budding, a polyp lengthens, the number of its tentacles and septa increases, and the polyp then splits into two — a process known as fission.

Branching corals keep on dividing to form new branches; if broken off, a branch settling nearby will start a new colony. Encrusting corals grow only on the edge of the colony. Plate corals also grow at the edges but lift off above the colony into the water.

The rate of growth varies from species to species and from place to place. Branching corals have been known to grow from 25 to 50 mm per year. The slower growing massive forms may increase by as little as 5 mm per year. Actual measurements showed an increase from 76 cm to 188 cm in 23 years for a brain coral, and from 5.7 metres to 6.85 metres for *Porites*. A channel in a coral reef in the Andaman Islands which was 27 metres deep in 1887, was only 30 cm deep 37 years later. ♡

Deepika Bhardwaj is the author of the forthcoming NCSTC-Hornbill book "The Wonderful World of Corals." Dr. B.F. Chhapgar is an internationally renowned marine biologist and former Curator, Taraporevala Aquarium.

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Macmillan Encyclopedia of the Environment

General Editor:

Stephen R. Kellert,

Six volumes.

Published by: Simon & Schuster
Macmillan. 1997.



This profusely illustrated (more than 1,000 wonderful pictures) and succinctly written encyclopedia is a valuable addition to any library. The first step to save the environment is to know about it. I am sure this encyclopedia will be of enormous help to both biologists and non-biologists who want to know about the world in which we live in — its basic functioning, its inter-relationships and mutual dependency, its immense biodiversity and threats to its survival.

This compendium provides basic information on energy resources, minerals, soil, agriculture, wilderness, threats to wildlife, population, environmental laws, ecology, evolution,

pollution and hazardous wastes. Wherever necessary key words are defined as box items. Terms used in the text and also elaborated separately (e.g. Ocean, Sediment, Tuna, Aluminum etc) are written in capital letters and are also differently typeset. This helps the reader to search the required terms easily in the same volume or in other volumes.

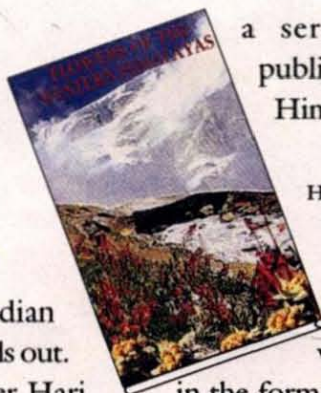
The text is in large readable print and simple language. The only drawback is that most of the examples given are from the USA. Perhaps it is written with the American readership in mind. Nevertheless, I recommend it for anyone who is interested in the environment. With the Ministry of Environment and Forests planning to make environmental science a compulsory subject in schools and colleges, such encyclopedias will be required in every library.

ASAD R. RAHMANI

Flowers of the Western Himalayas

by Rupin Dang,

Published by: Wilderness Films
India, New Delhi. 1998.



In the increasing list of young Indian naturalists, Rupin Dang's name stands out. Born in 1972, Rupin, like his father Hari Dang, has become synonymous with the natural history of the Western Himalayas. He is the founder of Wilderness Films India, which intends to publish more books on Himalayan ecology, and

a series of CD-ROM electronic publications on topics related to the Himalayas.

FLOWERS OF THE WESTERN HIMALAYAS IS NOT a detailed scientific book on the Himalayan flowers, but a field guide for the novice. It is the second edition (reprint), with an expanded species coverage in the form of an addendum. The text is well written and the photographs are excellent, except for two or three. The second edition is indeed an improvement over the first edition published by HarperCollins.

The design and appearance of the book is good but the binding is very weak. During the first reading the pages separated. The present format is quite confusing at times, since some of the text does not carry any photographs and for some, many are printed. Text and photographs could carry corresponding numbers for easy reference. We feel that the family name should have been written against the species name.



The photograph on p. 101 is quite confusing since there is only one picture, but the author has described three species of *Bistoffa* on the same page. On p. 73, there is no photograph of *Cassiope fastigiata*; instead three photographs of *Rhododendron campanulatum* are given, thereby misleading the reader. Sometimes, the flowers are too small to identify, e.g. *Benthamidia capitata* on p. 61.

The photographs are arranged family-wise, but sometimes the sequence is not correct. For example, *Cicerbita macrorrhiza* (p. 80) should appear after *Aster* spp. (p. 64), or *Rumex hastatus* and *Oxyna digyna* (p. 104) should appear before *Daphne bholua* (p. 102). There are numerous such examples in this book.

In some cases, the species name is written in capitals, e.g. *Rosa Brunonii* (p. 48) and

S. Chrysanthemoides (p. 68); in others the generic name is abbreviated. For example, on p. 48, '*Rosa brunonii*' is written as '*R. Brunonii*'. Since it is not appearing immediately after *Rosa* spp. it should be specified what 'R' stands for. Similarly on p. 53, it should be stated what 'P' stands for.

Some descriptions include the photograph of the flower as well as the fruit of the same species. One has to read the entire description to know if the

photograph belongs to the accompanying text. This could have been avoided by numbering the corresponding text and photograph; or indicated by an arrow pointing towards the photographs.

Rupin is certainly fond of the Western Himalayas. In many places, he has written 'our area' (pp. 32, 35, 37, 48, among others), meaning the region covered in this book (Western Himalayas). We think, the term 'our area' appears out of place.

FLOWERS OF THE WESTERN HIMALAYAS may not be a substitute for the seminal book FLOWERS OF THE HIMALAYA by O. Polunin and A. Stainton (1984), but this pocketbook will be useful to amateur naturalists and hikers.

NEELAM PATIL
ASAD R. RAHMANI



We are grateful to
SETH PURSHOTAMDAS THAKURDAS & DIVALIBA CHARITABLE TRUST
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for financial support for the publication of *Hornbill*.
Their consistent support is greatly appreciated.

Bats feeding on birds

Referring to Mr. Ernest Green's query on p. 835, Vol. XVII of this Journal, there is no doubt whatever that *Megaderma lyra* habitually feeds on birds and mice. These bats used to annoy me greatly by catching mice about my house, and fetching birds out of their comfortable nests in the night and chewing them up in the corners of rooms or verandahs.

We are spared the use of our inductive and deductive faculties (which would perfectly suffice) by the simple fact that I have seen them do it many times. The well known zoologist, Mr. Finn, was living with me at that time. We caught and caged the bats and he fed them on small birds brought for sale by natives. The hanging bat watched his time, made a grab, had the bird by the back of the neck and killed it instantly.

No chase or excitement, simply a swoop or even a grab with the wings when the bird passed close enough.

Having got the bird by the neck close behind the head, the hanging bat made a clean job of it in wonderful fashion. He started by chewing the neck in two and

dropping the head as neatly as any one could with two hands and a knife and fork. Never by any chance did he drop the body, though the wings were not used for holding it. Wings were occasionally used for turning the body round by a mere touch but never for supporting it. He chewed steadily along to the feet and tail which dropped in their turn with the same matter-of-course facility.

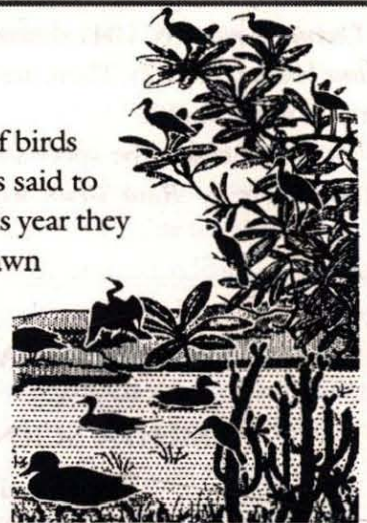
F. GLEADOW

Camp Bandra, Salsette, 10th March, 1907.

Bird weather reporters

I heard last week a prophecy about rainfall based on the habits of birds which might interest some of your readers. Last year the birds said to have built their nests high up on the topmost branches of trees. This year they have built low down in the most sheltered parts, the inference drawn is that while last year they did not seek much protection, this season they expect the fall to be heavy. I give this for what it may be worth. Let us hope the little prophets will escape the fate of some of our weather reporters.

K.R. BOMANJI I.C.S.
Bijapur, 10th June, 1906.



Eagles as barometers

One frequently hears how one can predict bad weather by watching a flock of sheep or kites and vultures, but it has never been brought to me as it has been in the last month. My camp is situated at an elevation of about 7,000 feet in a big deodar forest and I had on several occasions seen a pair of spotted hawk-eagles (*Spizaetus nipalensis*) in the nullah, about a mile or more above my camp and about 1,500 feet above it, but they never seem to come down any lower. One evening I was rather surprised to hear the shrill whistle of one quite near and soon spotted one sitting on a date tree and just before sunset he was joined by his better half. They sat there screaming for a few minutes and the other one shortly after followed, but went in lower down. Next morning we had a most terrific storm which lasted with a couple of short breaks for 5 days (from 14th to 19th) and all this time, the eagles remained near at hand and could be heard and seen at intervals throughout the day.

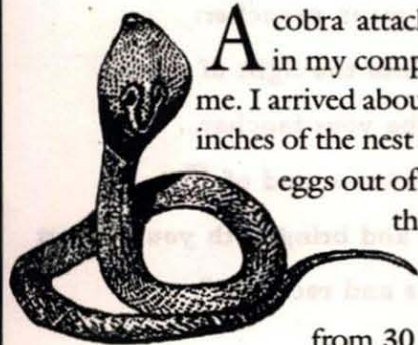


The 19th dawned cloudy and threatening and I thought we were in for still more rain, but about 9 am I saw the eagles soaring and watched them almost out of sight. About midday it cleared up and I did not see the eagles again till the other day. They arrived as before in the evening and I said to myself, I wonder if their arrival portends another storm. The weather though warm was quite clear. Sure enough at night a thunderstorm came on and it simply poured. It has rained off and on for 3 days now and the eagles are still here and I can hear them occasionally. I have just got my nets ready and a nice fat pigeon for a bait, so I hope to keep them here *a bit longer this time*.

C.H. DONALD

Bhadarwa, Kashmir, 8th June, 1905.

A cobra feeding on eggs



A cobra attacked, at 10 am the other day, the nest of a guinea-fowl sitting in my compound, and as none of the servants would kill it my wife sent for me. I arrived about 40 minutes afterwards, and found the cobra coiled up within 24 inches of the nest and the guinea-fowl still sitting. I shot the cobra and pressed two eggs out of the dead body, one of these eggs hatching. The curious thing was that the guinea-fowl was still sitting on her nest within a couple of feet of the cobra after it had taken two eggs and that one of the eggs should have hatched after having been inside the snake for from 30 to 40 minutes.

G.P. GEORGE

Secundrabad, 13th September, 1904.

INSA MEDAL FOR YOUNG SCIENTISTS — 1999

Instituted by the Indian National Science Academy in 1974, the Medal is awarded annually for outstanding work by scientists below 32 years. Only those **born on or after January 1, 1967** are eligible for consideration in 1999. Work done in India by the nominee will only be taken into consideration. The awardee is presented a **medal**, a **certificate**, and a **cash award of Rs. 25,000/-**. The award may include a grant of **upto Rs. 5 lacs for a period of 3 years**. Preference will be given for attending conferences/pursuing collaborative research under bilateral exchange programme with overseas Academies.

An awardee, who is unable to obtain suitable placement, will be considered for an interim Fellowship. A candidate may only be nominated once, and the nomination will be valid for 3 years or until the age of eligibility, whichever is earlier.

Nominations may be made by Fellows of the Academy, previous recipients of INSA Medal for Young Scientists and by established Indian scientific societies, University faculties and departments, or research institutions. **The last date** for the receipt of nominations is **October 15, 1998**. Proforma can had from AES (Council), Indian National Science Academy, Bahadur Shah Zafar Marg, New Delhi-110 002, by sending a self addressed envelope (25 cm x 12 cm).

ERRATA: The author of **The Tracking of the Forest Spotted Owlet** (*Hornbill* 1998 (1): 4-9) regrets that some of the photos were misattributed to her. The cover photo and those on pages 6-9 were in fact taken by David F. Abbott of Ashburn, Virginia, USA.

EDITOR'S CHOICE



Courtesy: the Artist

**Books! 'tis a dull and endless strife
Come, hear the woodland linnet,
How sweet his music! on my life
There's more of wisdom in it.
And hark! How blithe the throstle sings,
He too is no mean preacher:
Come forth into the light of things,
Let Nature be your teacher...
Enough of Science and of Art;
Come forth, and bring with you a heart
That watches and receives."**

— Anon.


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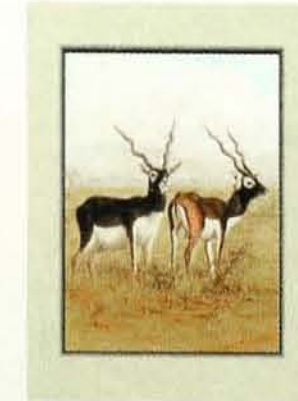
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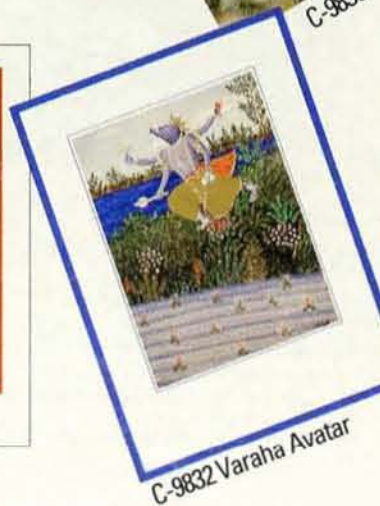
P-9814 Thespesia populnea



P-9812 Impression



C-9822 Divali



C-9832 Varaha Avatar



C-9833 Tree of Life



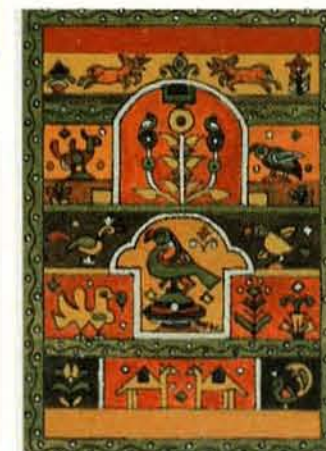
C-9820 Harmony



C-9836 Floral Images



P-9811 Winter Flowers



P-9815 Ethnic motifs



P-9816 Harmony with Nature



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Performers of the Deep Sea

I wish to share with you the great pleasures of watching the denizens of the deep. I write this letter at a location of about 200 nautical miles off Maputo close to South Africa as my ship sails towards its Load Port. I peep out of my porthole and find a school of fish playfully leaping on the port bow of the ship. They look wonderful as a whole lot of them show themselves for a few seconds in the air before diving in again.

I watch the ship bows regularly and see the flying fish and small fishes which move 20-30 feet over the water flying around trying to grab those fish as they fly. The fish appear to skim the water and I begin to wonder if they are really fish. We continue on our way leaving them to their peaceful life.

The ship seems to attract every type of marine life. They perform their playful dance around the ship and leave, and I wait in great expectation for the next performance.

Paul John,
Chennai.



Death traps for Olive Ridleys

I am happy that your Director, Dr. Rahmani catalyzed my joining BNHS. The *Hornbill* is so fresh and appealing that it takes me back to my days in Darjeeling Natural History Society — days of the easy early 60's.

Further, it is not gill nets but trawl nets which are drowning Olive Ridleys off the Orissa coast. Brig. Ranjit Talwar (Retd), at the WWF Section, is doing something about this with the Indian Coast Guard.

Lt. Col. Gautam Das,
New Delhi.



Lost and Found

The forest spotted owlet cover story was simply superb. *Hornbill* must now establish itself as the premier wildlife magazine in the subcontinent. We must strive for funds and improvements — also a far greater readership.

Rishad Naoroji,
Mumbai.



Snake Story

Apropos what Dr. Chhapgar writes under snake story (*Hornbill* December 1997) the receptors in the muscle cells of mongoose are so similar in structure to the snake's receptors, that the snake venom

cannot induce the paralyzing action of the cobra venom — alpha neurotoxin. As far as I know, venom of any species acts either in the blood or on the nervous system. When a mongoose fights with any venomous serpent how can it protect itself against haemotoxic venom. It is known only that snake venom cannot induce the paralyzing action. It appears that the information conveyed in the story is insufficient.

Digambar Gadgil,
Nashik.

B.F.C. replies: In a small letter meant to be read by laypersons, it is not possible to describe the chemistry of reaction of the cobra alpha neurotoxin. While the information as Mr. Gadgil writes, "is insufficient", it is not inaccurate.



Keep your City Clean

The following lines displayed outside a park in Scotland prior to 1916 still apply to public places in India.

*"Banana skin and luncheon scraps
Orange peels and choc'late wraps
Cigarettes and matches spent
Cardboard plates and paper rent
This and such like odds and ends,
Spoil this place for other friends
Dirt and papers in pretty places
Slam park gates in people's faces"*

Rizwana F. Shaikh,
Mumbai.



The Young Naturalist



.....
Compiled by V. Shubhalaxmi and Vibhuti Dedhia

Did You Know ?

There are 5 national parks and 24 wildlife sanctuaries in Maharashtra.

Asiatic Lions are found only in the Gir Forest of Gujarat.



The one-horned Rhinoceros is found only in the Indian Subcontinent.



Siberian Tiger is the largest among the tigers of the world.



Dragonflies lay their eggs in water; their young ones spend nearly six months in the water where they mostly feed on mosquito larvae.

The loudest singer among the insects is the Cicada, whose absence has given the Silent Valley of Kerala its name.



Wildlife Quiz

- How many eyes does a butterfly have?
a. 2 b. 6 c. 100 d. 12000
- Which snake makes a nest to lay eggs?
a. King Cobra b. Python c. Rat Snake d. None of the above
- Which of these animals breathes through its skin?
a. Fish b. Frog c. Crab d. Lizard
- How many legs does a spider have?
a. 6 b. 4 c. 8 d. 10
- How many eyes does a spider have?
a. 6 b. 4 c. 8 d. 10

Answers

1. (d) It has a pair of compound eyes, each of them is made up of 6000 minute eyes called ommatidia.
2. (a) The King cobra gathers dried leaves and twigs with its body and tail and arranges them in the form of a mound.
3. (b) Frogs are the only animals that respire by the skin besides their lungs and mouth.
4. (c) Spiders are different from insects as they have four pairs of legs.
5. (c) They have 8 eyes arranged in 2 rows placed parallel to each other on the head.

JUMBLE

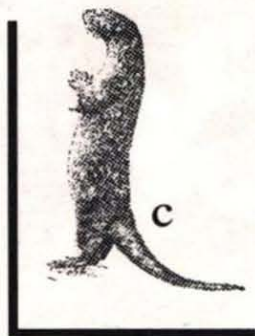
Solve the jumble and identify the homes of the animals.



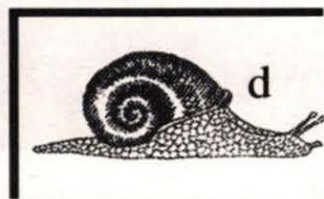
Bee



Eagle



Otter



Snail

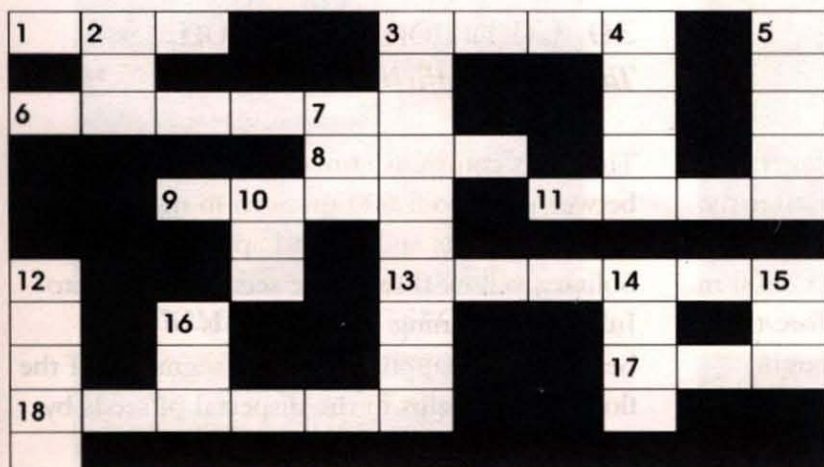


Squirrel

Answers
1. Drey (e); 2. Eyrie (b); 3. Shell (d);
4. Hive (a); 5. Holt (c).

1. YDER 2. YEEIR 3. LSLHE 4. IVHE 5. LOHT

CROSSWORD



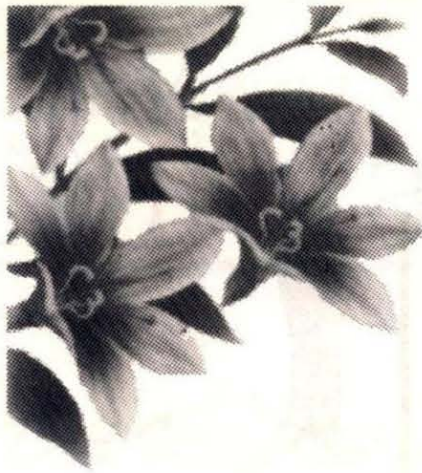
Across:

1. A family to which tigers and leopards belong (3)
3. Snakes and lizards are a favourite meal of this bird (4)
6. Female of a peacock (6)
8. Birds lay this in their nest (3)
9. Member of the dog family (4)
11. Home of birds (4)
13. Largest Indian deer (6)
17. Insects that construct hills (3)
18. Long-tailed, black-faced monkey (6)

Down:

2. Ancestor of man (3)
3. A fishing bird (10)
4. A bird-eating bird (5)
5. Projecting nose of animals (5)
7. Ribbon-like fish (3)
10. A night-flying bird (3)
12. Biggest mammal in water (5)
14. Honey loving mammal (4)
15. Enemy of farmer (3)
16. Only animal who wears clothes (3)

Answers
Across: 1. Cat; 3. Kite; 6. Peahen; 8. Eggs; 9. Wolf; 11. Nest;
13. Sambar; 17. Ant; 18. Langur.
Down: 2. Ape; 3. Kingfisher; 4. Eagle; 5. Snout;
7. Eel; 10. Owl; 12. Whale; 14. Bear; 15. Rat; 16. Man.



Indian Wildflowers

Text & Photographs: Isaac Kehimkar

Flowering in the Himalayas begins with the advent of spring. But in the late summer from July to September, rains in the Himalayas cover the region with the most beautiful and exquisite flowers.

35. Brahma's Lotus

Saussurea obvallata

Occurs from Kashmir to Central Nepal at 3600 to 4500 m. Seen during the late summer from July to September. Pale yellow papery bracts surround the cluster of purple flowers. At places, it is locally abundant and can be seen being carried in basket loads.

36. Common Coltsfoot

Tussilago farfara

These flowers are known to be harbingers of spring, as they are the first to appear after the snow thaws. Seen in the western Himalayas from Kashmir to Kumaon at 2000 to 3500 m. The flowers appear first and fade before the leaves appear. Valued as a cure for cough. Leaves and roots are used in treating respiratory ailments.

37. Himalayan Blue Poppy

Meconopsis aculeata

Seen on slopes among the rocks from Kashmir to Garhwal at 3000 to 4000 m. This is the most common among the Himalayan poppies. Seen from July to August. Root is considered to be narcotic and toxic.

38. Wax Flower

Bergenia ciliata

These common flowers are seen in shaded slopes and rocky ledges from March to July between 1800 to 4000 m. Flowers may be white, pink or purple, with broad glossy leaves spread flat on the ground. Another variety that occurs at a higher altitude prefers open slopes.

39. Common Dandelion

Taraxacum officinale

The most common Himalayan flower, it grows between 500 to 5,500 m. Seen in meadows, degraded lands and around apple orchards. Solitary, yellow flowers are seen from June to July. The adjoining photograph is of a seed bearing silky pappus (modified segments of the florets), that helps in the dispersal of seeds by wind.

40. Large Bellflower

Campanula latifolia

Conspicuous bell-shaped, dark purplish-blue flowers can be seen from Kashmir to Central Nepal between 2000 to 3000 m. This erect perennial herb stands 1.5 m tall. Flowers are seen from July to August.

Himalayan Blooms



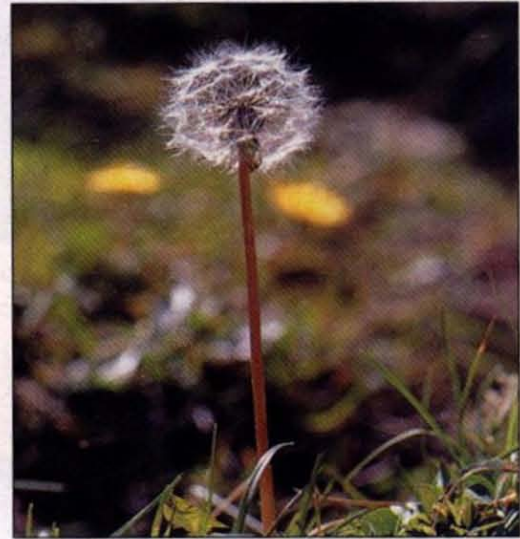
BRAHMA'S LOTUS



WAX FLOWER



COMMON COLTSFOOT



COMMON DANDELION

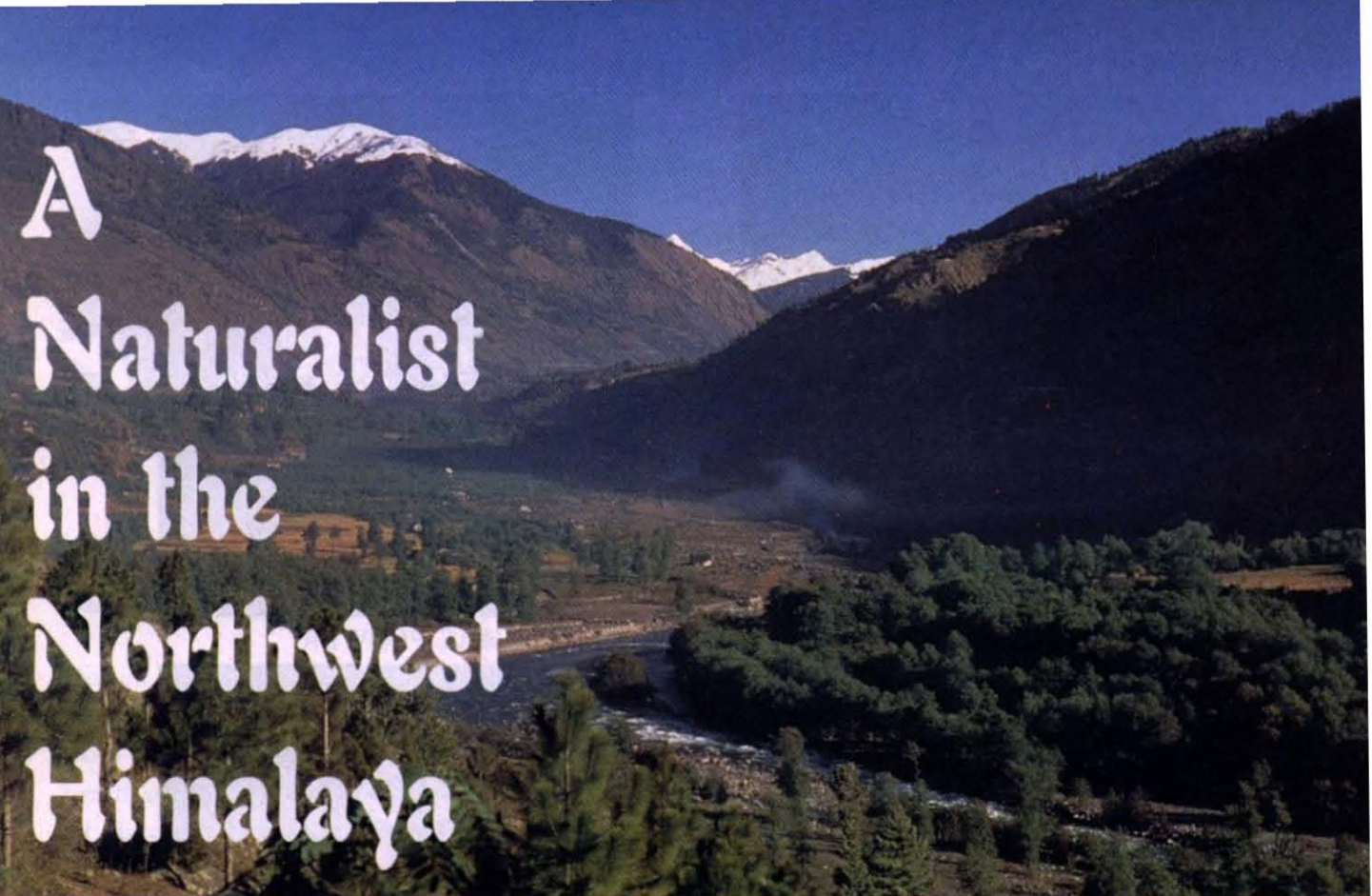


HIMALAYAN BLUE POPPY



LARGE BELLFLOWER

IK-DPA



A Naturalist in the Northwest Himalaya

DEVRAJ AGARWAL/PORPOISE PHOTOSTOCK

M. A. Wynter-Blyth

.....
contd. from Hornbill 1998 (2)

MANALI

The valley of the Beas narrows at Manali, hemmed in by steep forested slopes. To the north it widens out into a boulder strewn waste that extends to the foot of the great wall of mountains, ten miles away, which separates Kulu from the desolate high plateau of Lahoul. Down the valley, above where it bends to the east, are the big hills beyond Jagatsukh, and up the Manalsu Nala, which joins the main valley at Old Manali village, are views of the snow-covered peaks that are the source of the river Ravi.

The Kulu Valley, as Himalayan valleys go, is prosperous and much of its floor and lower slopes is closely terraced for the cultivation of rice and barley, and there are many orchards, for it is famous for its fruit especially those that are native to more northern climes. Other northern trees too do well, for the European oak, the linden (*Tilia europea*) and the Spanish chestnut flourish near Manali village.

Along the riverside grow tall alders (*Alnus* sp.) and the occasional poplar (*Populus ciliata*), while the lower slopes of the hills are covered with plantations of deodar (*Cedrus deodara*), and in the more open places with the scrubby growth that is usual at this altitude in the northwest Himalaya — *Spiraea sorbifolia*, *Spiraea canescens*, *Berberis*, *Crataegus*, *Indigofera*, *Rhamnus*, *Cotoneaster*, roses and the holly-leaved oak (*Quercus dilatata*). Above the deodar plantations the forest is mostly of spruce (*Picea morinda*) with a scattering of horse chestnut (*Aesculus indicus*) and walnut trees (*Juglans regia*) and a thick undergrowth of ferns and mixed herbage of balsams (*Impatiens* sp.),

dead nettle (*Lamium album*) and wild carrot (*Chaerophyllum villosum*), whose root is a favourite food of the black bear. Around 9,000 ft. it is common to find areas where planes (*Acer* sp.) grow to the exclusion of most other trees, and the vivid green of their young leaves makes a pleasing contrast to the sombre hues of the conifers. Above the spruce the dark leaved Narkanda pine (*Abies pindrow*) becomes the predominant tree, to give place at 10,000 ft. to the mountain oak (*Quercus semecarpifolia*), where an abrupt transition to an alpine type of vegetation takes place. From 11,000 ft. forests of birch (*Betula utilis*) and shrubberies of rhododendrons (*Rhododendron campanulata*) stretch to the treeline at 12,000 ft.

I had gone to Manali with great hopes of catching, if not any butterflies that were new to my collection, at least many that would be valuable additions to it. In this I was sorely disappointed, for in spite of a profuse and varied vegetation I saw no more than 42 species in all, and apart from catching fine series of *Heliophorus oda*, *Heliophorus bakeri*, *Heliophorus androcles* and *Erebia shallada*, and one or two bedraggled comma butterflies (*Vanessa egea*), I collected no species that the most fertile imagination could describe as anything but very common.

However, my series of *H. oda* and *H. bakeri* were of interest. Although I do not possess the wet season forms of these butterflies in which the difference between them is greater, that between the spring forms is small; *bakeri* lacks discal lines and an orange-flushed area on the under forewing, characters which are present in *oda*. This, in conjunction with the facts that I found the two insects flying together and that some of them displayed characters intermediate

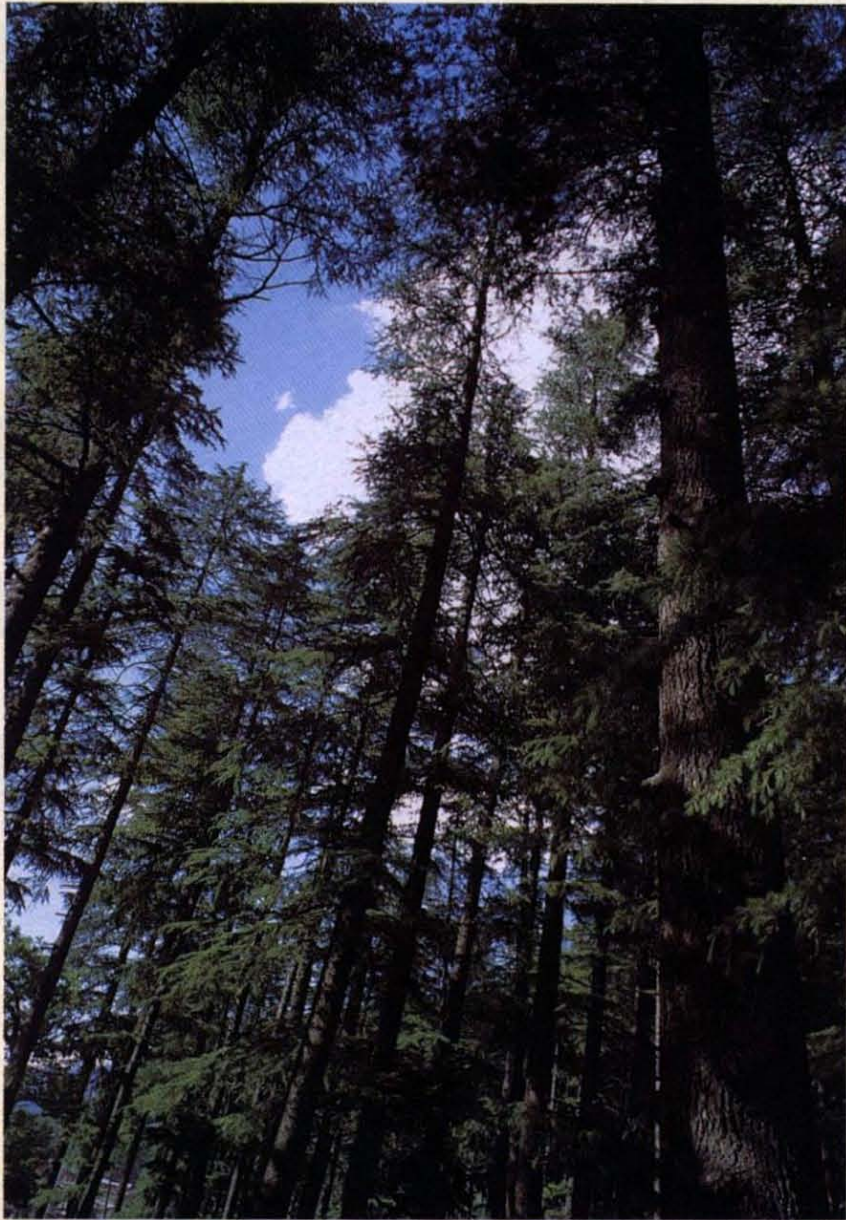
between the two, leads me to suspect that *oda* and *bakeri* may merely be forms of the one butterfly and not distinct species.

I was, however, more than compensated for my disappointment in Manali's butterfly life by the richness of the flora, which, though I am no botanist, I found to be of absorbing interest, especially that of the alpine region.

There was an easy route to the high altitudes up Khanpari Tibba, the mountain that rises abruptly just behind Manali. My first ascent was made in early May and took me no further than a steep little meadow at 9,000 ft. where spring had hardly begun and few flowers were yet to be seen except a scattering of white gypsophila (*Gypsophila cerastioides*) and strawberry blossoms (*Fragaria vesca*), purple thyme (*Thymus serpyllum*), golden (*Ranunculus hirtellus*) and the inevitable little blue gentian (*Gentiana argentea*). A week later I penetrated higher onto the extensive meadowland marked on the map as Gumhana Thach (*thach* being the vernacular for a grazing ground) behind the rocky steeps that mark the end of the first and hardest part of the ascent, to find that it was still under snow. At its lower edges among the trees *Primula denticulata* was in flower and among a



Sapphire butterfly — *Heliophorus* sp. sipping nectar from gentians.



ISAAC KEHIMKAR

The natural forests of Manali are being replaced with deodar plantations.

fine display of the white racemes of valerian (*Valeriana wallichii*) were early growths of the strange *Trillium govanianum*, the three-leaved lily with a curiously spider-like yellow and purple flower, a close relation of the rare English herb paris.

My next ascent was at the end of May when the snow had receded from the lower parts of the

meadow up to nearly 11,000 ft., but even yet flowers were scanty. *Primula denticulata* was now in full bloom, as was *Trillium govanianum*, a small purple fumitory (*Corydalis diphylla*) and the bright golden stars of *Gagea lutea* (the Star of Bethlehem). There were, too, some early anemones and a small, sweet-scented, leafless, flowering tree (*Viburnum foetens*). Where the snow had just melted, everywhere were visible the collapsed tunnels of Royle's vole (*Alticola roylei*). To judge from their abundance, the winters of these little animals are far from idle for they criss-crossed and wound about the surface of the ground much like the galleries constructed by certain species of white ant, but on a much larger scale. This vole scoops out a narrow channel along the surface of the earth and employs the earth so released for lining the upper part of the tunnel which is bored through the snow. Inside these, one imagines, the winter is spent scuttling to and fro feeding on the roots, seeds and grasses come across during the excavations.

I trudged through the snow to the top of the ridge leading to the final slopes of Khanpuri Tibba, where I sat down and ate my lunch. The view was superb for I was encircled by snowy peaks. To the north it almost seemed as if I looked down onto the Rohtang Pass (13,050 ft.), ten and a half miles away, where the track of early travellers to Lahoul could be marked in the snow as a thin black line winding across the long gentle ascent of its

summit. To the east was the great mass of ice-capped Dev Tibba (19,687 ft.) and, close beside it, the magnificent precipices and ice-falls of his greater, though nameless, brother. Again to the left was the pillar-shaped peak behind Chhatoru and the approaches of the Hamta Pass, and a little nearer the vast chimney of Indar Kila standing like a huge obelisk on the mountainside.

After lunch I began to return at a run down the steep snow slope that I had so carefully ascended. I soon learnt that this was a mistake for the snow was harder and more slippery than I had realised and before I could prevent it I was embarked on an involuntary glissade travelling at ever-increasing speed. Almost from the first I knew that I should inevitably collide with the trunk of a birch tree some 50 yards down the slope, and I remember turning over in my mind in an entirely detached way what would happen to me if I broke an arm or leg in this remote spot. The next I knew was that I had left the ground where the incline suddenly grew steeper and was flying, first through the air, and then through a rhododendron bush, which, I suppose, slowed me down somewhat, to glance violently off the birch tree and come to rest six feet lower down up to my waist in snow. I picked myself up with care and was surprised to find myself intact except for a few minor bruises and scratches. Thereafter I proceeded with great caution.

My final ascent was made on June 9th, the season when the cherries are ripe in the Manali orchards and the forest is lovely with the lilac of irises (*I. nepalensis?*). Beyond the old village the rare tiger-lily (*Hemerocallis*

fulva), a favourite garden plant, blooms among the rocks, and the lily of the valley (*Ophiopogon intermedius*) and the little dark blue and white *Mazus rugosus* flowers on the shady banks. Among the long grass can be found the curious climbing lily, *Polygonatum cirrifolium*, with the tendril-like leaf tips and drooping white flowers, and in the hedgerows the brilliant blue vetch, *Parochetus communis*.

Two hours saw me at the foot of the meadowland where a pleasing sight met my eyes, for it had become a garden wherein flowered a profusion of white and blue anemones (*A. obtusiloba*), golden *Ranunculus hirtellus*, *Trillium govianum*, and nodding heads of purple-chequered fritillaries (*Fritillaria roylei*).

On entering the meadow I startled a monal into flight, loudly shrilling his ringing alarm whistle, to be followed a moment later, as is their custom, by his drably-coloured mate. This bird is common at this season around 10,000 ft. and to have seen him in flight from above with the sun shining onto his plumage is to have witnessed one of the most lovely sights in nature. His head and crest of spatulate feathers, are of brilliant metallic



The musk deer has been hunted and killed for centuries for its musk gland.

green, and around his eyes is a bare patch of bright blue flesh. His nape is of flame-tinted bronze which shades into the silky green of his upper back. His lower back and wing coverts are of silky purple, and his tail bright cinnamon, the only drably coloured parts of him being his dusty white rump and dusky black breast and legs, a contrast that has caused the following legend about him to grow up among the hill folk.

In the beginning Jija Rana, the bird god, created the monal, king of the pheasants, giving him the plumage he deemed worthy of this position. But that bird, being displeased with his drably-coloured breast and legs, complained to the god and asked him to improve on his handiwork. However, Jija, being extremely annoyed at such criticism, angrily drove him off, speeding him on his way with a handful of ashes picked from the fire, which fell on the lower part of his back so that from that day to this the monal has had a dusty white rump. Jija Rana then set about the creation of an even more beautiful bird to take the place of the monal as the pheasant king, and so came into being the glorious, scarlet, white-spotted, black-breasted tragopan, who ever since has been called Jija Rana in honour of his maker.

On my return I was caught in the most violent hailstorm that it has been my lot to experience, and had I not been able to shelter under a large rock I should have been in a sorry plight for the hailstones were of the size of marbles. It wrought great havoc in this natural garden, beating down and destroying the flowers, except the nodding heads of the fritillaries which seemed especially constructed to withstand such an onslaught.

Lower down in the forest I saw a Himalayan yellowthroated marten (*Martes flavigula*), which, it so happened, was except for monkeys, the largest wild animal I saw in Kulu. His markings were unusual and striking, for his head appeared to be black down to the line of his eyes, as were his bushy tail, legs and hindquarters, whilst his back was brownish-gray. There is also another marten to be found here, the stone marten (*Martes foina*),

but he is seldom seen, being very nocturnal in his habits. Of the other wild animals that I might have seen, black bears (*Selenarctos thibetanus*) are undoubtedly common, especially on this Khanpari Tibba where I came across many of their scratchings, but they are abroad little in the daytime and are adept at keeping out of sight. At this season brown bear (*Ursus arctos*) are up at the high altitudes, but I saw the tracks of one that had crossed over the Hamta Pass. The snow leopard (*Uncia uncia*) too, had moved to the heights, but one had been shot close to Manali village as late as April, after having killed a pony and mauled a bull terrier dog, and another was seen in Lahoul, a march or so beyond the Rohtang Pass in early June. Ibex (*Capra ibex*) do not seem to be rare as there were several reports of them whilst I was in the valley, and bharal (*Pseudois nayaur*) to judge from the number of their horns that decorate the local temples, are to be found not uncommonly. The antlers of barasingha (*Cervus elaphus hanglu*) are also a popular decoration but these must be imported. (Rannoo, who is usually a reliable informant and is the generally accepted authority on wild life in Manali, asserts that they come from western Kangra, but no textbook allows that they can be found nearer than Kashmir). Of the rest, musk deer (*Moschus moschiferus*) are not very rare, and are persecuted for their musk pouch, tahr (*Hemitragus jemlahicus*) are present on the craggy hillsides, goral (*Nemorhaedus goral*) in the same type of country at lower altitudes, and serow (*Capricornis sumatraensis*), here called *yamu*, which are scarce, can sometimes be found in remote and thickly wooded nalas. I am told, too, that there are leopards, and that wolves occasionally come over from Lahoul in the winter. ♣

End quote

"The person who said that it is better to travel hopefully than to arrive had clearly never walked a Himalayan mile."

— W.T. Loke

Seized wildlife stocks destroyed

On World Environment Day, 5th June, 1998 the Maharashtra Forest department destroyed several mammal and reptile skins seized from poachers. These stocks were set afire by Mr. Chandrakant Khaire, Minister of Environment and Forests, Government of Maharashtra, at Hornbill House. The event received wide media coverage and good support from conservationists.

The stock destroyed included 6 skins of leopards, 1912 snakeskins, 44 snakeskin bags and purses. However, some pieces were preserved to train new forest guards and for conservation education. On the same day in Nagpur seized wildlife stocks were destroyed. ♣



SHEKAR SHIVESHWARKAR/CEC

SHEKAR SHIVESHWARKAR/CEC



in large numbers and wonderful ideas were put on paper by the children to deal with the Menace of Plastics. The best entries were awarded prizes by the Municipal Commissioner of Mumbai, Mr. Girish Gokhale. ♣

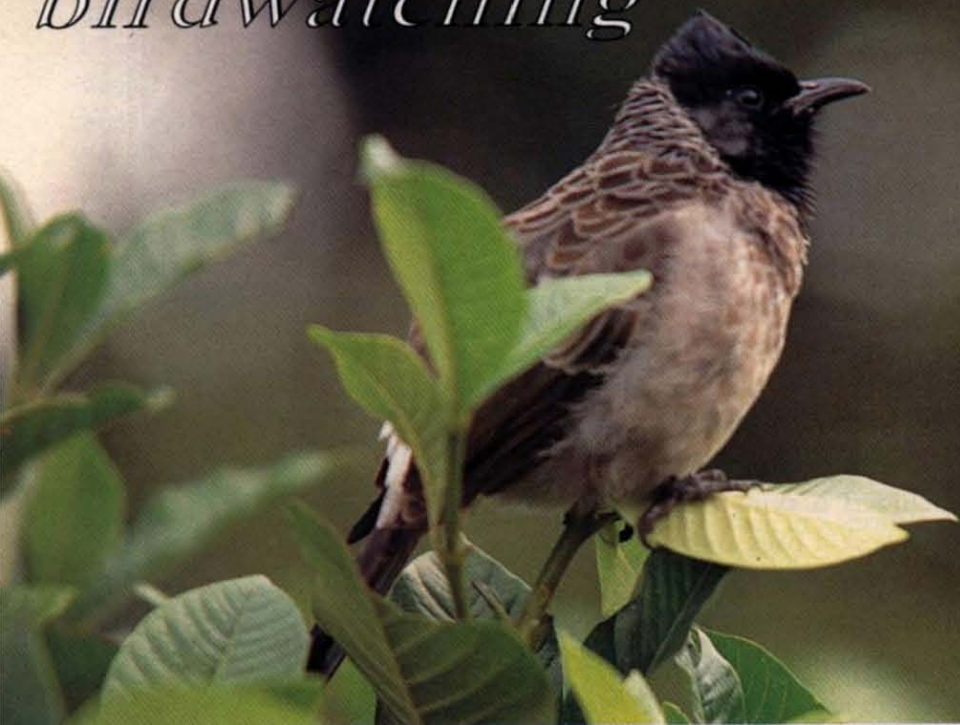
Menace of Plastics

A poster competition was held for school children on World Environment Day, 5th June, 1998 at the BNHS. The competition was attended



SHEKAR SHIVESHWARKAR/CEC

The joy and art of birdwatching



Redvented Bulbul

SUNJOY MONGA/PORPOISE PHOTOSTOCK

Eight characteristics to identify birds

contd. from *Hornbill* 1998 (2)

Sunjoy Monga

This is where the second step comes in, the lookout for any of the eight below-described characteristics, either physical or behavioral, which finally helps to accurately identify your feathered sighting. Let's discuss these eight routes which appear very different but which, with a bit of experience, actually complement each other to meet the same purpose — field identification:

Identification by Size

Size is the most noticeable feature of any life form, and especially birds. A good look at the bird at once helps you place it in a certain bracket. It is important that identification by size is related to certain yardsticks.

It is easy to describe what you saw, but any description of size can often be subjective and what

is big for you may not be so big for someone else. Therefore, it can be of great help to have something familiar to measure and relate the size of your bird with.

Familiarise yourself with the sizes of some common birds such as the house sparrow, house crow or the common kite. This way you can confidently say that the bird you saw was smaller than the house sparrow, or approximately the size of a house crow and so on.

Identification by Colour

Like size, colour is yet another very obvious feature, for identifying birds. A very important point is that all birds of same or similar colour(s) do not necessarily belong to the same group or family. However, colour is yet another way to short-list the birds' identity.



Indian Roller

E. HANUMANTHA RAO/PORPOISE PHOTOSTOCK

Some species can be easily recognised with just a quick glimpse of their colour e.g. a greenish bird with a long tail is usually some parakeet. But remember, in the above statement there is also a long tail. So colour is just one of the pointers to field identification.

Identification by Shape

Often it is possible to recognize a bird in dim light, even against the light, merely by its silhouette appearance. All birds have distinctive shapes. Shape is a combination of physical attributes like posture, build, head, beak, wings, legs and tail.

Posture pertains to a bird's actual carriage, to its stance or "gist". For instance, some birds swim or fly with their neck curved in a graceful S-shape, yet others with their neck stretched up or out front; nocturnal birds such as owls settle erect and across, or perpendicular to, a branch,

whilst nightjars settle flat and along a branch length.

A bird's build implies whether a species is slim and shapely or robust and thick-set, long-bodied or shortish. Is the head roundish as in owls, or crested as in many bulbuls? The beak comes in a vast array of designs, either hook-tipped as in most birds of prey and shrikes, long and dagger-like in kingfishers, or short and stout as in seed-eaters. Are the wings pointed, like in swifts, longish and broad as in herons or rounded as in warblers? Legs and tail also show variations in size and structure. With experience, the shape and form of a bird will help in identifying a bird.

Looking for other Field-marks

Since so many species have complicated colour arrangement, certain distinctive markings come in very handy. Often these field-marks can

help distinguish between species, and even between sexes of certain species. These field-marks can either be further, explicit modifications of colour and/or in the form of streaks and barrings on upper and/or under-bodies, eye-stripes, crown-stripes, wing-bars, tail-bands, neck-stripes, white or pale rumps, or actual physical modifications, like facial wattles or some peculiar development of certain feathers, perhaps in the tail or of the crest.

Identification by Behaviour

Just like every individual has a personality and temperament, so does every bird. This is yet another attribute which, with just a bit of observation and experience, begins to assist in birdwatching. A woodpecker can be recognised by its shape and preference for moving on stems and branches, a flycatcher by its habit of making frequent short sallies after winged insects and returning to its perch; a sparrow by its hopping movement; whilst larks and pipits by their walk, swifts and swallows by their almost constant flying. But again, the swallows can perch on wires and thin branches whilst swifts cannot.

Flight as an Identification Clue

Flight is what birds are best known and instantly recognised for. All bird groups have their distinctive flights which help in their identification. Woodpeckers have an undulating flight, while parakeets fly fast, mostly straight; the falcon dashes fast and steadily. The hawks with their roundish-wings make a few rapid wing-beats followed by a short glide; a heron/egret steadily flies with slow wing-beats and its head/neck pulled back into its shoulders; whilst cranes and storks fly with the neck stretched out. Diving-ducks, such as pochards, trip along and patter along the water surface before taking flight; while the surface-feeders such as pintails and teals directly spring up from water.

Habitat Preference & Season

All birds belong to a certain habitat and as far as possible most birds prefer to remain in familiar surroundings. After a few visits you will realise that you see certain birds more or less always in the same area. In a forest, you can always expect to see different birds in the various layers of tree-growth. On the upper, leafy branches are purely arboreal birds such as barbets, drongos, minivets and orioles; the stems and branches are home to woodpeckers, the upper-middle storeys hold various drongos, bulbuls, babblers, thrushes; the lower bush and scrub have yet other kinds of babblers, bulbuls, warblers, and doves.

Free as a bird might seem, the fact is that the majority of our feathered friends live in nature's seemingly indistinct yet highly organised 'cages'. It would be pointless to look for a lark in deep forest, or a woodpecker in a grassland. However, there are a variety of micro-habitats inside a forest.

Calls in Field Identification

Just like birds are celebrated for their flight, so too are they for their melodious voices — most birds have an individuality when it comes to voice.

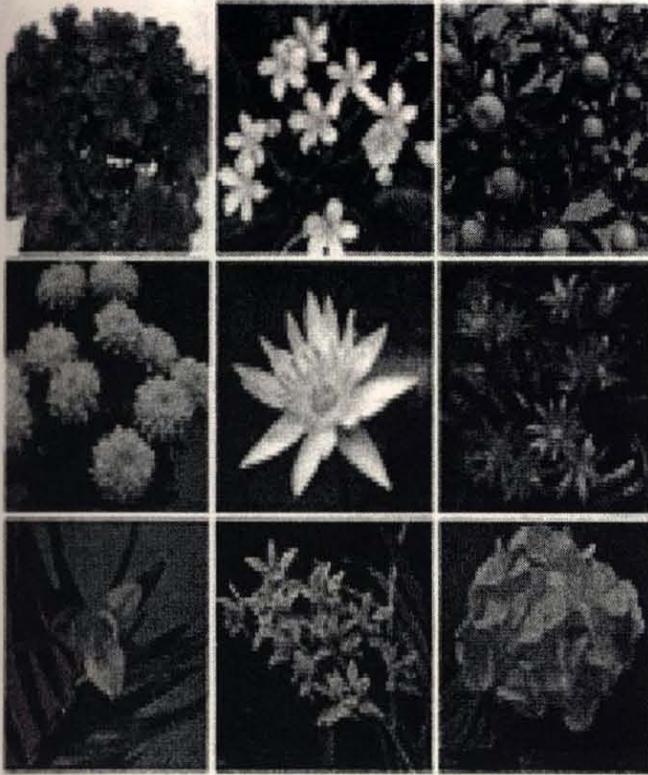
In fact, expert birdwatchers often rely on their ears as much as their eyes to recognise birds. Birdcalls are not just pleasant, they augment your enjoyment of the natural world. Birdcalls are a huge assistance in instantly discovering which bird is present at a particular moment in a locality. No matter how well field-guides and birdwatcher friends describe a particular call, ultimately the best judge will be yourself. Sounds difficult but its worth every whistle and scream. So happy birding! ♡

ERRATA

The Photograph on p 24 in *Hornbill* 1998 (2) was wrongly credited to Sunjoy Monga/PPS, it is by Krupakar-Senani/PPS. The error is regreted.

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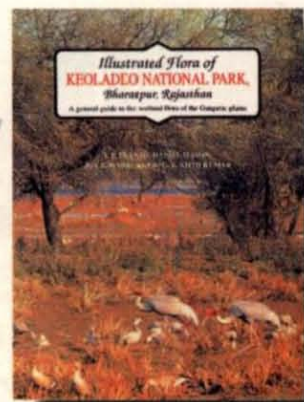
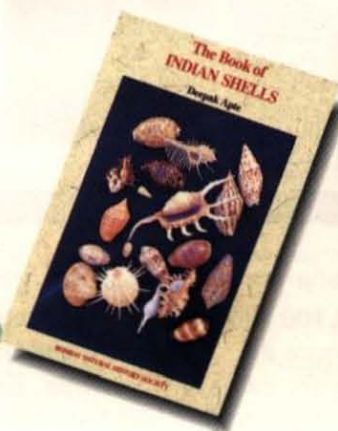
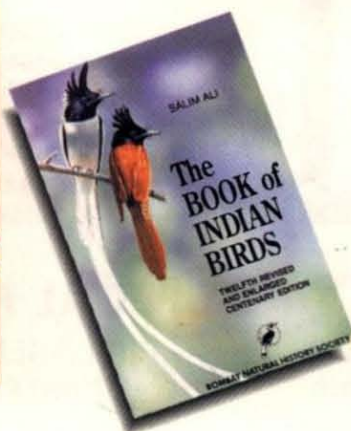
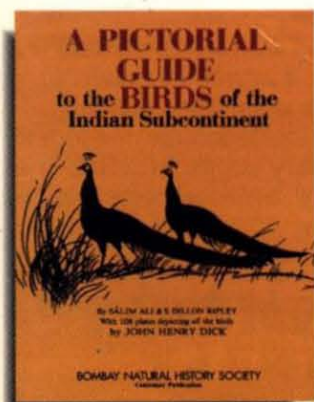
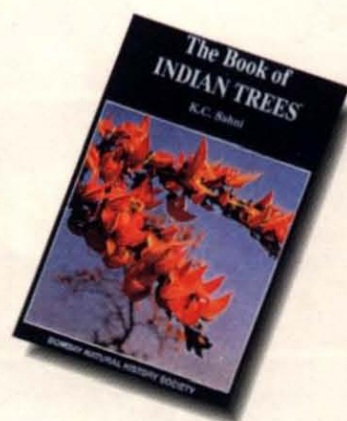
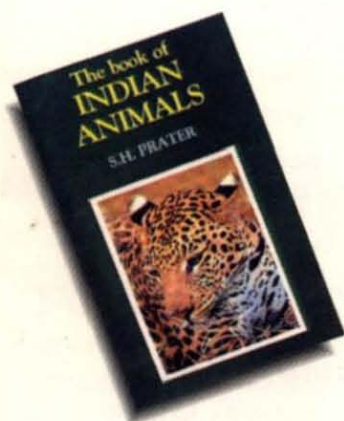
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