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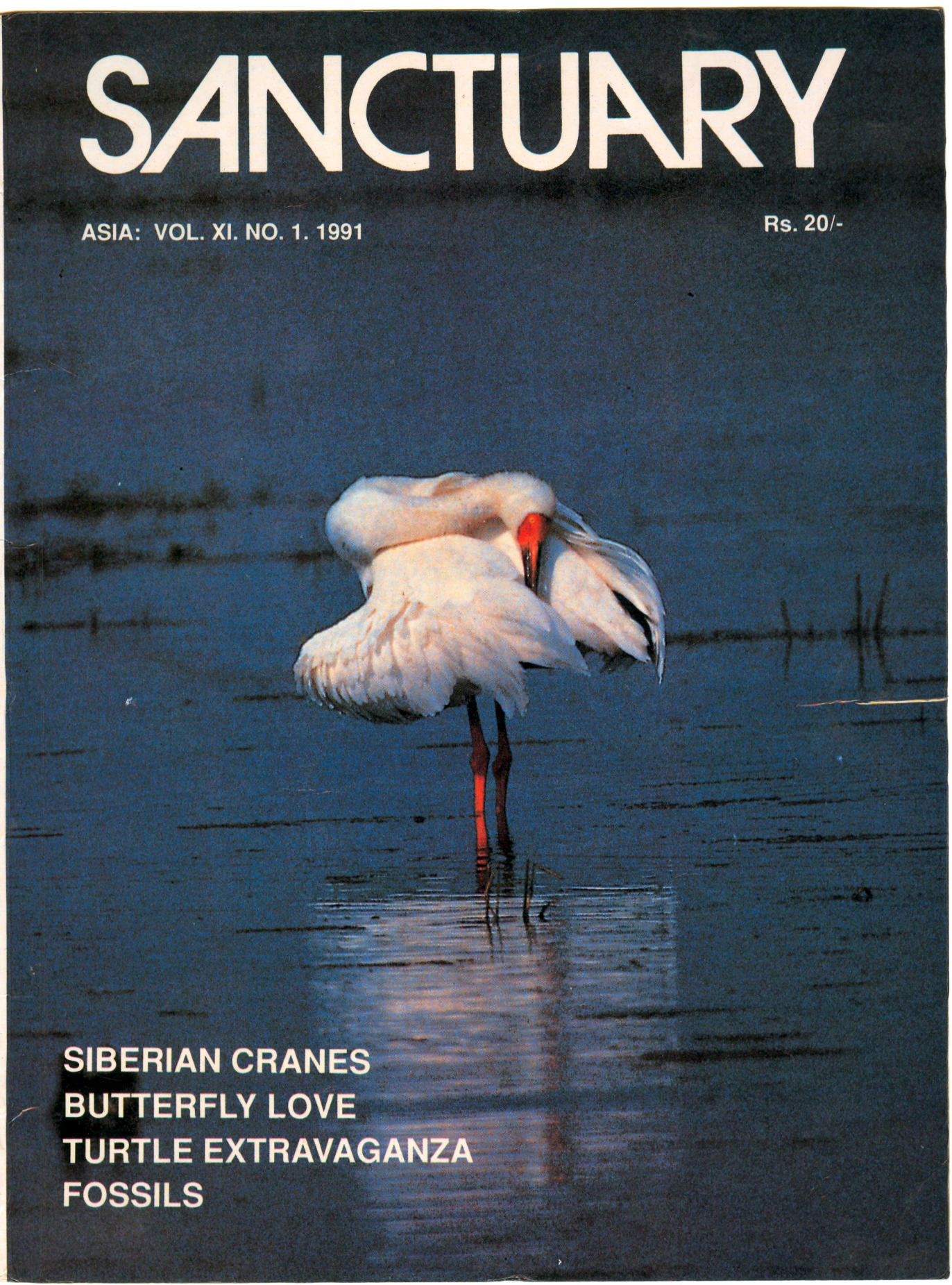

SIBERIAN CRANES
BUTTERFLY LOVE
TURTLE EXTRAVAGANZA
FOSSILS

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SIBERIAN CRANES BUTTERFLY LOVE TURTLE FOSSILS

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INSIDE
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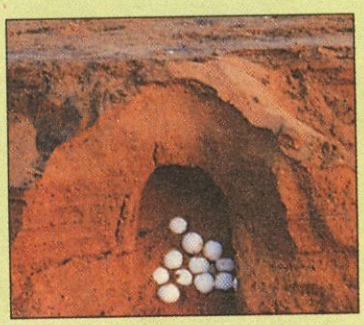
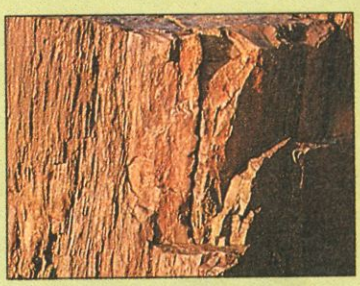
ASIA: THE COMPLETE ECOLOGY & WILDLIFE BI-MONTHLY

VOL. XI. NO. 1. 1991

From 200 just over two decades ago, the wintering population of Siberian cranes in the Indian region has fallen to an alarming 10. **Vivek R. Sinha** profiles the bird and argues that it is still not too late to save the species.





HISTORY IN STONE

Nihal Mathur

The saga of life on Earth is one of constant change. Given our infinitesimally short life spans, it would be impossible to document this change without the study of fossils. In India this fascinating subject has received scant attention by conservationists even though several survival lessons lie hidden in our fossil record. We present here two reports, on fossil parks in different regions of India.

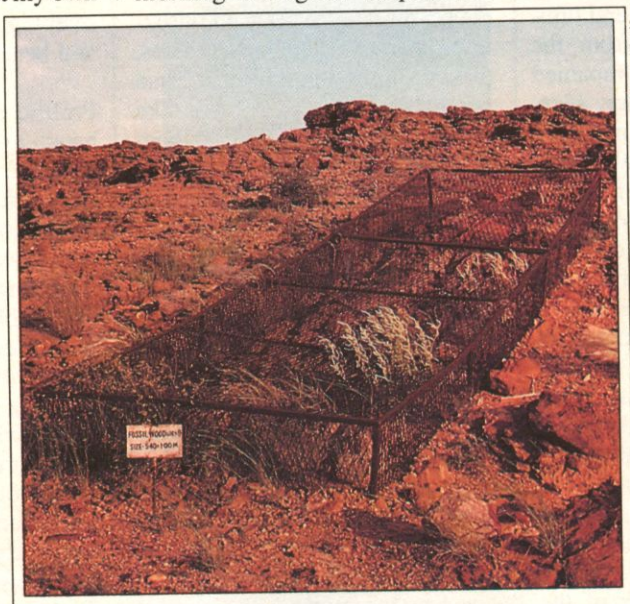
THE AKAL WOOD FOSSIL PARK

by Nihal Mathur

Huge empty vistas filled my field of vision as I stood on top of a rocky hillock and tried to photograph a setting sun and a rising moon. The two images in my camera were sharp at infinity, but my own focus wandered, seeing the immensities of the earth and sky that stood in striking contrast, like Yin and Yang, polarities of that awesome oneness. That was the day for contradictions anyway; I had come to see the petrified remains of a primeval forest but had ended up discovering the living flora of the desert.

The desert region of Rajasthan is strewn with fossil sites. Nearly two decades ago, the Geological Survey of India came upon a large concentration of wood fossils at Akal, a village some 14 km from Jaisalmer. To preserve this small but precious fragment, the Geological Survey handed this monument of natural history to the Forest Department of Rajasthan. In 1979, when some 3,000 sq km of the desert was declared a National Park, Akal was included. A Wood Fossil Park came in existence under the purview of the Wildlife Protection Act of India. To safeguard the site, an area of 21 ha around the major fossil finds was fenced by a stone wall and a watchman posted permanently.

I met Uttama Ram, a forest guard, when I reached Akal early one morning in August. Surprised to see an unexpected visitor, he was full of enthusiasm to show me the park. Almost immediately we set off down a trail that took us into a sand blown wasteland of grit and stone, broken by patches of sparse vegetation. As we progressed, I had a strange feeling of slowly stepping into the past. Relics from medieval period, carved stone pillars made their mysterious appearance standing in complete solitude, dotting the desertscape.



Nihal Mathur

Akal was once a hot and humid land with large fresh water lakes and dense vegetation. In those steamy, swampy plains, strange plants like cycads -- bizarre hybrids between ferns and palms -- grew along with equally unusual trees, plants and mosses. Seen here is a fossilised trunk protected by a wire meshing.

Gradually, the gravel gave way to rocky outcrops of granite and limestone as low sandstone hills rose and fell around me. Fragments of multi-coloured stones littered the surface like pieces from a gigantic jigsaw puzzle. Splinters from a primordial explosion, or so I thought as I stood surrounded by the silence and the secrets of Akal. And then I came upon a field peppered with pebbles. In a geologist's jargon, these marble sized stones were of glacial origins, signature of the passing of the last Ice Age nearly 30,000 years ago. But the antiquity of Akal goes far back in time and the evidence lies entombed in the yellow sandstone which holds the wood fossils.

To paleontologists, the story of these wood fossils at Akal reaches back a 180 million years. In geological time, this was the Lower Jurassic Age in the Mesozoic Era when the earth was passing through its middle stages of development. Akal was then a hot and humid land with large fresh water lakes and dense vegetation. In those steamy swampy plains strange

plants like cycads, bizarre hybrids between ferns and palms, grew along with equally unusual trees, plants and mosses. Termed gymnosperm in botany, this vegetation was simply the non-flowering but seed bearing flora that underwent their greatest growth and evolution during this time, far outstripping that of the animals. But if this was the epoch of the plants then it was also the time when the reptiles ruled the world, the heyday of the dinosaurs.

Eons ago

And then one day, dark and ominous clouds gathered from the boundless deep and, accompanied by lightning and thunder, blew inland with fury, bringing rain. Water came crashing down, snapping trees and spilling them out into naturally depressed areas. Drastic changes in the distribution of land and water were taking place as the earth tossed and turned. The seas rose, and wave after wave invaded the land at Akal, burying the driftwood under layer upon layer of fine sand. Before pressure from top and heat from the core of the earth could combine to decompose the wood into fossil fuels, the tree trunks underwent magical transformations—largely due to the cooling effect of the sea. Fine grains of silica impregnated every single cell replacing the living matter completely while retaining the original structure and turned the wood into stone. Subsequent folding and shifting of the earth pushed these fossiliferous sedimentary rocks back into the light of day in this barren and desolate land at Akal.

Amidst the sand and stone, wood fossils lie exposed and scattered over a large area here. There are 10 major exhibits of entire tree trunks which lie broken in many pieces. The pattern of the rings and the shape of the bark make them appear unbelievably like wood but they feel as hard as stone. Although protected from curious human hands by an expanded iron grill, the wood fossils are nevertheless vulnerable to the powerful withering forces of the desert. Grasses and plants take root and spring from the cracks and crevices in the fossilized stone presenting the paradox of life in death.

As I wandered through that prehistoric graveyard that August afternoon, I was gradually introduced by Uttama Ram to an extraordinary world of wild grasses, plants, shrubs and trees that I had failed to notice earlier; much like those tiny desert flowers that bloom unseen. Frugal, as it had apparently seemed, I discovered that nature's bounty in this arid wilderness was enough to provide food, fodder and fuel for man and support a handsome and rugged race of proud people like Uttama Ram.

Standing with fierce dignity, Khejri (*Prosopis cineraria*) is the most important tree of this desert biome. It sinks its roots deep and wide into the womb of the earth for sustenance and can survive seven seasons of drought. Venerated in our scriptures as the *shammi vraksha*, the khejri indeed is the sacred tree of the desert. Khejri blooms twice a year bearing leguminous fruit, the '*sangari*', which is plucked and dried to be later used as a vegetable. The hard wood of khejri is used for agricultural implements, carts and roof beams for huts locally called *jompha*. Offering a semblance of shade and shelter from the scorching sun to a desert weary traveller, the leaves of the tree are also relished by camel and cattle alike. Small wonder then that it is the khejri around which the bionomics of the desert revolves.

Prized for its gum secretions and used in ayurvedic medicine, the *googal* (*Commiphora weihtic*) is the sandalwood of the desert. Burnt as incense during rituals, the sweet smelling smoke of *googal* acts as an excellent repellent for insects. The local people believe it also keeps evil spirits away. A strong and powerful liquor is brewed from the bark of *khumta* (*Acacia senegal*). Its ripened berries are also eaten though they are not as succulent as those of another tree, *jal* (*Salvadora oleoides*) that normally grows on rocky surfaces and bears yellow flowers.

Prolific and well adapted to the harsh environment, *kair* (*Capparis decidua*) is a typical arid zone shrub that sometime takes the proportions of a tree. Bursting with passionate beauty during the flowering season, the kair sets the desert ablaze with scarlet blooms. The little green berries that follow are very bitter but are made edible by being fermented in salt water. The berries are then pickled or dried for storage. The red ripened berries of the *kair*, however, are fondly sucked for their sweet, sticky and highly nutritious pulp. A pithy desert saying extolls this resilient shrub that can keep man alive for 10 years of successive drought.

Though not as pulpy as the *kair*, berries borne by *bordi* (*Zizyphus maurituana*) are nevertheless relished by birds, beasts and man alike. Equally resistant to these arid conditions, *bordi* is a thorny bush prized by the farmer for its little round leaves which make excellent fodder, colloquially called *pala*. Bereft of leaves, the spiny skeletal frame of the *bordi* is then used for building *kraals*. Cattle and other livestock find plenty of browse on other shrubs like *lana* (*Haloxylon salicorni-*

cum), sinia (Crotolaria burhia) phog (Calligonum polygonoides) and others whose thick stems are used as props for '*jomphas*.'

Still other plants provide raw materials used to create things of utility. Long strands of some grasses and leaves are beaten and dried to make different types of ropes and brooms. *Bui*, a desert plant, is seasonally harvested for its soft cluster of flowers which are used in place of cotton to fill the quilts that warm cold winter nights. Truly, man's ingenuity to discover the potential of the natural resources of this harsh land seems inexhaustible.

Threatened ecosystem

Nature provides remedies also for simple ailments in a wide variety of plants. Blooming in a bunch of yellow flowers, *bhaifod* petals are boiled, mashed and then applied as paste to heal septic wounds and boils. The seeds of *tumba* or bitter melon are known to be very efficacious for de-worming. It isn't surprising that the plant kingdom is receiving increasingly special attention by scientists who have stepped up the investigation of folk medicines and hitherto unused plants which have intriguing chemical properties.

From among the millions of species of plants on the planet, it is estimated that only a very small fraction, a bare 200, are eaten by man. Thousands of other species are edible too but their real value will only be uncovered when the pressure on already exploited species exceeds the limits. One such species is the *khimp* (*Leptadenia pyrotechnica*) which bears pods with peas that can very well replace lentils in a meal during 'pinch' periods. Special chappatis are prepared from the seeds of *phog* and *bhurat*, painstakingly collected and pounded into flour to be used on ceremonial days of fasting or in times of scarcity. As good as any salad I had ever eaten, *khirdi* had tasty leaves and a fruit that was known only to Uttama Ram and his people who also have the knowledge to pick the edible from the potentially poisonous mushrooms that spring up overnight given the right humid conditions. Freshly cooked in curry or dried, the mushrooms are quickly collected during their momentary presence.

Meagre as it is, with around 100 mm of rain in a year, even a passing shower transforms the desert into a wondrous grassland. An incredible number of species of wild grasses spread their cover over the desert floor. Recognised as some of the most nutritious varieties of grasses anywhere in the world, *sewan* (*Lasiurus ecaudatus*) and *dhaman* are considered prime cattle feed. Growing in scattered clumps all over the park are other wild species like *ganthia* (*Dactyloctenium sindicum*), *lamp* (*Aristida funiculata*), *bekar* (*Indigofera cordifolia*), *bhurat* (*Cenchrus biflorus*), *burada* and so on. These grasses provide rich pasturelands and form the backbone of rural sustenance in the desert region of Rajasthan and nourish large cattle populations which in turn produce the milk that sustains and supports a strong and sturdy people.

The Wood Fossil Park at Akal at once represents the macrocosm that is the Thar, a unique and fragile ecosystem, threatened by gross misuse and neglect by man. At stake are hundreds and thousands of floral species — not all of them fully recorded or understood for their ecological significance or economic value. It is of great importance that the integrity of this complex biological system is maintained so that the diversity of plant and animal life within this natural system is conserved for future use by man who can draw upon the vast resources of the gene pool available. Although extermination of plant species do not pose a direct threat to human life, their loss is incalculable in terms of continuing scientific inquiry, the practical possibilities of exploiting the genetic diversity available, and of course, the sheer sense of aesthetics.....

From practical considerations to philosophic implications, I was lost in many thoughts, as I wandered in this bleak but beautiful desert wilderness. Moving from stone to fossil, tree to bush, I paused to taste a berry here, pluck a flower there; inspect a crawling insect, collect samples of grasses or chase a gecko — miniaturized descendent of the dinosaur. It was awe-inspiring to stand alone in the stillness and hear the song of the winds and feel the feathery touch of the wild weeds. In this sandscape, scenarios of 180 million years ago vividly arose in my mind along with many a concern for the shape of things to come.

Poised between the two eternities of past and future, I stood on top of the hillock contemplating the contradictions. There were no choices to be made between yesterday and tomorrow, the flora and the fossil, the poet and the paleontologist, the yin and the yang. The two together are one, in the here and now — the ever fleeting dynamic present — where we have to act not only to preserve the past but also to protect the present for posterity. In our actions, it is necessary to strive for that delicate balance on which depends the continuing evolution and the survival of man.