

1990 (2)

Hornbill



BOMBAY NATURAL HISTORY SOCIETY



COVER PICTURE

Grey partridge (*Francolinus pondicerianus*), by Krupakar Senani

This squat, fleet-footed, stub-tailed game bird is usually seen in pairs or small coveys. The three subspecies are spread throughout most of the country except the northeast; one race is thriving in parts of the Andaman islands, where it was introduced in 1890.

When alarmed, a covey of partridge scurries off, running swiftly from bush to bush, surreptitiously squatting in ones and twos in thickets. Even when harried by shouting, stone-throwing pursuers (and at least once when the bush was set on fire!), the bird will not emerge from its hiding place.

The Hindi name, *teetar*, comes from the characteristic duet of a calling pair: *kateetar*, *kateetar*, rising to a crescendo. The call is heard frequently throughout the countryside; much more frequently than the bird itself is seen.

Cocks are highly pugnacious; partridge fights have a large following, particularly in north India and Pakistan, with large sums of money changing hands during such bouts.

ACKNOWLEDGEMENT

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Hornbill

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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.

Membership is open to persons of either sex and of any nationality, proposed and recommended by one or more members of the Society; and also to persons in their official capacity, scientific societies, institutions, clubs, etc. in corporate capacity.

Members receive during a year four issues of *Hornbill*, the Society's popular publication. Life members receive, in addition, three issues of the *Journal of the Bombay Natural History Society*, now in its 87th volume.

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Ordinary members may subscribe to the *Journal*; annual subscription Rs. 80 for members resident in India.

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EDITORIAL

Yes, Minister

The Ministry of Environment suddenly came alive with the advent of the new government and the new Minister of State for Environment, Ms Maneka Gandhi, who blew in like a fresh breeze into the musty corridors of power. The ministry had not till then lived up fully to the expectations of the late Dr Salim Ali and other conservationists at whose suggestion the late Prime Minister Mrs Indira Gandhi had set it up. It had remained small and somnolent, immersed in the deadly inertia characteristic of all government institutions. Maneka was not chained by the conventions of bureaucracy and cut through red tape to get the ministry active in the cause of conservation. Fortright in speech and action and occasionally impetuous, she was often accused of being abrasive to officials — but usually only when they tried to justify the unjustifiable.

The ministry was soon humming with activity like an ant's nest stirred with a stick. A senior official said this gratifying sudden awakening reminded him of the story of the crows and the jet plane. It seems a mother crow and her baby were flying along when they saw a jet plane streaking across the sky. The baby crow said to its mother, "Mummy, I wish I could fly like that." The mother crow replied, "You would, my child, if your tail was on fire."

Ms Gandhi had truly set the ministry's tail on fire. But alas, the fire seems to have been doused. Decisions she had made in the cause of conservation have been — and are still being — set aside. Forest land is now being released for rehabilitation, and even worse, for five star hotels. A highway is to run through Kaziranga National Park. The ban on construction within five hundred metres of the sea beach is being waived for hotel construction.

The only remedy left is to take legal action to prevent circumvention of existing laws and to request the international conservation movement to rally to our assistance to blacklist and boycott hotels built in contravention of existing laws.

LETTERS

Sir,

The other day there was a massive rally in Bombay in favour of the Narmada dam, which came as a shock to the environmentalist. Here are a few thoughts as to why it happened.

The environmental protection movement in its popular sense came to India only 10-15 years ago. Its basis was to make people, preferably children, aware of the problem. In western countries this movement started much before it did in India. Consequently, the people who now take decisions in the west have had environmental education in their childhood. In India, however, the children with environmental education are not yet decision makers. The views formed in childhood are followed throughout life, often acting as a mental block to new ideas. India's decision makers have been taught in childhood that industrial progress is the only progress. This view now being rigid in their minds, is difficult to dislodge. If attempts are made to attack these basic views, people defend themselves stubbornly, refusing to yield. Therefore, in India it is extremely difficult to convince the generation of decision makers of the importance of environmental protection, simply because they have not been brought up with that view. The hope now lies with the environmentally aware new generation

While forming our environmental action programme, it would be dangerous to follow the trends of protests in the west, because by and

large, the views of our society are a clear 30 years behind theirs. Thus if the protests do not elicit as strong a response as they do in the west, there is no need to be shocked or frustrated, because awareness cannot be generated overnight, however hard we may wish. It has taken its time in the west also. So at present, whenever there is a conflict between industrial progress and environmental protection, slightly more weightage should be given to industrial progress. The balance can later shift, as the new generation grows up. Otherwise, there could be a tremendous backlash from people who hold the orthodox view. Such a backlash could kill the movement, which is still in its infancy in India.

Therefore it is better in the long term interest of the movement that we do not lose the very limited support that we have by protesting about each and every minor issue. The environmentalist should not be labelled as anti-everything. Once thus labelled, protests on genuine issues will lose their credibility. This is not written in opposition to the movement, but just to remind ourselves that a vast majority of people prefer industrial progress to environmental protection; they can crush this movement if care is not taken. So let us realize our limitations and plan our strategy accordingly, and not overdo things.

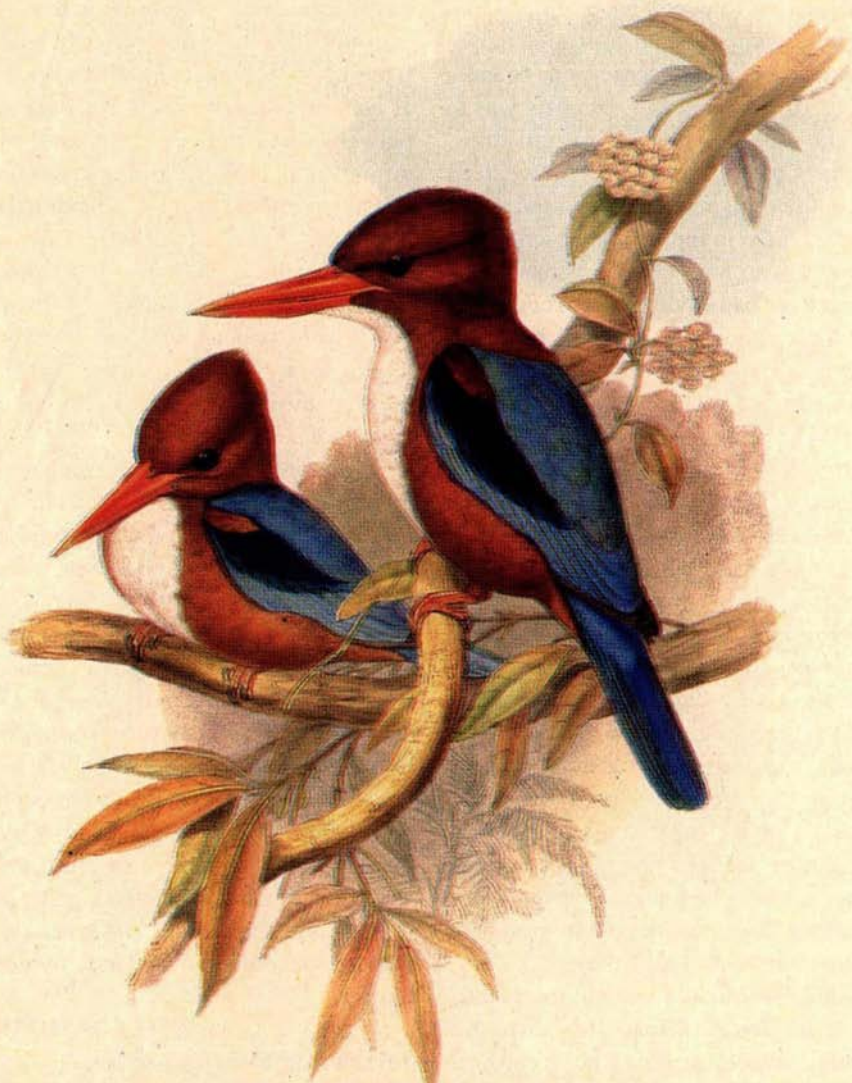
NITIN JAMDAR

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CHECKLISTS

The Birds of Andhra Pradesh

Aasheesh Pittie



Whitebreasted Kingfisher (*Halcyon smyrnensis fusca*)

Copy of a lithograph by John Gould.

It is a peculiar character of human nature which urges to collect. There are those who collect stamps, those who fancy books, or bottles, or even pieces of driftwood. Indeed, though each man is an island unto himself, given a chance and the means, he will also become a museum unto himself!

There are also those who collect bird notes and lists of birds seen at various places. Bird notes, when compiled properly, can shed light on the life histories of our avian friends, and on the drama and little intrigues which unfold in their lives each day. Bird lists help us to fathom better the ecological viability of an area, a habitat, or a geographical feature. The only problem with listers is that they seldom assemble their notes into one comprehensive list for an area. So much so that ornithologists often despair that the world is too much with listers!

'A Checklist of Birds of Andhra Pradesh' (by Aasheesh Pittie and Siraj Taher) began when we realised that there was no such data available for the state. Not that the avifauna hadn't been studied; but the results were scattered among various libraries, and not easily accessible to birdwatchers. Salim Ali's Hyderabad State Ornithological Survey in 1931-32 covered birds found in the erstwhile Nizam's areas. The results were published in the *BNHS Journal* more than 50 years ago and are now practically lost to present-day amateur enthusiasts. The studies done by Humayun Abdulali in Visakhapatnam and the more ambitious Vernay Scientific Survey of the Eastern Ghats suf-

fered a similar fate. Work on the avifauna of Andhra Pradesh has continued intermittently since Salim Ali's survey, mostly restricted to small parts of the state — the Eastern Ghats, Adilabad district, etc. But here too, most of the findings are not easily available. Then came Salim Ali and Dillon Ripley's ten-volume *Handbook of the Birds of India and Pakistan*. Exhaustive, monumental, but prohibitively expensive; and difficult to carry around in the field. Unless, of course, ten birders go out together carrying a volume each — nine of them watching, while the tenth refers to the pertinent volume! A student of ornithology would have to dig through more than 100 references from various journals, newsletters, magazines, etc. before he could begin drawing any picture of the bird fauna of the state. (We arrived at the figure of 100 after our searches, and there are likely to be many more that we missed.) This would be a formidable task indeed, and we resolved to make it easier for him.

Comprehensive checklists are the basis for the understanding of any regional avifauna and reflect its environmental strength and vitality. They can be drawn up for areas marked by political boundaries or for geographical features of the land. Rather than assemble a list of birds of, say, the Eastern Ghats or the Coromandel Coast or of a wildlife sanctuary, we decided to muster one for the political state of Andhra Pradesh. It would cover all these areas, and perhaps be more useful to birdwatchers, whose perspective of a region is more often political than zoogeographic. We divided the state



Jerdon's courser — believed extinct, then rediscovered in 1986 in the foothill-scrub expanses below the Lankamalai hills in Andhra Pradesh.

BHARAT BHUSHAN

into 3 major physical regions — the Eastern Coastal Plain, the Eastern Ghats and the Deccan Plateau. Each zone became a criterion for the distribution of bird species in the state. We worked from the Handbook and jotted down those species which occurred in A.P. Gradually, data on distribution and additional notes on behaviour accumulated, and the checklist took shape.

One problem was that while we were concerned only with Andhra Pradesh, the Handbook dealt with the entire subcontinent. It was only occasionally that Andhra Pradesh or a place within it was specifically mentioned. But more often we were swimming in the "entire peninsular India" or floundering "from the Punjab down to Kerala and east to West

Bengal"! Such entries required more spadework to support their inclusion in the list. An even more trying aspect of the exercise was that A.P. was created by the reorganization of the Madras, Mysore and Nizam states. Earlier surveys had been sponsored by the respective heads of state and restricted themselves to relevant state boundaries, and we had to reorganize much of the data.

Getting more reference material was another game altogether. We combed libraries, both public and private, for old journals of the BNHS, Zoological Survey of India, etc. and poured through the contents, the various papers and notes — often wading through protracted controversies about the races of birds. Some we were able to resolve to our satisfaction. Those that were too involved to unravel easily were clubbed

together with a query, implying that either of two given races could be found in the area.

Checklists are useful because they contain 2 vital pieces of information on the different species — distribution and status. We have been birding around Hyderabad for the past 8–10 years and have formed some idea of the status of 'our' birds. These have been included. Giving the status of birds for large areas may have to be generalised, for detailed information is lacking in our country. But such data which covers pockets of an area is useful in its own right and may become critical in bird studies like local migration patterns. The inclusion of bird names in the vernacular dialect comes of use in the field when assistance from the locals becomes essential.

There are some points which one might say are prerequisites of a good checklist. One, entries should be cross-referenced to an accepted reference work (we used the Handbook) for standardization of information. Two, authenticity of records which have not been published in journals should be verified with great care. And even the printed word is not infallible: it too should be scrutinised. Three, a complete bibliography is a must. Besides imparting an aura of genuinity to the checklist, it might also turn out to be the first complete assemblage of bird literature for an area! Asking help from a senior ornithologist can resolve many a confounding issue quite easily. Indeed, listers' discussions sometimes go off at such unusual tangents that the penetrat-



Rollapadu — south India's most important bustard sanctuary ASAD RAHMANI

ing insight of a trained mind is pure ozone!

All this work has to be presented in a slim volume which is handy, fieldworthy and affordable. In our country, it is not wrong to say that checklists will have to be constantly updated for some years. Birding in India is only just taking wing, and records will keep changing as more birders take their hobby and their notes seriously.

A checklist can replace neither the field notebook — which must be the primary source of all information for the naturalist — nor the field guide, used for on-the-spot identification. But it is a handy reference in which notes and sightings can be jotted down. It certainly helps a birdwatcher understand the birds of his area a little better. ■

SECOND THOUGHTS ON A 'MIRACLE' TREE

By Winin Pereira and Manek Mistry



N. D. MULLA

THE SUBABUL *Leucaena leucocephala* is native to central America. In the past two decades, however, it has been planted intensively (and sometimes spread unknowingly) in the tropics. Once touted as a 'miracle' tree, it is now making news by falling prey to what is probably the fastest spreading pest in history — the leucaena psyllid.

The leguminous subabul was seen as an answer to the deforestation-induced shortages of fuel, fodder and timber in the tropics. It grew quickly and easily, provided fuel-wood, timber and fodder of a kind, and enriched the soil by its root nodules. Other trees were superior in one or the other respect, but no easily available tree had all these qualities. Moreover, leucaena had no serious pests, at least then.

Leucaena did have its drawbacks, which were pointed out by a few scientists but generally ignored. It grew quickly only under optimum conditions and had a tendency to become a weed if not harvested regularly. There were uncertainties about its cultivation, such as control of pests and diseases.

For the Indian promotional campaign, the name of the tree was changed from 'kubabul' to 'subabul' (ku = bad, su = good). Twenty years of aggressive promotion resulted in leucaena being cultivated throughout the tropics; intensively in some countries such as Indonesia and the Philippines, less intensively in others such as India. It was time for Nature to teach us another lesson.

Until 1983 leucaena had been considered free from any major pests or diseases. In that year leucaena trees in Florida were attacked and defoliated by a psyllid which then began to leapfrog, probably on high air currents or on aircraft, westward through the tropics (see map). The psyllid obviously reached India soon after it reached Sri Lanka. In February 1988 it was reported from Pondicherry and several places in Tamil Nadu; in April from Koraput in Orissa; June — Chingalpattu district, Tamil Nadu; August — Bombay, and in late 1988 from Anandwan, Warora (Maharashtra).

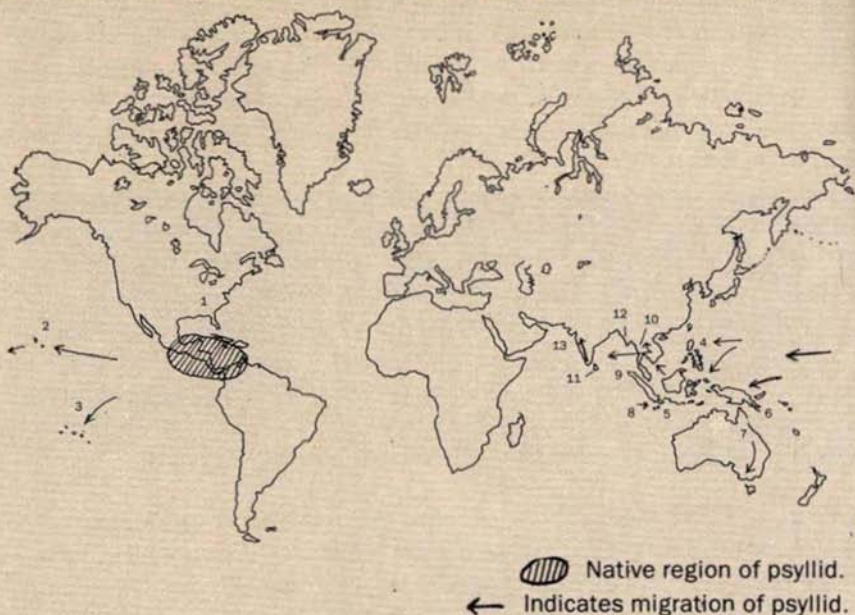
In Bombay the psyllid was first noticed on leucaena trees in Bandra in August '88. Its population increased till about March '89, but the pure stands of leucaena around Bombay showed no signs of infestation. Why scattered trees in the city were infested while pure stands of leucaena were not is unclear. Is it because city gardens have fewer natural predators? The psyllids disappeared with the coming of the monsoon, but the post-monsoon infestation in 1989-90 was much more widespread. We could not find a single uninfested tree in the city and its surroundings (though none of the affected trees was killed). With the onset of the monsoon the pest again vanished.

In a number of countries the psyllid populations have decreased after the initial outbreak. Mature trees usually recover in the monsoons, perhaps because an adequate supply of moisture strengthens their resistance against the psyllid; besides, some of the insects get washed away by the rain.

The damage caused by the psyllid in countries where leucaena is not native was in direct proportion to the intensity of monoculture. India got off relatively lightly, but in the Philippines and Indonesia, with thousands of hectares under leucaena,

Facing page: psyllid on a subabul leaf.

A severely infested tree may have up to 50 adults and nymphs per shoot.



The Psyllids's Progress

- 1 Florida, late 1983. First report of the psyllid outside its normal range; leucaena trees defoliated.**
- 2 Hawaii, April '84.**
- 3 Western Samoa, February '85; then Fiji, Tonga and other Pacific islands by end '85.**
- 4 Phillippines, October '85.**
- 5 Indonesia, February '86.**
- 6 Papua New Guinea and nearby islands, March '86.**
- 7 Australia (Queensland), April '86; Brisbane in September and New South Wales in April '87.**
- 8 Christmas Island (Indian Ocean), May '86.**
- 9 Malaysia, June '86.**
- 10 Thailand, September '86; then Vietnam.**
- 11 Sri Lanka, late '87.**
- 12 Burma, November '87.**
- 13 India (Tamil Nadu), February '88**

the infestation reached crisis proportions. Cattle starved from lack of fodder, live-stock feedmills closed down, hills reforested with leucaena became bare, and shade crops dependent on leucaena were scorched.

Control measures of various kinds have been tried, though without significant success. Chemical pesticides, besides being expensive and hazardous to both user and the environment, are relatively ineffective against psyllids. As they are highly migratory, the infestation can recur after the effect of a pesticide has worn off or after new growth appears.

Biological control of the leucaena psyllid is feasible because it is an introduced species, is not considered a pest in its area of origin and is known to have natural enemies. Ladybirds seem to be the most successful at reducing the density of infestation but, as they feed on other insects as well, their effectiveness is reduced.

Specific enemies such as certain parasitic wasps or parasitic fungi are therefore preferred, but such parasites have specific requirements and do not usually breed in laboratories. A search is on for appropriate parasites and predators in Central America (the natural home of the psyllid) and in other countries. A poor understanding of the classification and specificity of the approximately 18 species of *Heteropsylla* in Central America has hampered the search. A ladybird, *Curinus coeruleus*,

and a parasitic wasp, *Psyllaephagus* sp., have been introduced in several countries and their effects are being studied. In Bombay, we have seen tailor birds, ashy wren-warblers, Indian wren-warblers and whitebrowed bulbuls feeding on the psyllids.

However, there are contradictory opinions about the use of biological controls in combating new exotic insect pests. Some experts feel that such a pest will eventually come under control after a brief explosive phase without the introduction of its natural enemies. Others want biological control agents to be introduced as soon as a new pest is detected, to avert economic losses; but the introduction of an exotic predator must be handled with extreme care, as the predator itself may have an adverse ecological impact. If indigenous predators and parasites exist, they may in the end be able to control the pest more effectively on their own. A policy of 'no action' has also been recommended to deal with the psyllid infestation.

The introduction of resistant varieties of leucaena or its substitution with other species altogether would seem to be a possible solution. Resistance to the psyllid appears to vary with species, variety, country and even individual trees. Researchers are trying to find psyllid-resistant leucaena varieties.



The scientific name comes from the flower —
leuco = white, *cephala* = head

N.D. MULLA



Subabul pods — the species' ability to grow and spread quickly is a mixed blessing

N.D. MULLA

But there may well be other tropical American psyllids and pests associated with *H. cubana*—resistant leucaena species, and there is always the possibility that these pests may in future migrate throughout the world just as *H. cubana* has done. Moreover, mutants of *H. cubana* itself may have the ability to attack the resistant varieties.

Other nitrogen-fixing trees are being substituted for leucaena. *Gliricidia sepium*, a native of Mexico and Central America, is attracting a great deal of attention as a possible substitute. It was introduced into Sri Lanka in the late 18th century for shading coffee and has spread from there throughout South and Southeast Asia. But most gliricidia in Asia has been propagated vegetatively, and the resulting narrow genetic base would make the Asian gliricidia very susceptible to damage on a wide scale should a pest appear.

Monocultures, even of 'miracle' trees, are risky. Many leguminous trees and shrubs, like leucaena and gliricidia, have multiple economic uses; but psyllids show their greatest diversity on leguminous plants. Even while we develop strategies to deal with this particular psyllid on leucaena, other pests are waiting in the wings for other trees.

A point to note is that leucaena is not entirely new to the country — it has been around since the last century. Rural Indian folk had on their own 'discovered' a few uses for the tree, but they did not consider it at all special. They probably

preferred the wealth of native plants with which they were familiar. This preference for time-tested traditions got scientific backing from the experiments of Conservator of Forests A.N. Chaturvedi. In 1981 and 1983 he wrote in *Indian Forester* that "leucaena is not an exceptional tree that should be favoured over the many indigenous species available for the different climatic zones" and reported how out of twelve species (7 native to India) grown on usar soil with irrigation, leucaena had performed the worst.

Whatever its merits or demerits, leucaena is now widespread in India and can be put to some use. It grows well in lantana-infested areas (but is heavily damaged by cattle, deer, monkeys and other animals). The seeds germinate freely in nature and the aggressive root system breaks up the impervious subsoil layers, improving moisture penetration and decreasing surface runoff (these same characteristics have created weed problems when leucaena is planted on or near crop land). We must remember, however, that leucaena grows well only in deep and moist soil and in dry lands there are several Indian species that grow faster than leucaena. ■

The Leucaena Psyllid

Scientific name: *Heteropsylla cubana* Crawford (Homoptera: Psyllidae); synonym *H. incisa*.

Psyllids, or jumping plant lice, are tiny insects related to aphids. About 18 species of the genus *Heteropsylla* are native to the region extending from southern U.S.A. to temperate South America. *H. cubana* is native in the central part of this range, where due to natural predators it is only a minor pest. There may be other species of *Heteropsylla* attacking leucaena, but so far only *H. cubana* has been positively identified.

A female psyllid can lay 300-400 eggs in a lifetime on the young shoots of leucaena or other plants. The eggs hatch in 2-5 days. The wingless nymphs resemble aphids and feed only on leucaena and after 5 instars (stages) in 8-9 days, moult into adults. The winged adults, resembling miniature cicadas, are pale greenish yellow and 1-2 mm long. They have stout legs and when disturbed leap clear of the foliage before taking off on a short flight (hence the common name 'jumping plant lice'). Females can begin laying eggs within 1-3 days after emerging. The adult lives for 6-10 days, feeding on the sap of the old and new growth of leucaena. The major damage to leucaena, however, is done by the nymphs, which feed only on the sap of the young shoots.

The host range of *H. cubana* is restricted to species of the genus *Leucaena* and very few other plants, including the rain tree (*Samanea saman*, new name *Albizia saman*). The short life cycle (10 generations in a year in the tropics) enables the insect to reach epidemic proportions very quickly.

The psyllids excrete excess water, sugar and amino acids as a viscous liquid called 'honeydew', which causes young leaflets to stick together. It also attracts ants and causes the growth of the sooty moulds which cut out light and prevent efficient photosynthesis (*Fusarium* sp. and *Oidium* sp. have been identified; *Cercospora* leaf spot is commonly seen on the leaflets). These associated problems of psyllid infestation appear to be particularly severe on trees which are frequently lopped. Many psyllids are vectors for plant diseases, but *H. cubana* is not yet known to transmit any disease.

The new growth of a tree which is severely attacked by psyllids turns yellow, curls up and drops off. Such trees get defoliated and their growth is retarded. A few cycles of attack and defoliation may kill the trees, especially those under a year old or growing in dry conditions or in poor soils where they are already under stress.

Wildlife Photography

Text and Photographs by T.N.A. Perumal

ANIMALS ARE CREATIONS OF THE SUPREME ARTIST — NATURE.

Each species has its own beauty, and its own unique character. Their body-language is intimate and expressive, which makes for interesting pictures. A broadside-on pose of an animal shows well its shape and eye. An alert three-quarter facing pose is dynamic, depicting power and poise; and an animal in flight is a poem of grace, speed and liquid movement.

The character and mood of an animal is reflected in the catch-light in its eyes; this, therefore, *must* be captured in a photograph. Eye-level camera angle, low angle of light and diffused light will highlight the catch-light to good advantage.

In a well-composed photograph, the tonal, colour and graphic elements must be properly arranged in the picture space, in proportion to the main subject and the background. A basic rule is that the animal should form the main centre of interest, and occupy one third to half the picture area, leaving the remaining space for habitat, etc. This proportion can be changed to suit individual tastes, but it must be kept in mind that the size of the animal in the picture area conveys its size in relation to its habitat.

When an animal is depicted in a broadside view, leave more room in front than behind it, to suggest the direction of movement. Also, leave less space in the foreground and bottom of the picture and relatively more above the animal to balance the picture. A dark animal against a light or well-lit background, or a light coloured animal against a darker background makes an attractive photograph. A point to be noted is that the tone of the background will also suggest the diurnal or nocturnal life of the species portrayed. Avoid showing a diurnal species in a nocturnal black background. The other rules of picture composition like the leading line, S. curve, L. composition, etc. can be effectively used to make a good presentation. Different amounts of foreground, background and space on the sides, and the placement and scale of the animal within the picture format convey different meanings of distance and depth; a well-composed picture can visually communicate movement and the mood of the subject. Of course, all these rules are only general principles. You can sometimes break them (provided you understand the medium well) to create unusual, graphic pictures.

The size of the image is crucial to the quality of reproduction. A smaller image size requires greater magnification or

Great Horned Owl. Photographed with computerised flash and photo electric triggering device. (F/8 at 1/500th of a second).

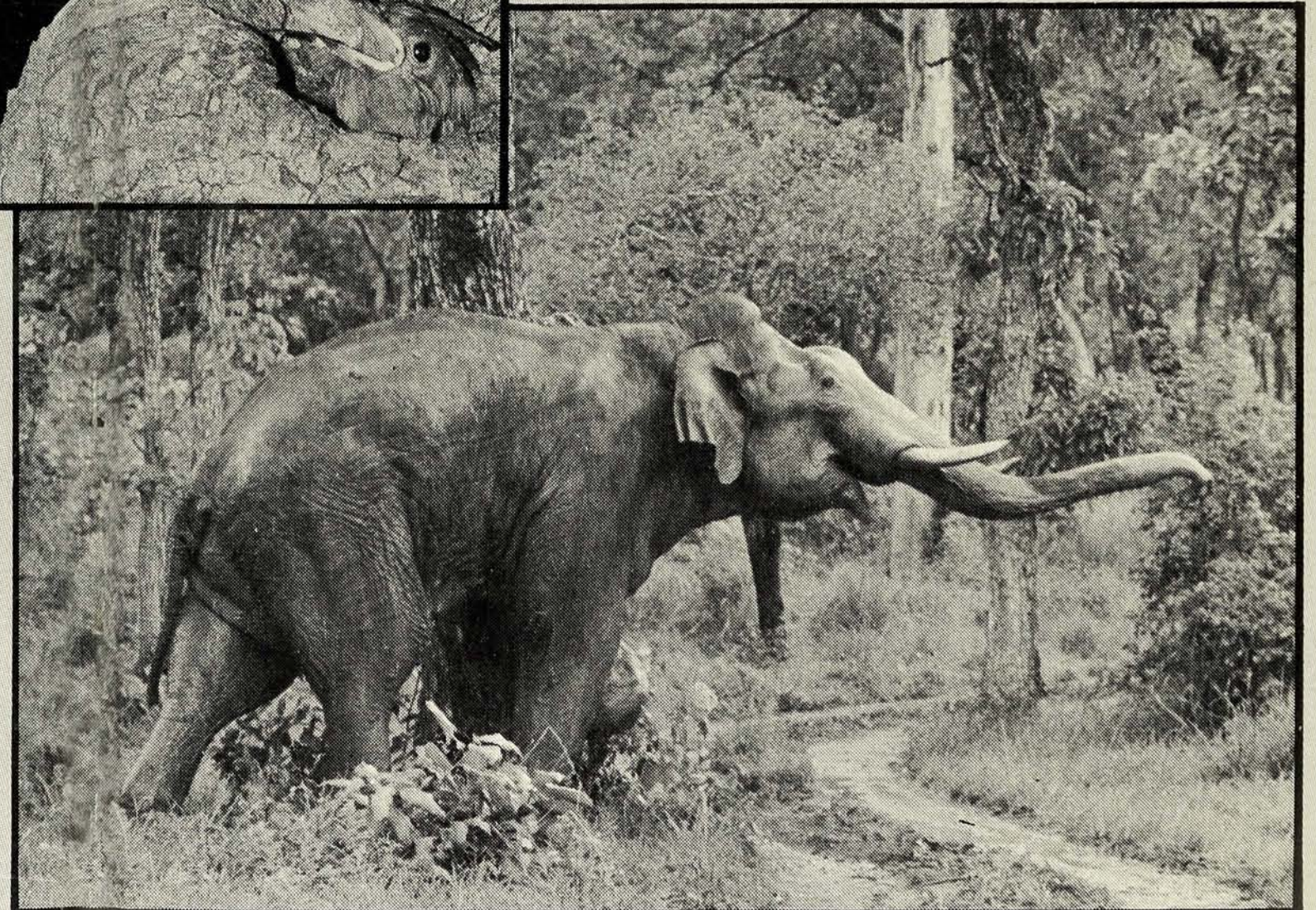


Wildlife Photography



Hoopoe. Photographed with computerised electronic flash with air-release remote control. (F/8 at 1/500th of a second).

Tusker.



enlargement, resulting in loss of definition and increase in grain. An adequate zoom lens aids in accurate framing and filling up of the frame. Alternatively, whenever possible one should either move closer to obtain a good image size or use a lens of longer focal length to achieve the same result. But a picture taken from close quarters is always superior to one shot from a distance, even though a longer tele lens may have been used in the latter case.

Another very important (but sometimes ignored) factor is the effect of camera shake. Even a minimal amount of shake will ruin the sharpness of the photograph. One must consciously and painstakingly ensure that the camera is held steady. Depending upon the situation, a tripod, shoulder pod, clamp pod, etc. can be used. Resting the camera firmly against any suitable support such as a rock or a tree, and placing the camera on a towel (which will act as a cushion) will also help.

To photograph animals in motion, use the combination of fast shutter speed and wide aperture; frame the animal properly in the view finder, keeping it in focus. Pan the camera smoothly in the direction of movement of the



animal and click just as the moment of peak action occurs, leaving more space in front of the animal than behind it. Practice will develop the ability to anticipate and react to these decisive moments. It will also pay rich dividends in the form of tellingly effective, slices-of-life photographs of wildlife:

Always learn to shoot consciously; aware of all the significant points and after weighing the picture-making possibilities in every situation. Use the right lens and aperture combinations instead of clicking at random in the hope that things will turn out right -- that rarely works in wildlife photography. Luck, of course, does play a crucial role: it is the 'animal' and the 'species' situations that make great pictures, and neither can be ordered or created. Being present at the right place at the right time is not always due to planning. Luck, however, more often favours the hardworking and alert photographer.

It is necessary to study animals and their behaviour to properly interpret their mood and movement (and to avoid danger). Wild animals in different places -- and different individuals of a species -- behave differently, depending upon their previous experiences with man. It is important, in particular, to know the 'flight and fight' distances of animals: how close to the animal can the photographer get? Any closer, and it will either run or demonstrate -- or charge. This distance again will vary from species to species, between individuals of the same species, from season to season, and area to area.

For example, tigers in Kanha behave differently from those in Dudwa (where there is too much disturbance and pressure on tigers). Likewise, the elephants of the Moyar part of Mudumalai sanctuary are suspicious and aggressive because the area has a history of man-elephant conflict (caused by habitat encroachment by man). The Bandipur area, on the other hand, is free from such disturbances, and the elephants there are more amenable to photography. Big solitary tuskers are generally much feared, but they are really gentlemen giants. The teenage tuskers, mothers and aunties with babies can be more dangerous -- keep a sharp lookout for these animals. Familiarity with patterns of animal behaviour will make the photographer's job far easier.

It is useful to know which animals can be photographed where and when; the best season and the right time to observe a particular aspect of behaviour. For instance, elephants will be seen in plenty in Bandipur during June, soon after the first showers. The peak of summer is the best time to visit Periyar for photographing elephants frolicking near water, and December the best period to photograph swamp deer in combat in Kanha. Chital get into rut in Bandipur around September.

The rutting season is a particularly good period for photography. The animals are intensely active, vocal, pre-occupied, demonstrative, and aggressive. Males, in the midst of the challenges and the combat, are almost indifferent to the presence of a photographer; and such opportunities are not to be missed. *Egret fly-past.*

NEWS NOTES COMMENTS

Indonesian seabirds at risk

The Indonesian archipelago, especially its western portion, harboured large colonies of seabirds as recently as 50 years ago. Many have now disappeared, because of colonisation and uncontrolled exploitation (raiding nests for eggs, for instance) by a rapidly growing human population. The waters near islands on which the seabirds nest are rich in marine life, and are heavily fished. Coral islands used by colonial seabirds are often breeding sites for turtles, which are also exploited.

Tern colonies have disappeared completely from islands with semipermanent or permanent human settlements. On coral islands, trees have been cut to build new boats; and in the fertile soil of volcanic islands, fruit trees (banana, pineapple and cassava) have replaced the original species. The result — the disappearance of tree-nesting Pelecaniformes and noddies. On all vegetated coral islands and most volcanic islands, rats have been introduced, devastating bird populations. There is still more damage in store: phosphate deposits on raised coral islands will probably be mined in the near future.

A few seabird populations still survive in mangroves bordering coral islands, on steep volcanic islands and in other relatively inaccessible places. But their turn too will come, unless a concerted effort by conservation agencies and the Indonesian government is made to protect not just particular species but

entire islands, especially the few relatively unaffected islands. Cooperation between conservation organizations that focus on different groups of organisms (e.g. seabirds, turtles, vegetation) is essential.

Similar seabird declines are probably also occurring throughout Southeast Asia; the relationships between seabirds and local people in Malaysia, the Philippines, and Palau are similar, and only seabirds nesting on isolated oceanic islands remain unaffected.

The needs of the local people (who have been primarily responsible for the damage to the island ecosystems) must come first. One solution which holds promise is the development of boat-based nature tourism to seabird islands, with revenue being transferred to the islanders. The introduction of the profit motive might stimulate them to preserve at least part of the wealth that now remains.

ICBP World Conference

The world conference of the International Council for Bird Preservation will be held in New Zealand from 21 to 27 November 1990. The first three days will be attended mainly by representatives of ICBP sections, member organizations, and specialist groups, but observers may be admitted by application to the ICBP Secretariat. The scientific symposia are open to all participants. Topics include: birds and tourism, management methods for

populations of threatened birds, national bird conservation strategies and the conservation of biological diversity, bird conservation strategies and the conservation of biological diversity, and bird conservation problems of the South Pacific islands. For information, contact ICBP, 32 Cambridge Road, Girtton, Cambridge, CB3 0PJ, U.K.

New lemur from Madagascar

A new species of lemur has been discovered in the forests of northeastern Madagascar by Elwyn Simons of Duke University, according to a report in *Conservation Biology*. It has been named *Propithecus tattersalli* after Ian Tattersall, who first saw a population of this lemur in 1974 but failed to recognize it as distinct from the diadem sifaka *P. diadema*. The new lemur, known as Tattersall's sifaka or golden-crowned sifaka, is estimated to number about 100, with its habitat very restricted and fragmented by deforestation.

New World Heritage Sites

National parks in Australia, Mauritania, Zambia and Zimbabwe were added to the list of World Heritage Sites at the 13th Session of the World Heritage Committee last December. Australia's 'Tasmanian Wilderness', the largest at 1,374,000 hectares, won its listing after a long and intense campaign.

The 1.2 million hectare Banc d'Arguin National Park on the Mauritanian coast includes both marine and terrestrial environments, and hosts more than two million migrant birds. Victoria-Falls/Mosi-Oa Tunya, jointly

nominated by Zambia and Zimbabwe, includes adjacent national park areas from both countries. Bandiagara, in Mali, made the list for its cultural importance as home to the Dogon people as well as for its natural qualities. In 1990, IUCN will evaluate eight new natural sites in seven countries.

Progress in the plant kingdom

Indian proposals on *Rauvolfia serpentina* and the Himalayan may-apple *Podophyllum hexandrum*, were the subject of prolonged discussions at the last CITES meeting in Switzerland. Both plants have medicinal value and are collected extensively throughout their ranges. *Rauvolfia*, one of the numerous species used to produce the alkaloid reserpine, is effective against nervous system disorders; the may-apple is a source of the resin podophyllin, which is used as a purgative. In both cases the root is the desired plant part.

Over collection from the wild has drastically reduced populations of these species, and at the CITES meeting it was agreed that both would be placed under Appendix II; chemical derivatives from the plants would, however, be excluded from the listing. This, it is hoped, will ensure a healthy trade in pharmaceutical products while simultaneously protecting the plants in the wild, and encourage propagation efforts for both species in India.

Kanger Valley National Park

The Kanger Valley National Park in Bastar district, Madhya Pradesh, has been designated a biosphere reserve. The 200 sq. km Park contains one of

peninsular India's last remaining pockets of nearly pristine forest, and is one of the few places where healthy populations of teak and sal coexist. The fauna of the area includes the tiger, leopard, gaur, sloth bear and several deer species. The flora is poorly studied, and is said to include a number of unidentified species.

The concept of biosphere reserves, where the focus is on 'realistic' conservation policies with a minimum of man-animal conflict, is one that is rapidly gaining ground; India now has 13 areas designated as such. However, several of them have had more than their fair share of problems, and if the Kanger experiment succeeds it could provide useful lessons in biosphere reserve management elsewhere in the country. The area is small enough to 'manage' and has a ready-made revenue earner (tourism income is often a prerequisite to successful management) in the 250 metre long Katamsar cave with its stalactites and stalagmites, and a crocodile sanctuary, in addition to the other wildlife.

Back issues of BNHS Journal

Volumes 1 to 70, of the Society's Journal are available, complete and bound in black calico. Contact Mr. E.R.C. Davidar, David Nagar, Padappai (via) Madras, Tamil Nadu 601 301.

Earth Day

Twenty years after Earth Day was first celebrated, our environment is in no better shape than it was; on the contrary, considerably worse. Pollution, deforestation and a relentless increase

in third world populations are threatening not just the balance of nature, but the very existence of the planet. On Earth Day, 22nd April, conservation minded people throughout the world gathered to focus attention on the continued abuse of the environment.

The BNHS organised a series of functions which included painting competitions, tree planting drives and mass rallies to focus on alternative, non-polluting energy sources.

SACON inaugurated

The Salim Ali Centre for Ornithology and Natural History (SACON) was inaugurated on 5th June by Mr Mahesh Prasad, Secretary, Ministry of Environment and Forests. Appropriately, the function took the form of a tree planting ceremony. BNHS staff, members and invitees planted 100 saplings to create a grove in memory of Dr Salim Ali, who provided the initial impetus for the setting up of the Institute.

Research programmes in natural history in India are unfortunately not as well funded as they should be. Much significant work has been done, both at the BNHS and by other institutions, but much more remains to be done. With the setting up of SACON, it is hoped that research in field biology will be given a new impetus, so as to assist land managers

A part of the institute will be housed in a 13 hectare plot near the Sanjay Gandhi National Park at Borivli, Bombay. The land was gifted to the BNHS by the Govt. of Maharashtra on the recommendation of Mrs. Indira Gandhi. Some of the proposed areas of

Biologist collared

"Why study tigers? No amount of study can change the behaviour of a tiger. It cannot be transformed into either a fox or an ox for ploughing." This perceptive observation by a local politician was just one of many made in connection with the recent tiger deaths in the Nagarhole Sanctuary in Karnataka.

Research biologist Ullas Karanth has been radio collaring tigers as part of a study on predator-prey relationships in Nagarhole. Five tigers died between March and May and this sparked off an uproar. According to Karanth, three of the deaths were probably a result of injuries sustained in territorial battles, which are common in areas with a high density of tigers (there are 44 in the 660 sq. km sanctuary). One was an infanticide, another was due to disease. The consensus of opinion in the legislative assembly, however, was that the deaths were caused by an overdose of the drugs used for chemical immobilization. Permission for the study has been withdrawn, and in June the forest and animal husbandry minister for Karnataka announced that Karanth would be fined Rs. 50,000 per dead tiger. The fines would be recovered by confiscating the project equipment if necessary. This in spite of the fact that only one of the five had been collared, as the minister was well aware.

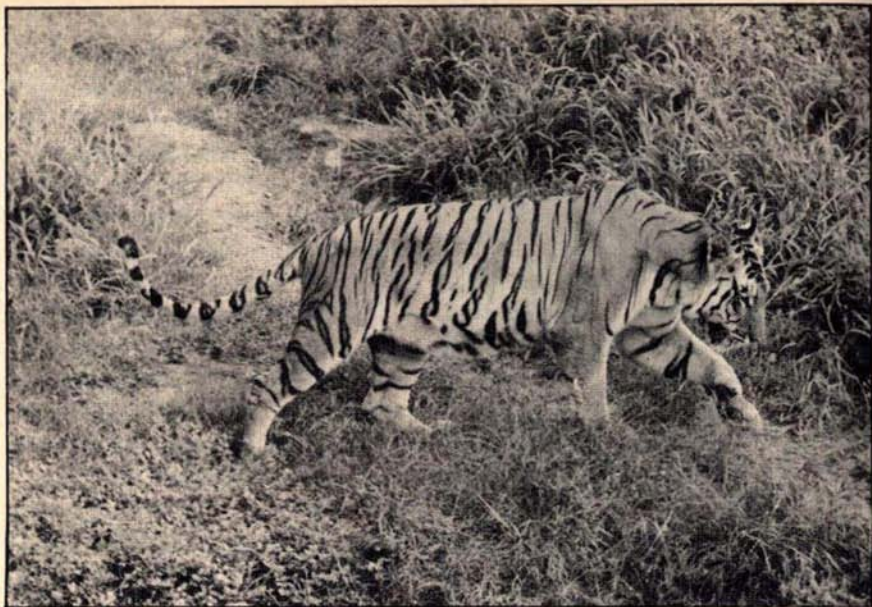
Radio collaring after chemical immobilization is an established technique, and has been used successfully in India on several big cats, including the highly endangered snow leopard.



SACON takes root — planting the Salim Ali memorial grove KAMAL MALKANI

study are: ecology, ethology, physiology, migration, zoogeography and the impact of the wildlife on agriculture, forestry and aviation. The institute will also provide advanced education leading towards university degrees in ornithology and natural history, and conduct training courses in wildlife management, etc.

Any research in natural history must in the end be directed towards species and habitat conservation. One of SACON's objectives is to gather data that could be used to refine management policies for sanctuaries and national parks.



No more collars – a setback to tiger studies

E. P. GEE

Obviously it is not completely free of risk, and fatalities due to the operation are not unknown. But wild accusations and precipitate action are no substitute for a genuine scientific enquiry into the deaths.

Appeals have been made to the government to allow the study to continue, and one can only hope that they are successful. Even with a sympathetic administration, field research is difficult. Without it, it is impossible. ■

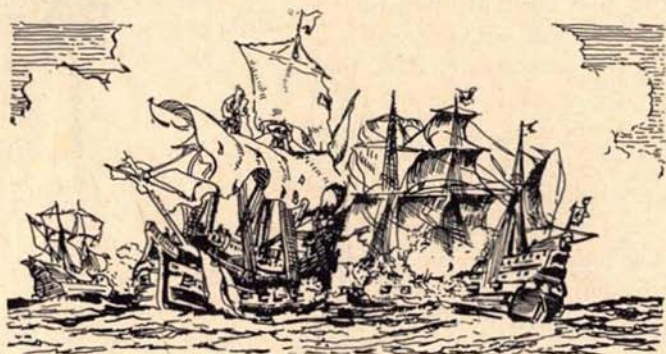
OBITUARY

Dr N. Shivanarayan, Chief Ornithologist of the Economic Ornithology Division in the Andhra Pradesh Agricultural University, Hyderabad, was struck down by cancer in February this year, at the age of 49. During his fifteen years as Chief Ornithologist, researchers at the University made considerable headway in controlling crop damage due to birds, particularly the roseringed parakeet. With his extensive scientific training and thorough practical knowledge of bird pests, Dr Shivanarayan was an asset to Indian economic ornithology. His untimely demise will be deeply mourned.



SEASHORE LORE

VI - Borne On The Purple Wind



BY BEEFSEA

*This is the ship of air, which poets feign,
Sails the unshadowed main —
The venturous barque that flings
On the sweet summer wind its purpled wings
In gulfs enchanted, where the siren sings,
And coral reefs lie bare,*

Where the cold sea-maids rise to sun their streaming hair.

— Oliver Wendell Holmes

Before the monsoon sets in, people on our coasts flock to the seashore to escape the summer heat and enjoy the brisk onshore wind that blows in from the sea. This wind blows a multitude of small animals onto our beaches, which normally would be seen only by sailors and fishermen.

In late May or early June, you might see numerous translucent, iridescent, violet-blue, elongated 'balloons' strewn on the beach. Most of them are around four centimetres long, but a few may be as large as 13 cm. Be wary of picking one up; it is the notorious Portuguese man-of-war. (People in India

also call it a bluebottle, but the latter name is more properly attributed to the horsefly.)

In water, the brilliantly coloured purple, blue, crimson or pink bladder floats on the sea surface. On the top of the float is a flattened inflated crest. We need not stretch our imagination too much to liken the float to a miniature sailing ship, with the crest acting as a sail. As a sudden breeze ruffles the sea surface, the float changes shape. In fact, the animal is not blown helplessly before the wind; like a sailboat, it can 'tack' and thereby move at an angle to the wind. In the aquarium, I have seen

the animal frequently roll its float under the water to wet its entire surface and prevent it from drying.

Hanging down below the float is a cluster of blue, green and pink finger-like protuberances, with one very long and a few much shorter dark blue threads. A Portuguese man-of-war is not, strictly speaking, a single animal, but a cooperative society or colony of connected individuals, each of a different shape, and serving various functions. The blue, tube-shaped members are for feeding and digesting the food, which is then shared by all members of the colony. The green, tapering fingers are feelers and tasters, and the finely divided pink clusters the sex organs.

In the Portuguese man-of-war *Physalia physalis* found in the Atlantic Ocean, there are many long streamers, but in *Physalia utriculus*, which lives in the Indian and Pacific Oceans, there is only one long (12 metres in an animal with a 13 cm long float) filament with a few much shorter ones. The Atlantic form is much larger, with a float up to 35 cm and the filaments extending to 30 metres. In the live animal, these long fishing tentacles continuously extend and contract; a tentacle which has extended to 12 metres will soon contract to less than a metre. The tentacles are beaded at regular intervals. Each kidney-shaped "bead" consists of some 500 large, and 2,000 small globules. These are the stinging cells.

Each stinging cell is a fluid-filled bladder-like capsule containing a hollow coiled tube. Outside the capsule is a hair-like trigger. When a tentacle comes in contact with a prey animal (or



Portuguese man-of-war

a human), the inner coiled tube is everted with force; it is 20 to 50 times the size of the stinging cell. Venom is injected from a tiny opening at its tip, with sufficient force to penetrate clothing or even a rubber surgical glove.

I have been stung on many occasions by a Portuguese man-of-war. It feels as if you have been struck by a red-hot whip which also carries an electric current. The venom is a neurotoxin similar to that of the cobra. Immediately, along the arm where the tentacle had struck, appeared red weals; my arm swelled up to the elbow, my armpit ached where the venom had spread to the lymph glands, and I could not sleep that night. Fortunately, the animals we come across at Bombay are small, with only one tentacle. Victims of the larger Atlantic species, who have encountered numerous tentacles of an individual animal, have suffered severe pain and

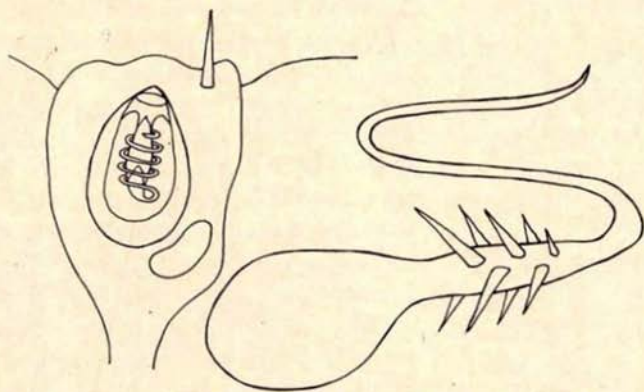
headache, swelling, cold sweat, nausea, vomiting and abdominal pain, muscular cramps, a feeling of nervousness and faintness, hysteria, chills and fever, laboured breathing and sometimes even paralysis and collapse. The intense pain is due to a chemical called 5-hydroxytryptamine.

Weight for weight, except for a few jelly fishes, *Physalia* is the most dangerous animal in the sea. Its venom is as potent as a cobra's; it requires just 0.037 ml of venom per kilogram weight of a human to kill. We should thank our stars that the Portuguese man-of-war cannot inject as much venom as a snake, otherwise no one would dare to swim in the season when the animals abound. The stinging cells are normally used to catch its prey, such as fish. These are stung to death and then drawn up by the contracting tentacles to the feeding polyps.

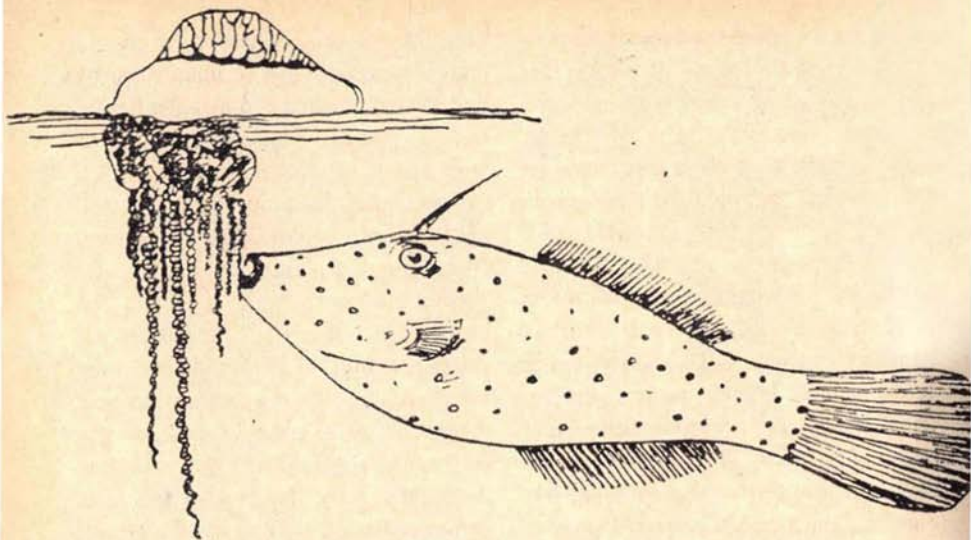
Since the stinging cells continue releasing venom as long as the tentacles are in contact with the skin, they should be immediately removed—not with the bare hand, but by rubbing with sand,

clothing, towels, seaweed or gunny bags. The venom can be inactivated by bathing the affected part in water heated to 60°C (but this can scald the skin), or with spirit, alcohol (whisky will do), suntan lotion, calamine lotion, petrol, kerosene or ammonia. The venom will continue to do harm even after the animal has been washed up on the beach, died and dried. Moreover, the floats are prettily coloured, and may tempt a child (or even an adult) to pick them up. If at all you must pick one up, use tweezers. After heavy rain with stormy winds, large numbers of tentacles broken off from the animals by wave action may drift in the water, so avoid swimming at that time.

Surprisingly, a fish called *Nomeus* chooses to associate with the Portuguese man-of-war. This bluish to purplish fish is found swimming around and under its tentacles, never straying far. When threatened by other fishes, it swims among the tentacles, safe from its enemies, which respect the *Physalia's* powerful sting. *Nomeus* appears to be immune to their sting, though oc-



Stinging cell coiled to strike (left) ... and discharged (right)



Unlikely predator—leatherjacket feeding on Portuguese man-of-war

asionally they have been found partly digested, clutched in the tentacles. They get shelter and protection, and probably repay their host's generosity by acting as a lure for larger fish preyed upon by *Physalia*, and doubtless join in at the feast. The young of one species of octopus pick up broken fragments of *Physalia* and hold them in their arms to ward off enemies.

With an armament so powerful, one would think that the Portuguese man-of-war has no enemies. But hawksbill turtles and the ocean sunfish *Mola mola* feed on them. So does the violet sea snail, *lanthina*, which blows gas bubbles and coats them with slime so as to form a floating raft. While feeding, the snail emits a purple dye, which probably neutralises the venom of the *Physalia* or inhibits the stinging cells from discharging.

I had the privilege of discovering yet another predator of the Portuguese man-of-war. It happened this way.

Once in a while, during the rainy season, fishermen would bring a live specimen of the scribbled leather-jacket *Alutera scripta* and the yellow-finned leather-jacket *Alutera monoceros*. These fishes have been caught at Bombay only when the Portuguese man-of-war are washed up on the seashore (May-June). They are slow, inefficient swimmers, and I wondered how they were able to catch their food. We tried to feed them an assortment of diets, but they seemed to be very choosy in feeding, and soon became emaciated and died.

One day a fisherman brought a live specimen and, as I was busy, I asked him to release it in a vacant tank in the next room. When he returned, he told me that he had released it in a tank where there were many floating 'balloons' He meant *Physalia*, and I rushed to the tank, expecting that the fish would, by now, have been killed by the Portuguese man-of-war. What I saw was a pleasant

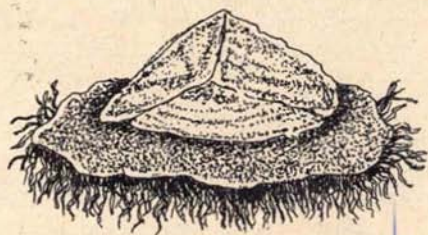
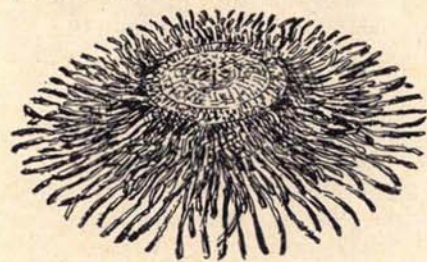
shock. In the few minutes that the fish was in the tank, it had nibbled off all the tentacles of the *Physalia*, leaving only the floats uneaten!

The other two animals which I now describe are not dangerous to us. Though they do have stinging cells, their venom is not so potent, so that they are harmful only to the minute prey organisms on which they feed.

Porpita has a flat disc-shaped whitish float made of chitin (the material which forms the shell of prawns) and divided into many chambers filled with gas. Around the central float are numerous dark blue tentacles armed with knobs of stinging cells. Below the disc hang the various types of polyps. Though most of the animals washed up on our beaches have their central disc the size of a 50 paise or one-rupee coin and are dark blue, the animal can grow to five centimetres. Very rarely it is coloured lemon yellow. For four decades I have been searching literature for a common name, but all authors call it by its scientific name.

The by-the-wind-sailor or purple-sail (*Verella*) resembles *Porpita*, but the central disc is oval in shape, not circular, and above it projects a triangular crest

***Porpita linneana* – surprisingly, no known common name**



By-the-wind sailor, *Velella mutica*

enabling it to sail across the wind. Though the adult (3 cm) floats on the sea surface, the young live in deep water. It, too, is dark blue. It has numerous enemies. The purple snail *Ianthina*, which feeds on the Portuguese man-of-war, also eats *Velella*, and so do two sea slugs, *Glaucus* and *Fiona*. *Glaucus* has a frilled silver and blue or black body 3 cm long, and it floats upside down on the sea surface by swallowing air. *Fiona*, however, feeds only on the top surface and sail of *Verella*, refusing to browse the tentacles or below the surface of the float. An isopod crustacean, *Idothea*, also feeds on the by-the-wind-sailor.

Both *Physalia* and *Velella* have the peculiarity of being dimorphic, i.e. those of the northern and southern hemispheres are mirror images of each other, so that their sails are trimmed to the prevailing equatorial winds, which also are contrary to each other in the two hemispheres.

All the three animals described above live in the tropics. They are siphonophores, as are the salps, being related to sea anemones, corals and jelly fishes. ■

BUTTERFLIES

Early stages in the life cycle.

BY NARESH CHATURVEDI & ISAAC KEHIMKAR

MILKWEED BUTTERFLIES Continued from *Hornbill* 1990 (1)

Besides the normal feeding on flowers for nectar, milkweed butterflies are often seen clustered around dead and withered branches of *Heliotropium* and *Crotalaria* plants. These provide them with pyrrolizidine alkaloids, which are believed to be essential for the production of pheromones. (Try crushing a *Heliotropium* inflorescence with your fingers; soon, milkweeds will flock to the crushed portion.) It has been suspected that the alkaloids also contribute to the butterflies' unpalatability to predators. This method of obtaining alkaloids is universal, seen in milkweed butterflies from vastly different habitats and widely separated biogeographic areas.

COMMON INDIAN CROW *Euploea core*

Larval foodplants Oleander (*Nerium oleander* and *N. indicum*), kuda or kurchi (*Holarrhena antidysenterica*), kalidudhi or krishnswara (*Ichnocarpus frutescens*), banyan (*Ficus benghalensis*), peepal (*F. religiosa*), golden fig (*F. benjamina*), umbar or gular (*F. glomerata*), India rubber (*F. elastica*), sandpaper tree (*Streblus asper*), anantvel or nannari (*Hemidesmus indicus*) and *Cryptolepis* sp.).

Egg Oval, creamish white with crisscrossing longitudinal and horizontal ridges or ribs, giving an impression of minute depressions. Laid singly on the underside of growing shoots of the foodplant.

Larva Eats the eggshell on hatching and later begins to feed on the underside of the leaf, often leaving the upper surface untouched. When the larva matures further, its feeding behaviour is typical of a milkweed feeder. It nips the midrib of the leaf before commencing to feed, so as to reduce the flow of sap. When alarmed the caterpillar may curl up or lash its head from side to side and may eventually drop to the ground. There are four pairs of tubercles, situated on the 2nd, 3rd, 5th and 11th thoracic segments. The tubercles on the 2nd segment are the longest.

Pupa Suspended from the underside of a leaf, the pupa resembles a drop of water shining in the sun. Though the metallic sheen makes it conspicuous, the pupa is apparently left untouched by predators, thus suggesting that the sheen may serve to warn off predators. Pupae which develop in shaded places have fawn markings ■

Facing page: fully grown caterpillar; pupa with fawn markings; adults on *Heliotropium* plant.

PHOTOS BY ISAAC KEHIMKAR



FOLKLORE *by K. Krishna*

There is a delightful little story among the tribal Kurubas of Mudumalai in the Nilgiri hills of Tamil Nadu, on the reason why the elephant does not have its testes outside the body like any other self-respecting mammal.

Once upon a time the elephant and the jungle bush quail had a friendly game of hide and seek.

Naturally the quail had little difficulty finding his massive playmate, but all the elephant's efforts to trace the quail proved futile, for the simple reason that the quail was standing quietly between the hind legs of the elephant. Finally, tired of the one-sided contest, the triumphant quail whirred up in flight as flushed quails have a habit of doing (and giving a heart-stopping fright to tense naturalists on the trail of a tiger or elephant).

The elephant was so startled by the quail rocketing up from between its legs that it involuntarily pulled up its testes into its body, and there they have remained ever since ■



The author is a Kuruba tracker with the BNHS Elephant Ecology Project

Hornbill publishes features on any aspect of natural history or environmental conservation; accounts of their work by field biologists are particularly welcome. Articles can be up to 1500

words in length, and *must* be accompanied by photographs (black & white/colour prints or slides). Pay-

ment for material published will be as follows: Short notes on observations, bird sightings etc. — Rs. 50; articles of up to 1000 words — Rs. 100; beyond 1000 words — Rs. 200. Photographs: black & white — Rs. 50; colour — Rs. 100. ■

WRITE FOR HORNBILL

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