

# HORNBILL



*Inaugural Issue*

BOMBAY NATURAL HISTORY SOCIETY



# PRINTWELL

*The Image Makers*

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On Cover—*Narcondam Hornbill*  
(Male at nest at Narcondam Island)  
Photo: Pat Louis



## EDITORIAL

In an age when natural history studies are becoming more and more specialised, scientific reporting tends to be increasingly technical. The Society's *Journal*, intended to 'disseminate and extend the knowledge of the flora and fauna', has developed through the years as the annals of natural history of the Indian sub-continent and has in the process acquired a high degree of technical merit.

"Excellent, but what about laymen?" ask the majority of our members who would like their interest in nature and wildlife to be a source of pleasure, unburdened by technicalities.

The Society's newsletter *Hornbill* is being revived with a view to provide communication between the member and the Society; to offer, in non-technical language as far as possible, information on various aspects of natural history and on conservation action generated by the Society and others; and which could be an expression of our members' concern over the dwindling forests and decimated wildlife of India.

We plan to publish an issue every three months and hope to develop the *Hornbill* into a popular magazine on Indian Natural History. This is possible only if we have the fullest co-operation from our members in the form of articles, notes, photographs and also financial support in some form or the other, for instance advertisements which could pay for printing colour plates.

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This issue is being published as a tribute to Dr. Salim Ali, on his 80th birthday in Nov. 1976. We are indebted to him for financial assistance for restarting the *Hornbill*. We are equally indebted to the Society's Executive Committee for the decision to undertake this venture. Our thanks are due to Mr. J. P. Irani for the cover layout.

We expect a critical appraisal from our members.

### EDITED BY

J. C. DANIEL  
S. A. HUSSAIN  
J. S. SERRAO



# PRESIDENT'S LETTER

## WHY HORNBILL HOUSE?

The frequency of the question makes me wonder how many remnants of the 'old guard' still remember, and how many members of the present generation have heard of William who was such a popular character in the Bombay Natural History Society in the early years of this century. 'William' (from his bill!), a Great Pied Hornbill was the Society's well-loved mascot-cum-PRO for over 25 years. He had become almost synonymous with Phipson & Co., the wine merchants as also with the fledgeling BNHS then occupying a part of their business premises in Apollo Street. This gracious old building, incidentally, had been the residence of the Chief Justice of Bombay High Court about the year 1860. The bird was introduced to us as a nestling from the Karwar jungles in

1894, and lived happily till May 1920 in a corner of the first floor, partitioned off by wire netting. Affectionately known as the 'Office Canary', William became a prime favourite with Phipson's customers—good for business no doubt!—and was equally popular with the visitors to the overcrowded 'museum' of the Society—a hodge-podge of mounted heads of glassy-eyed tigers, leopards and bears snarling at you perhaps more ferociously than they ever did in life. A claustrophobic assortment of heads and horns and miscellaneous sporting trophies cluttered the walls all round the room. Tables groaning under various zoological bric-a-brac—sea shells, birds' eggs, boxes of mounted butterflies and beetles, and glass-sided cases with live snakes, desert gerbills, fat-tailed li-

*The Society's 'Museum' in 1920*





zards and such like, were some of the other obstacles through which you stumbled your way, tripping over hoofs of sambhar skins and stuffed crocodiles which littered the floor! But by far the greatest draw of the BNHS in those early days as I recall, was certainly William the Hornbill in his wired cubicle, eagerly hopping about to be noticed. He had endeared himself to visitors by his unfailing readiness to play a game with them, deftly catching a tennis ball thrown from a distance of 7 or 8 yards with never a miss. William was a gourmand and an omnivore; he lost no opportunity to supplement his daily menu with cockroaches, mice and rats that rashly sneaked into his enclosure to share his food. Sitting inert on his perch yet intently watchful, he would suddenly make a lightning jab and seize the hapless intruder in his bill, and batter it into submission and suitable limpness before bolting it down. Unfortunately his omnivorousness did not end with misguided rats and mice: William actually died of overeating bits of iron wire from his cage! Although the grieving Society installed several successors in turn, to continue the tradition and the good Public Relations he had built up, none proved so long-lived or so friendly as the original William. It is, thus, the hallowed memory of our William I that has inspired the name of the premises which now house the Society's administrative offices, library and zoological collections,



*William—On his final roost  
(As the male in the hornbill nesting  
group in the Prince of Wales Museum,  
Bombay)*

and of the Newsletter which makes its debut with this issue. Although none of William's clan holds court in Hornbill House any more, we are fortunate in having with us a living pair of his near relations, the unique endemic species of Narcondam island in the Andaman group—*Rhyticeros narcondami*. Two nestlings were brought in by Shri S. A. Husain, of our research staff, some three years ago. They are quartered in a small aviary adjoining Hornbill House and, optimistically, provided with a section of a hollow tree-trunk to nest whenever their fancy moves. Although the birds happen to be the right sexes—presumably also mature by now and in prime condition—they have shown no inclination to breed as yet. We continue to hope.

SALIM ALI



## NOTES, NEWS AND COMMENTS

### Price of progress

A factor which is given little importance in India in the pursuit of progress is the effect of unseen environmental changes brought about by man-made artefacts such as dams. An illustrative example is available in the relation between the Nagarjunasagar dam in Andhra Pradesh and the occurrence of crippling Knock-knees among the poorer villagers living in the command area of the dam. The disease known as Genu Valgum is the direct result of excessive intake of the element Molybdenum in the diet and the consequent high excretion of copper and can be identified while the person is standing or walking. In severe cases the knee joints cross-over and in some, when standing, the feet may be separated by a yard while the knees touch. The physical handicap leads to disastrous emotional disturbance as the victim faces rejection and ridicule and economic hardships as they have to accept lowly paid unskilled occupations.

Scientists at the National Institute of Nutrition, Hyderabad believe that complex cause and effect factors are responsible. Briefly these are: the sub-soil water level has risen from seepage from the reservoir of the dam and feeder canals, thereby the alkalinity of the soil has increased, resulting in increased intake of molybdenum by those whose staple

diet is *Sorghum* and consequently high excretion of copper. This, in association with the skeletal fluorosis endemic to the area results in Genu Valgum. *Anil Kumar* in *New Scientist* 30th January 1975.

### The Mongoose in Fiji

The mongoose was introduced into many island communities around the world with the hope that it would control and exterminate an earlier introduction, the rat. The mongoose proved a disaster as it preyed on the more easily obtained local fauna. Island fauna having lived in seclusion fall easy victims to a vigorous, versatile, predator like the mongoose.

A recent investigation of the breeding habits of the mongoose in Fiji shows how well it has adapted itself to local conditions since its introduction in 1883. The male's testes are active throughout the year but the breeding season is linked to daylength. This is indicated in the difference in the breeding season between animals in islands in northern and southern hemisphere. In Hawaii (21°N.) where it was introduced in 1883 pregnancies occur between February to July; in Fiji 18°S. between August and January, periods coinciding with longest day length of each locality. *M. L. Gorman* in *Journal Zoological Society* London 178 (1976).



## The Crocodiles of Manghopir

The crocodiles at Manghopir, near Karachi used to be one of the sights of Karachi. No information on the crocodiles has been available in India for some years. In the Sunday Magazine of the "Morning News" of Karachi for November 1973, Hameed Zaman reports on the present situation.

The crocodiles are belived to have descended from those blessed by the Saint Haji Mangho who settled in the vicinity of the tank in the 13th century. 600 years later Lt. Carless of the then Indian Army while surveying the Karachi coast reported that "The swamp is not more than 150 yards long by about 80 yards and in this confined space

I counted above 200 large ones from 8 to 15 ft. long, while those of small size were innumerable". The number of crocodiles in the tank has steadily declined. In 1838, 200 were reported, in 1841, 60; at Pakistan's independence 25; and presently there are 3 large animals. The cause is, according to Zaman, overfeeding by the zealous seekers of blessings resulting from the good deed. The keepers coax and shove goats' meat into the mouth rupturing the throat membrane. 12 crocodiles died in 1959. The three left, two males and a female will probably not have survivors. Any attempt at mating is promptly discouraged with brickbats by the crowds which hang around the tank. A clutch of eggs was also similarly destroyed.

*The crocodiles of Manghopir being fed  
(This photograph was taken in 1930.)*





## The Vanishing Land

It is estimated that a cultivated fallow land erodes to the extent of 50 tonnes of soil annually. Sixty to hundred tonnes per hectare are lost from unprotected but cultivated slopes. Conservation measures required are contour or staggered trenching or contour furrowing and fresh afforestation. Upto 1973-74 the Tamil Nadu Government has spent 965 lakhs of rupees on soil conservation works. *P. K. Thomas*—Conservation Practices for the Red and Laterite soils of the South. *Indian Farming*, April 1975.

## Taipan's Temperature

The taipan, a relative of the cobra is considered the most deadly of Australian and Papua-New Guinea snakes. Their temperature control has been the object of some sophisticated experiments. The results indicate that both under artificial (heat lamps) and natural (sunlight) conditions the head temperature is cooler by 6°C than the body temperature. The head is kept cool by a judicious shuttling between sunlight and shadow and the head temperature is an accurate indication of the preferred level for the life of the animal. When you are deadly it pays to be cool headed! *C. R. Johnson* in *Zoological Journal of the Linnean Society*, Vol. 56(1), 1975.

## The role of the Shola Forest

The natural forests protect the soil, recycle its nutrients and bring an amelioration in climate and an increase in wildlife. A *Shola* forest recycles its nutrients and maintains itself at a high fertility level by the addition of 2760 kg of leaf litter per h.a. per annum. The nutrients added are worth about Rs. 5,000 per h.a. per annum. It is the well-developed overwood, underwood, undergrowth, mat of leaf litter, humus that protects the soil even in precipitous slopes and is rich in wildlife. It is an asset and needs complete protection. *S. Chinnamani*—A cropping pattern for the Southern Hill Zones—*Indian Farming*, April 1975.

## Birds in Spider Webs

The Giant Wood Spiders of the genus *Nephila* are widespread in tropical forests including those of India. Their usual food is butterflies and other insects.

*K. M. Howell* and *C. J. Mungirwa* cite three instances of birds, a little swift and two instances of munias being trapped in the web. The swift was released unharmed as also one of the munias. The other munia was found dead on the web. In none of the instances had the spider which was present on the web made any attempt to feed on the birds. *K. H. Howell & C. J. Mungirwa* in *East African Natural History Society's Bulletin*, June/July 1975.



## Energy Forests

The domestic energy consumption in India per annum is about 190 million tons of coal equivalent. 30% of this energy is obtained through burning cowdung pats which is equivalent to a loss of soil fertiliser (Ammonium sulphate) to the extent 600,000 tons per annum; 50% of fuel energy is obtained from fuel wood, the consumption being 203 million cubic metres per annum. Only 13 million cubic metres of this fuel wood is obtained from recorded sources, the rest are largely from illicit felling. The firewood requirements on the basis of population estimates will be 300 million cubic metres in 1990, with an estimated gap of about 100 million cubic metres between available resource and demand. India has at the moment 75 million ha. of land under forest which is approximately 23% of the total land area as against the national goal of 33-1/3 per cent of land under forest. To raise the additional fuel requirements 20 million ha. of fuel plantations will be required.

Bakhshish Singh writing in the *Indian Forester*, Vol. 101, October 1975 suggests raising village community woodlands of fast growing indigenous and exotic fuel species on the potentially productive wastelands around the 567,000 villages in India. Rotation crops on the 43 million ha. of such marginal lands, he believes, would meet the coming fuel crisis.

## The Tiger in Nepal

The Smithsonian Institution in collaboration with the Government of Nepal and with financial aid from World Wildlife Fund International have been studying tiger populations in the Royal Chitwan National Park in Nepal. The programme which has been in operation since 1973 has produced interesting results on the habits and movements of tigers. Using radiotelemetry techniques they have been able to obtain data on the home range, movements and populations based on radio location of tigers captured using tranquilliser guns, and released with a collar with a transmitter. Home range of male tigers varied from 52 to 62 sq. km without overlap. Home range size of tigresses varied from 26 to 39 sq. km.

Meetings between individuals are common as several may hunt in the same general area and travel by same routes. Territories are maintained by males. Successive days, movements may vary from 1.6 to 13.3 km. The estimated population in the Chitwan National Park with an area of 8,000 s. km is 15 to 20 animals.

## The Tiger in India

*Without comments*

“The project is now 3 years old . . . . . An estimate of the trend of growth in Tiger population is given below”.



<i>Tiger reserves</i>	<i>From</i>	<i>To</i>
Manas (Assam)	31	41
Palamau (Bihar)	22	30
Simlipal (Orissa)	17	50
Corbett (UP)	44	55
Ranthambhor (Rajasthan)	14	20
Kanha (MP)	43	48
Melghat (Maharashtra)	27	32
Bandipur (Karnataka)	10	19
Sundarbans (West Bengal)	50	175

Source—GOI. Min. of Agri. & Irrgn. (Dept. Agri.), New Delhi: 25.9.1976.

### Gamma Duck

The Bombay Duck (*Harpodon nehereus*) is a highly rated seafish which is susceptible to quick spoilage. Recent experiments by scientists at the Babha Atomic Research Centre show that Bombay duck's storage life at 0°C can be extended from 6 days to 26 days by low dose irradiation. *M. D. Attur et al.* in *Agricultural and Biological Chemistry*, Vol. 39, p. 1201 (1975).

### Camera Shots

How near should one be to portray an animal 20 mm high on 35 mm transparency?

Focal length in mm	135	200	280	400	600
Deer	*14	21	30	42	63
Pig	10.5	15	21	30	45
Heron	6.5	9	12.5	18	27
Hare	3.8	5.5	7.5	11	17
Pigeon, Crow	2.4	4.1	5.7	8.2	12.5
Woodpecker	1.9	3.0	4.2	6	9

\*Distance in metres

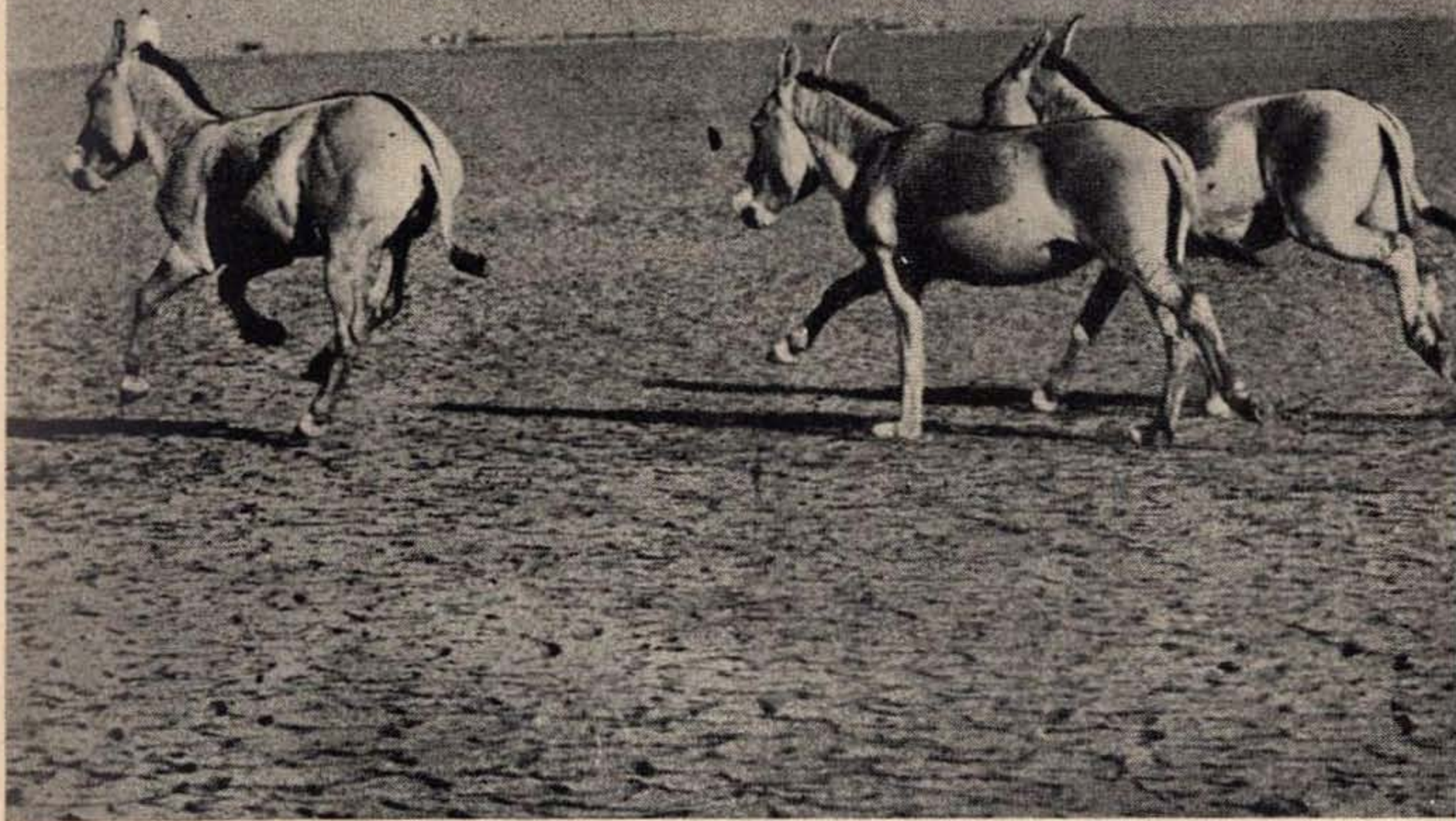
[from *Das Photographieren Von Wild und Vögeln* by C. A. Von Treuenfels. Translated by P. L. Davenpost [*Jour. Br. Deer Soc.* 3(8), 1975]

### Nature Tours

Since 1975 the Society has been arranging Nature Study Camps for its members. Areas so far visited are Gir National Park, Gujarat, Karnala Sanctuary, Maharashtra and

Ghana Bird Sanctuary, Bharatpur. We plan to have a summer camp in Kashmir in 1977, and a nature study tour of the Andaman Group in early 1978. Members will be sent details when plans are finalised.





### **Wild Ass**

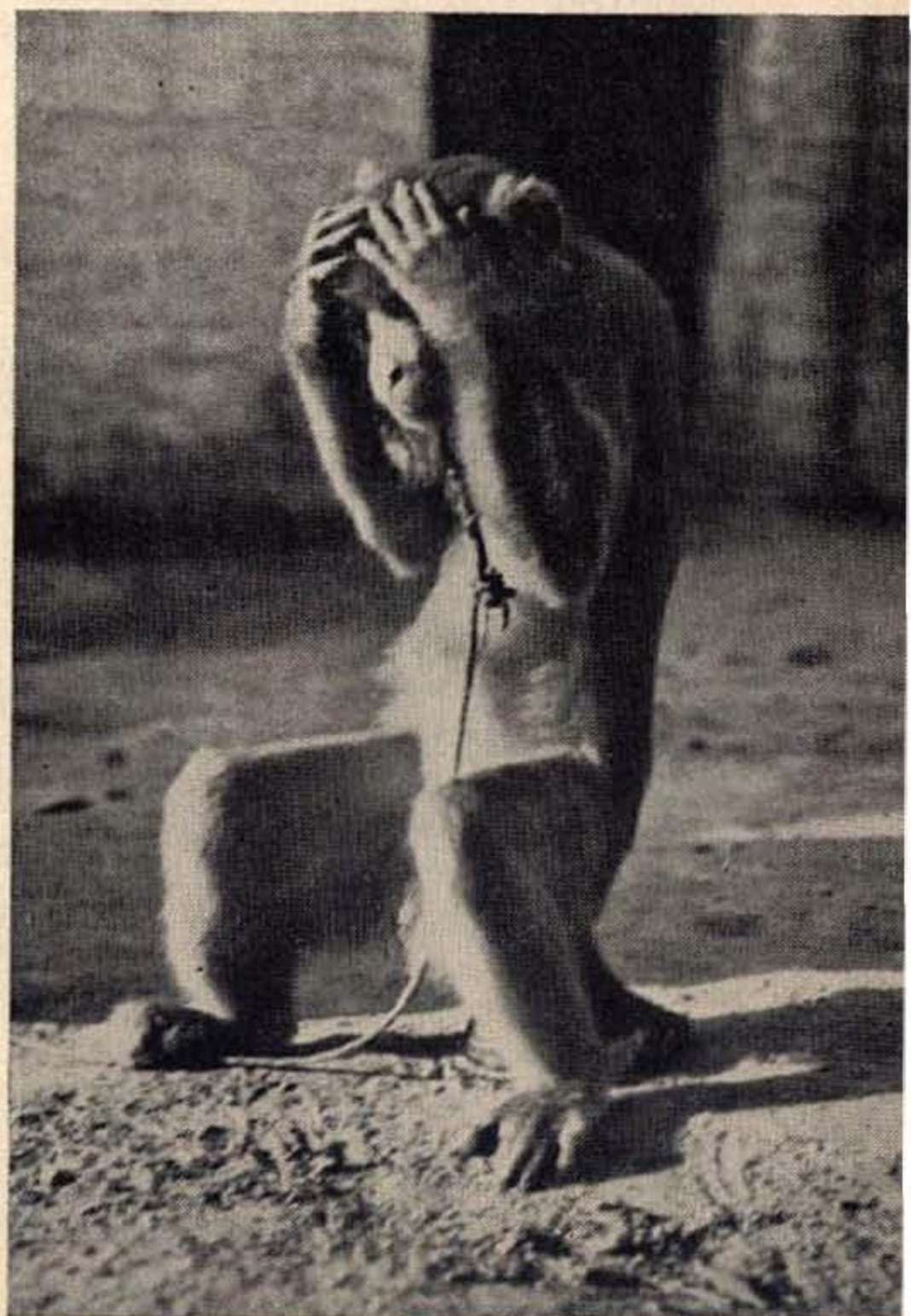
*How many asses on the Rann?*

*The latest estimate is 720 wild asses in the Little Rann of Kutch.*

### **Mishmash**

A matter that needs early attention is the administrative delays which hinder wildlife studies and conservation measures. We shall give two example.

The Society represents India on the Survival Service Commission's Crocodile Specialist Group. We were therefore anxious to find out whether the crocodiles in the lakes at Borivli National Park, more or less at our door step, were breeding as they used to do in former years. Permission was requested from the Forest Department in March for staff and members of the





Society to survey the lake shores. A reply was received in May quoting rules under the Wildlife Act and asking for names and addresses of participants. We wrote back drawing their attention to the fact that the reply was two months late and eggs would have been laid already and had probably hatched. The permission is still awaited.

In early August we offered the assistance of our members for the eradication of the exotic weed *Hyp-tis suaveolens*, known locally as *Wilyati Tulsi* which is replacing indigenous annual vegetation in the Borivli National Park. The time was opportune as the weed was just sprouting and could be easily pulled

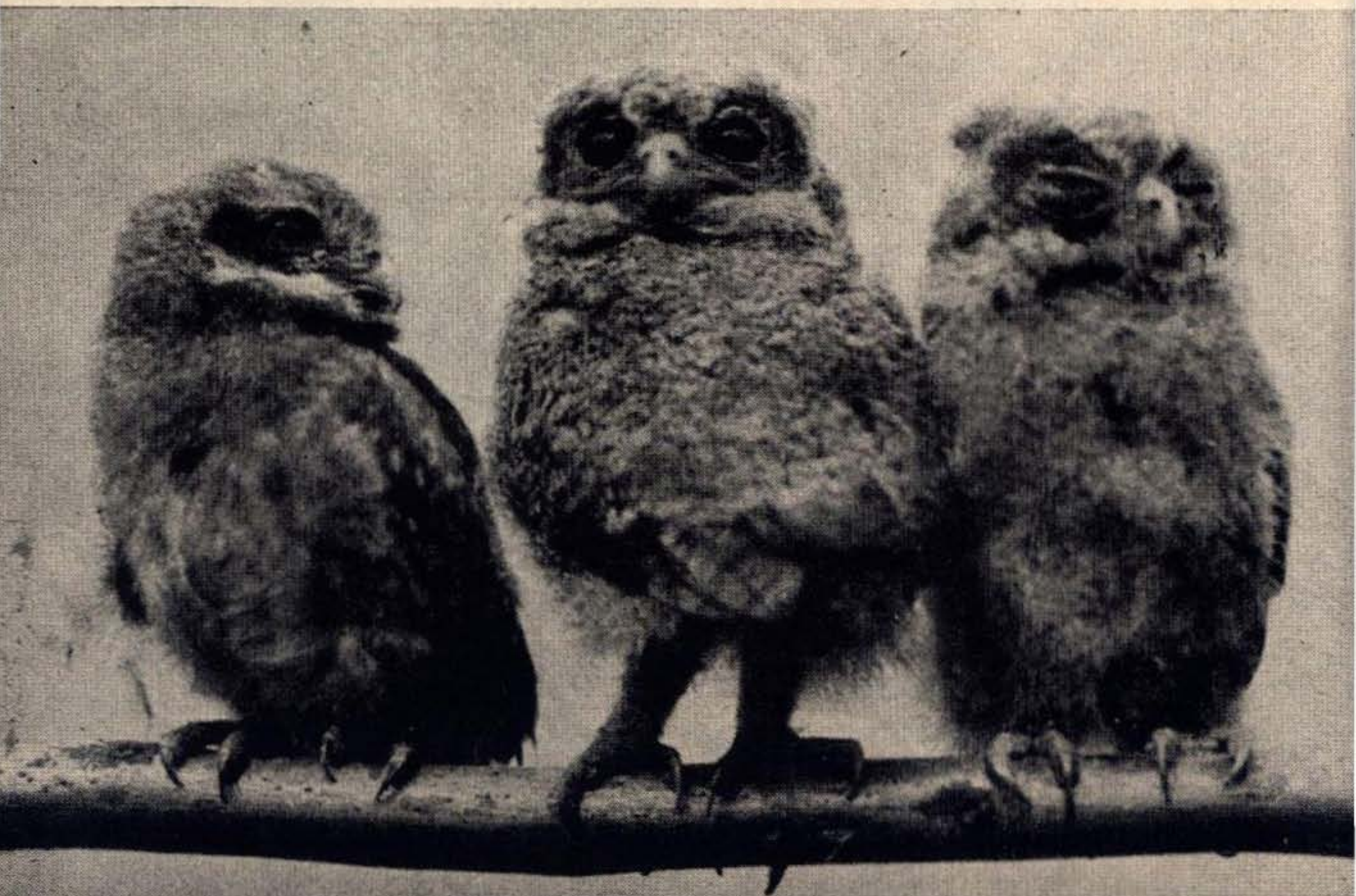
out. In late September we were advised that the matter had been referred to Government for orders! We wrote back suggesting that as the time when it could be pulled out easily had passed, the eradication be taken up immediately as a departmental project before the plant came into fruit. In the last week of October the permission finally came through too late to be of any use. We have asked for extension of the permission to the next year's season of growth.

The rules of the Wildlife (Protection) Act 1972 curiously enough are the stumbling blocks and appear to be serving a function for which they were not designed. There must be a remedy!

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### **The three wise Owls**

*Hear no evil, speak no evil, see no evil.*





## Monkeys of the Ashambu Hills

Ashambu Hills (which include Tirunelveli and South Travancore hills) are a distinct range of the Western Ghats, extending from the Ariankavu pass near Shencotah almost to Kanyakumari. Most of the range lies within Tamil Nadu, but the northwestern segment is in Kerala. The terrain is rugged and rises to an elevation of about 1869 metres (6132 ft). The Kalakkadu reserve forest and its adjacent areas in Ashambu Hills, are one of the very few places where the Liontailed macaque (*Macaca silenus*) still occurs in some numbers.

Kalakkadu contains the typical vegetation of the rain-forest. On the steep rock-strewn slopes the trees of the upper canopy reach heights of 40 m or more. The dominant species is the wild Durian *Cullenia exarillata* ('Vedipila' in Tamil). Apart from these, the other species of trees interspersed with masses of epiphytes, scramblers, climbers, shrubs and herbs give the forest a very complicated multi-layered structure. The seasons of flowering and leaf production in the different species are not synchronised to the same time of the year. So, although the forest community has a basic stability (some foliage and fruits are always present), it is never quite the same in any two points at a time.

Since 1973 the Bombay Natural

History Society has sponsored with the generous assistance of the Bombay Burmah Trading Co., a primate research project in the Ashambu Hills of Tamil Nadu in collaboration with the Rockefeller University, New York. The aim of the project is to understand the relationships between the ecology of rain-forest monkeys and their social organisation. The author and Prof. Steven Green of Rockefeller University have been studying the Nilgiri Langur and the Liontailed Macaque.

How do individual monkeys behave within a social group? How does each species react to the changing environment? And what are the seasonal changes, distribution and abundance of different plant species? The techniques used to examine the first two questions is to habituate groups of monkeys to close observation, so that they can be followed from dawn to dusk for at least five days in a month for at least one year. The animal's behaviour is studied through binoculars and systematically recorded. Thirdly, seasonality, foliage condition, leaf production, fruiting, etc. of important species of plants in sample plots is noted. This and the feeding behaviour of the monkeys, make it necessary to spend many hours in the field which also include regular census walks to assess primate density, and collection of food items for nutritional analysis.





*The Liontailed Macaque*  
Photo: Author

Characteristically, Liontailed Macaques live in social groups of about 15 animals which include several adult females and young ones and a dominant male. They are omnivorous, relying on fruits as well as insects and small animals. In a rain-forest these items are constantly available, but because of the nature of the forest, their distribution can be erratic. Fruits will be available at different places at different times and the density of insects will be affected by the availability of insect's own food (often tender leaves) and by climatic factors (which affect insect breeding).

To exploit this erratic, and relatively thinly-spread food supply, Liontailed Macaque groups spend much of their time on the move foraging through the forest canopy, occasionally descending to the ground. The group may move more than two km of forest in a day, and cover over five sq. km in a year. The group cannot defend such a large 'home range' for its exclusive use, occasionally being subjected to 'aggression' from a neighbouring group. However, if two groups meet, the large males interact with one group usually retreating.



The Nilgiri Langur, by contrast, is a specialised leaf-eater. Its stomach is divided into several compartments (like the ruminant hoofed animals), one of these is a fermentation chamber where numerous micro-organisms occur. These microbes can break down the leaf cellulose and also detoxify some of the harmful alkaloids often present in certain tropical vegetations. Thus the Langur can exploit the abundant foliage of the rain-forest and, although the Langur social group is similar in size and structure to that of the Liontailed Macaque, a single group uses only about one quarter of a square km through a full year, moving only a hundred metres each day. This small area can be effectively defended against other groups, and if one group crosses another's territorial boundary, it is immediately chased back. The characteristic loud whooping call of the adult male Langur, most frequent at dawn, probably serves to warn other males in the vicinity to keep off his territory.

Because of the drastic loss of evergreen forest in the Western Ghats in recent decades, both the Liontailed Macaque and the Nilgiri Langur have suffered a heavy decline in numbers. The former has been especially affected, because a viable population of Liontailed Macaque requires at least 100 sq km of undisturbed forest. A few such tracts of forest remain. A recent survey has revealed that the total



*The Nilgiri Langur — Photo: Author*

remaining population of Liontailed Macaque might be only about 400 individuals. Half this number occurs in the Ashambu Hills. On the other hand Nilgiri Langurs are more abundant, probably because they can occupy a smaller area. The forest area used by one Liontailed Macaque group can support several hundred langurs and the latter also exploit riverine forest and deciduous woodland below the main evergreen





*Nilgiri Langur study area — Photo: Author*

forest blocks. However, it has been heavily hunted, particularly in Kerala for its supposed medicinal properties.

The ecosystem of the Ashambu Hills is of great importance as catchment area for the drought-hit plains of Tirunelveli district of Tamil Nadu. Yet at present, this fine natural area, which falls into two states of Tamil Nadu and Kerala, is administered piecemeal. It is divided into numerous separate forest areas; some under government control, which, though declared as sanctuaries, are not free from exploitation

as some portions within them are leased out on long-term basis for plantation purposes. Apart from these there are several dammed reservoirs and hydro-electric projects in the hills.

The Ashambu Hills complex would form an excellent National Park or Biosphere Reserve for peninsular India and its primary purpose would be to protect the unique rain-forest ecosystem. As a first step towards creating such a reserve, a detailed physical and biological survey of the whole hill range is required. Subsequently a management





*The Kalakkadu Forests, Ashambu Hills*

Photo: Author

plan for better land use and to safeguard the natural reserve has to be drawn up. In the meantime further destruction of the forest should be stopped.

J. F. OATES

[The Society drew the attention of the Government of Tamil Nadu and the Central Government to this excellent forest in 1971. A representation was also made to the IUCN on the uniqueness of the area. Most of the Ashambu Hills area is now included in sanctuaries. It is however necessary as Dr. Oates suggests to treat the whole complex as a single reserve under one management.—EDS.]

*Dr. Steven Green of the Rockefeller University, contended that a viable population of the rare Lion-tailed Macaque cannot be maintained if a narrow strip of forest lying within the Singampatti plantation of BBTC, is disturbed, as it would break the genetic link between the populations occupying the forests on either side of the BBTC plantations. The area considered vital by Dr. Green was unfortunately of considerable commercial interest to the BBTC estates. However, on the recommendation of an expert group from the Society (whose study was sponsored by the WWF) the BBTC generously agreed to accept the financial loss resulting from the non-exploitation of the vital forest area. Thanks of all conservationists are due to the BBTC for this enlightened action.*



## The flowering of *Strobilanthes* or Karvi

The plant, known in Maharashtra as *Karvi*, was in general bloom during July to September, with its peak in August/September 1976. Its beautifully purplish blue flowers, tinged with pink or rosy hue presented a spectacular sight wherever the plant flowered.

*Karvi* grows wild in Madhya Pradesh, parts of Gujarat, thence down the Bombay Ghats, ascending them to a height of c. 5000 ft and covers large areas of the Konkan and North Kanara Ghats reaching its southern limit about the Nilgiris. A denizen of the moist-deciduous forests it forms a dense undergrowth, growing in the opener areas of the hill-slopes or in places covered with a few trees. *Karvi* generally does not allow other plants to come up in the places it occupies.

The life-history of the plant runs thus. Each year with the commencement of the monsoon rains *Karvi* shows signs of coming to life, and by July-August the plants attain their maximum height. With the cessation of the monsoon rains the plants shed their leaves by November/December, and what remains of the plants are dry, dead-looking stems wherever they are left untouched by man. The life cycle is repeated year after year, till one sees a few odd plants coming into bloom here and there in the extensive patches the plants occupy. These intermittent flowering plants

are the forerunners of a general mass-flowering which would be witnessed during July-September the following year, when patch after patch occupied by the plants would burst out into mass-bloom, adding colour to the countryside. A general flowering would also be followed by an intermittent flowering of a few odd plants, in the year following the general mass-bloom.

The interval between two general mass-flowerings of *Karvi* has always been a matter of controversy, and it is generally believed that plants come into mass-bloom once in 8-12 years. The villagers, however, in the Thana area of Bombay maintain that *Karvi* mass-flowers once in



*A single plant of Karvia callosa in flower. Photo: S. R. Nayak*



three years, whereas elsewhere a period of 10 years is indicated. Support was lent to the three-year period by Major K. R. Kirtikar, a retired army surgeon, who extensively worked the Thana area botanically in the early years of the Century. However, observations by subsequent workers do not sustain Major Kirtikar's findings. Literature is replete with chronological details of *Karvi* flowering in the past in the erstwhile Bombay Presidency. But most of these records seemingly do not distinguish between a general mass-flowering and the intermittent bloom that precedes and follows it. In recent years general mass-flowerings of *Karvi* have been recorded for the Bombay area in 1929, 1944 (McCann), 1952 (D. J. Panday), 1960, 1968, and in the current year 1976. Though the interval between mass-flowerings after 1944 indicates a period of about eight years, it is possible that either a general mass-flowering has lost attention of observers between 1929 and 1944, or the plants did not keep to the eight-year period. With an increasing number of naturalists visiting the countryside around Bombay nowadays, it is hoped that accurate records of the general mass-flowerings will be available in the years ahead. The next flowering year should be 1984, the year after the Society's Centenary.



*A gregarious flowering stand of Karvi*  
Photo: S. R. Nayak

*Karvi* plants are believed to die out of existence after flowering and that their place to be taken up by the seedlings from the seeds they have produced during the previous year's flowering. But that they do not conform to this general pattern of plietsials is evident from plants showing evidences of flowering and fruiting one season, and putting on fresh leaves the following monsoon, both on the one and the same branch. 1976 flowering will afford an opportunity of looking critically at this phenomenon.

J. S. SERRAO



## PERSONALIA

### PRIME MINISTER VISITS THE SOCIETY'S OFFICES AT HORNBILL HOUSE

Prime Minister Mrs. Indira Gandhi, the patron of the Society, on a visit to Bombay in December 1974 took time off from a busy schedule to spend about an hour at Hornbill House. The visit was in response to a long standing personal invitation from Dr. Sálim Ali, who, along with the members of Society's Executive Committee, received her at the Society. Mrs. Gandhi showed keen interest in displays, charts, maps, etc., prepared by the Society's staff, describing various activities of the Society. Later she spent some time looking at the Society's research collections.



*Mrs. Gandhi looking at rare books in the Society's collections*  
Photos: S. R. Nayak

*The President showing Mrs. Gandhi the bird collections*





## 1975 PAUL GETTY WILDLIFE CONSERVATION PRIZE FOR DR. SALIM ALI

The 50,000 dollar **Getty Prize**, for exceptional achievement in Nature Conservation, has been awarded to Dr. Sálím Ali. A thirteen member jury consisting of internationally recognised ecologists, scientists and conservationsists un-animously selected Dr. Sálím Ali's name out of 478 nominees from 53 countries. The citation reads:

"Sálím Ali, creator of an environment for conservation in India, your work over fifty years in acquainting Indians with the natural riches of the subcontinent has been instrumental in the promotion of protection, the setting up of parks and reserves, and indeed the awakening of conscience in all circles from government to the simplest village Panchayat. Since the writing of your book, *The Book of Indian Birds* which in its way was the seminal natural history volume for everyone in India, your name has been the single one known throughout the length and breadth of your own country, Pakistan and Bangladesh as the father of conservation and the fount of knowledge on birds. Your message has gone high and low across the land and we are sure that the weaver birds weave your initials in their nests and swifts perform parabolas in the sky in your honour. For your life-long dedication to the preservation of bird life in the subcontinent and your identification with the Bombay Natural History Society as a force for education, the World Wildlife Fund takes delight in pre-

senting you with the second J. Paul Getty Wildlife Conservation Prize."  
(Sd) J. Paul Getty

(Sd)  
Bernhard  
Prince of the Netherlands, President

The 80 year old doyen of Asian ornithologists and dedicated nature conservationist of the Indian subcontinent was also the recipient of India's second highest National award — PADMA VIBHUSHAN this year.

Dr. Sálím Ali was busy preparing for an expedition with Dr. S. D. Ripley to the Melghat Tiger reserve in Maharashtra to explore the possibility of rediscovering the enigmatic Blewitt's Owl when the announcement of the award, and an invitation to attend the presentation dinner in New York on 19-ii-1976 was conveyed to him. As the time was too short and the plans for the Melghat trip already far advanced, he was unable to attend and receive the award in person. Sálím Ali's comments given below, from his acceptance message, read at the New York dinner by India's Ambassador Mr. T. N. Kaul who received the prize on Dr. Sálím Ali's behalf, speak of the man and his work.

"At the outset I must confess to being rather overwhelmed by the generous recognition accorded to what little I have attempted for wildlife conservation in India, and I cannot point to any single flashy or specta-



cular achievement. However, in retrospect I realise that perhaps the chief merit of my work lay in waging some thing like a mild but long-drawn 'war of attrition' on public and governmental apathy and indifference on the principle that constant dropping wears away stones! With the drops already set in motion by many farsighted conservationist members of the Bombay Natural History Society over several decades, my task was made lighter in that, by and larger, I had merely to see that the drops continued to drop. The task was perhaps rendered easier with the publication of my various bird books and articles in the Society's *Journal* and elsewhere and their engendering a measure of public interest and concern—and thus a climate—for conserving our natural heritage. The success, no doubt, owes largely also to the improved living standards of the people since our Independence, and quite definitely so to the solid and unflinching support that all our efforts for the conservation of our wildlife and natural environments received from the highest political levels in the country—from our present Prime Minister Mrs. Gandhi and her father Jawaharlal Nehru before her. But for their personal concern and support—for instance as when the fate of the Keoladeo Ghana Waterbird Sanctuary in Bharatpur hung precariously in the balance—all our efforts would have come to naught.

Lack of funds, even for low budget exploration and status-surveys of enigmatic and endangered species of wildlife and their habitats, has been the chronic affliction of the Bombay Natural History Society. The present 'windfall' hopefully will help in alleviating the distress! My grateful thanks to the Donor and to the World Wildlife Fund and everyone concerned with the decision."



*Dr. Salim Ali in Ladakh in 1976*  
Photo: V. S. Vijayan

On the initiative of U.S. Senator Charles McC. Mathias Jr. of Maryland, who had nominated Dr. Salim Ali for the Getty Prize—unknown to him—the proceedings of the Award dinner and function, and Dr. Salim Ali's acceptance speech have had the unique distinction of being entered in the U.S. Congressional Record.



## The original home of the Coconut

The origin of most cultivated plants is enshrouded in mystery and few among them have received as much attention as the Coconut. That the Coconut has been known in India from the earliest of times is an unquestionable fact. Mention is made of it in several of the Puranas which are the oldest books after the Vedas. The Maha Bhagavata, Vishnu, Matsya, Markandeya and Brahmanda Puranas have references to the Coconut. There is also mention of it in the Ramayana and the Maha Bharata and also in ancient Tamil literature like Poru-narattupadai. The above references prove the great antiquity of the Coconut in India but do not show that it is native to the country. Although now an inevitable article used in worship throughout peninsular India it is significant that the coconut is not included among the fourteen articles sanctioned by the Shastras in the performances of holy sacrifices. Nor is it used by a considerable section of the orthodox Hindus in sradha ceremonies—those performed to propitiate the *manes* of the departed—in which non-indigenous vegetables are taboo. Again, though an indispensable item in sacrifices offered to Ganapati, it is not in the list of articles favourite with that deity as prescribed in the Dharma Shastras. In all auspicious ceremonies of the Hindus, worship is offered to Varuna, the deity presiding over the water and the oceans. This deity is represented by a pot of water with a coconut plac-

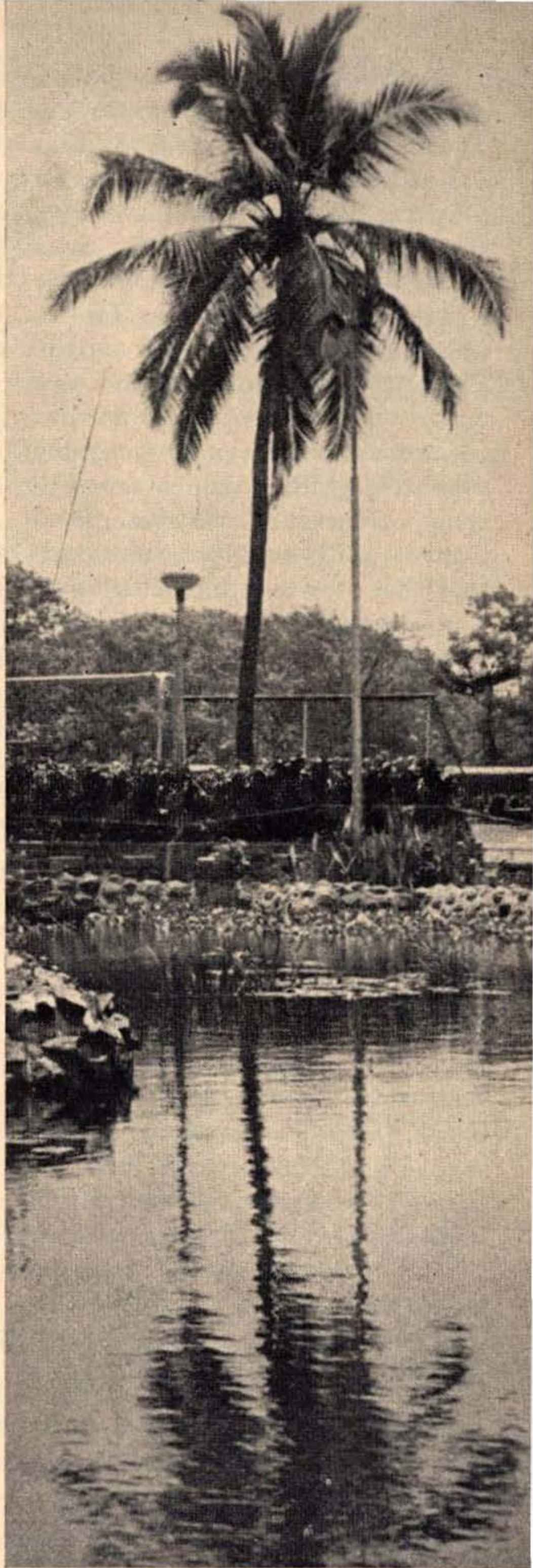


Photo: S. R. Nayak



ed on its mouth. A text is repeated in praise of the Coconut which says that it is a favourite with God Shiva and a destroyer of inauspiciousness. This text has come from a very remote period but is not Vedic. Such of the observances as are not in the Vedas are traceable to the Tantras which are of a much later origin. The offering of an unbroken coconut to the sea by orthodox Hindus on auspicious occasions is probably suggestive of the idea that the Coconut came from the seas. And there is a Ceylonese legend which says that it was brought to India from Nagaloka, the blissful region beneath the seas, by an illustrious king for special worship and was thence introduced into Ceylon by a king of that island for a similar purpose.

The Sanscrit name for the coconut is *Nalikera* or *Narikela* the *r* and the *l* being interchangeable according to the rules of Sanscrit grammar. Paucity of names in a language replete with synonymy is indicative of foreign nativity. In Pali also, it is known as *Nalikera*. North Indian languages as well as Arabic and Persian have their names for the coconut derived from Sanscrit. The philological relation of the Malayan names *Kerambil* and *Kelambir* with the Sanscrit is worth investigating. My view is that they have come from the Sanscrit as a result of Hindu influence. In the early centuries of the Christian era the Hindus had conquered and colonized a great part of Malaya

and the Malayan Archipelago, and it is natural to assume that the names used by the conquering race were adopted by the sons of the soil with some local variations and that these names have persisted through centuries side by side with the native names. In Sanscrit literature, we come across the word *Kera* in place of *Nalikera* as in *Kera bala phala* which means the fruit of a young coconut tree. The transition from *Kera* to *Kerambil* is recognised. Further, it may be observed that these names, again with their variants, are used in Sumatra, Java and the smaller adjacent islands. *Kelapa*, *Kelapo* and *Kalapa* are names for the coconut in Java; in the Malay Peninsula it is *Klapa*. I am of the opinion that these names also are after the Sanscrit form *Kela* or *Kela phala*, the fruit. It is significant to note that this series and the one just previously discussed are in use only in the lands once under Hindu colonization.

The original home of the Coconut should be a region where the nuts would freely germinate without watering, where its cultivation would demand the least care, where the plant could provide for itself, and where it would grow very prolifically as is the case in Malaya, the Eastern Archipelago, or the islands of the West and Central Pacific Ocean in the equatorial belt where coconuts grow as densely as bristles in a brush. These are regions of heavy and constant rainfall with a



warm moist climate. That it is a sea-side plant is evidenced by its high tolerance for saline moisture, by its nuts being adapted to efficient dispersal by sea and by the rare attribute of vivipary. The original form of the Coconut must have been one with viviparous adaptations and the inland form of today should be a retrograde from the original. Coastal swamps which are the home of the mangroves provide a habitat in which the Coconut cannot grow. A sea-washed well-drained coast with constant fresh moving water in the soil is genial to the palm. A region of light wind is more conducive to its growth than a region of violent winds. The area of equatorial calms characterized by light and varied winds, heavy and constant rainfall, extreme humidity, equable climate, and warmth without heat, provides ideal conditions for the nurture and growth of the Coconut. This then is the region where its place of origin should lie.

All Botanists are agreed that the home of the coconut is somewhere between Zanzibar and New Caledonia. No one ever thinks that Africa was its home. And all know that Indonesia, the islands, of the Western Pacific and Malaya are the great centres of coconut cultivation.

The claim of Malaysia needs serious consideration. This great equatorial group of islands, which extends from Northern Sumatra to Eastern New Guinea, a distance of about 4,000 miles, is divided into two continental areas and an inter-

mediate insular group the several islands of which are surrounded by deep straits and seas. The continental areas are the Asiatic bank—which includes the Malay Peninsula, Sumatra, Java, Bali, Borneo and the Palawan-Calamian group of the Philippines and the Australian bank which includes the ancient continent of Papua. These areas are the two great centres of origin and dispersal of plant and animal life. The intermediate and unstable area between the continental banks consisting of the Lesser Sunda Islands, the Moluccas, Gilolo, Celebes and all the Philippines except the Palawan-Calamian group, has been subject to great upheavals and depression from the earliest times. Its flora and fauna are made up partly of infiltrations from the two continental areas and partly of relic species and their descendants. Judging from its geologic history the Coconut could not have evolved in this intermediate area. The flora and fauna of the Asiatic bank is Asiatic or Malay-Asiatic in character. The Coconut having no affinities with the Asiatic genera of palms could not have evolved in the Asiatic bank.

The ancient Papuan land includes the island continent of New Guinea as we know it today and parts of it that have since been submerged. Biological evidence goes to prove that there were older lands connected with New Guinea that are now entirely submerged. It is submitted that the home of the Coconut should lie here. The nature of the



sea shelf on the north-west of New Guinea in the region now occupied by the Geelvink Bay, of the area just to the north of it, and the level of the adjoining shore tell us that in past ages, this huge land mass extended farther in this direction than the present day map indicates. Geographers are of the opinion that the climate of the whole of Malaysia, at any rate, of the regions of low altitude, has been constant through ages. As shown by the modern map the northern fringe of the submerged platform referred to lies in the equatorial belt and before it was deluged by the ocean possibly was the cradle of the Coconut. Our present knowledge of the New Guinean flora is scanty. A greater part of its mountainous interior which rises to a height of 16,000 ft. has not been trodden by civilized man. Exploration of its flora has just begun and until we know what it contains we cannot draw conclusions. But from what we know of its floristics we understand that its affinities are with the Australian-New Zealand-New Caledonian cycle. And we know that fossil *Cocos* has been discovered in New Zealand. When palaeobotanical explorations are taken up in New Guinea we may expect to find fossil species of *Cocos* with closer affinities to the Coconut than its living or extinct congeners in Tropical America or New Zealand. The claim of New Caledonia, if any, is set aside on climatic grounds as it lies far too remotely from the equator, near to the tropic of Capricorn. It would appear that the Coconut having evolved on

the submerged land to the north-west of New Guinea moved eastwards and westwards as drift nuts over calm tropical waters, and spread from islet to islet. This mode of accidental transportation, however, could not have successfully carried the species through long stretches of seas. The seed nuts lose their viability after some days due to salt water infiltration. This handicap has been largely overcome by the agency of man—the amphibious Polynesians and the wandering Malays. The migratoriness of the Polynesian seafarers must have been the main cause of the wide distribution of the palm over the islands of the Pacific Ocean. Either as a result of subsidence of their island homes for which evidence is not lacking, or pressure of population in their inelastic confines which tends to drive oceanic islanders to seek new lands, or as vanquished parties in the frequent wars which were a main feature of Polynesian life, these islanders had attempted distant colonization and had overrun parts of Melanesia in early ages. They developed singular navigational skill and nature's bounty in their quest for a new home in the unknown eastern waters, had given them timber and fibre to build huge crafts. A party of these adventurous mariners, remarkable for their powers of endurance and having their native methods of assuaging hunger and thirst in long voyages were probably the pioneers that first planted the Coconut in the New World. The consensus of opinion among eminent authorities on the



problem of the Pacific basin today is that contact between the Old World and the New across the Pacific Ocean did not begin till about the close of the fifteenth century though there is probability of some accidental contact earlier than that period. Competent ethnologists concede the possibility of Polynesian mariners having reached the shores of America within comparatively recent times—recent in an anthropological sense which is still pre-Columbian. The Malays were active sea-farers who had spread to the Eastern Archipelago in the distant past and traces of their emigration are seen throughout Polynesia. They, as well as the once maritime Tamils, together with the ancient mariners of the Bengal coast, have been responsible probably for a much wider distribution of the Coconut into the lands of the Indian Ocean and in this spread ocean currents and the monsoon drifts have undoubtedly played their part. The natural dispersal of the Coconut from the lands of the West Pacific to the islands of the Indian Ocean was rendered easy as there is a strong flow of water from the former to the latter ocean during the North-East monsoon. Of course man has carried the plant all over. But everything seems to point out to some island of the West Pacific as its original home and this as far as we can see is possibly the land now under the waves but which once formed part of the ancient Papua.

So old is the Coconut in India that the Arabs from early times upto now called it the Indian Nut. John of Monte Corvino and Marco Polo, both of the thirteenth century, both named it so. Cosmas in the sixth century described it under its Sanscrit name. To the orthodox Hindu it is *Kalpaka vriksha* or Tree of Heaven and hardly will he agree when told that it is an alien species come to this land ages ago. The explanation of its vast antiquity is as simple as it is natural. It started from the shores of the ancient Papuan land. The strong eastward current during the Northeast monsoon carried it through the Straits of Malacca into the Bay of Bengal and primitive man brought it over to the shores of India in pre-historic ages.

P. V. MAYURANATHAN

*This is a condensation of an article originally published in the Society's Journal in 1938. The original home of the coconut is still a matter of conjecture and is likely to remain so as the distribution of the coconut was largely influenced by man. Mr. Mayurnathan's conclusions are however considered to be the best on a very difficult problem.—EDS.*



## Narcondam—Island of the Hornbills

Northeast of the main Andaman group of islands in the Bay of Bengal, about 180 km west of the Burmese mainland, a small island rises abruptly from the sea. The fiercely entwined forest, treacherous, rocky, coral strewn shoreline and a massive central peak perpetually shrouded in a veil of cloud, lend a mysterious air to this tiny island. This is Narcondam, the home of the Hornbills. In 1873, Allan Octavian Hume, premier ornithologist of his time and one of the founders of the Indian National Congress, discovered these birds in Narcondam and named them *Rhyticeros narcondami*. Narcondam means 'Hell-pit' (Naraka=hell, Kundam=pit). It is presumed that there once might have been an active volcano there. The island has remained obscure and uninhabited except for a brief stir when Burma staked a claim to it.

In 1972 the Society sponsored an expedition to study the flora and fauna of Narcondam. The three-member team consisting of Pat Louis, a photographer member of the Society, N. J. George of the Prince of Wales Museum and myself spent about a month (March-April) studying and photographing, especially the Hornbills.

We reached Narcondam early on the morning of the 16th March. The first impression was of a sheer wall of forest-covered hill with jagged cliffs plunging down to the sea. We

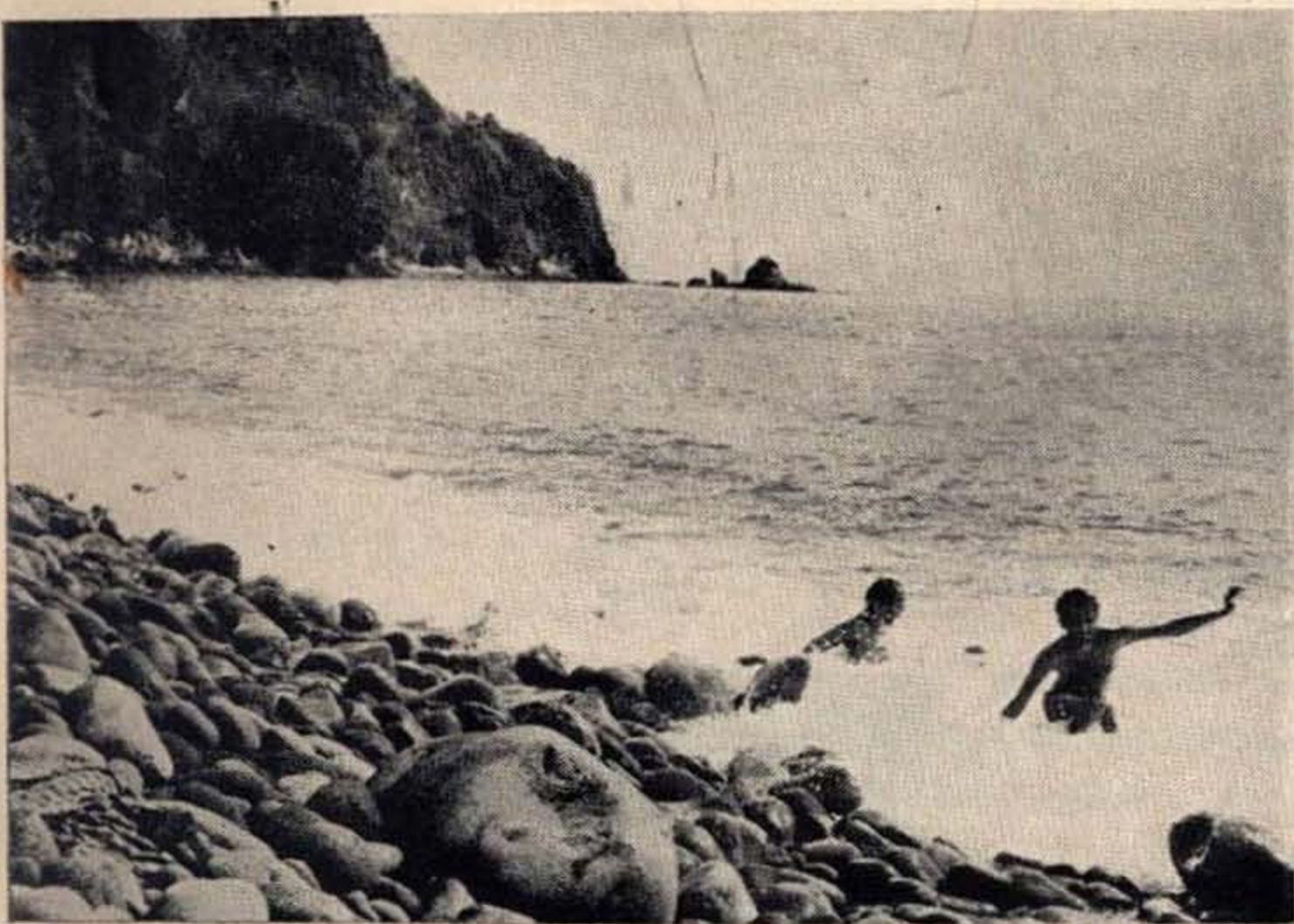
soon circled the island to the landing bay—a rocky loop where the sea is comparatively calm. Landing was a tricky affair. A small dinghy propelled by an outboard motor conveyed the passengers and luggage from the launch anchored about 200 m from the shore. The dinghy offloaded a couple of metres from the shore, and one jumped into the waist-deep foaming water and clambered ashore over the slippery rocks, thoroughly drenched and tossed about by the waves.

Within a short time of our arrival, we became well acquainted with the 'natives'. First to greet us were the large rats (*Rattus rattus*). These denizens of the underworld were quite adept at raiding our tents and pinching whatever appealed to their fancy! Every night, giant fruit bats (*Pteropus hypomelanus*) converged on a huge fruit tree (*Sideroxylon longipetiolatum*) near our tents. Their feeding orgies lasted throughout the night accompanied by nightmarish screams as they squabbled among themselves. The rather shy land crabs (*Cardisoma hirticeps*) peered at us from the rock crevices, their periscope-like eyes popping and the formidable pincers held up like a boxer's guard. A few bold ones managed to get inside our tents making us rather nervous about our bare toes. Friendliest were the skinks (*Mabuya tytleri* and *Lygosoma maculatum*). They were curious



*The landing  
bay at  
Narcondam*

*Photo: Pat Louis*



*Being tossed  
ashore by the  
waves at  
Narcondam*

*Photo: Pat Louis*

about everything, often following our movements, their forked tongues flickering inquisitively. The beautiful green geckos (*Phelsuma andamanense*) kept a wary distance among the banana trees planted earlier by some thoughtful visitor. The massive *Barringtonia* trees were the domain of the impressive large Tucktoo Geckos (*Gecko verreauxi*) about a foot in length which blend-

ed perfectly with the gnarled tree trunks. The shyest of them all were the Dwarf Geckos (*Cnemaspis kandiana*), skulking behind the rocks near the island's sole freshwater spring situated at about 800 ft from the sea line? This watercourse was also the territory of the largest reptile inhabitant of the island—a five-foot long giant water monitor (*Varanus salvator*). After a rainy



spell, we came across many of its brightly coloured offspring, basking on the seashore rocks.

The advent of rain brought in a great change in the life style of the island. The chain reaction was set in with the emergence of thousands of flying insects, mostly the winged termites. Swallows (*Hirundo rustica*) and Swiftlets (*Collocalia* sp.) braved the downpour to swoop down on them. The whole island assumed a fresh look. For the first time we sighted the graceful tree snakes (*Chrysopelea paradisi*) sliding through the branches. These are arboreal and are reputed to glide from tree to tree. Actually, as we observed, they sprang from branch to branch and the action was so quick and their green colour blends so well with the greenery that they appear to be floating across. On the sea shore we once saw a groggy sea snake (*Laticauda colubrina*) that had swallowed a Moray eel tail first, but unfortunately for the snake, one size too big. We collected both the dead and the dying.

Life continued on an even keel among the dark eerie recesses of the silent ravines of the higher forest, where several species of spiders patiently waited among their webs illuminated by slanting sun-rays. Dainty butterflies patrolled the watercourse, flitting among flowers. Two species of Beetles (*Chrysochroa ignita* and *Mimilia princeps*) were frequent visitors to the watercourse.



*The Camp at Narcondom*  
Photo: Pat Louis

*The sea snake and the eel it had swallowed.*  
Photo: Pat Louis







*The Narcondam Hornbill* Photo: Pat Louis

Ungainly, yet comical, the hornbills were the veritable clowns of the Island. They would hop along the branches, tossing their heads in characteristic jerks, occasionally peering at us with their heads cocked to one side. Sometimes a bored individual would regurgitate a berry, casually toss it about before gulping it down. Their flight is laborious, sounding like a distant locomotive straining up a gradient. Once we saw several hornbills mobbing a Whitebellied Sea-eagle (*Haliaeetus leucogaster*) which to its misfortune landed on their feeding tree. The hapless creature was hounded from tree to tree to the accompaniment of the deafening indignant cacophony of the enraged hornbills.

On the northeast corner of the Island, Pied Imperial pigeons (*Ducula bicolor*) nested on a giant offshore rock, approachable only during low tide after wading through waist-deep sea. The nests, built on low branches of the trees growing

in the cracks, are sketchy piles of sticks, and contained single chicks in various stages of growth. The adult birds had a game of their own. Occasionally three or four of them would soar high and dive in unison in a graceful curve reaching the trees on the main island and start it all over again in the reverse direction.

Osmaston, a British ornithologist, who had visited the Island earlier, wrote of the 'thousands' of swiftlets circling around the summit of the hill, and stated that they probably nested in caves along the south coast. Since this part of the island was unapproachable, we decided to explore the summit. Packing some food and water, we started up one morning. As we went higher, the climb became quite difficult and at some places we had to scale massive boulders of 20 to 30 ft. Sometimes one false step or a little jerk would cause a minor avalanche, while we clung to roots and branches. Soon it was dark and we decided to halt;





*The forests of Narcondam. Photo: Pat Louis*

and spent one of the most terrifying nights of our lives on a narrow ledge on a steep cliff. We huddled together, listening to the eerie night noises. A distant nightjar kept up an incessant *chaunk chaunk ... chaunk ...*. The continuous rustling sound which we dismissed as normal jungle noise, turned out to be a horde of formidable land crabs that scuttled among rock crevices around us, and to add to our uneasiness, we discovered by the torch light that the rustling noise was made by clicking of their powerful pincers. We kept on flashing the torch light to prevent them getting closer, but were not very successful as we discovered the next morning that one of Pat Louis's valuable cameras had been dragged into one of the cracks and its leather cover and strap cut to pieces!

The next day we reached the se-

cond highest peak, totally exhausted, our food and water long since consumed. The main summit where we could see thousands of swiftlets circling in the sky was beyond us. There was no other bird life. Neither did we see any skinks or rats. After resting for a while, we started back on a journey which was more hazardous than the ascent. Years of isolation have made the fauna and flora of this Island unique. Some forms like the hornbills are endemic. Their occurrence there is a mystery. How did they get there and from where? Why did they not reach the other islands in the group? Their position in the evolution of the Andaman group is intriguing. One day we hope to find an answer to these questions. In the meantime we endeavour to see that their home is safe.

S. A. HUSSAIN



# CONSERVATION ACTION

## Outlook for Crocodiles

The third working meeting of the IUCN/Survival Service Commission's Crocodile Specialist Group, was held at Maningrida, Northern Territories, Australia, in April this year under the chairmanship of Dr. Wayne King of the New York Zoological Society. The group reviewed the world-wide situation of the status of crocodilian species, and considered the conservation action for the next two years.

It was noted that the current situation of crocodiles in India parallels the situation in the US about two decades ago when the Alligator was seriously endangered. It was felt that there is an urgent need to build up the wild populations of all three species of Indian crocodiles (the Mugger or Marsh crocodile, the Estuarine crocodile and the Gharial) through restocking stations similar to those operating as a FAO project in Orissa and also at the Snake Park at Madras, Tamil Nadu, so that in due course the population of any one species reaches a level at which it can be removed from the endangered list.

It is hoped to hold the next meeting of the group, scheduled for February 1978, in India.

## Impetus to Wildlife Studies

Under a directive from the Prime Minister, the Northeastern Hill

University, Meghalaya, on behalf of the University Grants Commission, conducted a workshop on wildlife studies recently.

The main objectives of the workshop stressed the desirability of formulating university studies to give an impetus to wildlife science, with special emphasis on field observations. A data bank at the BNHS for collection and collation of all information relating to wildlife studies in India, was recommended by the group. Curriculae were discussed and problems for research were identified. It is felt that the climate is most appropriate for establishing a wildlife research centre at the BNHS as a development of the Society's University Department.

## Wildlife Research in India

The Society has taken the lead in research on wildlife problems either on its own or in collaboration with other institutions such as the Gir Project in Gujarat and Primate Studies in Tamil Nadu. The Society's University Department was the first of its nature in India and the Bombay University has the unique distinction of instituting wildlife studies in India.

Students under the guidance of Dr. Sálim Ali and J. C. Daniel submitted thesis or are working on problems listed below:



## DOCTORAL

Biology of the Baya and comparative feeding habits of certain species of Indian birds associated with Indian Agriculture.

Ecology and behaviour of Vultures in Gir forest.

Ecological isolation in two sympatric bulbuls at Point Calimere, Tamil Nadu.

Ecology and behaviour of the Black-and-Orange Flycatcher.

Synecological studies on nectar feeding birds and flowering plants in South India.

## MASTER'S

Some Indian Weaver Birds—A contribution to their breeding biology.

A preliminary study of the reciprocal association between flower birds and bird flowers as observed in and around Bombay.

A study on ecology of hole-nesting birds.

Feeding ecology of Bonnet Macaque.

Ecology of the fivestriped squirrel with special reference to population structure and activity cycle.

We shall have the students briefly report on their subjects of research in future issues of the *Hornbill*.

### Conservation in Ladakh

The recent BNHS/WWF expedition, led by Dr. Salim Ali, has recommended several conservation measures in Ladakh. The team noted that the various mineral and geothermal projects operating in areas close to the breeding grounds of



*Blacknecked Crane in Ladakh*

S. A. HUSSAIN

Barheaded Goose (*Anser indicus*) and other birds, at present, are of no serious threat to the habitat. The position of the Blacknecked Crane (*Grus nigricollis*), however, was unsatisfactory. The team urged immediate protection to the two pairs presumed to be breeding on marshes close to two villages. On their return they met the Prime Minister to apprise her of the conservation needs in Ladakh.

### The Road past Borivli

The City of Bombay is perhaps unique among cities of its magnitude, in having a National Park at the edge of its municipal limits, where leopards still roam. There was therefore grave concern when a link road between two express highways east and west of the Park was aligned through a section of the Park which when completed would have destroyed some of its best areas.





*The road through Borivli National Park which was realigned. (Note the clearing on the right of the picture. This is being replanted.)*

*Photo: S. R. Nayak*

However Conservation interests have so matured in the Bombay area that the Society with the active support of its members and other organisations like the World Wildlife Fund, was able to persuade the Government of Maharashtra to realign the link highway outside the Park limits. The Chief Minister and his Cabinet colleagues deserve particular praise as construction work had already commenced and large amounts had been spent when the decision to realign the road was taken by the Government.

#### **The Rhododendrons of Singalila**

The forests of crimson flowered rhododendrons are one of the most impressive features of trekking in the Bengal Himalayas in summer. According to Prof. G. De, of the

Indian Institute of Technology, Bombay, a life member of the Society, they are in great danger. Prof. De, writes after a recent visit:

'We are appalled by the wanton felling of rhododendron trees around Sandakphu. Already roadside rhododendron forests upto about 1 km on the Sandakphu-Phalut road have been denuded and unless these activities are immediately arrested, Sandakphu will soon become as barren as Tonglu and Phalut. During our discussion with the local forest officials and forest officers at Darjeeling, we found that the Forest Department is fully aware of the danger and holds the personnel of the Police Beat as responsible for this destruction. However, our impression is that not only cooking and heating necessities of all the Government staff, stationed at Sandakphu, are met in this way but also similar requirements of tourists



are accelerating the process. In the present condition, tourism in that region appears to be a scourge and within a few years tourists will not be able to see rhododendron forests within easy reach and will miss a walk through groves of rhododendron which many lengths of Sandakphu-Phalut road still offer.

Indisputably, the main charm of Sandakphu is its rhododendron forest, which shelters a wealth of flora and fauna, peculiarly its own. I am an ornithologist and have moved through various parts of Himalayas from Kashmir to Assam. I regret that I was so long unaware of the many species of birds, which one can see within such an easy reach and in abundance in this area.'

Prof. De also draws attention to the replacement of oak forests with conifers by the commercially oriented State Forest Corporation, which is bound to have disastrous effects on the ecology of the area. Prof. De suggests a multidisciplinary approach to the problem. We would alert our members particularly those in Bengal to the danger and would suggest that a co-operative effort be made to save the Singalila forests. Prof. De at the Indian Institute of Technology, Powai, Bombay 400076 may be contacted directly or through the Society for more information.

## **The Giant Wood Spider, *Nephila maculata* Fabricius**

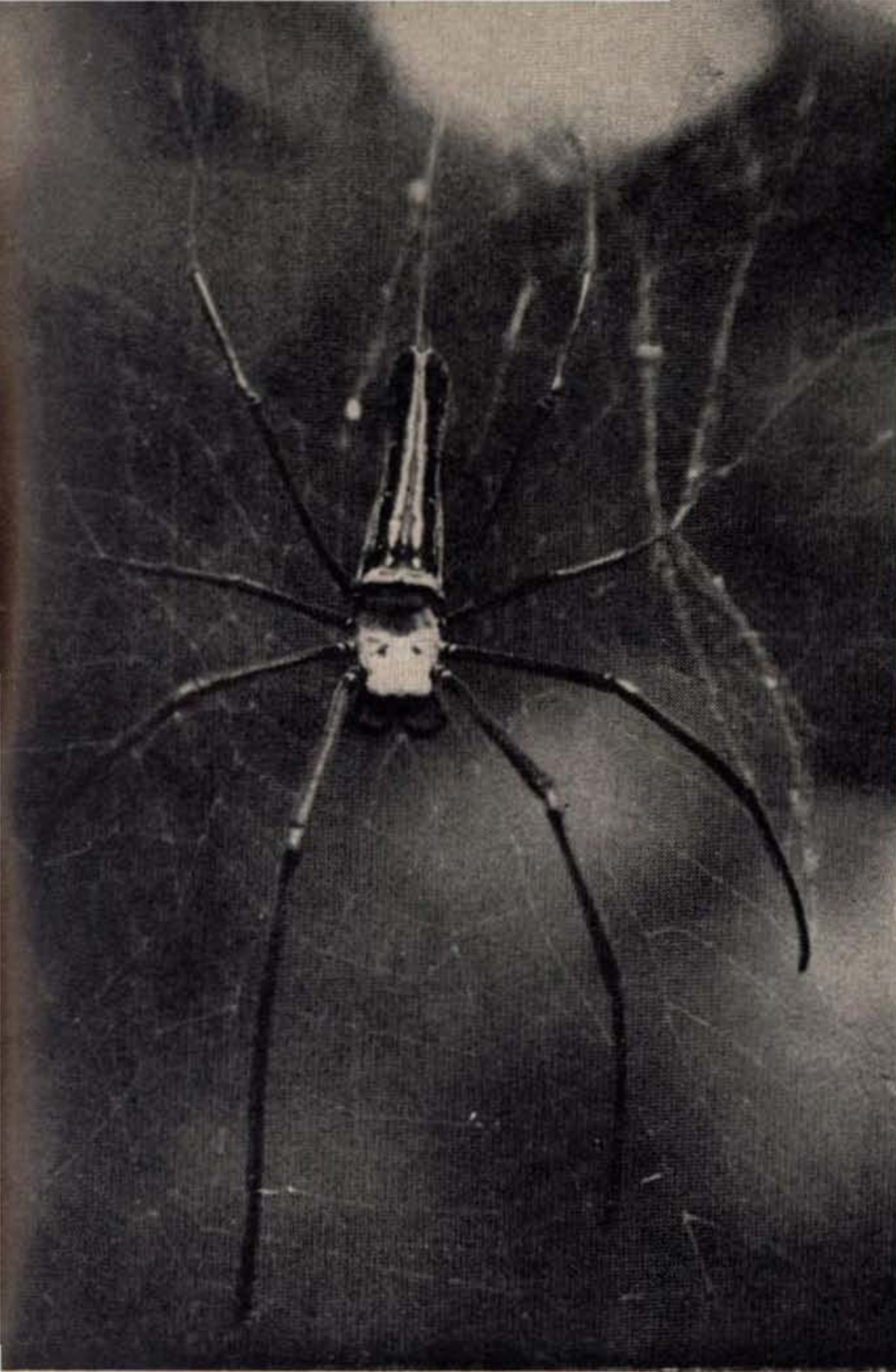
Among the many small forms of invertebrate life that emerge during the monsoon months in the Borivli National Park none is more conspicuous than the Giant Wood Spider. Fairly large numbers of these big spiders and their webs appear during August every year and can be seen till December.

The female spider is larger than the male, about 40 to 50 millimetres in body length and a centimetre at its broadest. Its general ground colour is a dark brown speckled in places with white, yellow and red. Throughout most of the day and night the female occupies the hub of its large orb web head pointing downwards waiting for flying insects to be trapped in its mesh and for interested males to court her. The

male, on the other hand, is much smaller than her and would be all but inconspicuous but for his red colour. His length usually does not exceed a centimetre and the body appears translucent. He occupies the top corner of the female's web and approaches her only during courtship and mating. Frequently two or more males may be seen on a web.

The web, which is constructed only by the female, is a large structure about a metre or so in average diameter, and is oriented in a slightly off-the-vertical plane. The usual location of a web is in the spaces between vegetation anywhere from a few feet above the ground to as much as 30 feet high between the trees, sometimes even between tele-





*The Giant Wood Spider, female on web. (Natural size)*  
Photo: S. R. Amladi

graph wires. The web is typical of the orb-web spiders and consists of silk lines radiating from a centre (hub) connected to adjacent lines by a single silk thread in the form of a concentric spiral.

Besides the chief architect of the web and its mate the web also harbours smaller spiders of another species (*Argyrodus nephilae*) which do not spin their webs, and also

feed on the insects trapped here. These free-loaders, called kleptoparasites, are only a few millimetres long and their rotund abdomens shine with the lustre of polished silver beads or mercury droplets. As many as half-a-dozen of these small spiders may be seen on a single web usually at its lower periphery.

During the day the female, which



remains mostly at the hub of the web, orients herself to the sun's position in the sky. The rear end of the abdomen is kept constantly pointed towards the sun. It is thought that this strategy of presenting an end-on, rather than a broadside-on, position to the sun reduces the sunlight received by the body and thus prevents excessive heating.

The courtship and mating of Giant Wood Spiders is an interesting phenomenon. The male slowly descends the web and quietly approaches the female from the rear. He plucks the strands of the web to announce his presence and this movement apparently reassures the female that it is not caused by prey. The male advances until he is able to touch the female with his front pair of legs and then he starts to lightly tap a leg of the female who responds by withdrawing the leg. This happens a number of times and finally the male climbs on to the back of the female, a relatively safe position, for should the male inadvertently approach from the front or go towards the lower surface of the female's body the latter would at once seize him, bite and paralyse and wrap him up like any other prey. Once safely planted on the female's back the male spins strands of silk and binds the bases

of her legs together with them. This seems to be a necessary part of the ritual before the male can approach the lower surface of the female to copulate because this web prevents the female from bending and biting the male. A number of times the male does make desultory efforts to go round to the ventral side of the female only to be brushed off by the latter's leg. Finally the male comes round the body of the female to her ventral side and copulates with her. Copulation in spiders is a specialised process in that the genital areas of the two sexes do not come in contact with one another. The male discharges his sperm into specialised structures situated at the end of each pedipalp (a jointed appendage situated near the mouth parts) and these are inserted into the genital pore of the female to inseminate her.

Eggs are laid in a mass surrounded by thick membrane made of interwoven silk strands (the egg-sac) and each egg sac is deposited in a well-concealed place like the underside of leaves, crevices in the trunks of trees, etc. During the next monsoon when the conditions are suitable the young spiderlings hatch out and disperse to start a new life cycle all over again.

S. R. AMLADI



## HOBBIES

### Indian Aquarium Fishes

#### DANIOS

Danios are streamlined, fast moving, fishes belonging to the family Cyprinidae. The smaller forms belong to the genus *Brachydanio* while the bigger forms are placed in the genus *Danio*. In nature, they generally live in flowing streams.

#### *Aquarium Notes*

Danios are peaceful aquarium inhabitants living in the upper one-third area of the aquarium. They will take any kind of food, prepared, as well as live. They look best in shoals. The aquarium should be well covered as they are great jumpers. They do best in moderately soft, neutral water.

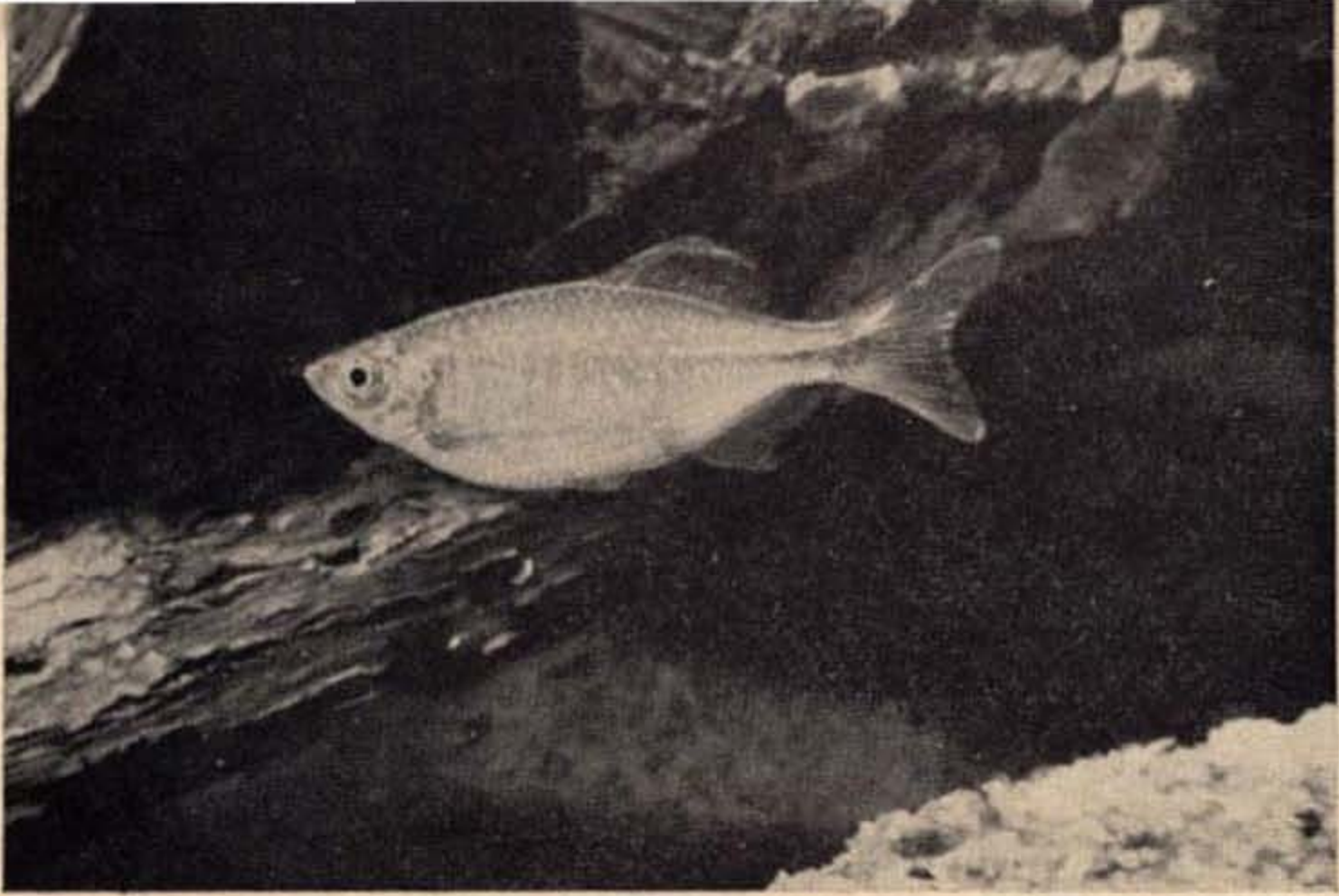
They are not too difficult to sex when seen together, the males being thinner and brighter than the females. The large species could be bred in 24-inch long tanks while the smaller *Brachydanio* could be spawned in smaller tanks. They spawn easily in neutral water at temperatures from 75 to 80°F. The spawning tank should be prepared by planting heavily with fine leafed plants or nylon mops. If the bottom of the tank is covered with pebbles or marbles the number of eggs saved is greater. One can use a breeding trap also but the fish do

not spawn so readily. They spawn more readily in groups, like 3 males and 2 females or in such proportion of sexes. The eggs hatch in 40 to 48 hours depending upon the temperature. The eggs are non-adhesive and generally the parents are avid egg eaters. On hatching the fry hang on to some support for 3 to 4 days. As soon as the young are free swimming they should be fed on infusoria or egg infusion. This should be continued for 4 to 8 days after which they should be fed on newly hatched brine shrimp, micro-worms or sifted daphnia. They grow very rapidly.

#### GIANT DANIO—*Danio davario*

*Description & Colour.* This is the broadest of all danios. It is mostly collected in northern India and was introduced to aquarists years ago, like *D. malabaricus* and *B. rerio*. It is supposed to grow to 4 inches in nature but rarely grows bigger than 3 inches in aquarium. A very attractive fish, the fins are deep yellowish orange at the base. The general body colour is a deep steel blue gradually turning silver on the dorsal and the ventral sides. There are broken vertical yellowish bars and spots in the front half of the body. The steel blue colour is deepest near the tail and





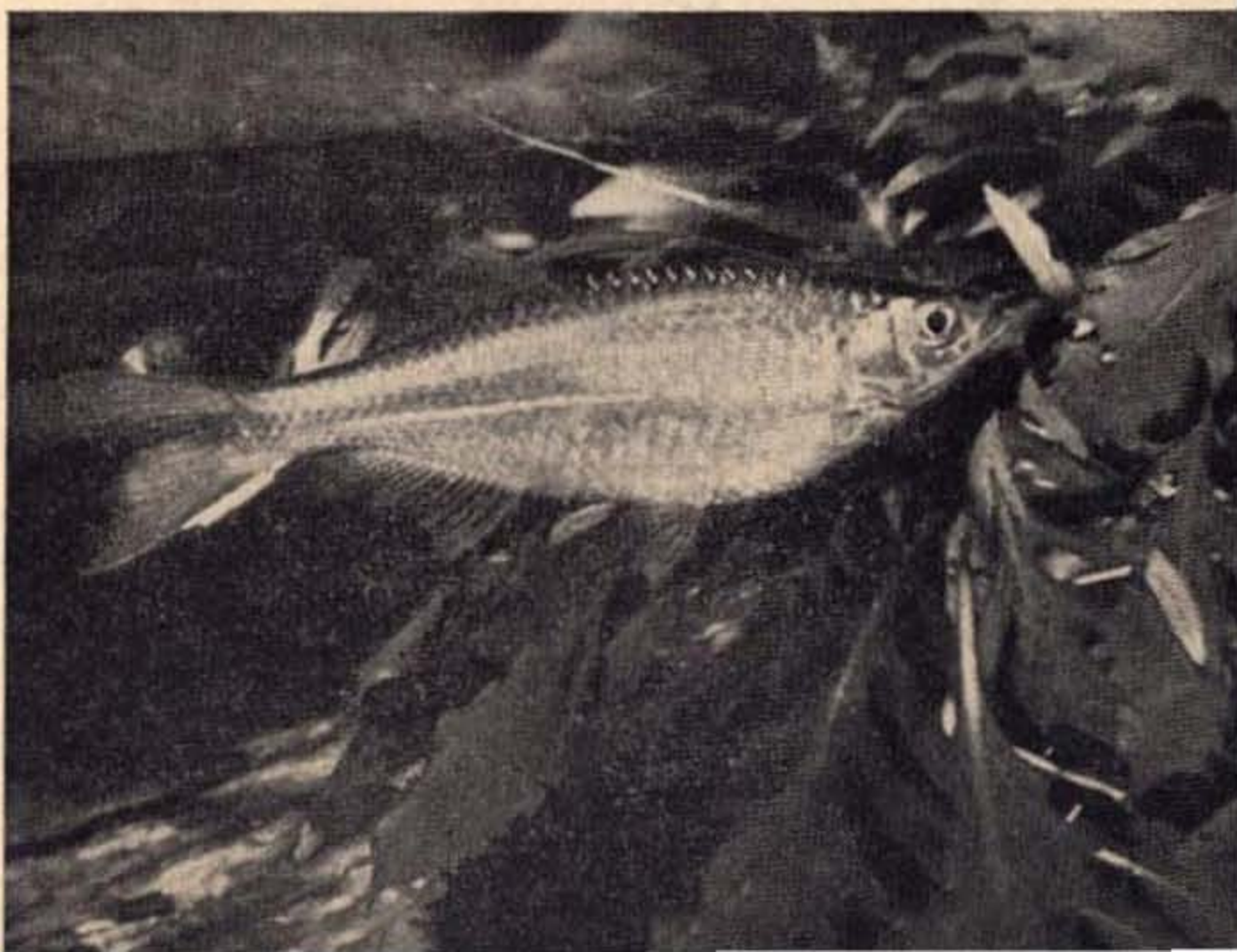
*Giant Danio Photo: S. R. Sane*

extends into it. This is bordered by a brownish yellow silver line on the dorsal side and a faint yellowish silver line on the ventral side. The dorsal fin is tipped more with white in the male.

*Location.* The specimens I have obtained were from the Lucknow area.

BLUE DANIO—*Danio malabaricus*  
*Description & Colour.* Comparatively less broad with more blue colour with 3 distinct lines in the back two-thirds of the body, the front one-third is with broken bars and broken lines. The bars and broken lines are yellowish silver. The fins are orange.

*Blue Danio Photo: S. R. Sane*





It is supposed to grow up to 6 inches in nature but in aquaria rarely grows over 5 inches.

*Location.* I have obtained specimens from Goa and Nagercoil in Tamil Nadu.

*Location.* I have obtained specimens around Bombay, Kolhapur, Sangli.



*Malabar Danio*  
Photo: S. R. Sane

#### • MALABAR DANIO

##### *Danio aequipinnatus*

*Description & Colour.* Similar to *D. malabaricus* but less broad with broken bars and lines only in the front quarter of the fish. The fins are deeper orange-red. This is supposed to grow to 6 inches in nature but rarely grows over 5 inches in aquaria.

#### ZEBRA DANIO

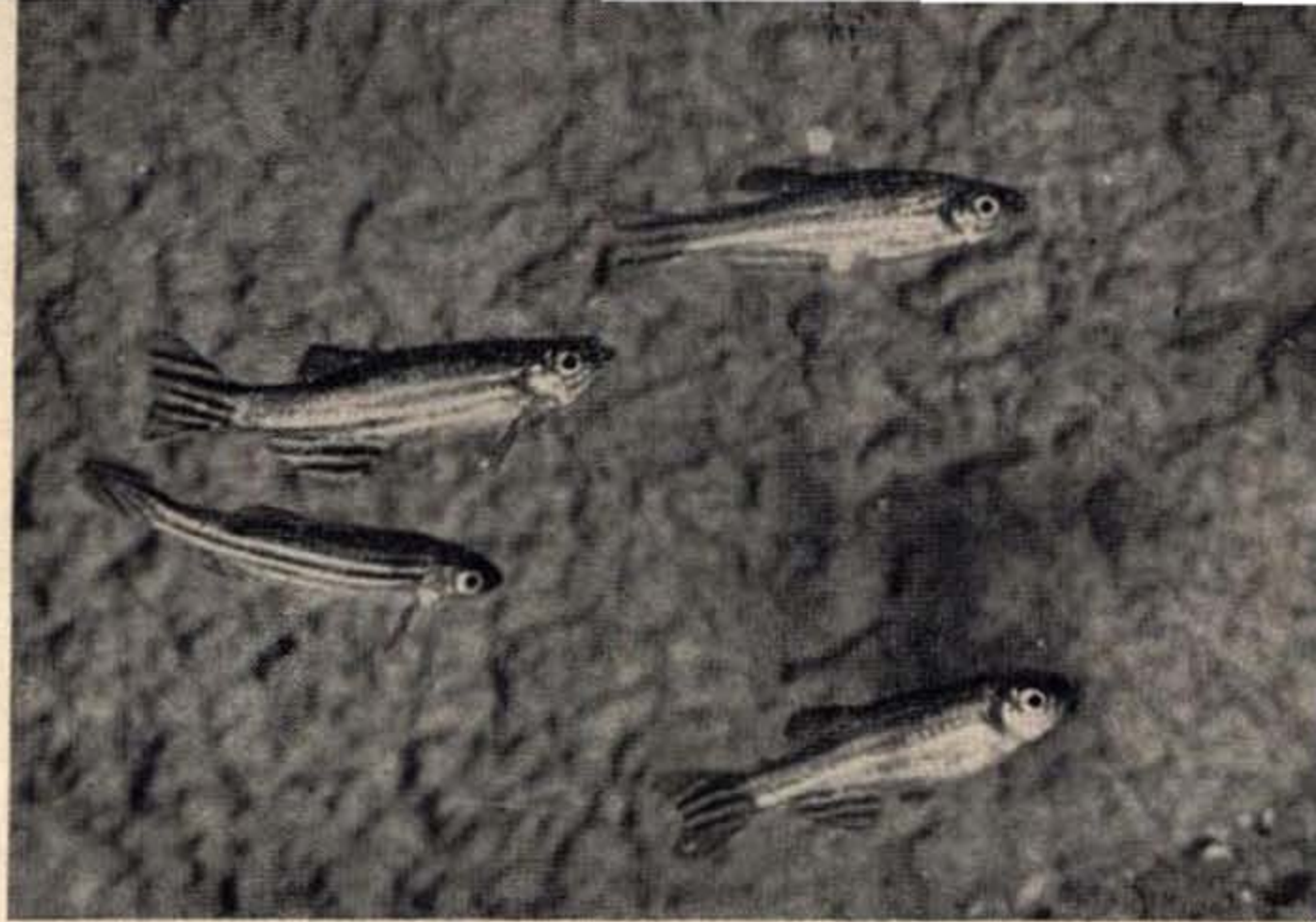
##### *Brachydanio rerio*

*Description & Colour.* This is a small attractive fish growing up to 2 inches. The coloration is of metallic blue lines on the silvery body. The bands run through the tail lobes. The anal fin is also banded. In breeding condition the male has a yellow tinge.



*Zebra Danio*

Photo: S. R. Sane



I have bred hybrids between *B. albolineatus* × *B. rerio* as well as *B. rerio* × *B. frankii*.

There is a golden colour mutation being bred now.

*Location.* I have obtained specimens from several places like Billimora, Surat, Nagpur, Madras, Calcutta.

There are several other species of Danio in India, but so far efforts to obtain live specimens have failed. They are *Danio dangila*, *Danio chrysops*, and *Danio neilgherriensis*.

*Brachydanio albolineatus* or Pearled Danio is supposed to occur in

Assam, Meghalaya and is common in Burma.

*Brachydanio frankii* or Leopard Danio is of unknown origin and is possibly a mutation of *B. rerio*. Its status has not been defined so far.

S. R. SANE

*Many Natural History subjects form the basis of excellent, absorbing hobbies. One of the best among them is the maintaining and rearing of aquarium fishes. In this series we are drawing attention to Indian Aquarium fishes.—EDS.*



## BOOK NEWS

**The Book of Indian Birds**, by Sálim Ali. Price Rs. 45 (Rs. 40/- to members).

The revised 10th edition of *The Book of Indian Birds* will be published by the end of this year. For the 35 years or so this book has been in print, over 50,000 copies have helped acquaint both the beginner as well as the seasoned ornithologist, in India and elsewhere, with the country's rich avifauna. The revised 10th edition has 16 species added to it, with coloured illustrations, thus bringing the total number of birds dealt with in the book to 280. The additions include several of our "hill-station" birds—the laughing thrushes of the evergreen forests of the Western Ghats, the enigmatic Black-and-Orange Flycatcher (*Muscicapa nigrorufa*) and a few others. This in a way

compensates for the author's *Indian Hill Birds* long since out of print.

**India's Wildlife in 1959-70**, by M. Krishnan.

These are a series of articles on the current status of India's wildlife, which appeared in the Society's *Journal*, now produced in book-form. This production was made possible by a munificent subsidy from the Seth Purushottamdas Thakordas and Diwaliba Charitable Trust. The text is illustrated with the brilliant photographs made by the author in the wild. At a time when the situation of our ever-dwindling wildlife is a cause of considerable anxiety, the book which is priced Rs. 30/- should help to spread knowledge among the public.

J. S. SERRAO



## **BOMBAY NATURAL HISTORY SOCIETY**

The Bombay Natural History Society is one of the oldest Scientific Societies in India and has been publishing a Journal since 1886 which is recognised throughout the world as the authoritative source of information on the flora and fauna of this subcontinent.

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