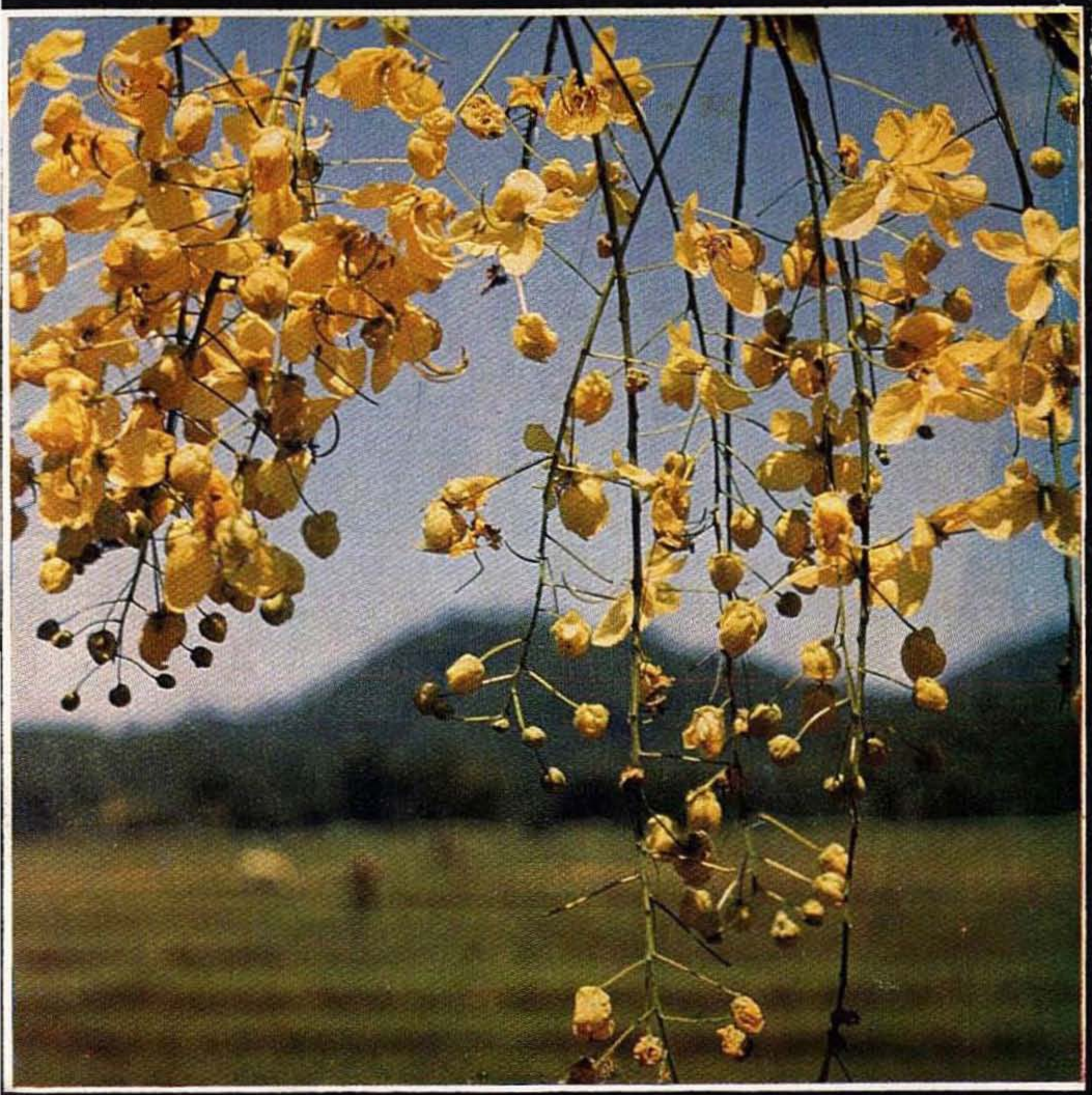
HORNBILL



BOMBAY NATURAL HISTORY SOCIETY

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 an authoritative source of information on the fauna and flora of this subcontinent.

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Bombay Natural History Society
Hornbill House
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BOMBAY 400 023 (INDIA)

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Membership of the Society 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 three issues of the *Journal of the Bombay Natural History Society* now in its 76th volume, and four issues of *Hornbill*, the Society's popular publication.

Journal Editors
J. C. Daniel, P. V. Bole and A. N. D. Nanavati.

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CONTENTS

Editorial 2

Feedback 3

President's Letter 5

Butterflies of Bombay—2
—*Naresh Chaturvedi* & *S. M. Satheesan* 8

Birdwatcher 10

Notes, News and Comments 17

A beautiful Indian spider
—*Asad Rafi Rahmani* 21

Pollination by birds
—*Priya Davidar* 23

The enigmatic buffalo
—*S. M. Hasan* 26

Does the Lion exist elsewhere in India?
—*Lt. Col. F. F. C. Bulsara* 28

An incident of tahr poaching
—*A. J. T. Johnsingh* 37

EDITED BY

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

EDITORIAL

Every year as the summer heat reaches a crescendo orchestrated by the maddening calls of the Brain-fever bird, one looks around for signs that the heat will break. And there is no better sign of an imminent change in the weather than the exodus of the Barometer or Rain ants. A shy, non-violent species, the Barometer ants swarm out of their underground burrows in their thousands, their jet black colour contrasting sharply with the white eggs and pupae they carry to safety as they feel the imminence of rain. One does not know how they feel the change but their move to safety is a sure sign that the rains are not far off.

We were not watching the Barometer ants this summer when the rains came to Bombay. We should have. The roof of Hornbill House after withstanding the monsoons for the short period of fifteen years had given up and developed substantial leaks. In the process of changing the the waterproofing of the roof, disaster struck in the form of a cement shortage which brought us perilously close to the date of the monsoon and before a tarpaulin cover to the roof could be installed the rains came.

The first severe thunderstorm of the season which broke at night found our watchman, Uma Singh, fighting valiantly to keep the water from damaging the Library books and the stock of publications. For the next few days the staff performed as diligently as the Barometer ants carrying the books and other valuables to safety. We are more than a little disorganized at the moment but hope to be back to normal by the time the next *Hornbill* is due. Our apologies.

The cover picture of this issue has the Indian Laburnum Cassia fistula, *photographed by the late E. P. Gee. Few Indian trees are more beautiful when in flower. Draped in streaming clusters of bright yellow blossoms, which hang from its branches in a golden shower, the tree suggests the European Laburnum, but it is infinitely more beautiful. Its drooping clusters of flowers are longer and the flowers themselves much larger. Each raceme or cluster is from 12 to 18 in. long.*

The tree is common in deciduous forests throughout the greater part in India and Burma, ascending to 4000 ft in the Himalayas; also in Ceylon.—EDS.

FEEDBACK

'A garden on top of the world'

In No. 12 issue of *Hornbill* (July-Sept. 1979), in the article 'A garden on top of the world', some of the altitudes mentioned are incorrect.

Ghangaria is at 3049 m and *not* 3413 m; similarly Badrinath is at 3112 m and *not* 3515 m, and Hemkund Lokpal at 4150 m and *not* 4640 m.

Hanuman Chatti Pass. This is probably an error for Khuntkhal Pass 4425 m from where one descends to Hanumanchatti.

SUMANT R. SHAH

Bombay

'White Gaur of Manjampatti'

I was most interested to see a photograph of a White Gaur at Manjampatti (*Hornbill*, No. 11, April-June 1979) and glad to read that white bison are still around there. I used to know this country very well indeed and had many camps there working from Talangi up the Taenar river and as far up the hill as to Kukkal village. A favourite camp was the Kulparai Cave above Talangi.

My first camp there was in 1929 with Ted Rannicar from the High Range. In those days the whole area teemed with herds of gaur, especially around the big salt lick in the crater close to the Kulparai. I have counted an assembly of over 100 gaur in that area.

Most of these animals were normal coloured gaur but there were always quite a few abnormal coloured ones to be seen, ranging in colour from dun light brown to white. Most of the white coloured animals were young calves but a few mature cows were also white. I camped in this area for a week or two in most of the 10 years 1929-39 and in all that time I only twice saw mature white bulls.

I shot a fine normal coloured solitary bull there and still have the head in my house here. His head was in the record class and so were many other bulls there. This one had abnormal coloured blue eyes! Perhaps this was part of the abnormal coloured strain.

At that time I do not think that the herds normally grazed up to Kukkal. That village was inhabited by Hill Gounders who cultivated barley on patches of irrigation on the hillsides. But the herds did graze up the slopes of Mudiamalai. The Puliyars of Talangi and Manjampatti knew all about the existence of White Bison and I think that they deliberately tried to steer shikaris away from any herd that had abnormal coloured animals.

The whole of this area teemed with wild animals when I knew it.

Gaur at the edge of a shola *Photo*: E. P. Gee

There were large herds of elephants everywhere as well as the gaur. There were a few chital and many sambur and there were some tahr on the lower slopes of Mudiamalai. I have seen these in deciduous forest as low down as about 2000 ft.

A lot of game migrated on regular migration tracks in the dry weather, round the hills into the Ayakudi Zemin near Palni. The walls of the Kulparai Cave were decorated with a lot of primitive drawings and I think that the cave was used as a halting place for pilgrims making for Madura. Over the whole of this area there were numerous colonies of prehistoric dolmens.

Between Manjampatti and Talanji the banks of the Taenar river had been extensively terraced and irrigated on both sides. But these terraces had long since been abandoned probably on account of the herds of elephants and gaur. Some of the terraces even had well-grown teak trees on them. But down at Talanji there was still extensive rice cultivation irrigated from the river though this was troubled from raids by game.

J. L. H. WILLIAMS

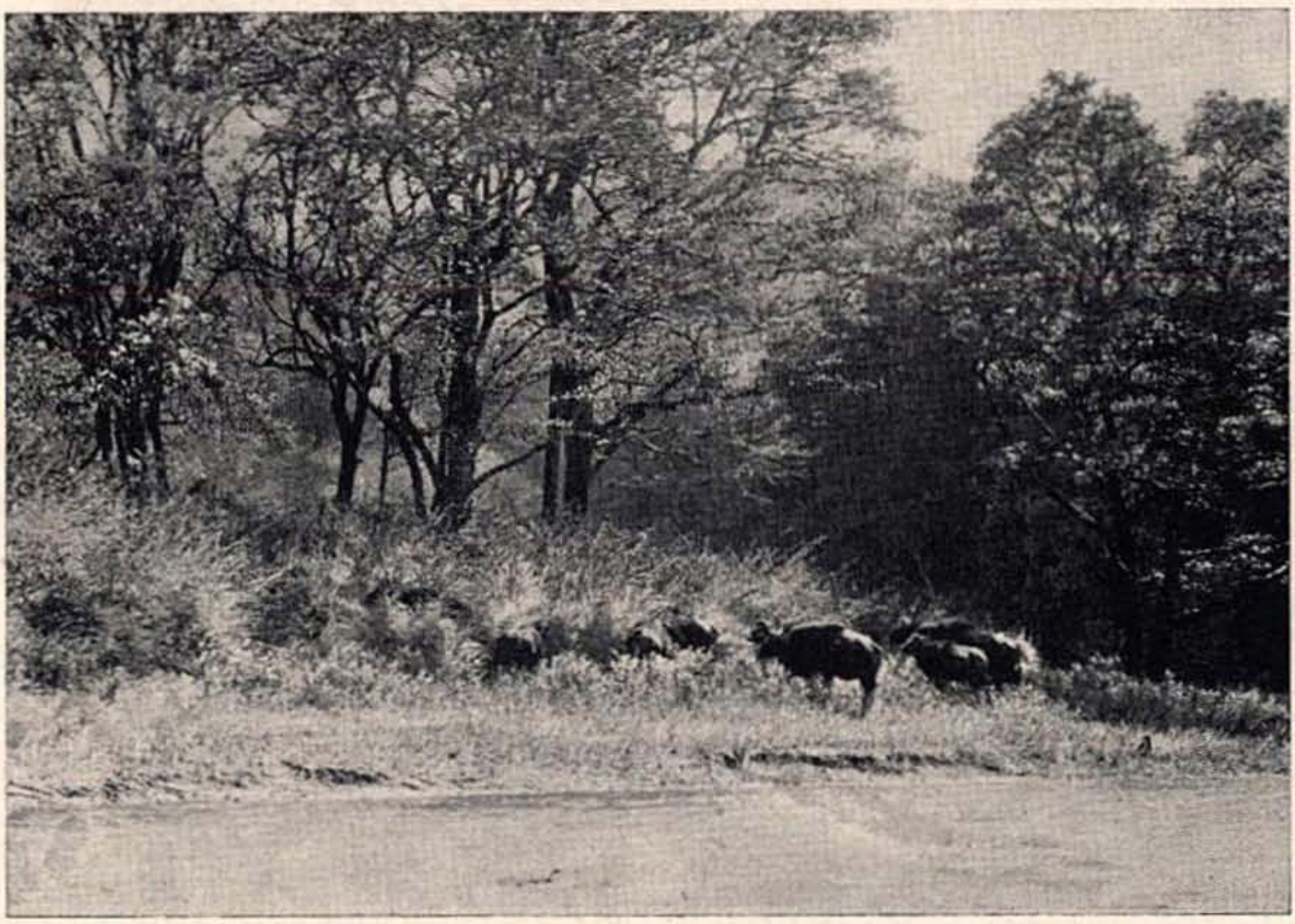
West Sussex, England.

PRESIDENT'S LETTER

A Central Ministry of the Environment?

It is an unpleasant but too common experience in India that official decisions on matters of palpably national concern are taken at state levels by ephemeral politicians or greedy vested interests dubiously claimed to be for the benefit of the 'common man'—who is ultimately their voter. Projects of far reaching importance are begun without giving sufficient prior publicity to the proposal or adequate opportunity for public debate upon its possible negative consequences. The decisions are often based largely on short-term regional economic benefits and take little count of the inherent ecological hazards. The result is that before the thinking public realizes what is happening the implementation of the project is often well on its way. The considerable public expenditure already incurred on it is then held up as justification for its completion even in the face of expert scientific opinion on its ecological wisdom. As a living example, this is just what we see happening today in the case of the highly controversial Silent Valley hydel project in Kerala. The proposed dam and the resultant flooding threatens to destroy one of the most scientifically priceless areas of primeval evergreen forest remaining in the country. The project was obviously conceived by blinkered engineers and short sighted local politicians anxious to establish their credibility with the public and with little thought beyond the immediate economic benefit expected for the State exchequer and for a section of the population of a section of the State. Inanities of this sort were being perpetrated on every hand on such an alarming scale that responsible ecologists and environmentalists—individuals as well as institutions like Bombay Natural History Society—appealed to the Prime Minister for the setting up of a Ministry of the Environment, such as are functioning today in many advanced and developing countries of the world. This ministry to be supported by appropriate legislation and armed with the necessary executive powers for bringing effective and coordinated action in place of the *ad hoc* and often belated environmental rescue operations now being tried. It would then be obligatory for every major project, whether sponsored by a state or as a central public sector undertaking, to be submitted for in-depth scrutiny by a multi-diciplinary committee of experts appointed by the Ministry and cleared for all aspects of its impact on the environment *before* any implementation is begun. This

Manas Wildlife Sanctuary (above); *Periyar Wildlife Sanctuary* (below)



should in future make unnecessary all the sound and fury as has been generated in the case of Silent Valley. Mrs. Gandhi, with her well-known concern for ecology and nature conservation, has reacted promptly and favourably to our representations and charged a special panel under the Department of Science and Technology to work out the modalities and prepare the ground for setting up such a department, or Ministry, at the earliest. It is to be hoped that the special committee's report will be completed on schedule by end July or August and that a full-fledged organisation armed with the necessary powers will be functioning before the year's end. 'Tis an ill wind that blows nobody any good, and whatever the ultimate fate of Silent Valley, the widespread national debate and international concern which the controversy has engendered will—let us hope—at least help to keep this newly aroused public conscience vigilant and active where indifference and a sense of non-involvement have often prevailed.

SALIM ALI

Butterflies of Bombay - 2

Continuing notes on Family PAPILIONIDAE from p. 32 of *Hornbill* 1980(1), we list and illustrate in colour the following seven species in this number.

9. CRIMSON ROSE *Polydorus hector* (Linn.). This butterfly is common from July to September. It is both at home in well-wooded areas as well as open gardens. Often roosts at night in large congregations on twigs and branches of shrubs and trees. A constant visitor to *Lantana* for the nectar of its blossoms. Its larvae are invariably found on *Aristolochia indica* (Sapsun).

10. COMMON ROSE *P. aristolochiae* (Fabricius). A common butterfly; flies from July to November. Like the foregoing has the habit of roosting in large numbers. Often met lazily winging over monsoon undergrowth during the rains. On sunny days fast on wing, and exhibits a restlessness while feeding on the nectar of *Lantana* blossoms, to which it is very partial. Its larvae feed on *Artistolochia indica* and *Glycosmis pentaphylla.*

11. BLUE MORMON *Papilio polymnester* Cramer. Not a common butterfly in our region, though it is very common on the mainland across the harbour. Considered to be seasonal migrant winging over Greater Bombay in September and November and again in March and June. Appears to maintain its flyways when migrants disperse in Bombay, and individuals have been observed trickling into the City over Strand Road at Colaba, possibly travelling across the harbour. The insect feeds on the nectar of *Crossandra undulaefolia* (Aboli). No breeding record of the butterfly in Bombay.

12. COMMON MORMON *P. polytes* Linn. A very common butterfly; on wing from July to October. The species has three female forms: ♀ form *cyrus* is similar to the male with the red marginal crescents prominently marked; ♀ form *romulus* mimicking the Crimson Rose (No. 9 above), but with the body without the red markings of the latter; and ♀ form *stichius* mimicking Common Rose (No. 10 above). A common visitor to *Lantana* as well as other garden blossoms. Its larvae are found on the plants of *Murraya koenigii* and *Aegle marmelos.*

13. COMMON BLUE BOTTLE *Graphium sarpedon* (Linnaeus). It is a common flier from July to October. The insect is restless while feeding and only pauses to hover for a moment at a blossom before darting on to another. It has also the habit of feeding on damp patches. The food plant of the larvae is *Litsea tomentosa* (Chikna).

14. TAILED JAY *G. agamemnon* (Linn.). A very common butterfly flying about in April to August and again in January and February. It is mostly encountered in well-wooded

(*Contd. on p.* 16)

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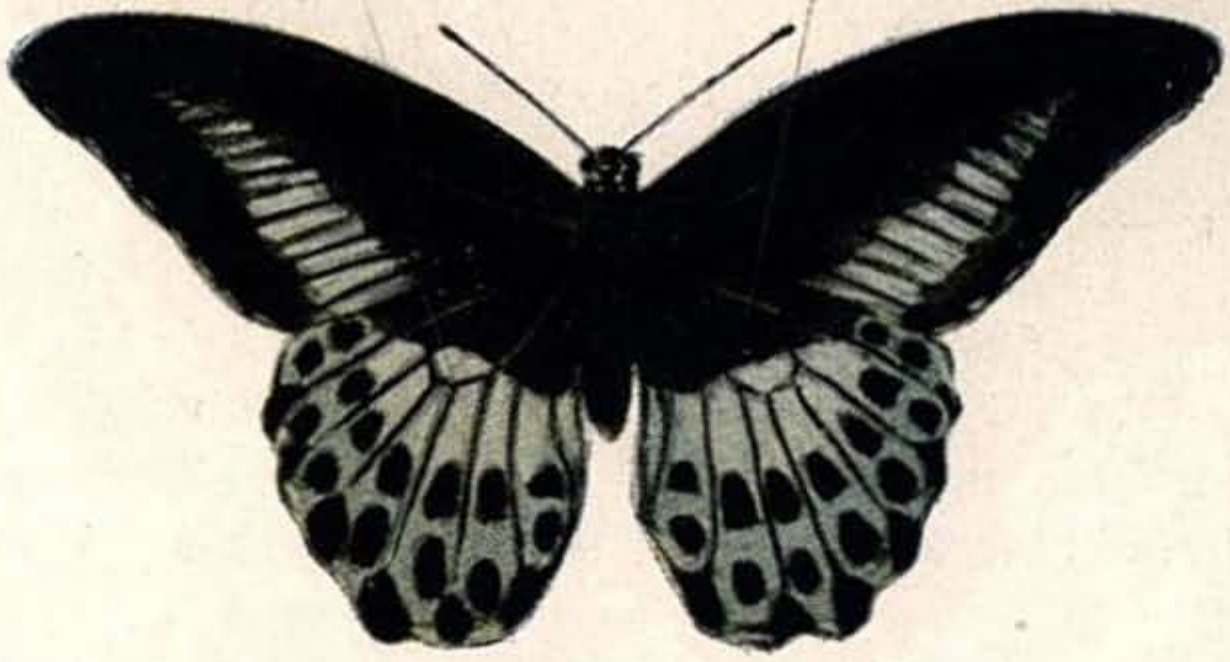

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BIRDWATCHER

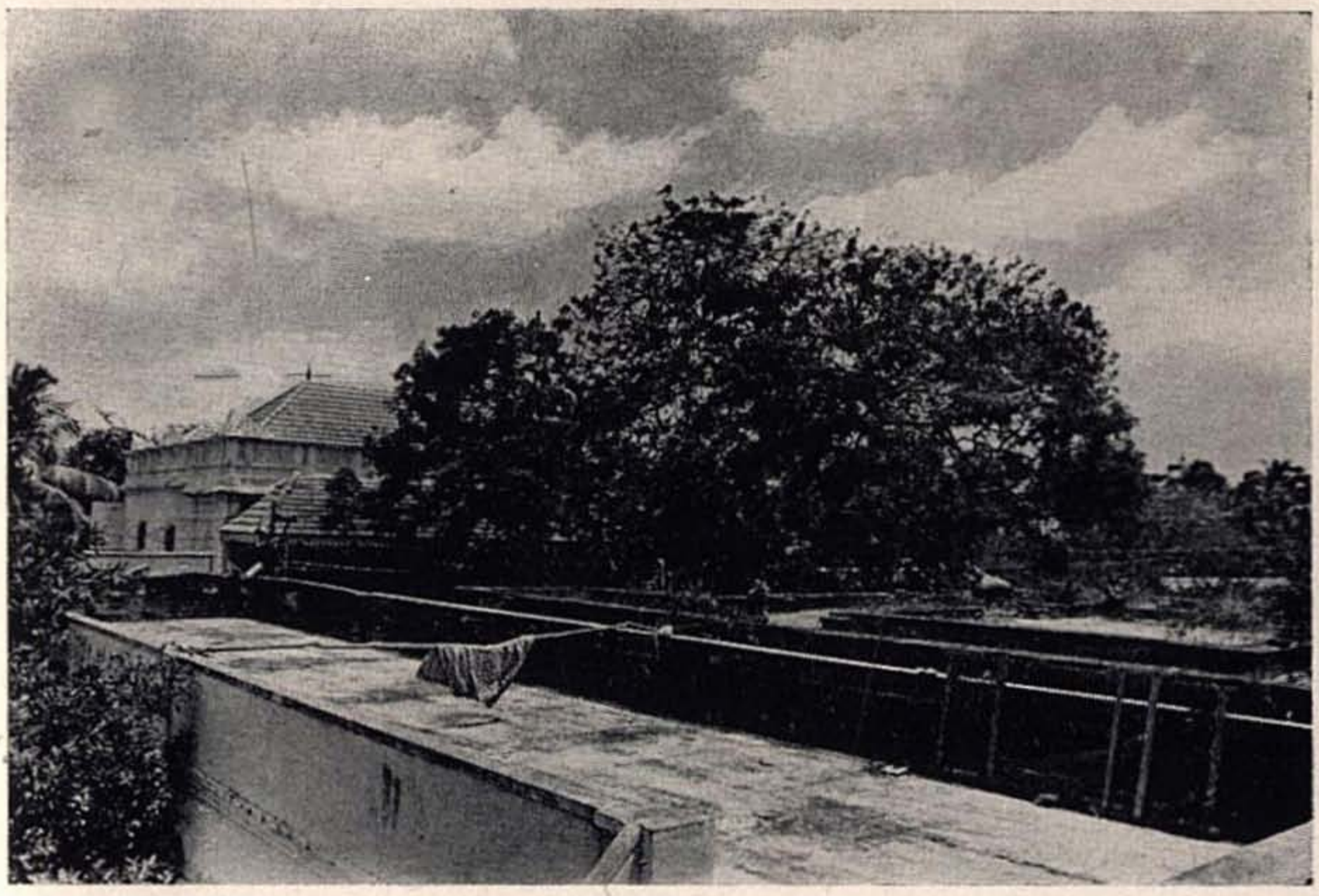
Koondakulam Heronry

In contrast to the bigger and more famous bird sanctuaries of India like the Keoladeo Ghana of Bharatpur and Vedanthangal near Madras, there are many obscure village heronries in many parts of Tamil Nadu and Andhra Pradesh, where man and bird co-exist. But in the course of the last few decades, most of them like the Kolleru Lake pelicanry in Andhra Pradesh, have vanished completely.

Of the few village heronries that still survive, Koondakulam and Moondraidapu, both near Tirunelveli in Tamil Nadu were visited by me thrice between February and May 1980.

If you take a bus from Tirunelveli to Nagercoil you will reach an insignificant place called Moondraidapu within half-an-hour. Here just beside the National Highway 7 stand two large tamarind trees which are smothered by Painted Storks and Grey Pelicans. It is indeed an incredible sight. Just below the trees there is a small town, or at any rate, a small shopping centre for the various villages near by and it is quite a busy place. The big birds nesting in the branches

Roadside heronry at Moondraidapu *Photo*: Author



Koondakulam—Home of man and birds

Grey Pelicans
They perch lazily fluttering their pouches
Photos: Author

above, keep up a shower of white droplets—their excreta—that smell strongly of fish. A cobbler's hut under a branch is so bespattered with droppings that you would think that someone had been whitewashing the roof over his head!

I saw some sixty pairs of Painted Storks and 3 or 4 pairs of Grey Pelicans this year. But in 1964, there were hundreds of Little Cormorants also. One does not have to be a seer to tell what is in store for the birds that nest in places like Moondraidapu. A few current indicators are enough to show which way the wind is blowing.

To reach the bigger heronry at Koondakulam is not an easy task if you do not have a vehicle of your own. By car you can reach the place in an hour at the most. For those who have to depend on public transport, there is a bus starting from Tirunelveli at 5 a.m. Take a ticket to Kalamkulam, and it drops you there by 6.30 a.m. From Kalakulam it is only a 1.6 km walk to Koondakulam, So you are right amidst the birds even before the village has risen up.

A family of Painted Storks *Photo*: Author

The village is very small, hardly one sq. km in area and contains 200 to 300 houses. It is inhabited largely by Telugu speaking Pannaiyars, believed to have migrated from Andhra Pradesh some three centuries ago. These people are pure vegetarians and have brought with them Andhra's tolerance of nesting water birds. The hospitality that is extended to the birds is extended to the birdwatcher also. If they understand that you are genuinely interested in watching their winged wealth or photographing them, they literally drag you to their roof-tops from where one can get the closest view of the birds and their nests.

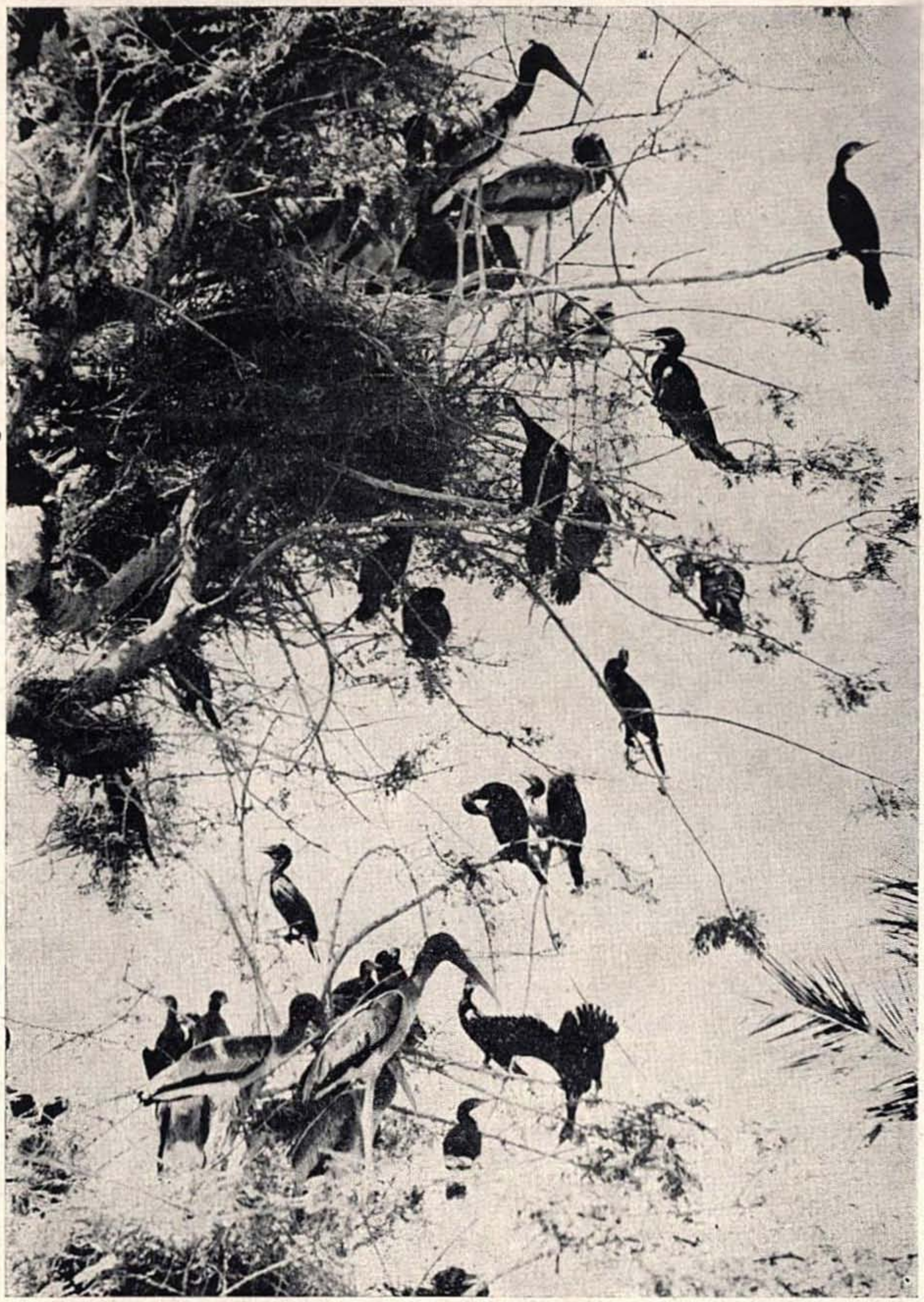
The village contains 50 to 60 trees of various kinds of which, the neem is the commonest. The birds do not seem to mind what tree it is as long as it is in the village—inside a house compound or beside the road. The occupants of this heronry are painted storks (*Ibis leucocephalus*), the grey or spottedbilled pelican (*Pelecanus philippensis*), little cormorants (*Phalacrocorax niger*), night herons (*Nycticorax nycticorax*), little egrets (*Egretta garzetta*) and the median egrets (*Egretta intermedia*). Even house crows and house sparrows insist on sharing the trees with storks and cormorants!

A rough count of the nests showed that there were 200 to 300 painted stork nests, 15 to 20 grey pelican nests, 300 to 400 little cormorant nests and in smaller numbers, the nests of night herons, little egrets and median egrets.

It is extremely interesting to watch the behaviour of the adult painted stork and the grey pelican during the heat of the day. The pelican sits lazily on some perch, facing into the wind and keeping its mouth open. The loose skin of the pouch keeps flapping in and out in a very rhythmic manner. By doing this, evaporation of the fluids from the inner surface takes place, which thereby lowers its body temperature. The pelican's pouch is therefore, rather like the elephant's ears!

The sight at the painted stork's nest is a different one. The adults keep their wings open and stand with their backs to the blazing sun, thus giving perfect shade to the contents of the nest. It is when the painted stork stands thus, still and statuesque, that you fully appreciate the aptness of its name. How beautiful is the open wing of the bird as it stands thus, with its pinions stretched out like sails! Near the top of the wing is a large black patch with what look like numerous thin wavy white lines. Below this is a long rectangular patch of white contrasting boldly with the large area of black formed by the long flight feathers. But 'black' is a misleading term. When the sunlight falls on these feathers they glow and glisten with now a green and now a purple gloss.

My last visit to Koondakulam was in early May and at that time all the painted stork juveniles had become large enough to fly about



Little Cormorants with Painted Stork juveniles
Photo: Author

and look for their own food. But the juveniles of the grey pelicans were still enjoying their parents' care inside the nest. It is when I saw the painted stork juveniles also doing the 'shading' without any purpose, that I understood that the phenomenon is instinctive.

All the nests you see at Koondakulam are built of twigs. But the painted stork's nest building never seems to end. Mr. D. Mangalraj Johnson in his article about the Koondakulam heronry (*Newsletter for Birdwatchers*, August 1971) says: 'An examination of the nesting material showed that nearly half the twigs were thorny; the number of sticks in each nest ranged between 324 and 387.'

Koondakulam seems to have been first reported in 1903 by Mr. C. E. Rhenius (*J. Bombay nat. Hist. Soc.* Vol. 17). Even then it was occupied by painted storks and grey pelicans. In January 1960, Miss Margaret Wilkinson of the Dhonavur Fellowship found a single nest of the black ibis (*Pseudibis papillosa*) here, which was the first record of the breeding of this bird in South India.

The birds are said to come in October, begin nesting by January and leave in June. No one knows where they go. Most probably they

One of the large and shallow tanks which provide the heronry with unlimited fish
Photo: Author

go to those parts of central and north India where the tanks contain enough water to provide them with food. To the villagers, they are visitors from Australia!

Why do these birds prefer such comparatively barren scorching regions? To me it appears to be because in these regions there are a number of large but shallow irrigation tanks. Between Tirunelveli and Nagercoil one can see any number of these tanks. They generally dry up in April. But when there is water in these tanks, they are full of fish, and the long-legged wading birds find it easy to satisfy the appetites of their voracious young ones.

Thus Koondakulam is a rare and splendid example of wild birds living in perfect harmony with human beings.

V. K. SURESH KUMAR

(*Contd. from p.* 8)

areas and often enters human dwellings surrounded by vegetation. Shows a similar restlessness while feeding as does the Common Blue Bottle No. 13 above). Females have a comparatively longer tail than the males. The larval food plants are *Annona squamosa, Polyalthia longifolia* and *Murraya koenigii*.

15. SPOT SWORDTAIL *G. nomius* (Esper). Common; flighting from May to August and again in November. The flight is usually low, straight and fast. Usually seen feeding on flowers standing low on the ground. Larval food *Polyalthia longifolia.*

NARESH CHATURVEDI
S. M. SATHEESAN
(*To be continued*)

NOTES, NEWS AND COMMENTS

The International Trade in rhinoceros products

Dr. Esmond Bradley-Martin has recently completed a fact finding mission for the I.U.C.N. African Rhino Group, to determine the extent and mechanics of the international rhino trade. He reports:

From 1970 to the present approximately 90% of the rhinoceros in Kenya, Uganda and northern Tanzania have been killed. Rhinos in these three East African countries and Zambia constituted, at the beginning of the decade, the world's largest concentrations. Official statistics, which exclude smuggling, show that a total of almost 24 tonnes of rhino horn was sent overseas from East Africa between 1970 to 1976. This represents approximately 8280 rhinos; the entire rhino population of Africa is now estimated between 14,000 and 24,000

An Indian Rhino in typical habitat. The horn is its doom. *Photo*: E. P. Gee

Should we look the other way and let them become extinct?
Photo: E. P. Gee

animals. In Asia, there are only about 2000 Indian, Sumatran and Javan rhinos left.

The main reason for the accelerated killing of rhinos results from the increased demand for rhino products, especially the skin and horn, in the Yemens, India, Singapore, China, Hong Kong, Malaysia, Taiwan, South Korea and Japan.

For centuries the horn of the rhino has been used for precious ornaments, works of art, ceremonial cups and especially for medicinal purposes. The popular belief among westerners that the major use of rhino horn is by the Chinese as an aphrodisiac is unfounded. In the Far East most rhino products are used medicinally to cure ailments, from typhoid to snake bites, but mostly as a fever depressing drug. Reliance on the efficiency of rhino horn as a medicine is probably more of a long term threat to the continued existence of rhinos than anything else.

Despite the fact that the quantity of rhino horn available on the market has increased in the decade of the 1970s, prices have risen to an all time high. From early years of this century up to 1975 there has been a 21-fold price rise, one of the greatest increases in the world for any product over so short a period of time. In 1976 the wholesale price of rhino horn went up more than three-fold to $105 a kilo. The following year the price al-

most doubled to $190 and in 1978 reached $300. By September 1979 in Southeast Asia the minimum wholesale price was an incredible $675 a kilo, some 2000 per cent increase in only four years.

The total number of rhinos that died annually in the wild from 1972 to 1978 produced 7970 kilos of horn, or about eight tonnes for the world trade. This is roughly the same amount as the total of imports from consumer countries. Thus from two very different and independent sources, we can conclude that a minimum of 7.75 tonnes of rhino horn has entered the world market annually from 1972 to 1978. If this is so, 1972 was worth $255, 750, at $33, a kilo. By 1978 the wholesale value had increased to about $2,400,000. If the same amount of horn came onto the world market in 1979 as in the previous year, the wholesale value was $4,650,000. If one were to calculate the retail value of that portion of it which ended up in the pharmacies of Asia (4778 kilos), the price would be $41,602,046, a gigantic sum of money for one single animal product.

RHINO-PRODUCT SHOPS IN THE FAR EAST

Sample of the larger traditional Chinese medicine shops—1979

Place	*Number of shops examined*	*Number selling rhino products*
Singapore	15	8 (53%)
Hong Kong (Kowloon)	15	11 (73%)
Macao (China)	9	7 (78%)
Taipei (Taiwan)	9	9 (100%)
Bangkok (Thailand)	23	12 (52%)
Chiangmai (Thailand)	5	3 (60%)
Total	76	50 (66%)

Average retail prices of rhino horn per kilo—1979

Place	*Type*	*Price*
Singapore	Almost all African	$11,615
Hong Kong	Almost all African	$11,103
Macao	Almost all African	$ 4,127
Taipei	African	$ 1,596
Bangkok	Indian	$17,090
Chiangmai	Mostly Sumatran	$ 3,654
	Sumatran	$11,764
	Average	$ 8,707

Source: Esmond Bradley-Martin —IUCN/SSC NYZS-WWF African Rhino Group, *Newsletter*, No. 1, April 1980

Third International Theriological Congress (III ITC)

The Third International Theriological Congress (III ITC) will be held at the University of Helsinki, Helsinki, Finland, on 16-20 August 1982. The Congress will be arranged by a local Finnish Organizing Committee under the auspices of the International Theriological Association, and the IUBS Section of Mammalogy (Theriology). Some 1000 participants are expected.

Current knowledge in various fields of mammal research will be presented and surveyed in plenary lectures, sectional meetings, symposia, workshops and scientific excursions. Contact

THE SECRETARIAT
c/o. UNIVERSITY OF HELSINKI
HALLITUSKATU 8
SF-00100 HELSINKI 10
FINLAND.

Wildlife Management Seminar

A seminar on 'Organizing Wildlife Management in Developing Countries' is scheduled to be held by the Pakistan Forest Institute at Peshawar from 10-12 November 1980. It will be followed by 3-4 days' trip to a wildlife area. Persons wishing to submit papers are requested to send the abstracts to reach in July and their full texts in September. Contact

DR. G. M. KHATTACK
DIRECTOR GENERAL
PAKISTAN FOREST INSTITUTE
PESHAWAR, PAKISTAN.

The Indian Laburnum is a small, upright tree which grows to a height of 20 to 30 ft. Its trunk is short, its branches slender, upright and spreading, its foliage of the deepest green. In young trees the bark is smooth and ash-coloured. In older trees it becomes rough and dark brown. While in fruit, the pods hang like so many straight pipes or flutes giving the tree its Latin spcific name fistula.—EDS.

A beautiful Indian spider

Inspite of the fact that very few people like them, spiders are sometimes very beautiful creatures. One such species is *Argiope aemula*. Actually all the eight species of *Argiope* spiders found in India are handsome. The top of the abdomen of *Argiope aemula* has alternate lines of silver, olive and black while the cephalothorax has intricate design of silvery white lines.

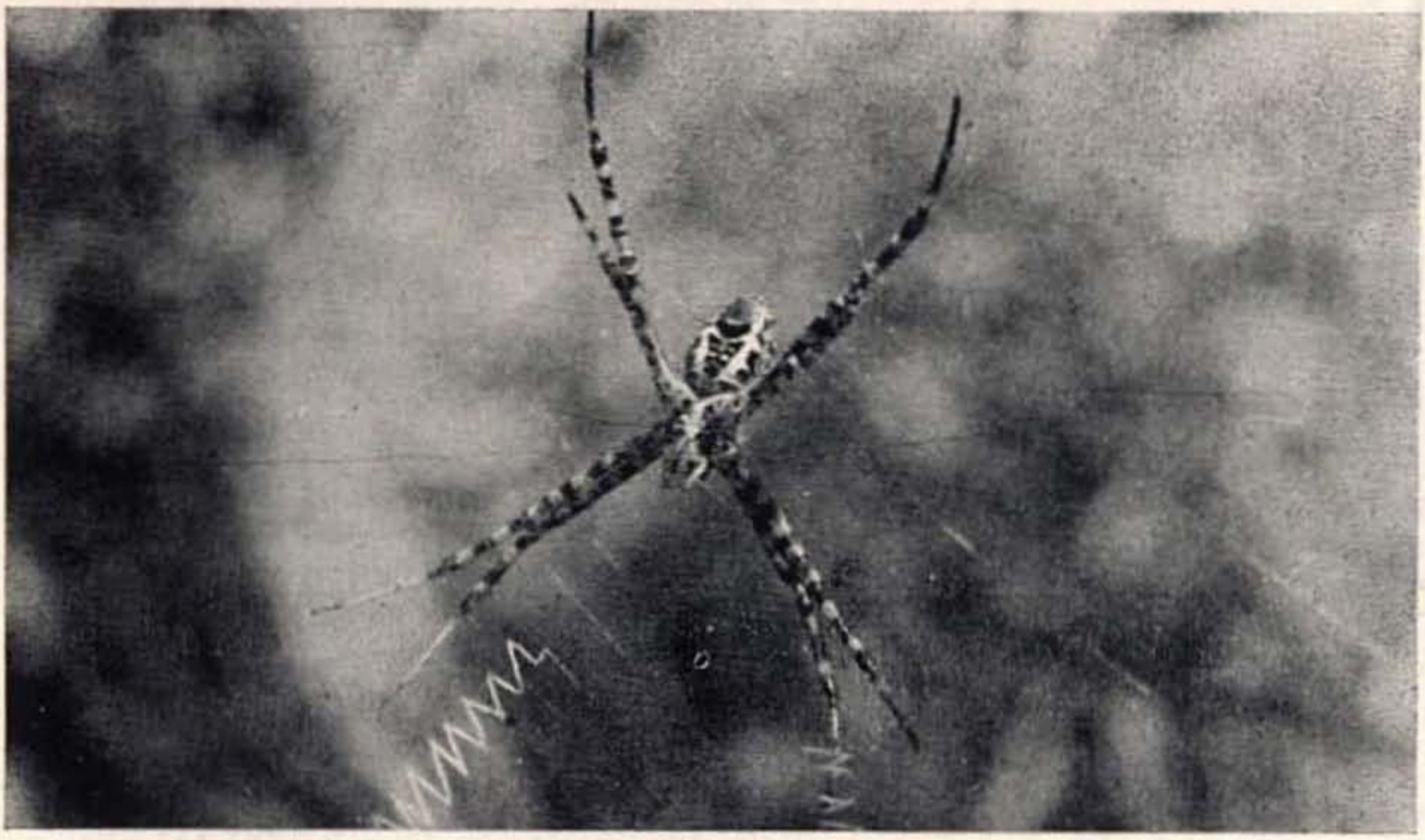
One of the characteristics, which distinguishes this spider, is the presence of zigzags of ribbons of silver-white silk in the web. These prominent structures cannot fail to arrest the attention of an observer. These ribbons are zoologically termed as stabilimenta. The ribbons are mostly in the form of the letter X, but sometimes they are separated from each other. The ribbons are woven in the centre of the large web where the spider sits and waits for the kill. Each limb of the stabilimentum is evenly separated and the crafty spider takes special care to fix them at equi-distant points.

Scientists are not unanimous in deciphering the significance of stabilimentum. Some call it a mechanical device, while others find it a camouflage structure. Probably the most accepted view is that it is a confusing device. It will be clear by studying the behaviour of the spider. *Argiope aemula* and *Argiope pulchella*, the two species studied by the author, sit head downward, with legs spread apart in four pairs, and each of these separate pair coincide with the limb of the stabilimentum in such a way that the ribbon appears merely an extension of the leg. In dark places, where the webs mostly occur, the spider itself becomes a part of a big 'cross' and no longer looks like a living thing. In this unspider-like outline, the creature successfully traps insects as well as escapes from enemies.

The spider shows another behaviour which bewilders the observer. As soon as the spider is touched or disturbed, it falls down as dead. The observer who is still attracted by the white ribbons takes some time to realise what has happened. In that period the spider slips away into the vegetation. This behaviour is known as cataleptic response and it is found in many spiders unrelated to genus *Argiope*.

Another fascinating behaviour markedly developed in *Argiope* spp. is rocking of the web. When the spider is irritated, it 'stands' up and starts rocking the web forward and backward (the webs are mostly vertical to the ground). Rocking was never seen by me when an insect strikes the web. Presumably, the spider uses its visual faculty to distinguish between disturbance caused by a trapped insect and disturbance by other agencies.

The life history of *Argiope* is in-



Argiope *spider on web* *Photo*: Saeed Ahmed

teresting, especially of the female which is usually observed. The furtive male is very small, nearly one-tenth of the female, and lives a semi-parasitic life around the web of the female. Sexual intercourse wholly depends on the whims of the female though the initiative is taken by the male.

The female *Argiope* spins a small purse-like cocoon or egg-case and deposits nearly 300 eggs in it. Though the egg-case is hung near the web, parental care is apparently not present. After three weeks or more, depending upon the temperature, spiderlings 'hatch' out from one or two weak points in the egg-case. For three to five days, most of the spiderlings cling to their draglines above the egg-case. The spiderlings show positive heliotropism and mostly move above the egg-case. Gradually they scatter on top of the bushes and on a breezy sunny day 'fly' away never to meet again. Only their inconspicuous drag-lines indicate their destinations. Most of the spiderlings do not survive the vicissitudes of changing climate and their innumerable enemies. The fortunate ones choose some secluded spots and start the whole spider-story again.

ASAD RAFI RAHMANI

Pollination by birds

Certain species of plants in the tropical and subtropical regions of the world are adapted for pollination by birds. Study of bird-flower systems has shed light on the complex pollination process, and more recently has provided emperical data on the energy budgets of nectar feeding birds. As a research fellow of the Bombay Natural History Society I studied the bird-flower relationship in the Nilgiris for a period of two years. The Nilgiris associated with the Western Ghats complex is situated between latitude 11° 12′ and 11° 43′ N., and longitude 76° 14′ and 77° 01′ E., and has remarkable morphological differentiation, from almost sea level to 2636 m. The climatic and altitudinal variations in different parts of the Nilgiris support a diversity of vegetation types, with about 2769 recorded vascular plant species and a significant number of endemic forms.

Birds help to pollinate about approximately 1% of the local angiosperm flora. Less specialised bird pollination was observed only in the deciduous forests of the lowland areas and slopes. Bird pollinated species like *Salmalia malabarica, Erythrina variegata, Acrocarpus* and *Helicteres isora* are designated as less specialised due to the easily accessible nectar, and the diverse types of bird visitors with mostly little or no adaptations for a nectar diet. The short conspicuous flowering span of these plants in the dry period of the year and the copious nectar produced could also be interpreted as strategies to attract the 'unreliable' bird visitors. Of these *Helicteres isora* is more spe-

A Nilgiri shola
Photo: Priya Davidar

cialised. Generally greater pollinator specialization is attended with a marked constancy of visitation by the pollinator. Species with highly evolved specializations for bird pollination in the form of a complete tubular corolla belong to the Loranthaceae, a family of semi-parasitic plants. The Loranthaceae are distributed throughout the district with a richer representation at elevations above 1500 m (nearly twice the number of species), a noted trend in tropical bird pollinated mistletoes.

Four families of birds in the subcontinent have species specialized for a nectar diet. They are the Irenidae, Dicaeidae, Nectariniidae and the Zosteropidae. All four are represented in the Nilgiris.

Intensive study was carried out in Coonoor at an elevation of 1800 m on *Dicaeum concolor*, the Nilgiri flowerpecker, *Nectarinia minima*, the small sunbird, *N. asiatica* the purple sunbird and *Zosterops palpebrosa*, the white-eye. These four ecologically similar species, by quantitative assessment were found to be isolated by their differing habitat, vegetation zone and food preferences. All four species are dependent on the presence of trees. The small sunbird and the white-eye found in largest numbers preferred the natural montane evergreen forests or sholas. The flowerpecker was less dependent on a specific habitat than on the presence of the loranthus, whose berries and nectar form an important part of its diet. The purple sunbird, the least common, favours marginal and disturbed habitats, which suggest that it possibly is a recent arrival in the higher altitudes, its more typical habitat being open lowland forests.

The sunbirds feed only on insects and nectar, and of the two, the small sunbird took a larger proportion of insects. The white-eye feeds predominantly on insects and less on fruits and nectar. The flowerpecker feeds mostly on fruits, usually of the loranthus.

The most interesting aspect of the study related to the nectar feeding behaviour of the birds. The different species showed a remarkable degree of flower specialization. Certain species of loranthus are pollinated by only one species of bird. There is a remarkable degree of ecological co-ordination between the plant and the pollinator. Species pollinated only by the small sunbird, an altitudinal migrant, flower only when the bird is in the area.

The nectar content and caloric value are considered most important in attracting the pollinator. The nectar secreted is adequate to attract the pollinator, and to ensure its visits to other flowers. Certain species of bird pollinated loranthus have an added mechanism that confers greater precision between the pollinator and the flower. It is the flower bud which does not open unless the bird pinches the apex. Species with the exploding bud produced no fruits when isolated from

Small Sunbird taking nectar from Helixanthera intermedia *flowers*
Photo: Priya Davidar

the birds. Whereas spontaneously opening flower species produced a small percentage of fruits. This indicates that a highly specialised bird flower does not have to rely on autogamy as a precautionary measure.

Nectar, a limited food resource, was defended vigorously by two of the species, the flowerpecker and the small sunbird. Only the male sunbirds held territories. I have watched over a period of time, certain birds holding territories, and in one instance for two consecutive years. Birds defending *H. intermedia* with less specialized flowers and lower calorie nectar left the territories as soon as flowering intensity diminished, though stayed on longer in the more speciliazed species. Theoretically the calories lost in territorial defence must be offset by the calories from the nectar defended.

The pollinator plays a vital role not only in fertilising flowers, but also in ensuring sufficient genetic heterogenety in the community. The pollen flow was predicted on the basis of the foraging pattern of the bird and the flowering pattern of the plant. The white-eye and the purple sunbird being non-territorial and unpatterned foragers would disperse the pollen over a wider area than the territorial flowerpecker and small sunbird, which forage systematically within the territory. The latter two species would also self pollinate to a greater extent than the former (plant is a single genetic unit).

(*Contd. on p.* 39)

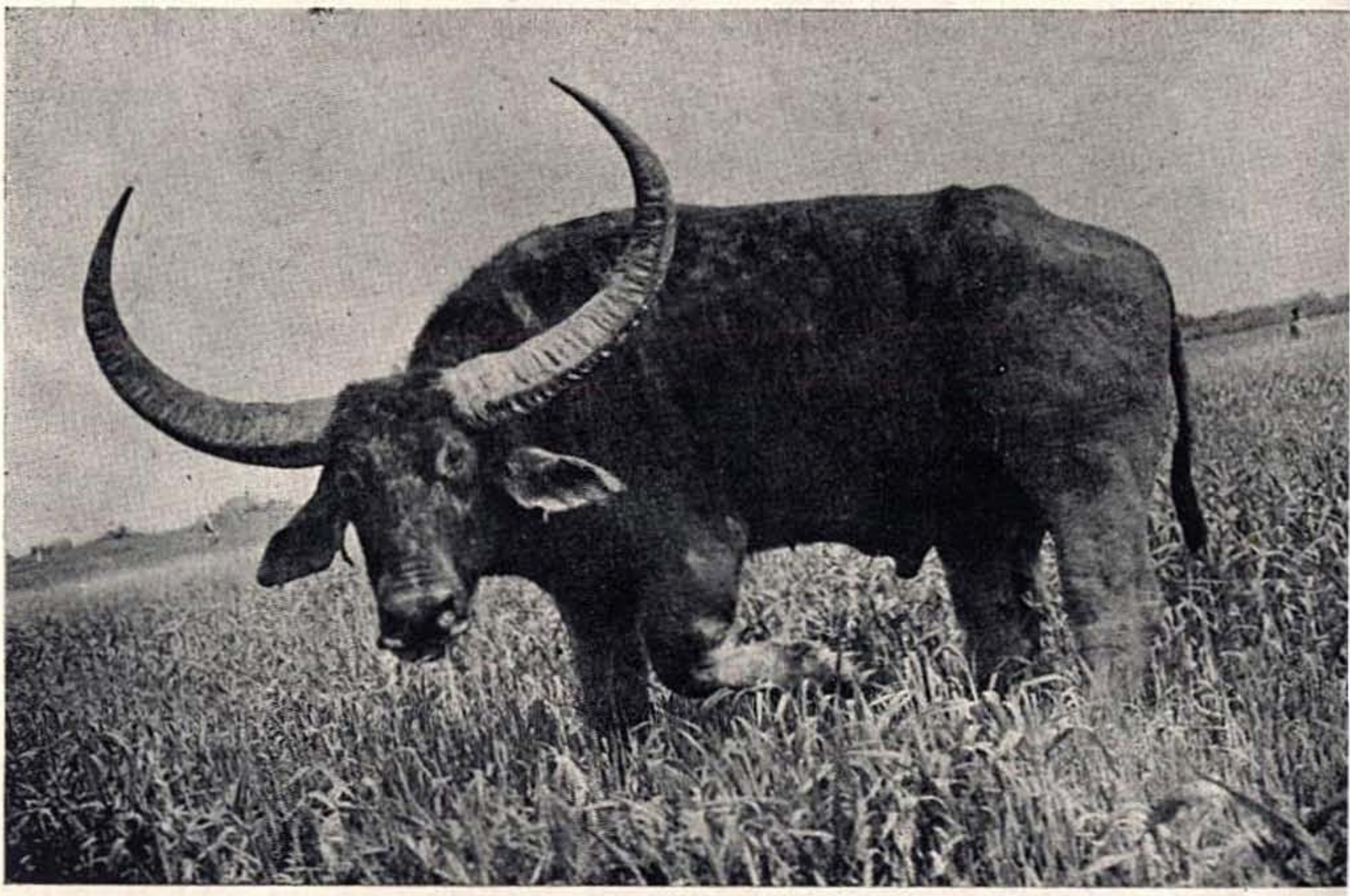
The enigmatic buffalo

During my visit to the Gangau Sanctuary in Panna district, Madhya Pradesh, some people told me that there is a huge buffalo which has been wounded by a bullet in Raipura range of the Panna Division. As it was inconceivable that a Wild buffalo existed in this area no one bothered to verify it.

On 15th February 1979 I visited the area in Raipura range which is situated on an extensive plateau of the Vindhyachal hill ranges. When I saw the animal, to my great surprise it seemed to be a Wild buffalo (*Bubalus bubalis*), exactly similar to animals of the same species found in Bastar district in south Madhya Pradesh. It had the massive typical wild buffalo horns, triangular in cross section with a maximum spread of 1.24 metres and a tip to tip width of 87 cm. All the four legs had 'white stockings', the tip of the lower muzzle was white. The body weight was approximately 1000 kg.

The buffalo, a bull, had a bullet injury on the left foreleg. The bones had been broken, and the buffalo was not able to place its foot on the ground and walked on three legs only.

When I first located the animal



The enigmatic bull buffalo *Photo*: Author

on 15th February it was lying in a wheat field and because of the damage it had done to the crop the villagers had beaten it nearly to death. Immediately veterinary care was arranged. The buffalo though very aggressive could not get up and allowed us to approach close enough. With the help of a stick we applied phenyle to the wounds. Pus was oozing from the bullet wound. Next day the buffalo got up, grazed on wheat crop and walked to the nearby nala for drinking. While grazing one was able to keep it away from the crop. It used to advance towards the people aggressively.

On 17th February the buffalo went into the water in the nearby nala, and when in the water it was roped, taken out from the nala and tied. The next day it was sedated and the veterinary doctor operated upon the bullet injury to remove the bullet. But the bullet could not be located. According to local people the animal was carrying the bullet injury for the previous five months.

At present the animal is kept tied at village Rupjhir of the Raipura range in the Panna district. It is being stall fed. The wound has still not dried up. As soon as the wound heals up we plan to take it to Gangau Wildlife Sanctuary at Panna.

S. M. HASAN

In the first and second quarters of the nineteenth century, the Wild Buffalo was abundant and reportedly seen in hundreds along the greater rivers of eastern India, and was equally abundant in peninsular India in the maritime tracts of Balasore and Cuttack in Orissa and the plains of southeastern Madhya Pradesh in the districts of Mandla, Raipur, Sambalpur and Bastar with a western boundary approximately coinciding with the 80 longitude and the Pranhitta river and as the southern boundary the north bank of the Godavari river.

Today the buffalo exists in the Peninsula only in west and south Bastar in Madhya Pradesh approximately 600 km south of where the 'Panna Bull' suddenly appeared. The most plausible explanation is the opinion expressed by Mr. M. K. Ranjitsinh presently at the United Nations Environmental Programme, Bangkok, who, while serving in the Indian Administrative Service, had considerable experience of the present day buffalo habitats in the Peninsula. According to him the bull may have been sired off a domestic cow by a wild bull in Bastar (a common occurrence in south Bastar) and may have run feral after having been brought to the Panna area or it may be the calf of a she buffalo brought to Panna from Bastar which may have mated with a wild bull while at Bastar and the offspring having become too large and too unruly to handle had run wild.-EDS.

Does the Lion exist elsewhere in India ?

This query relates to the note by Dr. T. R. Livesey, Kotah, dated March 21st, 1922, in the Miscellaneous Notes section of the *Journal of the Bombay Natural History Society*, Vol. 28(3), published on 30th June 1922, regarding the shooting of a lion in the main street of the semi-deserted hamlet of Shergarh in the erstwhile Kotah State in Rajasthan.

While browsing through this volume, I read this note and was reminded of an episode narrated to me by Lt. Col. (then Capt.) P. A. Atre, now of the Parachute Regiment Training Centre, Bhurtpore Lines, Agra Cantt, about sighting two lionesses (?) while out on manoeuvres with troops on the Talshahi-Gajpura Road near the Ban Vihar Sanctuary, about 40 km off Dholpur, during the 1961-62 winter.

Col. Atre was driving along the Gajpura-Talshahi road which traverses a low-lying area covered with babul and stunted 'khajjis'. It was about 'first light', so the time must have been just prior to or immediately after sun rise, when he spotted two lioness-like animals, slightly smaller than a tiger, walking parallel to the road. These animals appeared to be in their prime and were not much perturbed by the vehicle. Col. Atre viewed them for over a minute before losing sight of them in a dense patch of undergrowth.

Could these have been the last of the lions liberated in the Gwalior jungles around 1920? This area is adjacent to Gwalior.

I was told about this in early 1970. I had moved about extensively in this area in the late sixties and early seventies but came across no sign of a lion. It is a pity Col. Atre did not follow up his find then. Some old locals though did talk about *Untia bagh* (Lions) having been not too in-frequent in the Chambal area near by *bees-tees saal pehle*—20-30 years ago.

LT. COL. F. F. C. BULSARA

The background information to Col. Bulsara's query, extracted from Society's Journal *is given below, including correspondence on the Lion* v. *tiger controversy.*—EDS.

Lions at kill

African (above); *Indian* (below) *Photo*: E. P. Gee

The Indian Lion

(Miscellaneous Note No. 3, Vol. 28, p. 795, 1922)

A few months ago a lion was shot in the main street of the small and semi-deserted village of Shergarh in Kotah State. I have been able to obtain possession of the skin—or the remains of the skin—which I am sending to the Society as a donation from the Maharaj Kumar Saheb of Kotah. A lioness is reported to have been seen in the same vicinity. Rumours of a lion having been seen at Sawai Mahdopur, just north of this State, were current about a year ago.

With regard to this skin, I have endeavoured to discover—in vain—where this lion came from. It is said that the lions liberated in Gwalior some years ago were all accounted for, though it would be as well to get this confirmed or contradicted.

The only lions I have heard of were a pair liberated in Bundi some 10-15 years ago. According to some accounts both these beasts (which are said to have come originally from Kotah) were shortly afterwards found dead; according to others they were not seen again. It is just possible that they bred. Perhaps some member of the Society will be able to supply some information which will help to clear up this somewhat mysterious occurrence of a lion in Rajputana.

That lions were abundant here in the old days would seem apparent, for they are frequently depicted in the stirring shikar scenes which decorate the old Palaces, taking precedence as Royal game, over even the tiger.

In conclusion I may say that the skin is a small one—apparently a male lion 2 or 3 years old. We are trying to obtain the skull but it has probably been broken up and disposed of.

T. R. LIVESEY

Kotah, March 21st, 1922.

Experiments in Implanting African Lions into Madhya Pradesh

(Miscellaneous Note No. 7, Vol. 53, pp. 465-8, 1956)

The lion in India used to be fairly common in the jungles now included in Rajasthan and Madhya Bharat. It is unfortunate that it is not found any longer in the country except in the Gir forest situated in Saurashtra. The reason for its disappearance is the tiger which kept on increasing in number and killed off or drove away the lion until it found an asylum in the Gir forest. This forest is an isolated area completely cut off by over a hundred miles from the tiger infested hills. The tiger is the kind of animal which does not allow

other large carnivora feeding upon the same food to live in the same locality. It is like the case of having two swords in one scabbard.

The tiger seems to have come to India from China, Assam, Burma etc., through Bengal, and that is the reason why it is still called Bengal tiger. It was more cunning and powerful than the lion and therefore it killed off or drove the lion away from the areas it occupied.

I had a few opportunities to arrange duels between the lion and the tiger in a small arena specially prepared for the purpose. In three such experiments on three different occasions I found the same result. It is the lion that always makes the first attack and it is he who gets the worst of it. One or two smacks from the tiger are enough to make the lion retire.

The late Maharaja Sir Madho Rao Scindhia, realizing that lions had existed in his State (Gwalior) in the olden days, resolved to reintroduce them. With this object he imported three pairs of lions from Africa. The jungle selected was Sheopur and Shivpuri forest range, which covered an area of some 1,000 square miles.

When these animals arrived they were taken to a place called Dobe Kund which is practically half way between Sheopur and Shivpuri. A special enclosure of stone wall, 20 ft. high, was prepared, in which the lions were kept. They were not fed on dead meat but were always provided with live buffaloes so that they might not lose the natural habit of killing animals. They were kept in this enclosure for about 4 years during which they not only got thoroughly acclimatized, but also bred and increased in number.

This place was situated in a lonely spot in the midst of forest abounding in tigers. The roaring of the lions always attracted the wild tigers, but on account of the high wall they could not get at them. We used to make periodical inspections of the place, and twice I came across tigers lying about in the vicinity of the enclosure—they probably came to challenge the lions!

We did not let out all the lions at the same time, but they were released in pairs. The first pair which was let out in August 1920 gave us no trouble, but vanished in the wilderness. But when the second pair was let out, the animals came back again and made their home outside the enclosure. They caused great alarm among the men who went there with a supply of their food. They attacked and snatched away the buffalo from their hands. Fortunately they did not kill any man but they simply took the buffalo and started feeding on it there and then.

On getting this news we got rather worried; so the next day we went there in a party and drove them away from the enclosure. Since there were some more lions left in the enclosure a regular supply had

to be sent for their feed. The next day when the shikaris went with a fresh buffalo they found the male lion lying dead with his body badly mutilated, showing that he had been killed by a tiger. The lioness was not seen anywhere in the vicinity. What had apparently happened was that this pair on being driven away must have come across some tiger in the jungle who must have killed the lion, and the lioness must have escaped.

The third, fourth and fifth pairs gave us no trouble, but when the sixth and the last pair was let out after two months they proved most troublesome. They adopted the easiest method for getting their food. The forest in this part is very thinly populated having no big villages but just a few scattered hamlets. The poor villagers do not possess any fire-arms. The pair of lions made the habit of going to these hamlets and helping themselves to any cattle they could kill and eat on the spot. The villagers, to protect their animals, built stronger fences. The next time the pair visited the village, they could not get through those fences and therefore they killed a man instead and devoured him. As soon as this news was brought to us we rushed to the spot and destroyed the animals.

Most of the five pairs that vanished into the wilderness went a long way east and south. A few cases came to my knowledge of these lions having been actually shot near Panna and Jhansi in the east, and some at Kotah in the south. The late Maharaja of Baria shot one of them a few years ago along the bank of Kunoo River in Madhya Bharat.

I was glad to read in the newspapers that there is a proposal to re-introduce the Indian lion from the Gir forest into some other parts of our country, so that the species may not get extinct. If this idea is under serious contemplation, I suggest that the authorities should select isolated forests in which there are no tigers. Rajasthan is one of the suitable provinces where one can find such isolated jungles. It is most desirable to make this experiment, because very few Indian lions are left in the world, and if they die the species will vanish with them.

Where sport is concerned it is far more interesting and exciting to shoot a tiger than a lion. The tiger requires comparatively elaborate arrangements to be made for a successful shoot, and sometimes even after all such arrangements and precautions there is every possibility of his giving one the slip. He is infinitely more cautious than the lion.

In the summer of 1952 I accompanied the Maharaja of Jaipur who went for a lion shoot in the Gir forest in Junagadh. All shooting arrangements were organised by H. H. The Jam Sahib of Nawanagar. The very next day after our arrival a beat was organised in which two

lions came out together out of which one was shot. Another beat was organised the next day in which another lion was shot.

I was surprised to notice that in neither case did the lion attempt to make any use of cover. He came out boldly as if taking a stroll, offering an easy target to the sportsman. Once he is wounded he is certainly as bold as the tiger.

There is a great difference between the habits of these two animals as well. A lion uses his paws to strike his adversary, whereas the tiger uses them mainly for holding down his victim. Lions live in a 'pride' consisting of a large family, whereas the habit of the tiger in this respect is just the opposite. Lions do their hunting by team work which tigers rarely do. The lion is comparatively weaker but bolder, and he is not half as cunning as the tiger. If a tiger is accompanied by a tigress and cubs it is the tiger who tackles the kill first, and he has his fill before allowing any member of his family to touch the food. But in the case of the lion, and also the panther, it is the female who does the killing and eating, while the male joins her later on. To put it in nut-shell a tiger has more of the Indian habit in this respect than the other animals!

Lions should certainly be increased not only to save them from extinction but also for providing a variety of big game shooting in India, although it is much more fun, and also more difficult, to shoot a tiger.

In conclusion I must state that our implanting experiments were more of a success than a failure. The very fact that H. H. The Maharao of Kotah, and the Maharajas of Panna and Baria have shot these lions in comparatively recent years, suggests the possibility that they may still be surviving in remote areas away from the haunts of the tiger.

COL. KESRI SINGH

Narain Niwas,
Jaipur (Rajasthan),
October 26, 1955.

Lion v. Tiger

(Miscellaneous Note No. 2, Vol. 54, pp. 171-3, 1956)

Col. Kesri Singh's interesting Miscellaneous Note entitled 'Experiments in Implanting African Lions into Madhya Bharat', in Vol. 53, pp. 465-68 of this journal, gives the details of how lions were imported from Africa into Gwalior in 1916. This information is most welcome, especially as we are now concerned with the proposal of moving a few lions from the Gir Forest into some other parts of India. (See my paper entitled 'The Management of India's Wild Life Sanctuaries and National Parks' in this issue of the *Journal*, pp. 1-21.)

An interesting point was raised, also, in the details concerning lions versus tigers in combat. Col. Kesri Singh is of the opinion that the lion was ousted from its habitat in India by the tiger, but this is not confirmed by some naturalists. R. I. Pocock, for example, in his FAUNA OF BRITISH INDIA, Mammalia, Vol. I, pp. 220-221 gives emphasis to the slaughter of lions in India by sportsmen and others, particularly by British army officers during the nineteenth century. This shooting out of lions, he maintains, was the real cause of their disappearance in India, while the more wary tiger managed to survive.

In support of this theory, Pocock points out that lions have also disappeared from parts of Europe, SW. Asia and Africa, where there were no tigers to interfere with them. I am indebted to the Jam Sahib of Nawanagar for the information that in many parts of NW. India, where the lion has disappeared, there were never any tigers to contribute to this.

A tiger looks at the world *Photo*: M. Krishnan

Pocock goes even further by suggesting that the lion entered India from the NW, and was able to spread as far south as the Narbada River in spite of the previous occupation of many of these parts by the tiger, which (according to him) had probably entered India previously from the NE, to spread down to the tip of the peninsula.

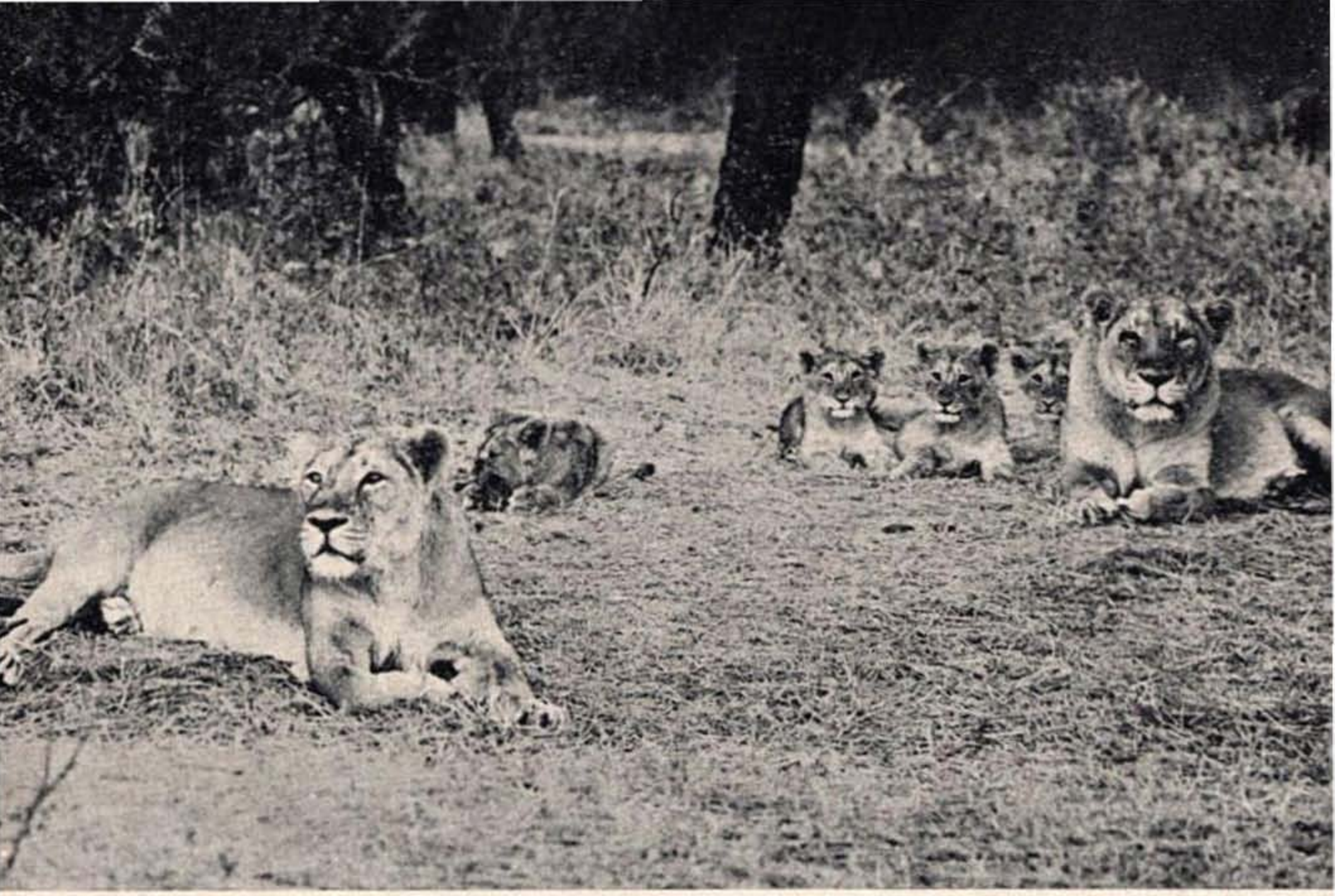
Pocock also is of the opinion that even if a lion and tiger did exist in the same region, their difference of habit and habitat would not necessarily bring them into actual conflict with each other, and that 'an encounter would just as likely to end in mutual avoidance as in a fight, and in the event of a fight the lion's chance of success, so far as anything is known to the contrary, would be as good as the tiger's. Hence there does not appear to be a particle of evidence that the tiger played even a subordinate part in the extermination of the lion in India.'

Now for the fate of some of the African lions when released into Gwalior forests. Col. Kesri Singh has explained how these three pairs of lions were confined in a 20 ft. stone wall enclosure 'for about 4 years' before being released. Col. Kesri Singh has very kindly informed me in a letter that the size of this enclosure was only 'about 100 ft. square'. This must surely have been a very severe handicap to the lions—to be thus confined for four years and then released straight into tiger country. Imagine a few tigers confined for four years in a similar enclosure in the Gir Forest and then released to fight the Gir lions on their 'home ground'!

Col. Kesri Singh refers to three duels arranged by him between tigers and lions, in which the tigers won on each occasion. In this connection it is interesting to note that the Jam Sahib of Nawanagar has informed me that he has himself witnessed a fight between a lion and a tiger on four occasions, on all of which the lion won.

My own humble opinion is that I do not think much importance should be attached to whether the lion or the tiger was victorious in any particular duel *unless the two animals were equally matched in every respect*. In other words both tiger and lion would have to be the same sex, same age, same weight (relatively), same condition, same duration of captivity, same length of time since last feeding and drinking, etc., etc. The combat would also have to be arranged under such conditions and circumstances that neither animal had any unfair advantage over the other. To organise such a combat would be extremely difficult—in fact almost impossible.

There is also another aspect to be considered. It has been the practice of many makers of nature films, especially of the Hollywood and more recent T.V. Schools, to present only the sensational. Their ani-



Family portrait—Gir
Photo: E. P. Gee

mal films include staged fights between captive animals unnaturally forced to fight each other, and ferocious charges by deliberately provoked animals, simply to pamper audiences which are ignorant of real jungle conditions and which have become accustomed to a series of excitements and thrills in nature films. This is most unfortunate, since not only are such films an unreal portrayal of wild life, but also when a serious field naturalist produces a genuine wild life film, of what he has actually seen, it is likely to appear flat and uninteresting after those made by the 'animal fight' school.

Having seen African lions in East Africa and Indian lions in the Gir Forest, I have immense respect for these creatures. And having seen tigers in various parts of India, I have the highest admiration for these. Both animals in their own different ways and in their own different habitats are equallly worthy of our admiration. I would rather think of them as mutually respecting and avoiding each other if they happened to meet in the wild state.

E. P. GEE

Doyang T. E.,
Oating P.O.,
Assam,
August 20, 1956.

An incident of tahr poaching

May 8th, 1976 was hot and dry and, in the company of my brother and three local guides, in the fading evening light, I trekked through the dry deciduous scrub jungle in the foothills of the Kalakadu Wildlife Sanctuary disturbing the junglefowl and giant squirrels on the way. Our destination was a flat rock in the Thulukkambarai river in the southern part of the sanctuary. The object of my visit was to count the tahr of the Thiruvannamalai peaks which are the southernmost stronghold of this endangered species. Any one motoring along the Kasi-Kannyakumari trunk road can easily spot these rocky peaks of the Western ghats, while passing the Panagudi area. I had taken up this survey in collaboration with E.R.C. Davidar who had been compiling a report of tahr habitats. Other than the sighting of three dogs, probably part of a pack, nothing remarkable happened on the way.

The rock which had been earlier used by the local assistants, was an ideal spot for spending the night. However, we had to dissipate the heat of the rock by repeatedly pouring water from the nearby rock puddle. Elephants do not visit Thulukkambarai river but my assistants told me that sloth bears are fairly common and to ward them off a camp fire was built close to the rock. When the sun, like a disc of fire was sliding behind the mountains, a grazing tahr buck was seen silhoutted against the sky on the slope opposite to us. We watched it as long as visibility permitted us. Throughout the night the wind combed the jungle and this increased the rustling noises around the camping site. Occasionally, sambar belled as if to give company to the nightjars who called frequently. In the course of the night, we threw more logs into the fire twice to keep it alive and stave off the cold that crept in after midnight.

We began climbing the steep northern slope of the Thiruvannamalai peak, strewn with boulders, as the grey jungle cocks started calling from their roosts. When we reached the base of the dome-shaped pinnacle of the northern peak, the sun was up on the eastern horizon and a buck, probably the one seen the previous evening, was seen feeding. As no other tahr was seen in that area, we climbed through the tall unburnt and sweet-smelling lemon grass and *Phoenix* palms to the southern peak and on the way, a female tahr and a kid were seen.

Fresh pellets and tracks seen amidst the freshly sprouting grass among the burnt ones showed that the southern peak was much frequented by tahr. Nevertheless, we did not see any. Soon, we came upon the reason. In fact, it was the two heaps of red meat which actual-

ly shone, as the bright morning sunlight fell on them, that attracted my attention from a distance of a kilometre. Gradually, nine persons became visible among the rocks and, a thin wisp of smoke was also noticeable.

Slowly we edged our way down and, as the sun was behind our back, the poachers saw us only when we were within a distance of 200 metres. It was the most unexpected and unpleasant incident for a poaching party to encounter in the wilderness. Their perplexed and agitated expression showed that our uninvited arrival had completely robbed them of the pleasure of their poaching expedition. From the conversation with them, it was understood that they did not know that the tahr was an endangered animal, but they knew what they had done was illegal and punishable. Early in the morning they had shot three out of a herd of nearly forty animals and were successful in killing a brown adult male and an adult female on the spot and the third, as it had fallen into a deep crevice. could not be retrieved. They offered us the juicy liver of the tahr which sizzled on a bed of red coals but we politely refused. We walked around and found a regular camp-

Poachers skinning tahr
Photo: A. J. T. Johnsingh

ing site, marked by a frequently used fireplace and old bones of tahr.

On reaching the plains, the incident was reported to Mr. K. Shunmuganathan, the then Conservator of Forests, Madurai. The Forest Department rose to the occasion. A truckful of foresters, was sent to investigate and, the culprits, who had by this time, hurriedly left the hills, were found, beaten up and fined Rs 1,500/-. All this happened nearly four years ago. After that as I had been fully occupied with my field study on wild dogs for the past three years, I did not have any opportunity to visit those isolated mountain peaks. I am also not certain whether the tahr of Thiruvannamalai peaks, are now hunted only by natural predators or the poachers still continue to make use of the camping site.

A. J. T. JOHNSINGH

(*Contd. from p.* 25)

The species of birds studied reflect the ecological and behavioural differences between their respective families. The sunbirds (Nectariniidae) have the greater dependence on a nectar diet. The flowerpecker (Dicaeidae) is associated largely with the loranthacean parasites as a pollinator and dispersal agent, and the white-eye (Zosteropidae) is a more generalized feeder, playing an important supplementary role in pollination.

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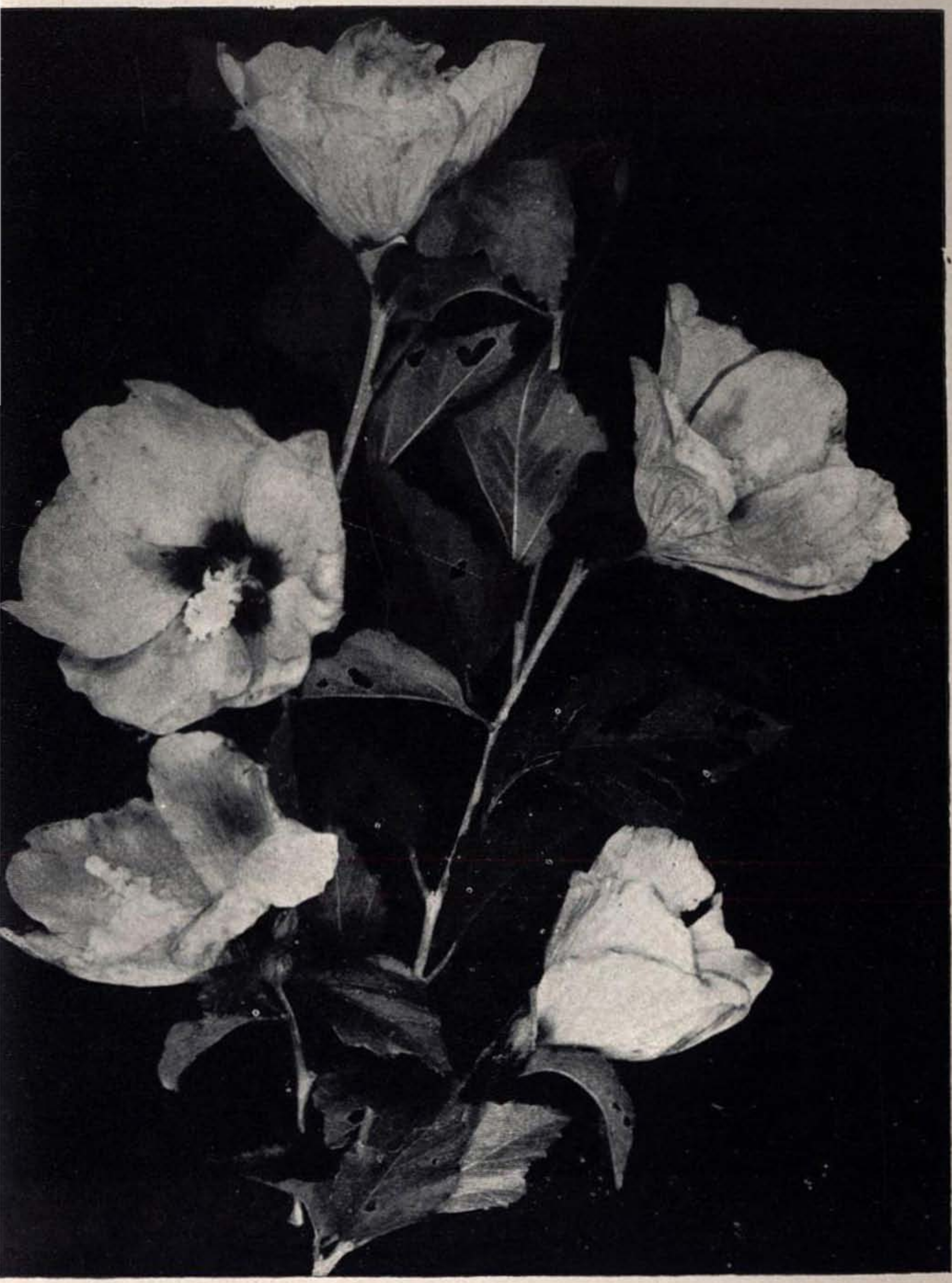

ROSE OF SHARON
Hibiscus syriacus Linn.

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