HORNBILL

1980 (1)

BOMBAY NATURAL HISTORY SOCIETY

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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.

Our members enjoy:

1. A four-monthly natural history journal acknowledged to be the finest of its kind in Asia.
2. A forum for discussing and pursuing all aspects of Nature Conservation and the Environment.
3. A library with many rare books on shikar and natural history unavailable elsewhere, which may also be borrowed by outstation members.
4. One of the finest research collections in India on Mammals, Birds, Reptiles, Butterflies and other forms of animal life. These are available to members for study on the Society's premises.
5. Up-to-date information and advice on birdwatching, wildlife photography and fishing; natural history field trips and information on possible areas for field trips.

In short, the Society offers a range of activities and interests for the scientist, the amateur naturalist, the sportsman, and the lover of nature. Even if you are none of these the Society deserves your support because it is struggling to preserve our natural heritage and to safeguard it for our children.

Please write for a membership form and also introduce your friends to:

Bombay Natural History Society
Hornbill House
Shahid Bhagat Singh Road
BOMBAY 400 023 (INDIA)

The Society was founded in 1883 for the purpose of exchanging notes and observations on Zoology and exhibiting interesting specimens of animal life. Its funds are devoted to the advancement of the study of zoology and botany in the Oriental Region. The Society also promotes measures for conservation of nature.

Membership 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.

Advertisements for publication in *Hornbill* are welcome. Rates : Inside full-page Rs 500/-; half page Rs 250/-; back cover Rs 1000/-.

Annual and other membership subscriptions

Entrance Fees	Rs	25.00
Subscription		
Ordinary individual membership	Rs	50.00
Ordinary corporate membership	Rs	100.00
Life membership	Rs	750.00
Compound corporate membership	Rs	1500.00

The first annual subscription of members elected in October, November, or December will extend to the 31st December of the year following the election.

Write to :

The Honorary Secretary
Bombay Natural History Society
Hornbill House, opp. Lion Gate
Shahid Bhagat Singh Road
Bombay 400 023.

CONTENTS

EDITED BY

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

EDITORIAL

A sign of the growth of interest in the country in Natural History and Wildlife and Environmental Conservation is the sprouting up of natural history societies in various parts of India. Almost all the big cities have organizations of this nature and most of them have a core group of members of the Bombay Natural History Society. This Society is, for all practical purposes, an all India body and the members have often enquired why it cannot have local chapters. There is apparently no objection except the lack of direction in the Society's Constitution providing for establishment of local chapters and thereby increasing its membership and influence in nature conservation. Rules under which such chapters can be organised and function have to be formulated. This is a point that needs serious consideration by the Society's members.

One of the points that has been raised against the Society functioning as an all India body is the name, Bombay Natural History Society, which sounds parochial to some people. But the name has not prevented the Society from functioning as an all India, infact an international, body all these years. The membership has always been Indian and international. There is a justifiable reluctance to change it now when we are just three years away from the Society's Centenary in 1983. Perhaps the Centenary year will decide whether we should continue as the Bombay Natural History Society or just the Natural History Society.

We would apologize for the many errors which appeared in the last issue of the *Hornbill* which was the issue for *October-December* 1979, and not October-November as given on page 1. This and the several spelling errors have left us totally mortified.

The cover of this issue has the Lime Butterfly, photographed by Mervyn Sequeira, who is by profession a pilot in the Indian Airlines. The Lime Butterfly is described on p. 8 (infra) in the first of a serial on the 'Butterflies of Bombay'. We plan to publish several such serials on trees, wayside plants, monsoon annuals, shells, beetles and such other topics of natural history interest, which would in course of time make the Hornbill *a handy field guide.*—EDS

PRESIDENT'S LETTER

The Andamans. An 'Endangered Species'!

The Andaman islands are actually the southward extension of the Arakan Yoma of Burma. They have evidently been isolated from the Arakan coast and from one another by submergence of the intervening land connections. To one familiar with the biota of Burma at corresponding latitudes the close general similarity of the flora and fauna with that of the Burmese mainland and offshore islands, e.g. the Mergui archipelago, is at once manifest. Yet, in the bird fauna at least, as in the endemic mammals —doubtless in other animal groups as well—there are to be seen some curious differences and striking anomalies which invite closer study. Presumably their explanation lies in the history and periodicity of the upheavals and subsidences of the connecting land bridges. As a first step in a study of this nature it seems essential to know by means of a proper ecological survey of a few selected islands which are as yet untouched by the hand of man and therefore in more or less primeval condition, and to prepare comparable inventories of their respective plant and animal productions. It was with the intention of making such a preliminary survey that a small representative team of field biologists from the Bombay Natural History Society visited the Andamans between January and March this year. The main purpose of the exercise was to identify some of the richest areas of the prevailing forest-type, officially classified as 'Andaman Moist Deciduous Forest', for permanent preservation as Biosphere Reserves. Due to uncalculated adversities such as lack of suitable boats for inter-island movement, and malaria soon putting half the party out of action, the operation proved largely abortive though some small but interesting collections particularly of birds, insects and maritime organisms were made on a number of the islands visited. At least two of the birds—a shortwing and an owl—are especially intriguing and may prove to be new forms. While mammals, excepting spotted deer introduced in comparatively recent times, and pig of controversial status as endemic or introduced, we saw no wild mammals whatever—no squirrels, no rats, no nothing! The absence of endemic mammals makes the forest rather lifeless in its unbroken monotony.

Among birds the complete absence of two of the commonest ubiquitous families of the Indian subcontinent, namely the Babblers and the Barbets, is particularly striking; so is the absence of hornbills with the sole exception of the species on Narcondam island, nearest to the Burmese mainland and most closely related to a species occurring in Burma. One would really like to know the history of hornbill distribution in this area: whether the

(*Continued on p.* 8)

Happenings at and from the Society in 1979

What happens at the Society apart from its routine activities of publishing the *Journal*, the various other publications, maintaining the collections, library and other member facilities such as arranging field trips? The Society offers suggestions and assistance on conservation and research to individuals, organizations and government. In 1979 we suggested a closer look at:

The status of the birds of prey. In the December 1978 issue of *Hornbill*, the President's Letter drew attention to the fact that 'something very serious is obviously happening to this class of birds... there is no doubt that many of the species are rapidly disappearing from the scene...In view of this disturbing worldwide trend in the decline of the birds of prey it has become mandatory for conservationists in India to try and make an objective assessment of their present status species by species.'

Pallas's Fishing Eagle
Photo: Loke Wan-Tho

The suggestion was considered by the Birdwing of the Indian Board for Wildlife and a letter was issued to the Chief Wildlife Wardens of the various states to provide available data on the birds of prey. We did not think that the Wildlife Wardens would be able to provide the data as they do not have trained personnel. We had suggested that the members of the Wildlife and Natural History associations throughout the country should be involved in the collection of data. Considering the difficulty of identifying the birds of prey it would be best to collect status information on easily identified birds like the Brahminy Kite, Common Kite, Blackwinged Kite and the Neophron or Scavenger Vulture which with the ubiquitous pig still serves the conservancy needs of rural India. Information should be collected over a minimum period of at least one year.

A sloth bear at a waterhole
Photo: H.H. The Maharao of Kotah

Sloth Bear. This is one species on whose status we have very little information. You may have seen them walking, hot and bothered, down the roads of the big cities of the country, being led by the nose and made to stand on their hind feet and shuffle around at the command of their masters. We have suggested that this is a species whose status in the wild needs an enquiry.

Frogmouths of Kerala. This cryptically coloured ally of the nightjars is known only from one or two sightings from the evergreen forests of Kerala. Mr. R. Sugathan, an ornithologist of Kerala, was aided to undertake a status survey and his findings which are quite encouraging will be published in the Society's *Journal* and *Hornbill*.

Endangered Plants—Kalakkad. The Kalakkad forests are extraordinary in having several endemic species of plants. A dam is now under consideration in the forest and considering the problems that have been had with the Silent Valley it was felt early action should be taken to protect the endangered species of plants. A list of the plants was circulated to all those immediately concerned.

We have, in this brief report, not included activities and programmes already reported in the 'Notes, News and Comments' columns of the *Hornbill* issues for 1979.

Butterflies of Bombay

Butterflies flying, sailing, visiting flowers or resting with their wings folded on the back have probably intrigued you about their identity. Their naming is not much of a problem though there are over 1443 species of butterflies reported from different parts of India, distributed from the high Himalayan meadows to tropical forests of the Western Ghats. Bombay City together with the Borivli National Park on its outskirts has about 140 species of butterflies. To help to identify the butterflies we have provided some notes on their habits, and habitats.

Family DANAIDAE. Slow fliers. Body tough and leathery compared to other butterflies which enables them to survive attacks from predators which would kill most other butterflies. They are unpalatable and have an unpleasant odour which protects them from birds and lizards. Larvae feed and metamorphose on fig, oleander and milkweed. The species met with are

1. COMMON TIGER *Danaus genutia* (Cramer). Very common; on wing from May to November but abundant during September and October. Does not visit flowers much, but observed on *Senecio grahami, Celosia argentea*, etc. Larval food plant is *Ceropegia oculata.*

2. PLAIN TIGER *D. chrysippus* Linn. Very common; seen throughout the year but abundant from August to October. Seen on flowers of *Senecio grahami.* Larvae feed on *Calotropis gigantea.* A single egg is laid on the underside of the leaf. Larva feed on the central part of leaves but later on they eat margins of leaves as well.

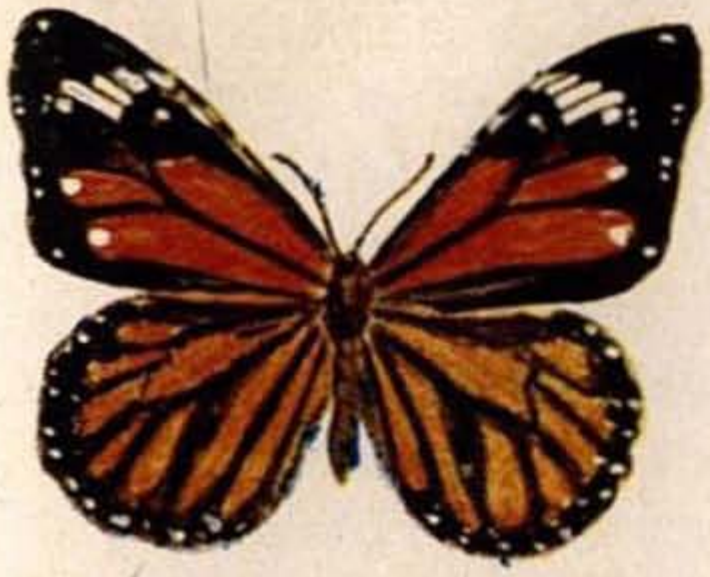
3. GLASSY TIGER *D. aglea* (Stoll.). Common from July to October. Larval food plants are *Calotropis gigantea* and *Cryptolepis buchanani.*

4. BLUE TIGER *D. limniace* Cramer. Very common. Seen on *Celosia argentea,* also *Tracheleospermum jasminoides.* Larvae on *Calotropis gigantea.*

5. COMMON INDIAN CROW *Euploea core* Cramer. Very common. On wing from June to November. Seen in large numbers on *Celosia argentea* and *Crotalaria* spp. Larval food plants are *Ficus bengalensis, F. glomerata, F. religiosa* and *Crytolepis buchanani.*

6. DOUBLEBRANDED BLACK CROW *Euploea coreta* Godart. Male of this can be differentiated from the Common Indian Crow by the presence of two parallel and longer brands on the upperside of the forewings. Not very common. Flies in September, October. Larval food plant is *Ichnocarpus frutescens.*

7. BROWN KING CROW *E. klugii erichsoni* C. & R. Felder. Rare. The male can be differentiated from those of the other two species by the presence of a pale brownish yellow area on the anterior upperside of the hindwing. Larval food plant is *Ficus hispida* and *Streblus asper.*



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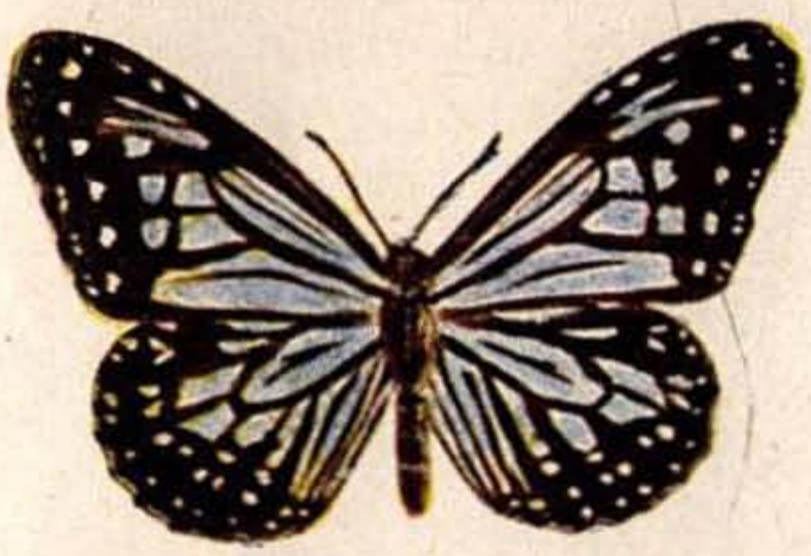

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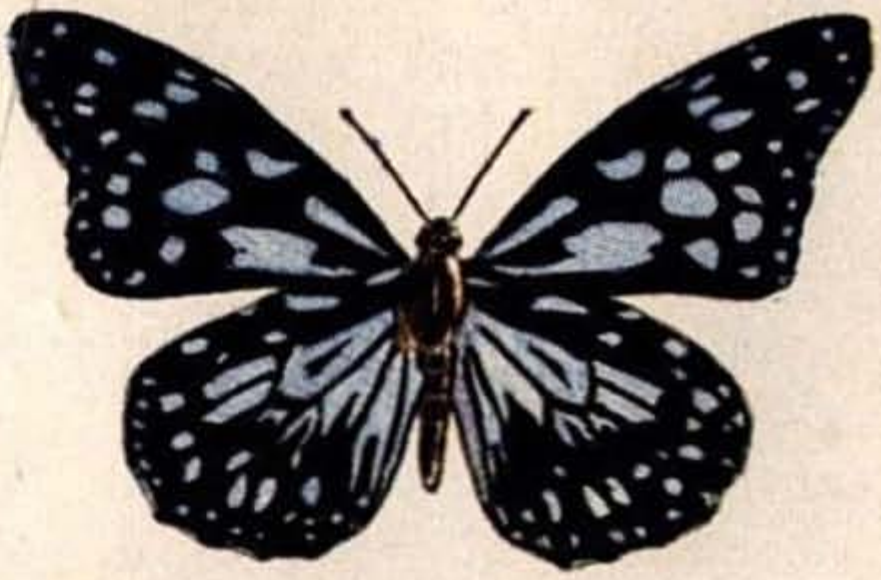

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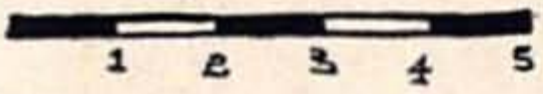


Sathish S.M.

Family PAPILIONIDAE. Commonly known as Swallowtails, as they have slender 'tails' projecting from their hindwings, but some of them are tailless. Larvae are bright in colour and unpleasant to taste and smell. Principal food plants are lemons, oranges, rues, laurels and custard apple.

(*contd. on p.* 32)

(*Continued from p.* 3)

Narcondam hornbill was already established before the island got cut off from the mainland, or whether the bird somehow arrived oversea at a later date and evolved in isolation in the restricted habitat. Why are no other hornbill species found on the rest of the islands inspite of the seemingly ideal ecological conditions for them: lofty and ancient trees for nest holes and abundance of food—*Ficus* and other fruit—as evidenced by the strong representation of other frugivores like fruit pigeons and parakeets? The absence of the pheasant and junglefowl family (Phasianidae) so common in Burma, struck me as another surprise.

Although thwarted by circumstances from achieving most of our planned objectives, we did obtain a sufficiently realistic overview of the position to lend the fullest support of the Society to the Chief Conservator of Forests' proposal to the Union Government for declaring certain identified areas in the Andamans as Biosphere Reserves to be preserved in perpetuity. Unfortunately it is not sufficiently appreciated how important and urgent this matter is. With the rate at which "development" is overwhelming the islands—acceleraed timber exploitation, opening up of forest land for settlement and rehabilitation of East Bengal and other refugees and ex-servicemen's families, the expanding activities of the Forest Development Corporation of replacing original forest by monoculture of commercial timbers and cash crops such as oilnut palm and rubber; and perhaps the most insiduously alarming of all, the intensified search for mineral oil.

However, all such conservation measures as wildlife sanctuaries, National Parks or Biosphere Reserves can have no meaning in the context of the Andamans unless and until the Wildlife Division of the Forest administration is adequately strengthened by additional trained protective staff and provided with a sufficient number of fast motorized boats for inter-island patrolling and the control of poaching. Commercial poaching of wildlife, chiefly of sea turtles and their eggs, is rampant on many of the remoter islands by professional gangs in dugouts and dinghis in complacent realization of their immunity from official interference.

SALIM ALI

Counting Elephants

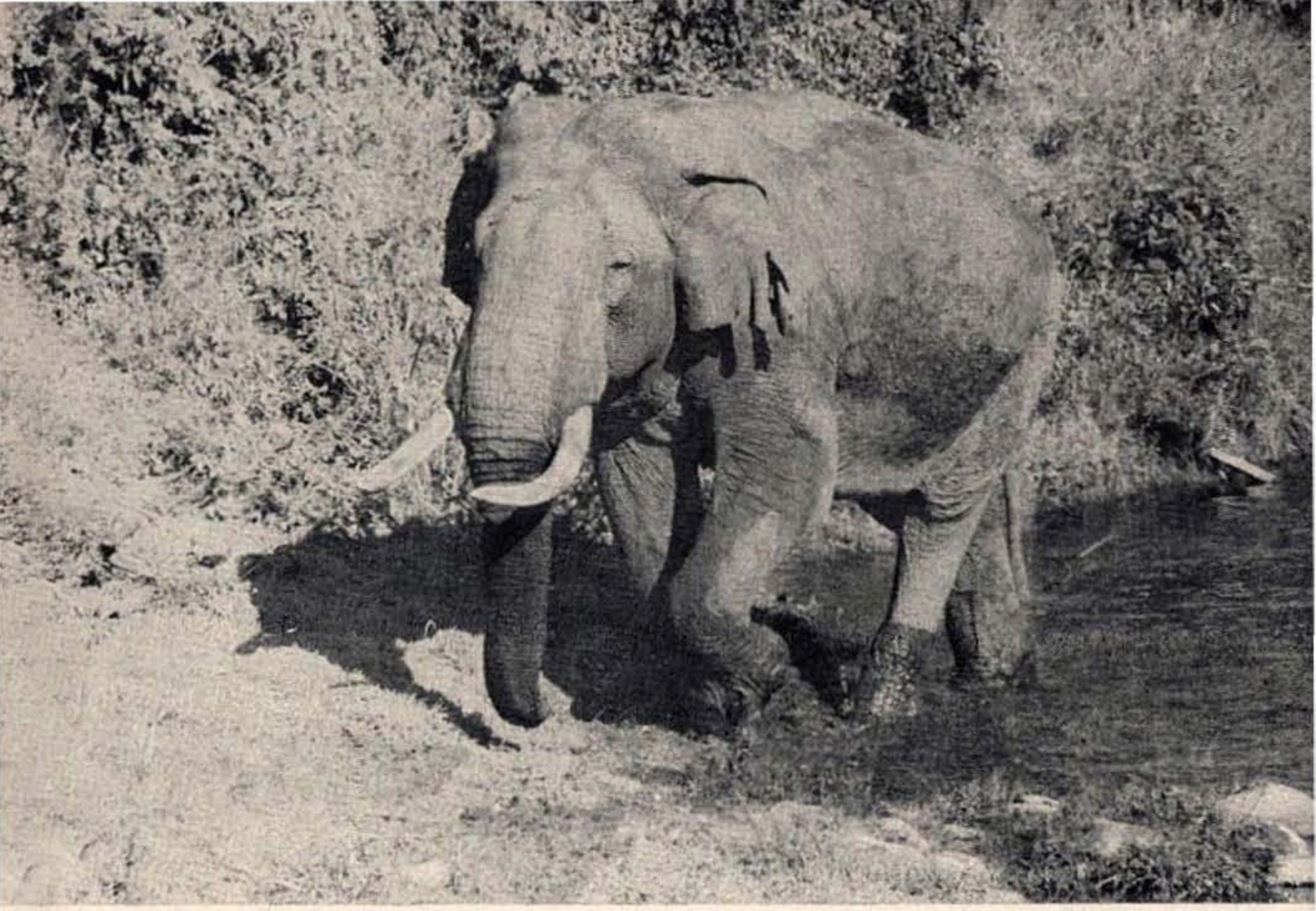
The Indian elephant in its wild state is adored or abhored, the latter, especially by those who have to share its habitat. Some think there are too many of them and others that there are too few. There are those who advocate control and others who strongly oppose any kind of management. Who is right and who is wrong? Only a head count can tell. No one will question this magnificent animal's right to live and grudge it a place to live in. But where? The pattern of its distribution might provide the answer.

A census of elephants over its entire range in South India spread over the three States of Tamil Nadu, Kerala and Karnataka organised to determine its distribution and status was the first step in formulating a plan to provide home ranges for the wild elephant. Such a census was organised for the 29th of May last year. The enumeration had to be done simultaneously on a given day to avoid duplication and, of course, to avoid missing some altogether. This possibility would have been there had the census proceeded at a leisurely pace over a period of time because of the elephant's love for wandering.

The count meant massive organisation involving thousands of men, problems of logistics, etc. I was glad I had no such responsibility. I was one of the enumerators and for me it was an adventure. Besides, it helped me to gain first hand knowledge of the census operation at the lowest level.

For purposes of administration, reserved forests in the states are divided into divisions, ranges and beats, and further divided into blocks and compartments. For the purpose of the census, the beat or an area roughly the size of a beat marked by well-defined geographical boundaries was taken as the unit. Each such unit was roughly 25 to 40 km in extent. I had a choice of 4 beats around Masinigudi within the Mudumalai Wildlife Sanctuary. I chose the Avaralla/Jagglikadavu beat west of the Sigur river, most of which was comparatively open country of dry deciduous forest type and usually held a fair sized elephant population. Each party consisted of the beat guard and watcher (and in certain beats the range forester), a tribal tracker and a helper. Each party was supplied with a proforma to note down details of the count. We were to adopt the sight count method based on actual sightings.

The census operation was planned to start around 5 a.m. When I reached the wildlife range office at Masinigudi, it was still dark, but the men had gathered there. There was no point venturing into the bush in the uncertain light of dawn unless we wanted to count elephants by the touch method! Wild elephants are temperamental by nature. Elephants when they closely associate with man suffer harassment and are irritable and are usually in a bad mood. This is particularly true of elephants around Masinigudi many



Tusker at Mudumalai *Photo*: Peter Davidar

of which come into daily conflict with man over the crops raised by him. So all possible care had to be taken to avoid running into them by accident.

It was a bright day and as soon there was sufficient light to see by the Range Officer took us in his jeep and left us at our starting point which was Moyar, the electricity board township 8 km away. The jungle was fully awake by then and birds were welcoming the day noisily. We worked our way along the rim of the Moyar gorge to the point where the Sigur river plunges into the Moyar Canyon 1000 ft below, to join the Moyar river. The waterfall is very picturesque. I was lost in admiration of the sight until I was reminded of the purpose of our trip. With my binoculars I scanned the slopes of the canyon for elephants. I did not see any. We then proceeded up the Sigur river stopping and listening intently every now and then for noises that elephants usually make while feeding —trumpeting, mothers calling their young, squeals of calves, breaking of bamboo branches and of trees and so on.

It was nearing the end of the hot season and water was available only in the river and elephants therefore could be expected to be concentrated near the water. This was what we were hoping for. It would appear that the time of the enumeration was chosen after earlier trials and errors. And this seemed the right time. As we proceeded up stream we looked for fresh elephant spoor and other signs. We also fanned out whenever we came to likely elephant feeding grounds.

At about 9 a.m. we picked up the tracks of a herd that had just come into our area. Mathan, the tracker, set to work tracking the herd, with the rest of us following. As the trail got warmer excitement mounted. We hoped to meet the herd at any moment. Elephants, it is true are huge, as large as hay stacks, and it is difficult to believe that it needs a practised eye to detect an elephant. In actual practice elephants that do not give themselves away by making noises are very difficult to make out in cover. And elephants can be very silent indeed when they do not want to give themselves away. To detect wild animals in their habitat one has to develop 'jungle eyes'. I prided in thinking I had keen jungle eyes. But compared to Mathan I found I was a tyro. Having lived all his life in the jungle Mathan could make out the smallest living thing a long way away. What seemed to be part of a mud bank to the rest of us was transformed into elephants when Mathan pointed them to us! They had obviously sensed our presence for we were only 30 metres away. They were moving in single file. There were four of them —two full grown females, a young about a year old and a slightly older calf about 3 years old. This sight was greatly encouraging especially since we had a lot of time and area left.

After the elephants had disappeared from view we decided to stop and have breakfast. The Range Officer had thoughtfully provided each party with breakfast and lunch packets. It turned out that Mathan had eyes everywhere. He located and robbed a hive and gave us a welcome treat of wild honey. It was beginning to get warm. After proceeding some way up the river we decided to change course and head towards the Maravankandi dam. The overflow from the dam formed a perennial stream which was a favourite spot for elephants. Just then we heard elephants in the river and hurried towards the noise. They had been disturbed and dashed into a thicket and disappeared from view. The cause of the disturbance was a solitary wild boar which had wandered too close. This was rather strange as elephants usually ignore wild pigs. There could have been some other reason which we did not know. How to count the herd in their retreat in the bush? It would have been unwise to follow them into the dense cover and at the same time we could not stay there the whole day waiting for them to break cover. We tried to beat them but they would not budge. A herd of elephants in a small thicket and we were foxed! This only goes to show that elephant enumeration is not as simple as one would like to believe. In thicker jungle the problem would be worse. At 11 a.m. we got a glimpse of the herd. It was composed of one full grown male—a nice tusker—seven adult females and two calves.

We then moved to the Maravankandi area. Every time a sambar stampeded through the cover we

Moyar Slope *Photo*: E. R. C. Davidar

were negotiating it gave us the creeps. We could not be sure whether it was an elephant charging us or some smaller animal fleeing away from us. In dense cover sound is magnified. It was now 3 p.m. and and very hot. Then the sun mercifully went ahead behind a blanket of clouds and gave us some relief from the heat. We had a brief halt for lunch and set out again.

After casting about for fresh signs of elephants we decided to head back to Masinigudi along the Singara-Moyar flume channel. We got there without encountering any more elephants.

After the men left me I proceeded along the Moyar road and had a chance meeting with three elephants. Two females and one small calf materialised ahead of me like ghosts in the dark. They were coming from the area we had just left! They were not one of the elephants I had seen earlier. And to think we had searched every conceivable place where an elephant was likely to be in our beat! I reported my sightings to the Range Officer. There were altogether 17 elephants in our beat—the young among them forming a good proportion. There were 64 in the beats and none in one, 81 in all in our range.

If three elephants could have been missed in an easy terrain and in a jungle which was thick only in parts what about inaccessible slopes and heavy jungle? No doubt more were missed this day during the operation and possibly there was some duplication. Some of the numerous ennumerators may not have been very conscientious and some may not have had the stomach for the risks involved. The census may not therefore be one hundred per cent correct. But it certainly gives us a very good idea of elephant population in South India and the data collected will provide the basic ground work for formulations of action plans to help this magnificient creature live in peace with its neighbours.

PETER DAVIDAR

Notes, News and Comments

Executive Committee Election of 1979

The Society, considering the nature of its activities, needs a cohesive Executive Committee and normally members accept the nominations of the outgoing Executive Committee as the best suited to meet the Society's needs. In fact there was no election in the first 88 years of the Society's existence. Since 1971 elections have had to be held occasionally when additional nominations were received from members. Perhaps it is an indication of members' interest in the Society. Those elected in 1979 are:

1. **Prof. P. V. Bole,** votes received 397. Joined 1951; Committee member from 1964, Prof. Bole teaches Botany at St. Xavier's College, Bombay, and is the Botany editor for the Society's *Journal*. Main interests are Plant systematics and medicinal plants.

2. **Dr. A. N. D. Nanavati,** M.D., votes received 390. Joined 1964. Committee member from 1970. Also the Society's Honorary Secretary and one of the editors of the *Journal* from 1974. Dr. Nanavati is a Virologist who retired as an Assistant Director of the Haffkine Institute at Bombay. His current interest is environmental pollution.

3. **Dr. S. R. Amladi,** M.D., votes received 375. Joined 1964 and Committee member from 1972. Associate Professor of Pharmacology at the Topiwala Medical College at Bombay. Interests, general natural history particularly botany and wildlife photography.

4. **Dr. C. V. Kulkarni,** M.Sc., Ph.D., votes received 371. Joined 1954 and Committee member from the same year. Dr. Kulkarni's speciality is fish and fisheries. He retired as Director, Fisheries Department, Maharashtra State and is currently engaged in researches on the breeding of Mahseer Carps.

5. **Mr. Humayun Abdulali,** votes received 352. Joined 1931 and Committee member from 1943; was Honorary Secretary from 1947 to 1963. Businessman. Interests, general natural history. Speciality bird taxonomy; currently engaged in cataloguing the Society's bird collection.

6. **Dr. B. Das Gupta,** M.S., votes received 341. Joined 1974 and was elected Committee member in 1975. Surgeon in private practice. Interests, general natural history, particularly wildlife photography.

7. **Mrs. Dilnavaz Variava,** votes received 334. Joined 1974. Committee member from 1978. Senior business executive. In-

terests, Wildlife Conservation. Was Administrator of the World Wildlife Fund (India). Currently Convenor 'Save Silent Valley' Committee.

8. **Mr. H. K. Divekar,** B.E., votes received 308. Joined 1974. Committee member from 1975. Partner in an engineering firm. Interests reptiles, particularly organizing educational snake exhibitions. Currently engaged in a survey of the status of the Wild Buffalo.
9. **Mr. David Fernandes,** votes received 302. Joined 1972. Elected to the Executive Committee in 1979. Business executive. Interests Wildlife Conservation; worked with the World Wildlife Fund (India) for some time. Currently an active member of the 'Save Silent Valley' Committee.
10. **Mr. Bansi Mehta,** votes received 291. Joined 1968. Committee member from 1975. Stock Broker. Interests, Wildlife and environmental conservation.
11. **Mr. Divyabhanusinh Chawda,** votes received 277. Joined 1977. Committee member since 1978. Senior business executive. Interests, general natural history and wildlife conservation.
12. **Mr. M. S. Srinivasan,** votes received 259. Joined 1969. Committee member from 1978. Senior business executive. Interests, conservation and bird-watching.

The number of members eligible for voting was 936.

Trekking in the Nilgiris

The Nilgiri Wildlife Association has many Game Lodges which can be used by trekkers and wildlife viewers. Guides registered with the Association are available on the following terms: Rs. 10/- per day with a *batta* (allowance) of Rs. 5/- for a full day out on camp. Those who are desirous of engaging the Association's Registered Guides are requested to book them through the Office of the Association to enable the Association to keep a check on the rates charged. The wages of ordinary helpers is Rs. 7/- per day; a *batta* of Rs. 5/- for a full day of 24 hours will be paid to both categories.

Flowering of bamboo

U Tun Yin writes that in 1954 he planted in his compound in Rangoon, Burma a clump of 'Wabo' (*Dendrocalamus giganteus*) obtained from the University Estate. For a number of years he cropped on an average of eighty shoots a year. The yearly crop began to decline and it bloomed throughout 1976 and 1977. In 1978 he cut all the plants. From the stumps, side shoots sprouted and have been blooming. He learnt that in the University Estate, side shoots are also blooming as they do in his compound.

Co-operation to Naturalists and Wildlife viewers

Mr. Amrut S. Dhanwatay of 108, Ramdas Peth, Nagpur 440 010,

who is a member of our Society wishes to bring to the notice of fellow members interested in wildlife observation or photography that there are about six National Parks around Nagpur, Madhya Pradesh, within easy motorable distances well connected with public transport. These have all amenities such as dak bungalows, canteens, etc. If any of the Society's member desires to visit any National Park around Nagpur, he would be most happy to guide and give such help as is feasible.

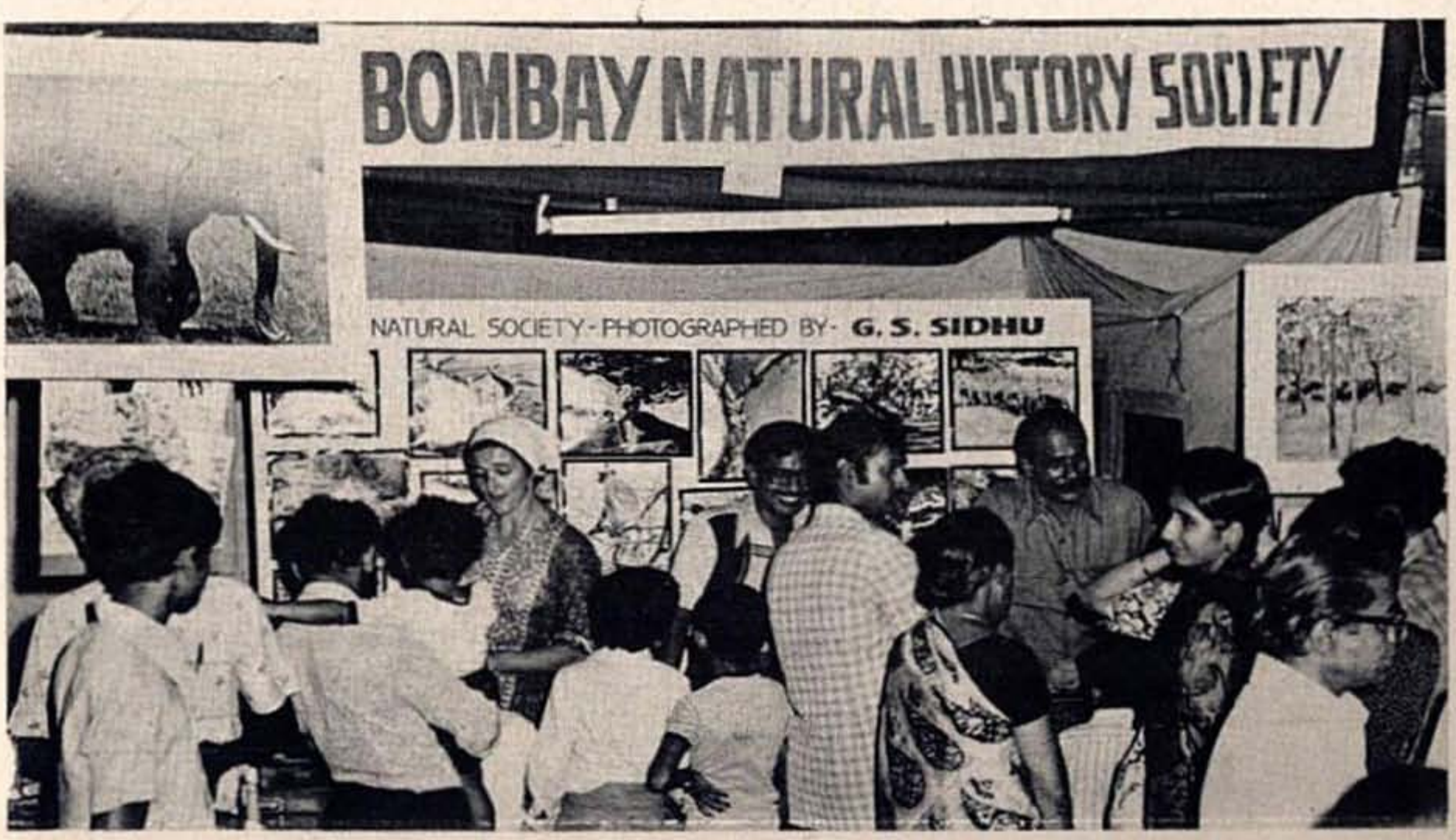
An Appeal

Dr. Rick C. West, 519 Phelps Avenue, Victoria, B.C., Canada V9B 3H9 is studying the Theraphosidae spiders, also known as Catleg Spiders (cf. *Hornbill* Jan.-March 1977, pp. 36-37). Besides specimens he would be interested in having information on folklore or superstitions about these spiders. Readers who are in a position to give Dr. West any information are requested to communicate with him.

'Happy Environment' Exhibition

Thanks to the Rotary Club of Bombay West, a stall was given to the Bombay Natural History Society at the 'Happy Environment' Exhibition at Santa Cruz, Bombay, from the 13th to 16th March. Members of the Society: Mrs. Phillippa Mukherjee, Dr. A. S. Kothari and Mr. G. S. Sidhu, assisted by the Society's staff managed the stall. Specimens of a few birds and butterflies were displayed, and many visitors to the stall were persuaded to join the Society as members and extend support to the cause of Conservation and Wildlife Preservation. An added attraction to the stall were the beautiful enlargements of photographs of wildlife in the natural environment made by Mr. G. S. Sidhu. Members' children were active in collecting voluntary donations from the visitors towards the cause of Conservation. We hope to acquire further benefits from visitors to the exhibition joining the Society.

Society's stall



A pack of Wild Dogs

The wild dog society is every feminist's dream come true. The elephant bulls leave the cows alone, but do not help them in any way either. The chital stags force the does to stay on the periphery of the herd where they are much more susceptible to danger. The paper wasp drones are parasites on the colony and force the female workers to feed them without doing anything in return. And the hanuman langur males bully the females incessantly, slaughtering their infants every once in a while. We have thus seen little to comfort a feminist in our animal histories so far. Fortunately that is not the whole story, and we have the wild dogs, wolves and hyaenas. In these pack hunters' females enjoy a position of equality, or even dominance over the males. These, too, are amongst the most strife-free societies known to us.

With the decline of the bigger cats, wild dogs have become the commonest predators of the larger mammals in India today. They are about the size of a pariah dog with a rusty, brown colour and a big, bushy, black tail. They are always in packs ranging in size from six to fifteen animals. The packs are bi-sexual, with roughly equal number of males and females. The sexes are well-nigh indistinguishable at first sight.

The packs hunt in cohesion and this is the key to their sociality. Wild dogs prey on animals considerably larger than themselves—chital, sambar, wild pig and occasionally even an adult gaur that is disabled. For successfully bringing down these large animals they depend on group effort. If the group did not act in unison, they would have to rest content with smaller prey such as hare, partridges and rats. Although, like jackals, they do take the smaller prey from time to time, bulk of their nourishment comes from the bigger game they hunt as a pack.

If you place a huge pile of plantains in the midst of a group of hanuman langurs, you release mayhem. As all the monkeys scramble for the plantain, the dominant male threatens and drives them away. He makes every attempt to monopolize the booty as the other monkeys try to sneak in and steal a plantain here and there. When the dominant male cannot stuff himself any longer, the subordinates quarrel over the remainder.

But when a pack of wild dogs bring down a chital, they all feed peacefully on it. There is no growling, no threat. Every dog is intent on bolting as much meat as quickly as possible. Any injured member of the pack which could not help in the actual hunt will still get a share. And in the breeding season the dogs will go to the den and feed the pups and the bitch or

Part of Bent Ear's pack of Wild dogs—Bandipur Tiger Reserve.
Photos: A. J. T. Johnsingh

"Bent Eared Wild Dog". Bent Ear, leader of the pack drinking

dog who has stayed with the pups by regurgitating meat to them.

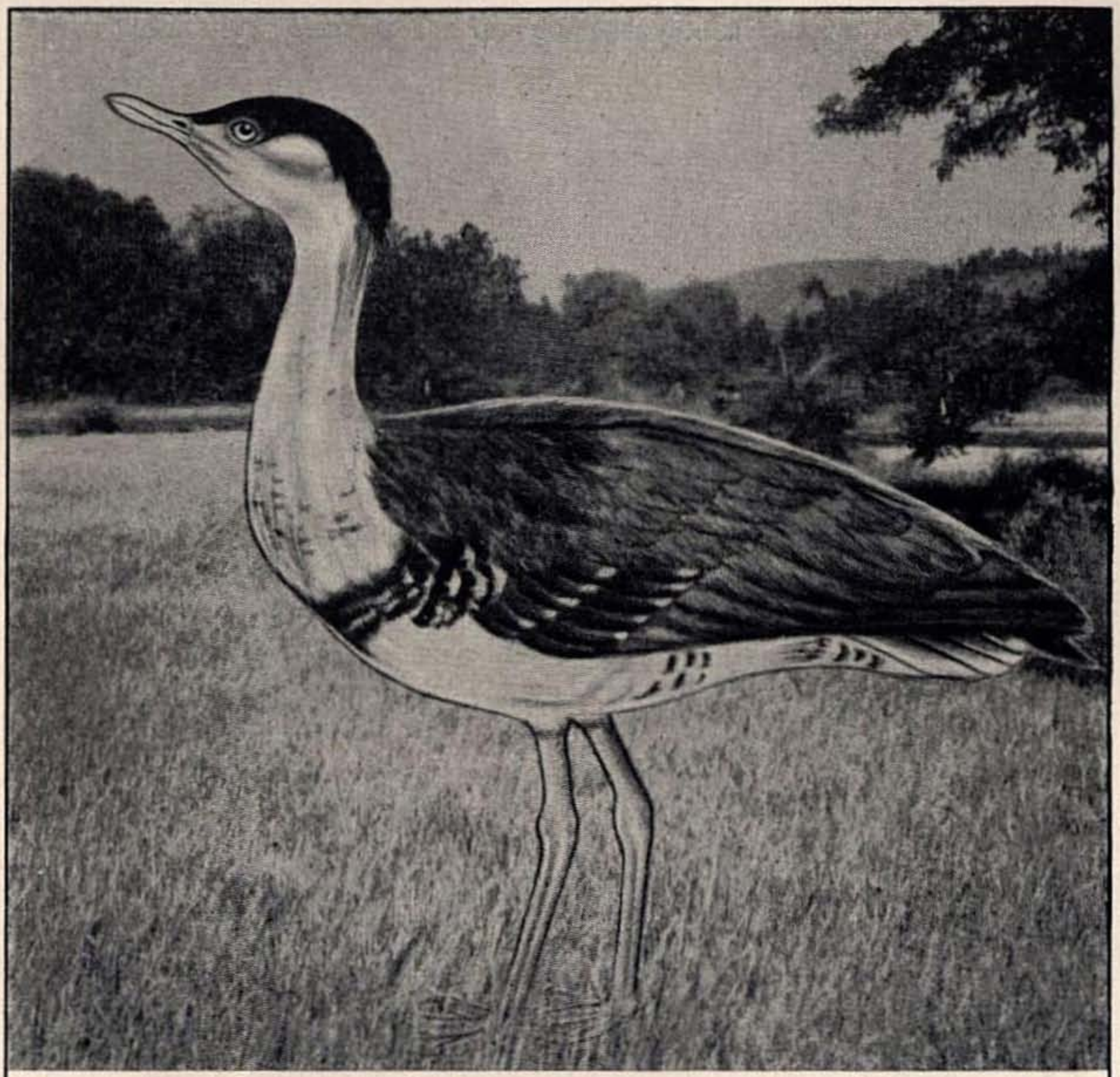
An intriguing feature of wild dogs society is the monopolisation of breeding by a single bitch. Only one bitch of a pack litters in a rocky den every year, bringing forth as many as nine young. The other bitches apparently accept sterility, at least for that one year. Part of the clue to the cohesiveness of the wild dog society probably lies in this pattern of breeding. For wild dog packs are essentially family packs with all individuals being related to each other as brothers or sisters or mother or father or uncle or aunt. Although we are not yet absolutely sure of the composition of a wild dog pack, it must surely be a group of very close blood relatives.

As we discussed earlier in connection with wasps and elephants, natural selection does favour self-sacrificing traits if such sacrifice strongly benefits a blood-relative. Such kin-selection has no doubt operated amongst the wild dogs to produce a strife-free pack. Moreover, for the pack hunters co-operation is critical. Without it they will be unable to exploit their major sources of nutrition, and natural selection would have therefore strongly favoured co-operative traits.

It has been suggested that early humans were also pack hunters like the wild dogs. Most of the monkeys and apes collect their food of leaves, fruits, insects and reptiles individually. They never share it with each other, and there is no development of co-operative behaviour in this context. The chimpanzees, however, do occasionally hunt larger prey such as other monkeys. Group effort plays an important role in such hunts by chimpanzees, and they do share such large prey with each other. Correlated with this pack-hunting behaviour, the chimpanzee society shows much less strife within the group. It is highly likely that our remote ancestors were also pack-hunters in the manner of chimpanzees, with co-operative hunting playing a very significant role in their societies.

The pack-hunters like wild dogs are therefore key animals to our understanding of the development of human sociality. They have been little looked at so far, except for the pioneering work of Davidar and the important recent studies by Johnsingh who has taught me much of what I know of wild dogs. We are yet to learn much though, particularly about the composition and dynamics of the packs—and this is a golden opportunity for our naturalists to make a significant contribution to sociobiology.

MADHAV GADGIL



The Great Indian Bustard. Ten years from today how great will it be?

Once, this bird inhabited almost the entire Indian Peninsula.
Wherever there was open flat grassland, the Great Indian Bustard lived.
But not any more.
Today, just a few of these shy, confiding, harmless creatures are alive.
Almost on the brink of extinction. Like scores of other species—victims of indiscriminate poaching and unprecedented deforestation.
If we do not save our wildlife now, our world will be without birds and animals in the future. Because extinct is forever.

It's your world. Help save it.

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BIRDWATCHER

A project for the eighties: Saving the Spottedbilled Pelican

As dedicated naturalists, members of the Bombay Natural History Society could not have missed an interesting contribution by Shri S. N. Guttikar to Volume 75, No. 2, of Society's *Journal*. Writing under the title A LOST PELICANRY, Shri Guttikar reminds us of the recent and inexplicable desertion of their major breeding centre by Grey or Spottedbilled Pelicans (*Pelecanus p. philippensis*). His note should serve to wake us up and worry seriously about the future of this species of pelican whose breeding, so far as can be gathered from the meagre records, is now restricted to a few spots in India and Sri Lanka. In India these are: the Kaziranga Sanctuary, Sajne Kahl in the Sunderbans, the marsh at the entrance to the Delhi Zoo, Sulurpetta in Andhra Pradesh, Bellur and Bannalli villages in Karnataka (Mandya dist.), Kanjiramkulam (Ramnad dist.) and Kundakulam (Tirunelveli dist., Tamil Nadu). Even if all these nesting places are in regular use by the birds, they cannot account for more than 4 to 5 hundred pairs at the most. Yet, some 25 years ago there were, according to E. P. Gee's computation, no less than 1500 nests in the Kolamuru area (W. Godavari dist.) alone. A hundred years ago "millions" of Grey Pelicans used to nest in a truly stupendous pelicanry '20 miles long and 5 miles broad' in the Sittang Valley of Burma. No one knows the fate of these pelican legions! In our own time the 'Kolleru pelicanry' was the largest known; and even in its heyday it could not have held more than 2000 nests.

With the loss of the Kolleru pelicanry the species must be facing a real crisis unless the birds have discovered some other breeding place of the same magnitude. But we know of no such place. Although reliable statistics are not available for the country as a whole, it is known that hundreds of Grey Pelicans are regularly seen in both the breeding and non-breeding seasons in places like Point Calimere. Their numbers may mislead us into thinking that the species is somehow holding its own against every adverse circumstance, but it is doubtful whether even 10% of the birds breed regularly.

We should remember that the pelican is a long-lived bird. It is quite probable that most of the Grey Pelicans living today are more than 20-25 years old. If the existing population is unable to nest anywhere and produce a reasonable number of young ones, we may find the number of Grey Pelicans suddenly plummeting down; and if that happens it won't be long before the species becomes extinct.

In the face of this prospect, it is the duty of every birdwatcher and conservationist in India to be on the look out for the Grey Pelican and to note down when, where and

Pelicanry at Kolleru. *Photo*: E. P. Gee

The parent being "unloaded" by a chick. *Photos*: E. P. Gee

A nest with parents and young on top of a babool.

in what numbers it was seen. If the bird is found nesting, full and precise details. should be recorded. The information so gathered may be sent to the Bombay Natural History Society or directly to me at the address given below. I should be only too happy to co-ordinate the findings and publish summaries periodically in the *Hornbill* or in the Society's *Journal*. The active co-operation of every birdwatcher all over the subcontinent is earnestly solicited.

Let us launch a Project Pelican and preserve this species for posterity.

A FOOTNOTE ON OUR PELICANS

3 kinds of pelican occur in India. All are as big as a large domestic goose (i.e. + vulture in size). Plump-looking with a long neck and a long bill, flattened above, and with a large pouch of loose skin on the underside. Legs short; feet fully webbed. Wings large and broad; tail short.

The Grey Pelican is the only one that has no black on its wings and has two rows of bluish black spots, one on either side of the upper mandible.

If the pelican you find flying overhead has white underparts with strikingly black flight feathers and pink or red legs and feet, it will be a White (Rosy) Pelican (*Pelecanus onocrotalus*).

If the bird flying overhead has the front and rear halves of the wings white or whitish (not black on the rear half), it could be a Dalmatian Pelican (*P. philippensis crispus*) or a Grey Pelican (*P. philippensis philippensis*). But the Dalmatian form will show some black at the tips of its wings. If the pouch can be seen, note its colour; the Dalmatian's pouch will be yellow to orange; that of the Grey Pelican will be purplish.

SUMMARY OF FIELD MARKS

Plumage:

white with rosy tinge—White (Rosy) Pelican

silvery white — Dalmatian Pelican

grey—Grey (Spottedbilled) Pelican

Underside of wing:

shows strong black and white contrast (lining white, all flight feathers jet black)—White Pelican

shows no contrast, but appears to be greyish or white all over—Dalmatian or Grey Pelican

Legs and feet:

flesh colour, pink or red—White Pelican

lead grey to brownish, not red or pink—Dalmatian or Grey Pelican

Colour of pouch:

pale pink, orange or yellow—White Pelican or Dalmatian Pelican

purplish, blotched and spotted with bluish black—Grey Pelican

Bill:

yellow to orange and unspotted—White Pelican or Dalmatian Pelican

dull yellow or ochre, with a row of blue-black spots down both sides on top of the bill—Grey Pelican

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A look at the Kerala forests

In May-June last year I had an opportunity to visit some of the forested areas and hydroelectric-irrigation projects in the Western Ghats of Kerala. The visit was possible with a grant from the Sálim Ali Nature Conservation Fund. Messrs V. S. Vijayan of the Kerala Forest Research Institute and R. Sugathan, a research scholar, very kindly accommodated me in Dr. Sálim Ali's programme in Kerala in search of Frogmouths. Mr. Sugathan has been surveying the area to explore the possibility of locating the rare frogmouths to study their biology and ecology. The itinerary included a visit to the Kerala Forest Research Institute establishment at Peechi and then to Sholayar dam and catchment area, Kuriarkutty and surrounding forests, Idamalayar dam and catchment area, Thattakkad and Periyar Tiger Reserve.

Sholayar. The catchment area of the Sholayar project lies south of the hill range that separates it from the Parambikulam Hydroelectric catchment area of Tamil Nadu. The contiguous forest areas of the two projects on either side of the Pandaravarai peak, harbour a considerable number of wildlife including the Tahr which inhabit the bare precipitous rocks of the Pandaravarai outcrop. Herds of gaur frequent the lower portion of the hills and are sometimes seen from the project rest house.

A second dam is being proposed on the Chalakudiyar at Vazhachal. This project will submerge a considerable stretch of the Chalakudy-Anamalai road. An alternate route then has to be made above the existing road which would open up additional forested areas, and exert pressure on the forests above Chalakudiyar gorge. Once again further destruction of this habitat will affect elephants of this area. The Vazhachal dam will also hold up flow of water to the picturesque Adirapally waterfall down river.

While the forests in the immediate vicinity of Sholayar, for the present, seem to be relatively undisturbed, large tracts of good forests including some excellent bamboo patches are being cleared on the lower hills on the Vazhachal-Kuriarkutty tract. These gently undulating hills are being completely denuded and are replanted with tapioca, teak and other commercial varieties. Such denudation of watershed areas is bound to affect the ecology of the area in the long run. The fertile ground layer of the original forest would no doubt provide excellent top soil for tapioca and other commercial crops. But by the time two or three crops are raised most of the top soil would have been washed away by the monsoon rains leaving behind a bare landscape, though this would be replanted with teak, it would make very poor substitute for the original forest. Tapioca provides

Sholayar Dam Reservoir *Photo*: S. A. Hussain

a cheap staple food for a large number of people in Kerala and its cultivation is favoured as a secondary crop to rice. But sacrifice of primary forests is indeed a very dear price to pay for cheap food, and in the long run could prove disastrous to the economy of the State.

The old tramway that passed through the excellent forests from Chalakudy to Kuriarkutty and beyond is being converted into an all-weather road. An irrigation-cum-hydroelectric project has been sanctioned at Kuriarkutty. This 24 crore-rupee project is expected to be completed in six years and would provide irrigation water for the entire Kozhichampara Firka.

Periyar-Idamalayar complex. The Periyar river has been tapped at two places for electricity—Periyar and Idikki. Further down river a barrage has been constructed at Bhbotanketu near Kothamangalam. Recently the water from this barrage has been let out in order to carry out repairs and to raise the height. Impounded waters of the raised barrage would submerge considerable areas of Thatakkad forest on the right bank of the river. This patch of forest has been known as one of the best for birdlife. A 200 m deep stretch of the forest along the river has been already encroached upon by settlers. Paddy, coconut, arecanut and other commercial varieties are being planted by the settlers. Pressure on the adjacent forest is evident by the fact that the original forests are making way for teak plantation.

Though the hydroelectric/irrigation projects have a major impact on the ecology of the areas where they are situated it can be conceded that once such projects are complet-

Clear-felled for Tapioca--Vazhachal-Kurialkutty

Tapioca plantation on hills clear-felled of forests
Photos: S. A. Hussain

ed and commissioned, (except in exceptional areas like the Silent Valley, which are remnant ecosystems), the affected areas except for the submerged portions regenerate to a certain extent. The initial onslaught on the surrounding areas of the dam site lasts as long as the construction is in progress and the activities of not only the contractors engaged in extraction of timber etc., but also the labourers and supporting staff associated with the major construction projects should not be permitted to cross irremediable levels. Approach roads to project areas also encourage poachers and other destructive elements. The Forest Department and Police Check-posts are situated on these roads mainly to check illegal transportation of timber. Normally these check-posts are not very effective against poachers. Availability of rest houses in these areas also encourages law breakers. A colleague on a survey trip to Silent Valley in Palghat district recently was offered 'all the facilities' by the project staff camped there, including as a special consideration, Nilgiri langur meat!

Kerala State has perhaps one of the best natural resources in India. Everywhere the energy potential of the forests is being exploited for human needs. Timber and firewood are perhaps the first source to be exploited. Bamboo and other specific produce cater for specialised forest based industries. Geographical features like well-drained shady slopes with suitable climatic conditions have provided land for commercial crops like tea, coffee, rubber, cardamom, etc. Perennial streams cascading down steep gradients are a continuous energy potential for generation of electricity as well as for water irrigation in the plains. Mineral and other subterranean resources can be exploited if feasible. All these factors are favourably disposed within the boundaries of Kerala State. The State has the additional advantage of a long sea coast that provides for an excellent marine based industry. Along with the natural resources the State has the highest literacy rate in India.

Against all these advantages, unfortunately, there appears to be a tendency among the authorities to over exploit the resources. This in the long run could prove to be disastrous. The socio-economic situation prevailing in Kerala today is highly conducive to the development of a stable and prosperous community. There are all the advantages that can come to a successful society of an obviously intelligent group of people, bestowed with a certain degree of natural advantages, not paralleled elsewhere in India, except perhaps in the Punjab. One would expect from such a society a balanced and rational approach to various problems and a far-sighted outlook. This unfortunately does not appear to be the case in Kerala.

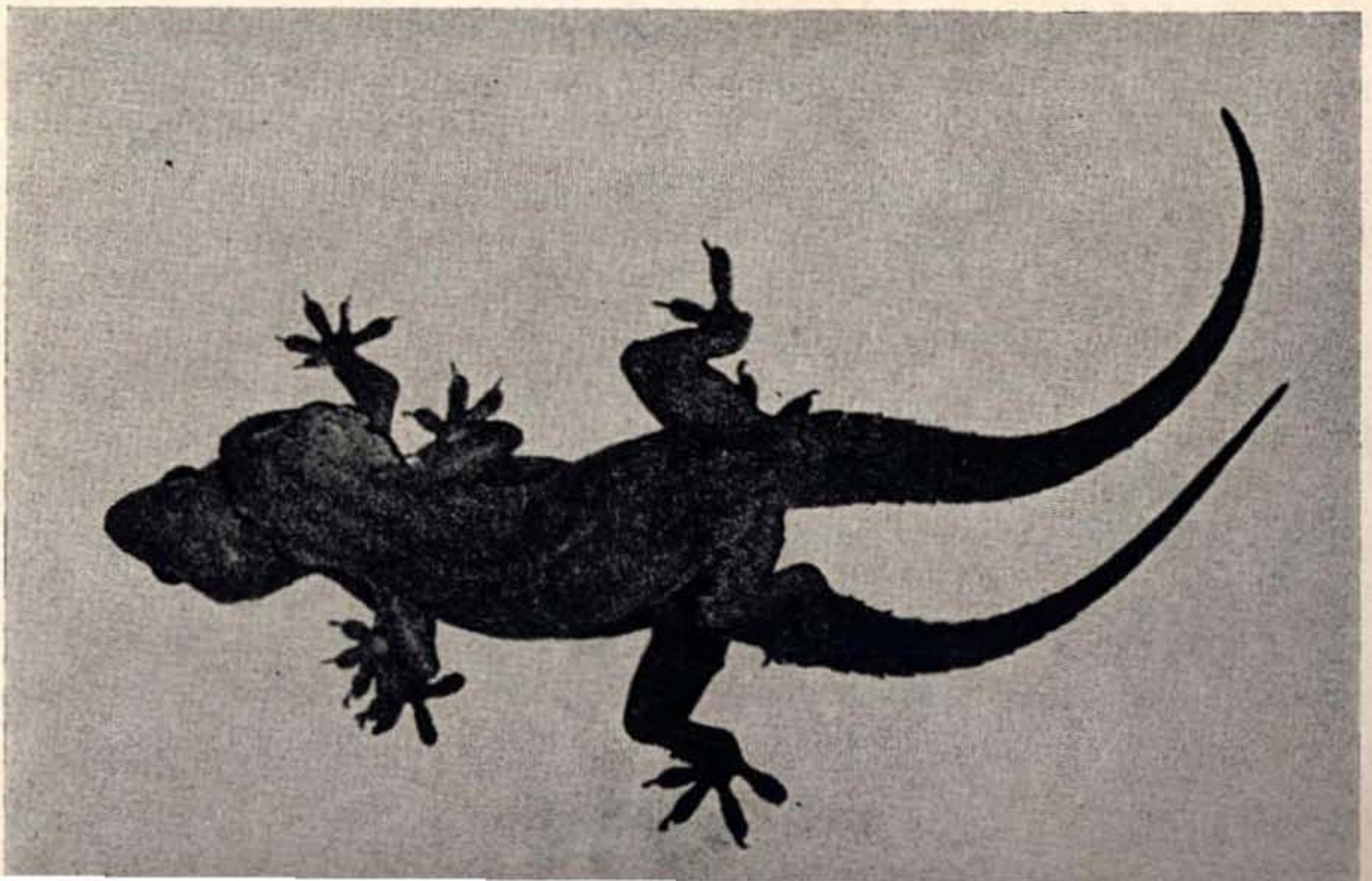
S. A. HUSSAIN

Love life of the gecko

The geckos, lizards of the family Gekkonidae are found all over the tropics, even in the remotest islands. The Wall Lizard or Common House Gecko (*Hemidactylus flaviviridis*), lives in our houses. It breeds during March, April and May in western India. The male gecko, like the males of other lizard has, not just one but a pair of copulatory organs called hemipenes. Each hemipenis is a hollow structure located in the base of tail just behind cloacal opening. During mating, only one of the hemipenes, the one nearest the female, is everted and introduced in the cloacal opening of the female. A groove on the outer side of the erected hemipenis acts as a channel for sperms. The courtship and mating of geckos are a chain of species-specific instinctive reactions, rarely witnessed and still rarely photographed.

On one April evening, I had a 35 mm camera fitted with 120 mm lens and an electronic flash attachment handy, when a pair of geckos started their courtship rituals on our drawing room wall. On this occasion, I first noticed the female dashing around actively catching insects under an incandescent tube on the wall. I soon noticed the male lurking in the shadow and observing the female intently; the sexes were easily recognised because the base of tail which accommodates the hemipenes, is relatively stouter in the male. A couple of times the male took a few steps forward only to withdraw back into the shadow. He continued to watch, wiped the cornea of one of his eyes with the ton-

Mating geckos
Photo: R. M. Naik



gue, and also chirped. Finally convinced that the female was in an agreeable mood, the male came out into the open and in a hurried, but typical wobbling gait of geckos, approached the female from behind. Even before I could blink my eyes, the male had seized the skin on the female's neck with his jaws and was on her back. Thereafter things happened in a slow motion. By bending his tail downward the male manoeuvred his cloacal opening into contact with the female's and brought about insertion of one of his hemipenes. They remained locked up in this seemingly impossible posture, but still maintaining a firm hold on the smoothly plastered wall, which only geckos can do, for about a minute or two. Then the female started pulling herself up the wall; the male, still gripping the female's neck with his jaws and his rear end locked up with hers, was dragged up a little. Eventually, the male let go his hold on female's neck and fell back. Shortly afterwards the cloacal contact also broke. The female quickly crawled up the wall, leaving behind the mate.

RAMESH M. NAIK

What keeps the gecko on the wall?

Several theories have been advanced to explain the ability of gecko lizards to climb smooth vertical surfaces and to move on ceilings defying the law of gravity. Early theories suggested adhesion by secretions under digits, but there are no glands on the digits. Subsequently the minute setae or hair-like structures under the toes were believed to act as suction cups, a theory that was given a boost by the examination of the structure of the setae under the toes through a scanning electron microscope. Another theory advocated frictional forces. However, none of these considered the part played by the foot as a whole in gecko movement.

Recently the problem has been examined through careful anatomical study of the foot bones and muscles of the large Tokay or Tuckkoo Gecko of eastern India, Burma, etc. It is now believed that several systems are involved. A key bone in the hind foot acts as a swivel permitting the foot to hold firmly while the whole body is pivoted on it. Unlike other plantigrade (walking on the soles of the feet) animals, where the toe is the last part of the foot to leave the ground, in the gecko the toe tip leaves the ground first and the toes are the last to touch the ground when the foot is put down again. The muscles that control the precision movement of the foot show several peculiarities. Unlike other running lizards and birds where the limbs are thin and only the tendons activate the limbs, the legs and feet of the gecko are heavily muscled. The fibres of the muscles that control the toe movements are arranged like the barbs on a feather from a central tendon per-

mitting more muscular attachment to the setae holding plates. Between the toe bones and the setal plates blood sinuses occur and when the gecko flexes its toes the pressure on the sinuses helps to press the setae hard against the climbing surface. The exact nature of the action of the setae is still not clear. The suction cup theory is not tenable as a dead gecko can also be made to hold on to a vertical surface and the setae lose their holding ability if the animal is repeatedly pulled off from the wall. The delicate nature of the setae, the large number of spoon shaped tips and the ability of the animal to bring them into close contact with the substratum suggest that adhesion is a 'dry adhesion' brought about by surface phenomena possibly at the molecular level between the setae and the substratum. —EDS.

Old jungle tales retold

The tiger as fruit eater

'There is a forest fruit of the shape and size of a wood-apple with a very powerful, pungent, aromatic smell, which tigers and wild dogs eat greedily; this is also the favourite fruit of the *Chenchu* buffalo; but singularly enough the bear, which devours every other kind of forest fruit, will not touch it. The favourite fruit of bears and wild dogs alike is that of the female blackwood tree.'

This is taken from the article titled 'Wild Dogs' written by a forest officer under the name of 'Robin Hood' and published at page 130 of the *Journal* Vol. 10 in 1895. It is an interesting item of jungle lore which will be appreciated by a number of our members.

I have ascertained through the Conservator of Forests, Bellary Circle, that the fruit referred to is that of *Careya arborea* Roxb., *dudippa* in Telegu. The blackwood is *Dalbergia latifolia* Roxb.

Buffaloes slay a tigress

In the same article 'Robin Hood' related the killing by a tigress of a female *Chenchu* buffallo, and the speedy retribution by the maddened herd which slew the murderer of the cow and her calf. He was at the Bairnuti Forest Inspection Shed and while sitting in the veranda one evening was looking at the herd feeding on the fallen fruit of a large fig tree which strewed the ground on the skirt of the forest a stone's throw from the shed.

'There was the "tonk" of a startled sambar, then a combined roaring and bellowing from the forest. Some of the buffaloes rushed back with dismayed snorts, stopped suddenly as if by word of command, circled round and returned to the scene of conflict. In serried ranks, like a squadron of cavalry, with their great heads lowered to the ground, and bellowing out encouragement to their fellows fighting in the forest, they swept onwards to the rescue,

while I nimbly ran along in their rear with my rifle. In this order we crashed into the forest. A feeble gurgling noise announced that the buffalo had been vanquished and a hoarse roar of rage proclaimed that "stripes" refused to quit the victim. Then ensued a perfect pandemonium of roaring, bellowing, stamping and crashing in the midst of which I had to drop my rifle and shin up the nearest tree, owing to two blundering buffaloes, who could not force their way through their struggling companions in front fixing their regards upon me, and in insane delusion that I was the cause of all the turmoil, charging me savagely.'

So he lost sight of all that was going on, but after what seemed an interminable time a number of *Chenchus* arrived and with great difficulty appeased the ferocious buffaloes and got them away. The tigress was found trampled deep into the mud and gored all over. Beside it lay the carcase of an immense she-buffallo, and a yard or two away the body of her calf in defence of which she had lost her life.

I saw the Bairnuti Shed when shooting in the Nallamallai Hills in 1902 but had forgotten, or not noticed the remark about the tree fruit, so made no enquiry about it.

R. W. BURTON
Lt.-Col., I.A. (Retd.).

Bangalore,
August 13, 1950.

(*contd. from p.* 8)

8. LIME BUTTERFLY *Papilio demoleus* Linn. Very common. On the wing from August to November; also in March. Feeds on wild orange plants, also seen on flowers of *Urena lobata.* In old specimens the yellow markings on the wings frequently turn to a deep orange. Larva feeds on *Zizyphus glaberrima,* in addition to citrus plants.

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

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