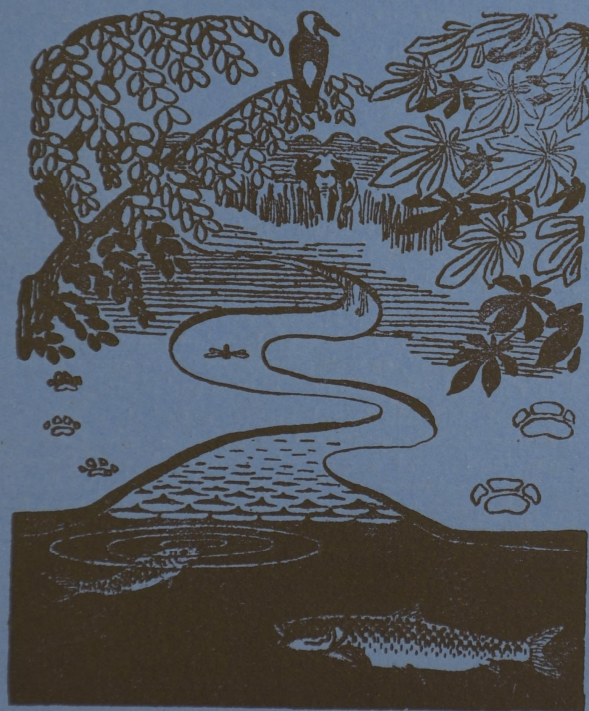


VOL. XXVIII

NOS. 1 & 2

DECEMBER 1955-APRIL 1956

JOURNAL OF THE BENGAL NATURAL HISTORY SOCIETY



Edited by : J. C. DANIEL.

PRICE : Rs. 3-4-0

69

BENGAL NATURAL HISTORY SOCIETY
Estd. 1923

Managing Committee for 1955-56

Chairman—Dy. Commissioner, Darjeeling (*Ex-officio*)

Vice-Chairman—SIR UDAY CHAND MAHTAB, K. C. I. E.
Maharajahdiraja of Burdwan

MR. W. H. MATHEWS

Secretary—The Curator

Members

DR. S. C. LAW, M.A., Ph.D.

MR. E. D. AVARI, F.Z.S.

MR. J. R. JOHNSON

MR. B. N. GHOSH

MR. M. SAIN

DR. J. C. SAHA, M. sc., Ph. D.

Divisional Forest Officer, Darjeeling. (*Ex-officio*)

Financial Advisory Sub-Committee

DR. S. C. LAW, M. A., Ph.D.

MR. W. H. MATHEWS

MR. C. TENDUF LA

LT. COL. E. S. E. RERRIE

The Curator.

Technical Advisory Sub-Committee

DR. J. C. SAHA, M. sc., Ph. D.

MR. M. SAIN

Divisional Forest Officer, Darjeeling

The Curator

The Society under the name Darjeeling Natural History Society was started about the end of 1923, the objects being to maintain the Museum in a proper condition, to promote the study of Natural History and to get together as complete as possible collections of Natural History specimens from a limited area, including "the Civil Districts of Jalpaiguri and Darjeeling and the State of Sikkim", as well as what could be procured from the neighbouring countries of Tibet, Bhutan and Nepal.

Government and Municipal grants not being sufficient for our purpose, it was proposed to enrol members so as to increase our funds, and a quarterly journal has been started. The journal is no longer confined to articles on the Natural History of the above-mentioned area, but includes those from anywhere. It is hoped that everybody will join the Society and co-operate to make the Museum and Journal a success.

The annual subscription is only Rs. 10. Life membership Rs. 150; those who have been members for over twenty years can become Life members on payment of Rs. 75.

Members get copies of the Journal free and other privileges. All facilities are also given to members to study the museum collection and expert advice is given to them regarding collection, preservation and identification of specimens.

Application for membership should be made to:—

THE CURATOR

Natural History Museum
Darjeeling.

Coloured Plates and Journals for Sale.

- The Leaf Insect.
 The Atlas Moth.
 The Golden-throated Barbet.
 The Yellow-billed Blue Magpie.
 The Bora Cheng.
 The Red-headed Tit. }
 The Grey Tit. }
 The Green-backed Tit. }
 Gould's Parrot-Bill.
 The Velvet-fronted Nuthatch.
 The Cinnamon-bellied Nuthatch. }
 The White-tailed Nuthatch. }
 The Assam Black Partridge.
 The Rufous-necked Laughing }
 Thrush. }
 The Purple Thrush.
 The Eastern Palm Swift.
 The Burmese Black-naped Oriole.
 The Indian Grackle.
 The Indian Green Magpie.
 The Indian Purple Sunbird. }
 The Indian Yellow-backed }
 Sunbird. }
 The Fire-tailed Yellow-backed }
 Sunbird. }
 The Nepal Yellow-backed Sunbird.
 The Black-breasted Sunbird }
 Mrs. Gould's Sunbird. }
 The Bengal Jungle Babbler.
 The Common Indian Kingfisher. }
 The Assam Blue-eared Kingfisher. }
 The Great Blue-eared Kingfisher. }
 The Indian Three-toed Kingfisher. }
 The Brown-headed Stork-billed }
 Kingfisher. }
 The White-breasted Kingfisher.
 The Indian Ruddy Kingfisher.
 The Moth, Bramea Wallichii.
 Hodgson's Broadbill.
 The Long-tailed Broadbill.
- The Painted Bush-Quail.
 The Burmese Red-headed Trogon.
 The Indian Black-crested Baza.
 The Painted Snipe.
 The Black-headed or Brahminy }
 Myna. }
 The Indian Grey-headed Myna }
 The Gold-crested Myna. }
 The Bank Myna.
 The Duars Paradise Flycatcher
 The Bengal Green Pigeon.
 The Northern G. Iden-backed }
 Woodpecker. }
 The Himalayan Whistling Thrush.
 The Assam Spotted Babbler.
 The Northern Bay Owl.
 The Grey-winged Blackbird.
 The Indian Scarlet Minivet.
 The Indian Thick-billed Flower- }
 pecker. }
 The Indian Short billed Minivet.
 The Yellow-throated Minivet.
 The Burmese Small Minivet.
 The Sikkim Yellow-vented }
 Flowerpecker. }
 The Indian Scarlet-backed }
 Flowerpecker. }
 The Nepal Fire-breasted Flower }
 pecker. }
 The Indian Lorikeet.
 The Turkestan Stone Chat (Male).
 Hodgson's Bush Chat (Female)
 The Black & White, or Jerdon's }
 Chat. }
 The Himalayan Speckled Piculet. }
 The Indian White-browed Rufous }
 Piculet. }
 The Himalayan Tree-pie.

The above are available at the following prices by Value Payable Post :—

To Members :

Single copies at 0-12-0 each
 Set of 4 plates Rs. 2-0-0 per set

Back numbers of the Journal may be had at the following rates by Value Payable Post :—

Those with coloured plates :

To Members Rs. 2-8-0 each
 To Non-Members Rs. 4-0-0 „

Those without coloured plates :

Rs. 2-0-0 each
 Rs. 3-8-0 „

X'mas, New Year, Dewali, Birthday or Marriage Greetings Card with coloured plates of Birds in folders are for sale at -12/- each with envelopes. Dozen Rs. 9/-, Postage extra.

Application for the above should be made to :—

THE CURATOR
 Natural History Museum
 Darjeeling.

The following back numbers are out of print :—

Vol. I, Nos. 2, 3 and 4	Vol. VI, Nos. 1 and 2
Vol. II, Nos. 1, 2 and 4	Vol. XVI, No. 2
Vol. III,	
Vol. IV, Nos. 1, 2 and 3	Vol. XVIII, No. 4
Vol. V, No. 4	Vol. XIX, Nos. 1 and 2

DECEMBER 1955-APRIL 1956

Table of Contents

	PAGE
1. A list of the Mammals of the Rajasthan Desert— Ishwar Prakash	1
2. Birds of the Bihar Forests—Jamal Ara	7
3. Bird Watching—R. S. Dharmakumarsinhji	15
4. Birds of the Duars—C. M. Inglis, F.Z.S., C.M.B.O.U. (Continued from p. 155, Vol. XXVII, No. 4, 1955)	18
5. Notes on the occurrence and habits of <i>Bufo stomaticus</i> Lutken at Bombay—J. C. Daniel	51
6. The Heterocera of Tukdah, Sept-Nov. 1945—D. G. Sevastopulo, F.R.E.S.	57
7. Lepidoptera of Darjeeling and Tukdah, Addenda and Corrigenda—D. G. Sevastopulo, F.R.E.S.	63
8. A Catalogue of Plants of Sikkim Himalaya—B. N. Ghosh (Continued from p. 186, Vol. XXVII, No. 4, 1955)	67
9. Obituary—Dr. S. L. Hora, D. Sc., F.N.I.	78

EDITORIAL.

We have been compelled by the lack of Articles to combine the first and second Numbers of the present Volume of the Journal. In this respect, we would like to repeat the appeal to members to contribute articles to the Journal, which has often been voiced in these pages by the previous Editors of the Journal. Unless we have the full co-operation of the Members, the publishing of the Journal would be extremely difficult. We particularly address this appeal to those Members who are permanently resident in our area and who have the opportunity of observing the habits of the animal life in the nearby Jungles. It is really unfortunate, considering how little we know of our Fauna, that those who have had the opportunity of studying them are very modest about recording their observations in print.

We would also welcome presents of Bird and Mammal skins to the Museum from our Members. Most of the Exhibits housed in the Museum have aged considerably and need to be replaced.

JOURNAL
OF THE
BENGAL NATURAL HISTORY SOCIETY

VOL. XXVIII

Nos. 1 & 2

DECEMBER 1955-APRIL 1956

**A LIST OF THE MAMMALS OF THE
RAJASTHAN DESERT.**

ISHWAR PRAKASH

(*Jaswant College, Jodhpur*).

In October, 1953 U.N.E.S.C.O. sanctioned a scheme to study the vertebrates of the desert of Rajasthan. This scheme was supervised by Prof. Daya Krishna, D. Phil. (ALLD.), Ph.D. (Cantab), F.Z.S., F.A.Z., Head of the Department of Zoology, Jaswant College, Jodhpur. The author had the opportunity of working in this scheme, as incharge of the mammals. The present paper is an annotated list of the mammals collected and observed during the study period.

My grateful thanks are due to UNESCO authorities for the financial grants. I am grateful to Shri M. M. Bhandari and Shri S. C. Sharma for assisting me in the field work.

ORDER INSECTIVORA

1. **Long Eared hedgehog**, *Hemiechinus auritus collaris* Gray
(Hindi—*Jhau-chuha* ; Marwari—*Sehla*).

This small insectivore inhabits scrubby land and is usually found near bushes and hedges. They reside in burrows dug by themselves. The burrow has only one opening and is devoid of any 'bolt run'. Usually only one Hedgehog is found in a burrow, which is invariably situated under a bush. During the breeding period—August-September, many females were collected with their young. Hedgehogs are nocturnal and sleep rolled up during the day. They come out of their burrows

after dusk for feeding, which lasts for 4 to 5 hours, and by midnight they retire to their burrow. Insects, reptiles and small mammals form their diet.

2. **Indian Hedgehog**, *Paraechinus micropus micropus* Blyth
(Hindi- *Jhau-chua* ; Marwari—*Sehla*).

These Hedgehogs are found only in Sikar-Jhunjhunu area ; while the former is evenly distributed over the desert area. Their habits are similar and both the species can be found in association. *P. m. micropus* is less fossorial than *H. a. collaris*.

3. **House Shrew**, *Suncus murinus sindensis* Anderson.
(Hindi- *Chuchundar*).

It is sometimes seen in houses after dusk. Their activities continue upto 3 or 4 A.M. They feed on small insects, cockroaches, etc. Though beneficial to man, due to their musky odour, and to being mistaken for rats, they are killed at sight. They are becoming scarce in the desert area.

ORDER CHIROPTERA

4. **Indian Flying Fox**, *Pteropus giganteus giganteus* Brunnich
(Hindi- *Chumgarad* ; Marwari-*Bagad*)

In the desert area only one colony (Balsamand, Jodhpur) consisting of about a hundred of these flying foxes was observed roosting on Peepul trees. Their feeding rhythm lasts from dusk to dawn. Due to their frugivorous habits they are harmful to fruit gardens and are shot in good numbers every year.

5. **Lesser Rat-tailed Bat**, *Rhinopoma hardwickei hardwickei* Gray.
6. **Rat-tailed Bat**, *Rhinopoma kinneari kinneari* Wroughton.
7. **Rat-tailed Bat**, *Rhinopoma kinneari* sbsp. nov.
8. **Tomb Bat**, *Taphozous perforatus* Geoffroy.
9. **Sheath-tailed Bat**, *Taphozous kachhensis kachhensis* Dobson.
10. **Indian False Vampire**, *Megaderma lyra lyra* Geoffroy.

All these micro-chiroptera are locally known as *Chumcher*. As is well known these inhabit dark unattended ruins and caves. Almost all the above species are found every where in the desert area. The lesser Rat-tailed bats are found in groups of 4 to 8, never more; and in colonies of the same species only. On the other hand *R. k. kinneari*, *R. k. sbsp. nov.* and *T. perforatus* are found roosting together in great numbers. The sheath tailed Bat, (*T. k. kachhensis*) is essentially a rock dweller and usually inhabits the crevices in between them, even if large caves are available. This variety is the most noisy. All these bats feed on flying insects. The false vampire (*M. l. lyra*) is found in the darkest recess of caves. It appears to have a less specialised diet. I have found small fish scales from its stomach and several times it has been observed hanging in the verandah, after dusk, with a bird or toad in its mouth.

ORDER PRIMATES

11. **Rhesus Monkey**, *Macaca mulatta* sbsp. (Hindi-*Lal muh ka Bandur*; Marwari—*Molya*).

Only a few were seen in the public park at Bikaner.

12. **Langur**, *Presbytis entellus entellus* Dufresne. (Hindi-*Langur*; Marwari—*Bandero*).

Generally found in small or larger communities in hilly areas. They are more arboreal and powerful than the *Macaca*. They are regarded as sacred and are provided with food. In nature they feed on fruits, seeds, and young shoots.

ORDER PHOLIDOTA

13. **Indian Pangolin**, *Manis crassicaudata* Gray

The animal is not so rare as it is thought to be, being nocturnal they are rarely seen. In the Desert they occur in hard sand dune areas where they live in long tunnels. One specimen was collected during our investigation.

ORDER CARNIVORA

14. **Wolf**, *Canis lupus pallipes* Sykes. (Hindi-Bhedya; Marwari-Chhalinar).

Wolves were quite common some fifty years ago, according to early authors, but now they are only occasionally seen. In the desert area they are found in the hills. They hunt in pairs or in small packs and are destructive to gazelles, goat and sheep.

15. **Jackal**, *Canis aureus aureus* Linn. (Hindi-Gidar; Marwari-Siyal).

These are fairly common in low rocky hills, where they prefer small caves. Jackals are usually nocturnal but in Winter they may be seen during the day. They sometimes become a bane to villagers by stealing poultry and small kids.

16. **Desert Fox**, *Vulpes vulpes pusilla* Blyth. (Hindi-Lomri; Marwari-Lonki, Lonkdi).

Common in waste land with scattered bushes. They shelter in burrows dug by themselves. Each burrow has three openings and a pair inhabits it. It is nocturnal but is often seen during the day. Feeds mainly on the desert gerbille. *Meriones hurrianae* and ground roosting birds. In the winter season their food consists of melons, ber (*Zizyphus*) and beetles. They usually hunt in pairs.

17. **Indian Fox**, *Vulpes bengalensis* Shaw.

This is rarer than *V. v. pusilla* in these areas, and lives in same localities as the former. *Zizyphus*, melon, lizards, eggs, and small mammals form its chief diet. It is often found near villages after dusk.

18. **Otter**, *Lutra perspicullata*? (Hindi-Ud-bilao).

One pair was seen at Sardarsamand, Jodhpur, which could not be shot. According to the distributional records they should be *L. perspicullata*.

19. **Indian Grey Mongoose**, *Herpestes edwardsi ferrugineus* Blanford. (Hindi-Newla; Marwari-Nolya).

This mongoose inhabits hilly areas having Euphorbia bushes which provide it with cover. Several times they were observed to enter the crevices between rocks which are perhaps their dens. Five specimens were trapped near the stone wall of a well, in the Balsamand area, within seven days, using live Squirrels or Rats as bait. Their food consists of partridges, other ground birds and small mammals.

20. **Hyaena**, *Hyaena hyaena hyaena* Linn. (Hindi-Jarakh; Marwari-Chhhalinaryo).

Hyaenas are not so common in the desert region. They prefer open waste lands and rocky areas where they pass most of the day. They are nocturnal, and are effective scavengers, feeding on carcasses. They do not attack cattle but are reported to take sheep and children.

21. **Desert Cat**, *Felis libyca ornata* Gray. (Hindi—Jungli Billi).

Inhabits waste lands and is not usually seen near human inhabitations. Feeds on rodents, mainly *Meriones hurrianae*.

22. **Jungle Cat**, *Felis chaus prateri* Pocock. (Hindi—Jungli Billi).

Larger than the desert cat and can be distinguished from it by its longer legs. It is commonly seen near villages and on country roads. Food similar to that of the Desert cat.

23. **Leopard**, *Panthera pardus* Linn. (Hindi-Baghera)

Very few but do exist in the Kaylana-Chopasni hill range.

ORDER ARTIODACTYLA

24. **Wild Boar**, *Sus scrofa cristatus* Wagner. (Hindi—Jungli Suar; Marwari—Hur).

They were quite abundant fifty years ago but now are restricted to the reserve areas. They are destructive to cultivation at Pali, an area not included in desert region.

25. **Nilgai**, *Boselaphus tragocamelus* Pallas (Hindi—*Nilgai* ; Marwari—*Rose*).

Quite an uncommon animal in the desert region, though sometimes seen in pairs on the Jodhpur-Pali road.

26. **Black Buck**, *Antelope cervicapra rajputanae* Zukowsky. (Hindi—*Kala Hiran*).

Seen in herds at the Sardarsamand and Gajner Reserves. Their numbers have been considerably reduced due to indiscriminate shooting. Inhabit scrubby areas.

27. **Indian Gazelle**, *Gazella gazella bennetti* Sykes. (Hindi—*Chinkara*).

Fairly common in open, scrubby waste land. They are also found in the hilly areas. Their food consists of melons and grasses.

ORDER LAGOMORPHA

28. **Desert Hare**, *Lepus nigricollis dayanus* Blanford. (Hindi and Marwari—*Khargosh*).

They inhabit hilly tracts and also bushy areas in which their runs are usually situated. They are often seen on the roads while driving at night. Its favourite bush for shelter is *Euphorbia*.

ORDER RODENTIA

29. **Northern Palm Squirrel**, *Funambulus pennanti* Wroughton. (Hindi—*Gilhari* ; Marwari—*Tilori*).

Very common in the cities and in the wooded areas. Feed on seeds and fruits of common plants.

30. **Indian Crested Porcupine**, *Hystrix indica indica* Kerr. (Hindi—*Seh*, Marwari—*Sehli*).

Usually lives in rocky areas. A pair used to visit the Balsamand gardens, but attempts to capture them, failed. They emerge at night for feeding and retire before dawn. Their food consists of modified stems and roots.

31. **Indian Gerbille**, *Tatera indica indica* Hardwicke. (Marwari—*Safed-Undra*).

Usually found near human habitation, they are even found in the heart of the city at Bikaner. They are nocturnal and come out of their burrows after dusk. Their feeding rhythm lasts for 3 to 4 hours after which they retire to their burrows. Usually a pair resides in one burrow which has 3 to 4 openings. They are not as shy as the Desert Gerbilles. They feed on seeds but after the rains they mainly feed on insects. One male was fed with 37 locusts, which it consumed within an hour. They are very intolerant of the presence of other rodents as rat or gerbille (*Meriones*), and will immediately attack and kill them.

32. **Indian Desert Gerbille**, *Meriones hurrianae hurrianae* Jerdon

33. **Indian Desert Gerbille**, *Meriones hurrianae* sbsp. nov. (Marwari—*Safed Undra*).

They are evenly distributed throughout the desert region and almost every field has the openings of their burrows. They do considerable damage to cultivation, eating seeds and cutting down stems and roots of young plants. They are diurnal but in the summer they keep to their burrows during the hottest part of the day. Their burrows are much longer than those of *Tatera i. indica*.

34. **House Rat**, *Rattus rattus rufescens* Gray. (Hindi—*Chuha*; Marwari—*Undra*).

Common, never found far from human residence.

BIRDS OF THE BIHAR FORESTS—I

BY

JAMAL ARA

Birds though an important factor of the jungle Home have not received the attention of detailed ecological study largely because their names are not generally known. Identification of a species must precede any work on it and this series of articles is primarily intended to enable forest officers to identi-

fy a larger number of birds than are illustrated and described in the popular books. A list of the forest birds of Bihar, with a breakdown for types of forests, is also made available.

The easiest way to identify birds is to keep one of the four illustrated popular books listed in the bibliography given in this article and to look up birds one comes across. Within a few months a touring forest officer would come to know a large number of common birds and will become acquainted enough with the look and feeling of the family characteristics to be able to place in its proper family a bird not described or illustrated in the popular books.

In the jungle any where, more so in Bihar, the common birds of the gardens in the built-up areas are the more numerous. There are in addition several birds whose pictures are not available and descriptions cannot be read except in the not generally available *Fauna of British India*.

The scope of these articles has been narrowed to the forests in Bihar state to keep the length manageable and also because the writer has first-hand knowledge of the birds of those forests. It would not, however, be far wrong to claim that the birds described in these articles are the more important forest birds of a much larger territory than Bihar.

The writer has not been to the forests of Champaran where the Nepal Kaleej pheasant (*Lophura leucomelana*) and the pin-tailed green pigeon (*Sphenocercus apicaudus*) come down to the 1,000-foot contour along with *Pinus longifolia* on the Siwalik hills around Ramnagar Dun. Reference to Champaran and North Bihar has, therefore, been generally avoided. The Parasnath Hills have also been excluded from this article because their avifauna has not yet been surveyed.

The inter-connected factors of altitude, topography, rainfall and vegetation determine the bird-population of an area. It would obviously be beyond the proper length of a contribution of this type to discuss the influence of these factors.

A rough indication of birds preferring particular types of forests should be adequate, and is given below. The forest types are according to Champion's classification.

Forest type—B2c—Singbhum Valley Sal—Grey Tit (*Parus major*), Velvet-fronted Nuthatch (*Sitta frontalis*), Spotted Babbler (*Pelloroneum ruficeps*), Common Iora (*Aegithina tiphia*), Gold-fronted Chloropsis (*Chloropsis aurifrons*), Black-crested Yellow Bulbul (*Pycnonotus dispar*), Blue-headed Rock Thrush (*Monticola cinclorhyncha*), Grey-headed Flycatcher (*Culicicapa ceylonensis*), Scarlet Minivet (*Pericrocotus flammeus*), Ashy Swallow-Shrike (*Artamus fuscus*), Large Racket-tailed Drongo (*Dicrurus paradiseus*), Grackle (*Gracula religiosa*), Yellow-throated Sparrow (*Gymnoris xanthocollis*), Yellow-backed Sunbird (*Aethopyga siparaja*), Pitta (*Pitta brachyura*), Scaly-bellied Green Woodpecker (*Picus xanthopygaeus*), Rufous Woodpecker (*Micropternus brachyurus*), Indian Cuckoo (*Cuculus micropterus*), Sirkeer (*Taccocua leschenaulti*), Pied Hornbill (*Antracoceros coronatus*), Trogon (*Harpactes fasciatus*), Forest Eagle Owl (*Bubo nipalensis*), Forest Spotted Owlet (*Athene blewitti*), Imperial Green Pigeon (*Ducula aenea*) and Purple Wood Pigeon (*Columba punicea*).

Forest type—E4(ii)—Climax Moist Deciduous—Evergreen patches other than those near major streams : Velvet-fronted Nuthatch (*Sitta frontalis*), Chestnut-bellied Nuthatch (*Sitta castanea*), Shama (*Copsychus malabaricus*), Black-capped Blackbird (*Turdus simillimus*), Malabar Whistling Thrush (*Myiophonus horsfieldii*), and White-throated Fantail Flycatcher (*Rhipidura albicollis*).

Forest type-E-5(i)—Moist Terminalia in Sal Forest—Common Iora (*Aegithina tiphia*), Red-whiskered Bulbul (*Pycnonotus jocosus*), Dhayal (*Copsychus saularis*), Black-naped Flycatcher (*Hypothymis azurea*) and Long-tailed Nightjar (*Caprimulgus macrurus*).

Forest type—1 S/7(6)—Tropical Moist Deciduous Riverain Forests—Evergreen patches along major streams : Dhayal (*Copsychus saularis*), Shama (*Copsychus malabaricus*), Blue Rock-Thrush (*Monticola solitarius*), Black-naped Flycatcher (*Hypothymis azurea*), Large Green-billed Malkoha (*Phoenicophæus tristis*), Large Indian Pied Hornbill (*Antracoceros coronatus malabaricus*), Jungle Nightjar (*Caprimulgus indicus*) and Green Pigeon (*Treron phoenicoptera*).

Forest type—C 2—Dry Sal Forests—Most extensive type in Bihar, extending all over the hills of South Bihar.

This type has been invaded a great deal by birds of villages and fields. Excluding those forms of the open country the following birds occur : Spotted Grey Creeper (*Salpornis spilonotus*), Red- and Black-throated thrushes (*Turdus ruficollis* and *T. atrogularis*), Cliff Swallow (*Hirundo fluvicola*), Forest Wagtail (*Dendronanthus indicus*), Fulvous-breasted Pied Woodpecker (*Dendrocopus macei*), Pigmy Woodpecker (*Dendrocopus hardwickii*), Crested Swift (*Hemiprogne longipennis*), Long-tailed Nightjar (*Caprimulgus macrurus*), Sykes's Nightjar (*C. mahratensis*), Crested Serpent Eagle (*Spilornis cheela*), Peafowl (*Pavo cristatus*), Red Jungle Fowl (*Gallus gallus*), Red Spur Fowl (*Galloperdix spadicea*), Black Partridge (*Francolinus francolinus*), Grey Partridge (*F. pondicerianus*), Indian Courser (*Cursorius coromandelicus*), Red-wattled Lapwing (*Lobivanellus Indicus*) and Yellow-wattled Lapwing (*Lobipluvia malabarica*).

Forest type-C2-Acacia Scrub Forest : This area is also much invaded by birds of villages and fields. Larks are especially abundant. The other birds are: Jungle Wren Warbler (*Prinia sylvatica*), Black-backed Woodpecker (*Chrysocolaptes festivus*), Emerald Dove (*Chalcophaps indica*), Jungle Bush Quail (*Perdica asiatica*), Black and Painted Partridges (*Francolinus francolinus* and *F. pictus*), and Red-wattled Lapwing (*Lobivanellus indicus*).

Forest type-E7-Aegle areas of the Tropical Dry Evergreen group. This type again has more village birds than forest birds. The latter are: Yellow-eyed Babbler (*Chrysomma sinense*), Red-vented Bulbul (*Pycnonotus cafer*), Collared Bushchat (*Saxicola torquata*), Redstart (*Phoenicurus ochrurus*), Brown-backed Robin (*Saxicoloides fulicata*), Red-breasted Flycatcher (*Muscicapa parva*), Black-headed Shrike (*Lanius schach tricolor*), Wood Shrike (*Tephrodornis pondiceriana*), Tailor Bird (*Orthotomus sutorius*), Indian Wren-Warbler (*Prinia inornata*), and Rufous Turtle Dove (*Streptopelia orientalis*).

Forest type-IS/2-Khair-Sissu forests along rivers in the plains, Bagaha area in North Bihar. Avifauna of this type not yet surveyed.

Forest type—2S/2—Dry Deciduous Scrub, developing locally in South Bihar. Largely invaded by birds characteristic of open country. Bulbuls, Robins, Quails and Partridges.

Forest type C4—sub-tropical evergreen forests of Parasnath and other high hills, generally above 3,000 feet altitude. Avifauna not yet surveyed.

Forest type—Bamboo brakes, mostly in Palamau and Pora-hat. Red-capped Babbler (*Timalia pileata*), Iora (*Aegithina tiphia*), Dhayal (*Copsychus saularis*), White-browed Blue Flycatcher (*Muscicapa supercilialis*), Racket-tailed Drongo (*Dicrurus paradiseus*), Cliff Swallow (*Hirundo fluvicola*), Mottled Wood Owl (*Strix ocellata*), Brahminy Kite (*Haliastur indus*), Green Pigeon (*Treron phoenicoptera*), Ashy-headed Green Pigeon (*Treron pompadora*), Red Jungle Fowl (*Gallus gallus*), Blewitt's Bush Quail (*Cryptoplectron erythrorhynchum*), Black, Grey and Painted Partridges, Little Button Quail (*Turnix sylvatica*) and Button Quail (*Turnix tanki*).

Differences in the biotope bring about surface distributional variations. Superimposed over these are five micro-habitats zoned vertically in the same forest area.

The tree-tops are the favourite haunt of the chloropses, black-crested yellow bulbul, minivets, ashy swallow-shrike, large racket-tailed drongo, orioles, grackle, rufous woodpecker, barbets, Indian cuckoo, large green-billed malkoha, bee-eaters, hornbills, crested swift, crested serpent eagle, green pigeons and purple wood pigeon.

The lower canopy is preferred by the grey tit, iora, bulbuls, white-throated fantail flycatcher, large racket-tailed drongo, yellow-throated sparrow, yellow-backed sunbird, purple-rumped sunbird, woodpeckers, malabar trogon, mottled wood owl, dusky horned owl, forest eagle owl, jungle owlet and emerald dove.

The tree-trunks are the hunting ground of the nuthatches, spotted grey creeper and pigmy woodpecker.

In the Khair-Sissu forests of North Bihar resident ducks like the comb duck, cotton teal and whistling teal nest in the hollows of trees.

The undergrowth teems with babblers, bulbuls, dhayal, shama, black-capped blackbird, red, and black-throated thrushes, blue and blue-headed rock thrushes, flycatchers, jungle wren-warbler, yellow-backed sunbird and black-backed woodpecker.

On the ground are the spotted babbler, blue rock thrush, black-capped blackbird, forest wagtail, pitta, sirkeer, malkoha, nightjars, peafowl, red jungle fowl, red spur fowl, bush quails, partridges, button quails, Indian courser and red-and-yellow wattled lapwings.

Cliff swallows are fond of rocky escarps near water; the resident ducks like the comb duck, cotton teal and the whistling teals nest on trees near water. The common and white-breasted kingfishers are also common and nest in tunnels in river banks.

The third aspect of the jungle bird population is their banding together in mixed hunting parties or localised forest associations. The parties move in more or less daily circuits and are representative of the population at all levels—babblers on the ground, bulbuls in the undergrowth, nuthatches on the tree-trunks, tits and ioras in the lower canopy and minivets and chloropses in the tree-tops.

In the scrub and the more open forest types the red-vented bulbuls are the most numerous in any mixed hunting party; in dense jungle their place is taken by the red-whiskered bulbul.

The composition of the mixed hunting parties mostly is as follows: tits, small minivets, jungle and yellow-eyed babblers, black drongo, crimson-breasted barbet, orioles, chestnut-headed and blue-tailed bee-eaters, treepies, flower-peckers, black-headed cuckoo-shrike, sunbirds, rufous-backed shrike, the two chloropses, two nuthatches, white-eyes and wren-warblers.

Bibliography

IDENTIFICATION :

1. Inglis and Bainbrigge Fletcher—*Birds of an Indian Garden* (Thacker, Spink and Co., Calcutta, 1936).
2. Salim Ali—*Book of Indian Birds* (Bombay Natural History Society, Bombay, 5th Edition, 1946).

3. Salim Ali—*Indian Hill Birds* (Oxford University Press, 1949).
4. Whistler, H.—*Popular Handbook of Indian Birds* (Oliver & Boyd).

SYLVICULTURAL ASPECTS :

5. Smythies, B. E.—*The Birds of Burma* (Oliver & Boyd, 2nd Edition).
6. Champion, H. G.—Preliminary Survey of the Forest types of India, Burma and Ceylon (Indian Forest Records, Sylvicultural Series).

There are a large number of babblers—common, jungle, yellow-eyed, etc.,—in the forests of Bihar. Not being particular about the country they inhabit these birds of the open country and the scrub spread into the less dense forests. Partial to small bushes and unkempt ground these birds are specially numerous in the scrub and swarm the fringes of the jungle.

The red-capped babbler (*Timalia pileata*) loves forests a great deal more than the other babblers. Its deep red cap and pure white forehead mark it out from the rest of the tribe. Its throat and chest are more prominently and extensively white than the dirty light-coloured throats of the yellow-eyed and spotted babblers, with whom it has some resemblance. Those two have white brows, not a whole white forehead setting off a strong, shiny black bill. The red-capped babbler "frequents thick cover and is often best identified by voice," says Smythies and describes its distinctive call as "a curious combination of a trill and a whistle descending in pitch, and is unlike any other bird note; another call commonly uttered as the bird climbs about in cover resembles *chew-aye, chit, chit, chit, chit* or sometimes *scree—chit, chit, chit*; another call consists of 5 or 6 notes harsh and rising in pitch."

The red-capped babbler occurs at Kechki in Palamau and also in the Santal Parganas. It is 7 inches in length and has bright-red eyes.

The Spotted Grey Creeper (*Salpornis spilonota*), tiny and bark-like in its colouring, scuttling up tree-trunks has to be

differentiated from the two nuthatches and the pigmy woodpecker. Its slender curved black bill is strikingly different from the straight bills of the other three trunk-scuttlers. Its entire upper plumage including wings and tail is black, spotted and barred with white; the lower plumage is pale fulvous with black bars. The chin and throat are white and catch one's eye as the bird moves. This bird prefers light forest and can be seen at Kasbawasali and Rajapokhar in South Bhagalpur, Batia in South Monghyr, Gurudih in Ranchi Division and Parasnath Hill.

The red-throated and the black-throated thrushes (*Turdus ruficollis* and *T. atrogularis*) have a slight resemblance to the common myna but are bigger. As both come to our area in winter their off-colour plumage is not striking. The male of the red-throated thrush has an ashy-brown upper plumage, deepening into chestnut at the chin, throat and breast and then paling into white on the abdomen. The male of the black-throated thrush is browner and has black throat, breast and crown. Both the species have yellow bills and females of duller colouring. These birds are quite common in the open scrub in Hazaribagh and Ranchi Divisions.

The Jungle Wren-Warbler (*Prinia sylvatica*) is about the same size as the house sparrow but with a good bit of its length spent on the tail. It resembles the Indian Wren Warbler but its earthy brownness is duller; its underparts are cream where the other bird (partial to cultivated fields) is buff. That gives the jungle wren-warbler greater contrast, but its arch over the eyes is only fulvous where the Indian wren-warbler has a white eyebrow. The jungle wren-warbler is quite frequently seen in all forest areas of Palamau, Hazaribagh and Manbhum.

The cliff swallow (*Hirundo fluvicola*) has a tail less deeply forked than that of the common swallow. It has a more mottled appearance because of black streaks on its chestnut head and a brown band along the eye. As one is more likely to see the two birds from below as they fly across, the main character for distinguishing one from the other is the white underparts of the cliff swallow as against the rufous of the common swallow. The cliff swallow is slightly smaller than the sparrow; it is abundant

on rocky hillsides near water in Palamau, Hazaribagh, Ranchi and Manbhum.

The forest wagtail (*Dendronanthus indicus*) cannot be mistaken for any other wagtail because of the very contrasting effect of alternate black and white bars across its body. The pied wagtail looks a sober bluish bird compared to the forest wagtail and is larger too. The forest wagtail has a dark olive brown upper plumage over white underparts. Across the white breast is a bold black crescentic band and on the closed wing prominent buff spots. It is fond of beds of streams and paths in the forest in Singhbhum and Ranchi.

The black-crested yellow bulbul (*Pycnonotus dispar*) is distinctive from all other bulbuls because of its bright-yellow underparts. The upper plumage is olive yellow but the bird in flight gives an impression of all bright yellow with a prominent black crest. It prefers deep forest and is particularly numerous near Jate in Porahat Division.

(To be continued)

BIRD WATCHING

BY

R. S. DHARMAKUMARSINHJI

Wild Life Preservation Officer, Bombay State.

Bird watching has become more popular throughout the world, in schools, colleges, universities and amongst the older generation who can find time to recreate by studying the

behaviour of bird life. So much information is now available on bird life which very few people knew fifty years ago. In the past more time was spent in the discovery of new bird types and large scale collection was done by field naturalists to determine the geographical habitat of various species. The expeditions of these days lay more stress on ecological studies. While there is little scope of discovering new species of birds, new races or sub-species are being established as a result of a wider knowledge of the life history of birds confined to particular habitats. In Saurashtra for instance, Bhavanagar's Sand Lark (*Calandrella raytal krishnakumarsinji*), which is not uncommon in the mud-flats of the Gohilwad coasts, and which breeds locally, appeared to me to be darker in colour than those of Sind and other areas. I was compelled, much against my will, to collect a few specimens for verification, and on the basis of these specimens the race was established. Other local races of birds found in Saurashtra are Dharmakumar's Small Minivet (*Pericrocotus peregrinus dharmakumari*), Kathiawar Wren-Warbler (*Prinia hodgsoni pallidor*), and Kathiawar White-Eye (*Zosterops palpebrosa amabalis*) to mention only a few.

Observing bird behaviour is one of the fascinating aspects of bird watching. Very little is known of the habits of Indian bird life, their behaviour during the breeding and non-breeding seasons, their food and feeding habits, the mode of flight, the habit of establishing territories by individual birds and even the incubation period of such common birds as the Mynas, Sparrows, Swallows, Swifts and Larks is still scarcely known.

School children should be discouraged from collecting Eggs though they can observe and study the eggs of different birds and much more than this they should be encouraged to take to bird watching as a hobby. The beginner in bird watching should naturally start with bird recognition, that is, recognising different birds by their colour, song and flight.

This is therefore the initial stage in which to introduce the subject of bird watching to young people. Girls may perhaps take greater interest in the subject as they have more patience. Some of our birds have beautiful songs and are magnificently coloured so it should not be an uninteresting hobby to young people. The interest created among school children will no doubt be a foundation for the preservation of bird life in our country. College students can considerably help expert ornithologists by undertaking the study of little known problems as the habits and behaviour of Cuckoos in laying their eggs in the nests of smaller birds.

In this great country of ours hardly any work has been done on birds, and our knowledge of them can be considerably increased by merely watching and taking note of what is seen of bird life. The note book is essential as every observation must be recorded before one forgets. It is surprising how deep a study of a species can be made from ones own garden during the course of an year. Every little interesting habit should be mentioned in the diary and when the year is over, it is remarkable how much we will then know of the life history of the bird. I had been hunting the lesser Frigate as a young boy but I only got to know of its courtship dance when I started closely watching and photographing the species. Bird photography is ideal for an intimate study of bird life. It trains one in patiently carrying out a task with a cool mind, and to observe accurately. There is also the added joy of watching birds when they are quite unaware of the observer. The resulting photographs which are sometimes unique, always remind one of the memorable times one has had in the country.

Bird watching is an interesting hobby which has its reward not only in the pleasure it gives one but also in the discovery of strange behaviour which may not have been previously recorded. It is said that 'A bird in the hand is worth two in the bush' but to me the opposite will always be the truth.

BIRDS OF THE DUARS

BY

C. M. INGLIS, F.Z.S., C.M.B.O.U.

(Continued from page 155, Vol. XXVII, No. 4, 1955)

SUB-FAMILY Turdinae

110. The Indian Grey-winged Blackbird

Turdus bouboul bouboul (Latham)

Fauna Brit. Ind., 2nd. Ed., 571

Description.— Length 11 inches. *Male* : Upper plumage black, lower plumage dull brownish black, a long patch of ashy white across the closed wing.

Female : Differs in being olive-brown, instead of black and the long patch on the wing is dull rufous.

Bill orange to Coral-red ; iris brown, eyelids yellow ; legs brownish yellow.

Distribution and Habits.— Common in the hills and extends well into the plains in the winter even as far as 20 miles from the foothills, it remains in the plains, at any rate, till the end of March. It is a Forest bird but in the hills comes into gardens and even nests in them, it likes forest glades and is rather sedentary in habits. In its actions it much resembles the English Blackbird hopping about on the ground in its search of worms, grubs and insects, turning over the dry leaves in its hunt for them ; it also consumes a certain amount of wild fruit and berries. It has a fine song, as a rule, reminiscent of that of the English Blackbird but I have heard some whose notes were not at all musical. In the hills, it can be heard during most of the day during the breeding season. It is known as the 'Kastura' and is a favourite cage bird.

111. The Red Throated Thrush

Turdus ruficollis Pallas

Fauna Brit. Ind., 2nd. Ed., No. 577

Description.— Length 10 inches. *Male* : Upper plumage ashy brown, tail rufous, the central feathers broadly and the lateral ones, more narrowly, tipped with dark brown ; eye brow,

cheeks and lower plumage, to breast, chestnut; some black specks on each side of the throat, wing quills dark brown edged with silvery ashy, lower plumage, from below the breast, white mottled with ashy; under wing coverts orange brown.

Female: Resembles the male but has the chestnut paler and spotted with black.

Bill dullish yellow, top of upper mandible, the tip dark brown; iris brown; legs fleshy brown.

Distribution and Habits.—I have never seen this Thrush in the district but the Darjeeling Museum has two specimens, a male purchased from O'Donel who shot it just outside the Haldibari bungalow compound on the 27th March, 1933 and the other presented by E. G. L. Webb, who collected it, at Binaguri on the 11th February, 1934. It will only be come across in the winter. Where commonly found it associates in large flocks of twenty or thirty individuals between October and March but neither of the birds collected in the Duars were members of a flock. It, apparently, likes open country where there are a good number of trees in the neighbourhood. It feeds mostly on the ground and eats insects, berries and grain and is most active in its pursuit of termites as they rise out of the ground. It has a sweet alarm note.

112. The Black Throated Thrush

Turdus atrogularis Jarocki

Fauna Brit. Ind., 2nd. Ed., No. 578

Description.—Length 10 inches. *Male*: Upper plumage grey brown; chin, throat, and breast, black (the feathers edged with light grey in our winter birds) rest of lower plumage white, mottled with ashy; under wing covert dull orange-brown.

Female: Chin and throat, white spotted with black; breast and flanks ashy, the upper part of the former spotted with black and in the lower portion streaked with brown; rest of plumage very similar to that of the male.

Bill yellow, dark brown on culmen and tip ; iris dark brown ; legs yellowish brown.

Distribution and Habits.—A very common winter visitor to the plains, staying upto the end of March or probably, later. It is seen in great numbers in open country ; on the 21st February, 1930, I saw a flock of over a hundred flying over Haldibari and have seen other flocks of over fifty individuals on the ground. Some years it seems less plentiful, I saw very few during the winter of 1930-31. It also frequents tea gardens and open land near forest. It is the only Thrush seen in large numbers in the Duars. It feeds largely on the ground, like other Thrushes, on insects and worms, and is said to partake of berries and wild cherries. It is rather shy and when disturbed flies with considerable speed.

113. The Grey or Tickell's Thrush

Turdus unicolor Tickell

Fauna Brit. Ind., 2nd. Ed., No. 579

Description.—Length 9 inches. *Male*: Upper plumage ashy grey ; lower plumage pale slaty grey, paler on the chin, and with black shafts on it ; abdomen white ; under wing coverts chestnut brown, the base of the inner webs, grey.

Female: Upper plumage olive brown ; chin and throat white with a line of black spots on each side ; breast olive-grey, spotted with dark brown ; rest of lower plumage white.

Bill and legs yellow ; iris brown ; eyelids greenish yellow. Differs from the last species in size and in the male having no black on the throat and breast ; the females differ in this bird having the coverts and axillaries, under the wing, uniform chestnut brown, whereas in the last species the former are orange brown and the latter rufous grey.

Distribution and Habits.—There are only two records from the district, both females ; one secured by O'Donel, at Hasimara, on the 10th November, 1926, and purchased from him by the

Darjeeling Museum; the other collected by me, in the Apalchand forest at Katambari, on the 21st December, 1936. It seems to prefer groves near villages than forest though it is also found in the latter. In Kashmir where it is a very common bird it is seen hopping about on lawns searching for worms and snails.

114. The Black-breasted Thrush

Turdus dissimilis Blyth

Fauna Brit. Ind., 2nd. Ed., No. 580

Description.— Length 9 inches. *Male* : Head, neck and breast, black, rest of upper plumage dark slaty; lower plumage as far as abdomen, bright orange rufous, rest of lower plumage white.

Female : Upper plumage olive-brown; sides of head ashy-brown with some whitish shaft-streaks; chin and throat, white, heavily streaked with brown, especially on the sides; upper breast olivaceous, spotted with black; sides of breast and body, orange rufous, rest of lower plumage white.

Bill and legs orange yellow; iris brown; eyelids yellow.

Distribution and Habits.— A rare bird in the Duars the only one seen and collected, a male, was obtained near a stream in the Moraghat forest on the 1st March, 1930. It is a forest loving bird. Stuart Baker wrote. "This is one of the most shy and elusive of all the bigger Thrushes shunning observation" but elsewhere he says they are not shy birds and Hume said the same and that when disturbed they just flew up into a tree. Like other Thrushes it feeds much on the ground its food consisting of insects and berries, it is very partial to slugs and snails. It has a sweet song. Besides forest it also frequents scrub jungle.

115. The Pied Ground Thrush

Geokichla Wardii (Jerdon)

Fauna Brit. Ind., 2nd. Ed., No. 584

Description.— Length $8\frac{1}{2}$ inches. *Male* : Upper plumage and breast, black; a white eyebrow; rump and above tail with crescentic white tips; tail black tipped with white increasing

outwardly; wings black and white; rest of lower plumage white with the flanks barred with black.

Female: Upper plumage olive-brown, eyebrow fulvous white; rump with white bars; tail tipped with white; wing coverts tipped with fulvous; sides of head and throat buff and black: chin white; upper breast buffish-white edged with brown, rest of lower plumage white, barred with dark brown, except on the abdomen, and suffused with ochraceous.

Bill yellow ochre with black tip; iris brown; legs fleshy ochre.

Distribution and Habits.—Oates recorded it from “the Bhutan Doars” but I cannot say on what authority or from what part of the district. If it does occur it is only likely to be met with above—Baksa Duar in the winter. According to Stuart Baker “Although a conspicuous bird except in deep forest, it does not shun observation and frequents the vicinity of houses rather than the deeper forests. Like other Thrushes it spends most of its time on the ground searching for insects”.

116. The Northern Orange-headed Ground Thrush

Geokichla citrina citrina (Latham)

Fauna Brit. Ind., 2nd. Ed., No. 587

Description.—Length 9 inches. *Male*: Head, neck, lower plumage, orange chestnut darkest on the head and palest on the lower plumage, sometimes nearly white on the middle of the abdomen; upper plumage bluish grey, a conspicuous white spot on the shoulder on under side of quills; wings brown edged with grey; vent and below the tail white.

Female: The orange chestnut is paler and the bluish grey is replaced by brownish olive grey.

Bill dark brown, base of lower mandible fleshy; iris dark hazel; legs fleshy pink.

Distribution and Habits.—A resident Thrush in the Duars, O'Donel had the parents and 3 young brought to him in July, 1911. It is fairly common but being rather shy is not very often

seen. It frequents forests and bamboo jungle, loving shady spots. It spends most of its time on the ground searching the dry leaves for insects, slugs, snails, caterpillars and also berries. Many writers have noticed that its bill is generally muddy from this constant habit of digging about in the ground.

Although it is such a brightly coloured bird, it is far from conspicuous, its colour blending, admirably, with its surroundings. W. A. S. Lewis wrote this interesting note :— I think the presence of this bird, even as a breeding resident, could easily be overlooked. I have never seen it in the open away from the shelter of the woods. It evidently likes the gloom of the forest. Its flight is fast and direct. When it perches on a branch it stays quite still, deliberating the next move and quietly eyeing an intruder. There is no unnecessary fidgeting about, to attract attention. It hops about feeding on the ground but in the woods which it frequents the ground is often bare earth, strewn with withered leaves and dappled with patches of sunlight. Against such a back ground the orange head and breast, bluish grey upper plumage and streak of white on the wing present a broken pattern in colours which easily escape notice.

It breeds, principally, in May and June making a cup-shaped nest composed of grass-bents, fine twigs, leaves and moss, a certain amount of mud is often used in its composition. It is placed in the fork of a tree, usually at no great height from the ground. The eggs number 3 or 4 are pale greenish-blue or cream coloured, freckled, or blotched, with reddish-brown or purplish-red, sometimes covering the whole surface or else boldly blotched, mostly at the thick end and only slightly speckled elsewhere. They average 1.00 by 0.65 inches.

117. Himalayan Lunulated-backed Mountain Thrush

Oreocincla dauma dauma (Latham).

Fauna Brit. Ind., 2nd. Ed., No. 595

Description.— Length $10\frac{1}{2}$ inches. Sexes alike. Upper plumage ochraceous-brown, with crescentic black bars at the tips of the feathers preceded by a golden fulvous patch ; sides

of head fulvous white, spotted with black and with a black patch formed by the tips of the ear-coverts ; wings a mixture of dark brown and fulvous ; lower plumage white ; except the breast which is fulvous, with crescentic black tips to the feathers.

Bill blackish-brown above, yellowish horn on lower mandible, iris dark brown ; legs horny white.

Distribution and Habits.— A winter visitor to the plains, remaining until well into March or later. I have seen it at Hasimara and in the Moraghat and Kharibari forests and years ago I saw one in the open land surrounding the old Nilpara Forest bungalow. It is a forest loving bird, for preference haunting heavy cover but this is not always true as I fairly often came across it in North Bihar where the only approach to 'forest' were a few Mango Groves. It is a ground feeding bird hunting about in dead leaves, under bushes, feeding on various insects and larvae ; when disturbed it flies up into a tree.

118. The Large Long Billed or Brown, Thrush

Zoothera monticola Vigors.

Fauna Brit. Ind., 2nd. Ed., No. 601

Description.— Length 12 inches. Sexes alike. Upper plumage dark slaty-brown, the feathers narrowly edged with black giving it a scaly appearance, sides of head brown with ochraceous spots ; chin and throat, white with some triangular black tips to the feathers ; sides of the throat and the breast ochraceous marked with olive brown and tipped with black, the olive brown is especially dark on the sides of the throat and upper breast ; lower breast, abdomen, white, the feathers boldly tipped with blackish brown ; the olive brown patch under the tail tipped with white.

Bill blackish brown ; iris, dark brown ; legs light horny brown.

In this genus the bill is very long and strongly curved near the tip.

Distribution and Habits.— This is a rare Thrush but as it frequents dense undergrowth, in deep forests, and is sombrely coloured, it may not be quite as rare as it seems to be. It is a winter visitor. O'Donel shot one on the 11th March, 1928 in the Moraghat forest and I obtained one in the same forest on the 16th January, 1935 and another in the Tondu forest, at Gorumara, on the 14th December, 1936. It is an exceedingly shy bird, sedentary and crepuscular in its habits, searching for insects in the fallen leaves on the ground beneath the dense undergrowth. It may be seen in pairs and is rather fond of damp situations.

119. **The Lesser Long-billed or Brown Thrush**

Zoothera marginata Blyth.

Fauna Brit. Ind., 2nd. Ed., No. 604

Description.— Length 10 inches. Sexes alike. Upper plumage olive brown, narrowly margined darker ; sides of the head mixed fulvous and dark brown ; chin to middle of breast and abdomen white with brown tips and margins and the sides dark olive brown some of the feathers dark centred patched ; under the tail pale buff, margined at the sides, with olivaceous.

Bill very dark brown ; iris dark brown ; legs olivaceous or plumbeous.

This is rather like, a small edition of the last bird.

Distribution and Habits.— I obtained two specimens of this Thrush in the Moraghat forest on the 26th February, 1930 and on the 24th February, 1932. O'Donel obtained one at Hasimara and considered it to be a resident species, this is unlikely though it may be so at elevations above 3000 feet. Its habits are similar to those of the last species, it, too, is partial to damp situations in dense forest and is crepuscular in habit.

120. The Chestnut-bellied Rock Thrush

Monticola rufiventris (Jardine and Selby).

Fauna Brit. Ind., 2nd. Ed., No. 605

Description.—Length $9\frac{1}{2}$ inches. *Male* : Upper plumage brilliant cobalt-blue ; sides of the head black ; chin and throat dull blue ; rest of lower plumage rich chestnut maroon.

Female : Upper plumage olive brown, with narrow, crescentic bars on the back, a patch on the sides of the neck, a broad cheek stripe, chin and throat, buff, the feathers mostly edged blackish ; lower plumage barred buff and blackish brown.

Bill and feet black ; iris brown.

Distribution and Habits.— A rare winter visitor the only specimen seen and secured, is a female obtained in the Moraghat forest on the 15th February, 1929, this is a long distance from the foothills. Stevens came across one and remarked :— “Bhotan Ghat, Raidak River, 30-1-22. where I observed a male taking toll of an odd white butterfly *Appias Sp?* on the outskirts of the forests.” It is a forest loving bird. Often being seen in the hills near forest patches, stragglers descend to the foothills during the winter and the Moraghat forest (350 ft.) is exceptionally low for it to occur. Stuart Baker gives the following note on this bird's habits “in winter it becomes excessively tame and takes to the vicinity of villages and other human habitations, often perching on house-tops and hunting for food in gardens and orchards. It will eat almost anything from the tiniest insects to the largest snails, worms, small lizards, frogs, etc. They will also eat small fish and water insects. In its actions generally it reminds one much of some of the Redstarts”. Like these ; he continues “they often capture insect prey from a fixed post and they constantly jerk their tails backwards and forwards over their back.

121. The Blue-headed Rock Thrush

Monticola cinclorhyncha (Vigors)

Fauna Brit. Ind., 2nd. Ed., No. 606

Description.— Length 7 inches. *Male* : Top of the head, chin, throat and bend of the wing, bright cobalt blue ; sides of head and back, black ; rump, above the tail, and lower plumage chestnut, wings and tail black washed with blue with a white patch on the former.

Female : Upper plumage ochraceous olive brown ; chin and throat whitish ; rest of lower plumage white with ochraceous on the breast, all the feathers margined with dark brown giving it a scale like appearance.

Bill black, gape yellow ; iris dark brown ; legs plumbeous horny.

Distribution and Habits.— A rare winter visitor. I have never seen it in the Duars but O'Donel obtained one at Gorumara on the 22nd. March, 1932. It is a forest loving bird but sometimes, wanders far from it as I obtained it in a mango grove in Bihar as late as the middle of April. During the winter it is a solitary bird, the bright plumage of the male makes it readily seen but the female is not so easily observed especially as this thrush is inclined to be secretive. Whistler syllabilizes its pretty, warbling song as “*tew-to-di, tew-ti-di, tew-ti-di, tew* (the *tew* descending in the scale, getting louder at each repetition)”. Its food consists of both insects and berries the former often caught in the air, when captured the bird returns to its place in the tree.

122. The Indian Blue Rock-Thrush

Monticola solitarins pandoo (Sykes)

Fauna Brit. Ind., 2nd. Ed., No. 608

Description.— Length 9 inches. *Male* : Entire plumage dull dark blue, brightest on the forehead, over the eye and on the chin and throat ; upper plumage fringed with brown ; wings

and tail dark brown edged with blue and more or less tipped with white, lower plumage with some black bars and white edges to the feathers.

Female : Upper plumage similar to that of the male but duller and more of an ashy brown ; lower plumage fulvous white, the feathers from the chin to breast, margined with brownish black, giving it a scale like appearance ; rest of lower plumage fulvous white, barred with brownish black. Bill black ; iris dark brown ; legs dark brown or black. In the summer the fringes wear off and the male becomes much bluer.

Distribution and Habits.— The status of this species in the district is difficult to say at present, far more specimens are required before this can be worked out satisfactorily. According to the few specimens I have access to, the next race seems to be the commoner one here. The Blue Rock Thrushes are winter visitors. It likes open country and is often seen on boulders in river beds and freely comes into compounds and may be seen there perched on the top of a bungalow roof, or a wall, and will, sometimes, roost under the eaves of the former. Away from habitations it is a very wary bird and as noted by Whistler "if approached it bows and flicks the tail nervously before flitting to another vantage point". It is pretty omnivorous, feeding on snails, worms, grub, insects, lizards, centipedes and seeds obtained both on the ground and in the air. The male has a fine song, a short, soft, melodious whistle, sometimes heard during the winter though the usual one at that season is a low chuckling note accompanied by a flick of the tail. The Blue Rock Turush is the sparrow that sitteth on the house top of the scriptures.

123. The Burmese Blue Rock Thrush

Monticola solitarinus affinis (Blyth).

Fauna Brit. Ind., 2nd. Ed., No. 609

Description.— Length 9 inches. *Male* : Only differs from the last in always having some chestnut on the feathers under

the tail and sometimes, splashes of the colour on the flanks and abdomen.

Female : Not distinguishable from the last bird.

Colours of soft part the same as in the last race.

Distribution and Habits.— The habits are similar to those of the Indian Blue Rock Thrush.

124. The Himalayan Whistling Thrush

Myiophoneus caeruleus temminckii Vigors

Fauna Brit. Ind., 2nd. Ed., No. 614

Description.— Length 12 inches. Sexes alike. The whole plumage deep blue black, brighter on the wings and tail, the feathers of most of the plumage with glistening tips of a paler blue, giving a spangled effect ; some of the wing coverts tipped with white ; abdomen blackish brown.

Bill yellow, blackish along the top ; iris dark brown ; legs black. This Thrush appears black when seen in the field.

Distribution and Habits.— A common bird in the hills and wandering well into the plains in the winter. I even came across it in North Bihar. I have specimens collected in the Duars in January, February and March, many miles away from the hills. I saw a pair at Binaguri in the middle of latter month.

It is fond of hilly streams, and may be seen flying from boulder to boulder and prefers shady spots but is also often seen far from them. In Darjeeling it is often found in compounds regularly seen sitting on the top of some roof in the centre of the town, a single bird pays the Museum a visit. In the Duars I have seen them in the Hasimara, Binaguri and Haldibari compounds. At Haldibari one used to stay in a clump of trees near the bungalow and come on to the verandah.

It is either seen singly or in pairs and has a long melodious whistle, but it is not a fine songster as the Malabar Whistling Thrush (*Myophoneus horsfieldii*). It becomes very tame and makes a nice pet. I had one in Bihar which was not confined and would fly up to take pieces of liver from my fingers. Its food consists of water insects, dragon fly, nymphs, snails etc.

FAMILY MUSCICAPIDAE

125. The Nepal Sooty Flycatcher

Hemichelidon sibirica cacabata (Penard)

Fauna Brit. Ind., 2nd. Ed., No. 632

Description.— Length $4\frac{1}{2}$ inches. Sexes alike. Upper plumage sooty-brown ; a buff and white ring, round the eye ; sides of head mottled white and brown ; lower plumage, except abdomen to below tail which are white, smoky brown, the breast and flanks with a varying amount of white.

Bill above dark brown, lower mandible yellowish ; iris brown ; legs brownish black.

The bill of this flycatcher, when viewed from above, is almost an equilateral triangle.

Distribution and Habits.— A not uncommon cold weather visitor to the plains and is also to be found in the hills. It wanders considerable distances from the foothills notwithstanding. Oates remarks that "it appears to be entirely absent from the plains". I procured a specimen in the Moraghat forest on the 5th February, 1931. It is not at all a shy bird, and its favourite spot is a dead branch from which it makes sallies after insects, returning to the same perch. It does not seem to care for the leafy branches of trees. It has a low mouse-like squeak.

126. The Himalayan Orange Gorgeted Flycatcher

Muscicapa strophciata strophciata (Hodgson)

Fauna Brit. Ind., 2nd. Ed., No. 636

Description.— Length $5\frac{1}{2}$ inches. *Male* :—Upper plumage olive brown ; tail black with white bases to the feathers except the central ones ; a short white eyebrow ; in front of eye ; chin and upper throat, black ; an orange rufous gorget on lower throat ; breast, and flanks, slaty-grey changing to white on abdomen and below the tail. In some specimens the orange rufous gorget is practically non-existent, according to Ludlow.

Female :—Similar to the male but usually, the gorget is smaller and paler ; the chin and throat are slaty-grey instead of black. Many females, however, do not differ from the male. Bill and legs black ; iris dark brown.

Distribution and Habits.— I obtained this Flycatcher at Baksa Duar on the 24th March, 1915 but it also wanders far into the plains during the winter as I secured a specimen in the Moraghat forest on the 16th February, 1930. It is a forest loving bird but will come into gardens in the hills. It is by no means a shy bird and may be seen, either sallying after some insect from some favourite perch, or sitting flicking its tail, the black and white of which are then, most conspicuous. It is rather a silent bird but has a sweet little song as well as a 'churr' uttered both on the ground and in the air.

127. The European Orange-breasted Flycatcher

Muscicapa parva parva (Bechstain).

Fauna Brit. Ind., 2nd. Ed., No. 638.

Description.— Length 5 inches. *Male* :—Top of head ashy-brown ; upper plumage fulvous brown ; above the tail black ; central tail feathers black, the others the same, with basal two thirds white ; sides of head bluish ashy, a ring of

white feathers round the eye ; wings dark brown ; chin, throat and breast orange ; remainder of lower plumage white, tinged with grey and buff, on the flanks.

Female and immature male : Upper plumage, fulvous brown ; chin and throat almost white (there is no orange on those parts and the breast) breast fulvous white ; rest of plumage like adult male.

Bill brown above, brownish fleshy below, iris dark brown, legs blackish brown.

Distribution and Habits.— This and the next race are both winter visitors to the district. Blanford identified both in a collection of Birds from the “Bhutan Duars obtained by Mandellis’ collectors (*Stray Feathers Vol. V. p. 484*)”. O’Donel mentions both. I have failed to come across this race. The habits are the same as those given for the eastern sub species, usually known as the “Red-breasted Flycatcher” but the above name seems more appropriate.

128. The Eastern Orange Throated Flycatcher

Muscicapa parva albicilla (Pallas).

Fauna Brit. Ind., 2nd. Ed , No. 639

Description.—Length 5 inches. *Male* :—differs from the last species in having the orange restricted to the chin and throat, the breast being ashy, the crown is the same colour as the back and the sides of the head brown instead of bluish ashy.

Female and immature Male :—Distinguished from the last race “by the colder, greyer, brown upper parts and the whiter under parts suffused with grey. On the breast instead of creamy white suffused with buff” (C. A. Ticehurst, *Jour. Bom. Nat. Hist. Soc. Vol. XXXIV p. 904*).

Colours of soft parts same as those of the last

Adult males are far from common. I obtained two, one from Hasimara on the 24th March, 1927 and the other in the Moraghat forest on the 1st April, 1933.

Distribution and Habits.— A very common cold weather visitor arriving in the middle of September and probably, leaving some time in April. It frequents both forest and will even enter gardens. It would not be so conspicuous a bird if it was not for its habit of continually flirting its tail over its back thus exposing its white basal portions. It is often seen sallying after insects from a perch, or sometimes, picking them off the ground. Deignan and others, have noted that it makes use of the same perches each year and that Naturalist writes that "Upon its first arrival in the autumn, each individual stakes out for itself a territory in which it may be found day after day throughout the cold weather." Its note is a "chur-r-r." Its food consists largely of beetles but it will also eat small dragon flies, moths, ants. Mason examined the stomachs of 12 birds in Bihar and recorded that "Of 108 insects, 3 belong to the beneficial group, 64 to the injurious, and 41 to the neutral," it is certainly a beneficial species. This is usually known as the "Eastern Red-breasted Flycatcher."

129. The Slaty-backed or Rusty-breasted Blue Flycatcher

Muscicapula hodgsoni (Verreaux).

Fauna Brit. Ind., 2nd. Ed., No. 642.

Description.— Length 5 inches. *Male* : Upper plumage slaty-blue ; in front of the eyes, cheeks and above the tail, black ; tail black edged with blue, with the bases of the feathers, except the central pair, white ; wings blackish brown, narrowly margined with dull rufous ; lower plumage orange chestnut becoming whiter on center of abdomen and vent.

Female : Upper plumage olive brown, including the sides of the head, changing to rufous buff on the rump and above the tail ; a pale ring round the eye, whitish ; lower plumage ashy brown, becoming almost white on the abdomen.

Bill, feet, blackish brown ; iris deep brown.

Distribution and Habits.— I found this a rare winter visitor, the two specimens I secured were got in the Moraghat forest on the 9th and 17th of March, 1930. Stevens came across it at Bhutan ghat, a female, on the 27th January, 1922. It is a forest loving bird keeping largely to the tops of trees from which it sallies after insects, it is also to be seen hunting for insects in stony river-beds. In summer Ludlow found it at an elevation of 12,000 feet in S. E. Tibet.

130. The Indian White-fronted, or Rufous-breasted Blue Flycatcher

Muscicapula hyperythra hyperythra (Blyth).

Fauna Brit. Ind., 2nd. Ed., No. 643

Description.— Length $4\frac{1}{2}$ inches. *Male* : Upper plumage slaty-blue ; a conspicuous white eyebrow from the forehead to the eye ; in front of eye, cheeks, and chin, black ; tail slaty blue all the feathers, except the central pair, with white bases ; throat and breast orange rufous with the lower breast, and flanks olivaceous-brown ; the abdomen, below the tail white.

Female : Upper plumage olive-brown ; lower plumage ochraceous, brownish on the flanks, pale on the throat and abdomen.

Bill black ; iris dark brown ; legs fleshy horny.

Distribution and Habits.— An exceedingly common little fly-catcher, in the winter, in all forests in the district. It remains, at any rate, upto the middle of March, probably later. It frequents scrub jungle as well as forest land and is not a shy bird. I have seen it in hunting parties of other small birds. It is a cheerful little bird and obtains some of its food on the ground. Stevens "saw a male on the ground making a somewhat fruitless attempt to demolish a large earth worm, which it eventually flew away with, though this feat was by no means an easy undertaking."

131. The Western Slaty-blue Flycatcher

Muscicapula tricolor tricolor (Hodgson).

Fauna Brit. Ind., 2nd. Ed., No. 645

Description.— Length $4\frac{1}{2}$ inches. *Male* : Upper plumage dark, dull slaty blue ; forehead, and sides of crown, a brighter greyish blue ; sides of the head black ; above the tail, and tail black, the latter, except, on the central feathers, with the bases of the feathers white ; chin and throat white ; rest of lower plumage fulvous grey.

Female : Upper plumage olive brown ; above the tail and tail ferruginous ; which readily distinguishes it from the female of the last species ; chin, throat, and centre of abdomen, white, rest of lower plumage ochraceous.

Bill black ; iris and legs, dark brown.

Distribution and Habits.— Another very common winter visitor. It frequents any kind of jungle, thick forest, reeds or elephant-grass and goes about in pairs. It has a sweet, but feeble song. Ludlow found it as high as 13,000 feet in South East Tibet in June.

132. The Western White-browed Blue Flycatcher

Muscicapula superciliaris superciliaris (Jerdon).

Fauna Brit. Ind., 2nd. Ed., No. 647

Description.— Length $4\frac{1}{2}$ inches. *Male* : Upper plumage a dull, but not dark, blue ; a broad white eyebrow reaching as far back as the nape ; in front of the eye and the tail, black the latter with the bases of all the feathers, except the central ones, white ; lower plumage white, with a dark dull blue band across the breast broken in the middle.

Female : Upper plumage olive-grey, above the tail, blue, tail blackish, edged with blue ; lower plumage pale buff, with centre of abdomen and patch below the tail, white. The blue

feathers above the tail distinguishes the female of this flycatcher from the others found in the district.

Bill and feet, black ; iris dark brown.

There is a sub species, the Eastern form of this flycatcher.

[*M. superciliaris aestigma* (G. R. Gray)] which should be the race occurring in the Duars. It is very similar to the typical race the principal difference is the male has no white eyebrow or if at all present, it is only shown by a few scattered bluish-white feathers, it is, also, more an ultramarine blue on the upper plumage. The female too is very similar to that of the typical race but the feathers above the tail are generally more tinged with fulvous and less with blue. In the Darjeeling Museum the males of this race collected in the Darjeeling district show no signs of any white eyebrow but in the single male from the Duars it is very broad and distinct so belongs to the Western form.

Distribution and Habits.— This must be a very rare winter visitor, the only specimen from the district is a male shot by O'Donel, at Haldibari, on the 3rd April, 1933, this specimen was purchased from him by the Darjeeling Museum. It frequents forest country, either mixed or deciduous. Stuart Baker says "In summer rather shy and retiring, frequenting forests, in Winter they come far more into the open and even into gardens when they are very fearless and confiding. The song is sweet and like that of the slaty blue flycatcher but stronger and better sustained."

133. The Indian Little Pied Flycatcher

Muscicapula melanoleuca melanoleuca Blyth

Fauna Brit. Ind., 2nd. Ed., No. 649

Description.— Length $4\frac{1}{2}$ inches. *Male* : A very broad eyebrow, patch across the wings, basal half of lateral tail feathers and whole of lower plumage, white ; the rest is black.

Female : The female resembles that of the last bird but has the feathers above the tail bright ferruginous, the lower plumage is greyish white.

Bill black ; iris, and legs, dark brown.

The pied plumage of the male is very conspicuous.

Distribution and Habits.— An exceedingly common little Flycatcher all over the plains during the winter. It is found in the thick evergreen forest especially where there are clearings, in more open river bed jungle, even enters gardens. It is a fearless bird and can be observed at close quarters. It is active and sociable and catches much of its insect prey on the wing but also some on the bushes and trees it moves about in and on.

134. The Sapphire-headed Flycatcher

Muscicapula sapphira Blyth

Fauna Brit. Ind., 2nd. Ed., No. 651

Description.— Length $4\frac{1}{2}$ inches. *Male* : Top of the head and about the tail, brilliant ultramarine blue, rest of the upper plumage, sides of the head and an interrupted band on the breast, deep purplish-blue ; in front of the eye, and the tail, black, the latter edged with bright blue ; chin, throat and upper breast chestnut ; rest of lower plumage pale bluish grey.

Female : Upper plumage rufous-olive, above the tail bright ferruginous, sides of the head fulvous brown with a fulvous ring round the eye ; chin, throat and breast pale orange rufous, rest of lower plumage whitish, the flanks tinged with brown. The rufous of the throat and breast is an easy distinguishing feature.

Young males, which may possibly be seen in the district are like the female but have the wings, rump and patch above the tail, like the adult male.

Distribution and Habits.— The only place in the district where I have seen this beautiful Flycatcher is Baksa Duar,

where it was collected in rather open forest. It is not likely to be found at a lower elevation and is of course, only a winter visitor. It goes about singly or in pairs and is found both in trees and high undergrowth.

135. The Indian Pale Blue Flycatcher

Muscicapula unicolor unicolor (Blyth)

Fauna Brit. Ind., 2nd. Ed., No. 655

Description.— Length $6\frac{1}{2}$ inches. *Male* : Upper plumage a light soft blue, except the forehead, eyebrow and wing-coverts near the shoulder, which are shining ultramarine-blue, in front of the eyes black ; lower plumage pale blue, albescent on the abdomen, patch below the tail bluish-olive brown ; tail rufous-brown, outer webs of wing quills, feathers above the tail, ferruginous, a pale rufescent ring round the eyes, lower plumage sooty-grey suffused with blue on the sides of the throat and flanks.

Bill black, iris, hazel, legs brown.

Distribution and Habits.— I have only secured two specimens of this delicately coloured Flycatcher in the district, both in the Moraghat forest, a female on the 22nd November, 1923 and a male on the 27th March, 1930. It is a very rare winter visitor. The Moraghat forest is humid and that is the kind of habitat it prefers, Stuart Baker found it in a similar locality in Assam, where it was seen "hawking insects both from high up in big trees and from low down in bushes and we noticed that it used regular perches for this purpose much less than most of the family. It is by no means shy."

136. The Indian Blue-throated Flycatcher

Muscicapula rubeculoides rubeculoides (Vigors)

Fauna Brit. Ind., 2nd. Ed., No. 657

Description.— Length $5\frac{3}{4}$ inches. *Male* : Forehead, eyebrow and wing-coverts near the shoulder, glistening blue,

upper plumage dark blue ; chin, throat, sides of neck and breast, deep blue ; breast bright orange-rufous, rest of lower plumage white.

Female : Upper plumage olive brown, suffused with rufous on the forehead and above the tail ; wings and tail brown, edged with rufous, a pale fulvous ring round the eye, lower plumage dull orange-rufous on the breast, the remainder white.

Bill black ; iris brown ; legs fleshy horny.

Distribution and Habits.— This handsome Flycatcher is not uncommon along the base of the hills in the winter and it is possible that it may be resident above Baksa Duar. It remains in the plains, at any rate up to the end of March. It is a forest bird and may also be found in bushes ; bamboo jungle and scrub. As a rule it keeps low down in these seldom visiting high trees. It is a cheerful bird and though rather silent, has a sweet song a soft *chur-r-r-r* like some of the other Flycatchers.

The breeding season is from April to June and it makes a cup-shaped nest of moss, fine root, bits of grass and leaves lined with fine roots, placed in a hole in a tree or some hollow in a bank or rock, preferably, according to Stuart Baker "in natural holes in old stumps which are well concealed by moss or creepers." The eggs number from 3 to 5 and are pale clay or greenish stone colour, covered with specks of reddish brown. They measure about 0.73 by 0.6 inches

137. The Pigmy Blue Flycatcher

Muscicapula hodgsoni hodgsoni (Moore)

Fauna Brit. Ind., 2nd. Ed., No. 664

Description.— Length 4 inches. *Male* : Extreme forehead in front of eyes, sides of the head and neck, black tinged with blue ; crown glistening ultramarine blue, rest of upper plumage dark, bright blue ; lower plumage light orange-yellow, almost white on the abdomen and purer white below the tail.

Female : Upper plumage olive brown, rather rufescent from the lower back to above the tail, lower plumage saffron yellow, albescent from the centre of the abdomen to below the tail.

Bill horny brown, yellow on the lower mandible ; iris deep brown ; legs pinkish plumbeous.

This tiny Flycatcher has a very narrow, slender bill.

Distribution and Habits.— When the original list was published, the only record of this beautiful little Flycatcher was a specimen collected by me at Baksa Duar, but since then I have secured a number of specimens from Baksa Duar, Kartik, Hasimara, Gorumara and 5 from the Moraghat forest above, so it can be called a well spread winter visitor, the specimens were obtained from November to March. I have found them in moist as well as in dryer and more open forest, usually in lower trees and undergrowth. Stuart Baker writes "When catching insects on the wing in the flickering shade and sunlight they looked more like brilliant butterflies than birds". Several are often seen together and their note is a sharp, sibilant, but rather feeble *tsip*.

138. The Indian Verditer-blue Flycatcher

Eumyias thalassina thalassina (Swainson)

Fauna Brit. Ind., 2nd. Ed., No. 665

Description.— Length 6 inches. *Male* : Whole plumage bright verditer blue, brighter on the exposed parts of the wings and tail ; in front of the eye black ; patch below the tail broadly edged with white.

Female : Duller and greyer than the male, the chin and throat mottled with white.

Bill and legs, black ; iris dark brown.

The bill seen from above forms an equilateral triangle fringed with hair.

Distribution and Habits.— A winter visitor to the plains where I have found it at scattered localities, all over the district, it remains in the plains, at any rate well into March. It wanders far from the hills in the winter as I obtained it in the Darbhanga district of North Bihar. It frequents evergreen and thin forest and also comes into gardens. Its beautiful colour, its tameness, makes it a very welcome addition to the bird life of a garden where it hunts for insects among the shrubs or makes sallies after them on the wing but it does not return to the same perch as most other Flycatchers do. Its song is sweet and generally to be heard in the mornings and evenings. They are such confiding little birds that in the hills they often, make their nests under the eaves of the house. It is seen singly or in pairs but they congregate in small parties during migration to the hills.

139. **The Sikkim or Hodgson's White gorgeted Flycatcher**

Anthipes moniliger moniliger (Hodgson)

Fauna Brit. Ind., 2nd. Ed., No. 669

Description.— Length 5 inches. Sexes alike. Upper plumage olive brown, tinged with rufous on the rump, tail and above it dull ferruginous; a broad, bright, fulvous eyebrow; chin and throat, white, surrounded by a black band; remainder of lower plumage fulvescent and olive becoming white on the abdomen.

Bill horny brown or black; iris dark brown, legs fleshy white.

The only place where I came across this Flycatcher was in the undergrowth near Baksa Duar. It is a great skulker so not always noticeable. It must be considered a rare winter visitor and probably does not descend lower than 2000 feet. It has a chattering note.

140. The Sikkim Olive, or Brooks Flycatcher

Olcyornis olivaceus poliogenys (Brooks).

Fauna Brit. Ind., 2nd. Ed., No. 673

Description.— Length 6 inches. Sexes alike. Upper plumage olive brown, the sides of the head and a ring round the eye, ashy grey, above the tail and the tail, ferruginous, lower plumage orange buff albescent on the chin and throat and pale buff on the abdomen and below the tail.

Distribution and Habits.— A common bird over a large part of the district especially so in the Moraghat forest. I have collected many specimens of this dull coloured Flycatcher during the winter upto the end of March. O'Donel said it was resident and it may be so in the hills and foothills upto 5000 feet. I have found this bird both in scrub and forest jungle and once in a cane-brake. Stevens gives the following interesting note on this species. "Somewhat resembles a robin as it hops over and about fallen stumps and brushwood in forest, although it keeps generally much above the ground amongst trees, it utters a pleasing trill."

The breeding season is from April to June and it makes a cup shaped nest of moss, grass and leaves which is placed in a hollow of a bank or between boulders or in a hollow in a stump. The eggs number 3 to 5 and are pale buff, pale green and stone colour, covered with tiny freckles of reddish brown. They are slightly smaller than those of the Indian Blue throated Flycatcher.

141. The Brown Flycatcher

Aleonax (Muscicapa) latirostris (Raffles)

Fauna Brit. Ind., 2nd. Ed., No. 675

Description.— Length about 5 inches. Sexes alike. Upper plumage ashy brown, a dull white ring round the eye ; wings

and tail dark brown edged with ashy white; lower plumage white, with the fore neck, breast and flanks tinged with ashy grey.

Bill black on upper mandible, lower one yellow; iris, brown; legs black.

Distribution and Habits.— I know nothing about the distribution of this rather sombre-coloured Flycatcher. O'Donel recorded getting specimens in July and thought it was a summer visitor. It is a quiet unobtrusive bird making sallies after insects, every now and then, from a perch. It is found in forest country but does, also, enter gardens and is a solitary bird but according to Scully, is sociable during the winter. It has an insignificant song.

142. The Simla Grey-headed Flycatcher

Culicicapa ceylonensis pallidior Ticehurst

Fauna Brit. Ind., 2nd. Ed., No. 679

Description.— Length 5 inches. Sexes alike. Head, neck and breast, ashy grey, darker on the crown and crest; upper plumage yellowish green; lower plumage bright yellow, concealed parts of wings and tail dark brown.

Bill brown above, horny yellow below; iris dark brown; legs yellowish brown.

The bill viewed from above forms an equilateral triangle.

This Flycatcher has a sub-crested head.

Distribution and Habits.— This pretty little Flycatcher is a very common winter visitor to the plains, arriving in October and remaining at least up to the middle or end of March. It is a forest lover, especially that which is open and may be seen making sallies after insects from some lower branch of a tree beside a road through the forest or on its outskirts, it also sometimes, picks up insects from the ground. It is often seen alone, or in pairs, and is not a shy bird. Its call has been syllabalized as *che-tut-tut teeee* or *wit-tweet-chitat-chitat*, another

rendering is *tit-titu-weet*. It joins hunting parties of other small birds amongst which is often seen a Racket tailed Drongo.

It may possibly, breed in the hills around Baksa Duar. The breeding season is from April to June and makes a beautiful little nest, shaped like half a cone, or half a hemisphere, which is placed against the perpendicular side of a tree trunk or on rock, amongst moss and lichen. The eggs number 3 to 4 and their colour is white, or dull yellowish white, spotted and blotched with grey, and yellowish grey generally forming a dense ring round the large end. They measure 0.60 by 0.48 inches.

143. The Sikkim Greater Black-breasted Niltava

Niltava grandis grandis (Blyth)

Fauna Brit. Ind., 2nd. Ed., No. 682

Description.— Length $8\frac{1}{2}$ inches. *Male* : Crown, rump, above the tail, wing coverts near the shoulder, and a patch on each side of the neck, brilliant, shining cobalt blue ; rest of upper plumage, central tail feathers and outer webs of lateral ones, deep purplish blue ; forehead, sides of head and upper breast, black ; lower breast purplish black, changing to bluish ashy on the abdomen.

Female : Upper plumage rich fulvous brown, forehead and sides of the head, buff with pale shafts, the crown is more bluish grey, especially posteriorly, a patch of glistening azure blue ; on each side of the neck, chin, throat and upper breast, buff ; remainder of the lower plumage, rich olive brown.

Bill black ; iris dark brown ; legs brownish black or black.

Members of both sexes of all the Niltavas can be recognized by the glistening patches of blue on each side of the neck. The greater one is a robust bird for a Flycatcher.

Distribution and Habits.— A rare winter visitor to the Duars, I have only once obtained a specimen, a female, on the 11th February, 1926. O'Donel also, once came across it and said it descended as low as 600 feet. It can, however, be easily overlooked as it is a sluggish bird, sitting still for quite long periods. It frequents forest country both the trees and undergrowth and unlike most Flycatchers feeds a lot on the ground. It also like the other Niltavas, likes the proximity of water. It is said to eat berries as well as insects. Deignan says "The unmistakable song is a soft, rising *one-two-three*..... *one-two-three*".

144. The Nepal Orange bellied, or Beautiful Niltava

Niltava sundara sundara Hodgson

Fauna Brit. Ind., 2nd. Ed., No. 684

Description.— Length $6\frac{1}{2}$ inches. *Male* : Top of the head, rump, above the tail, wing coverts near the shoulder and outer webs of lateral tail feathers, glistening cobalt blue ; a patch on each side of the neck of even a brighter blue ; forehead, sides of head, chin and throat deep black ; rest of lower plumage bright rufous orange.

Female : Upper plumage olive, brown, with a fulvous ring round the eye, a brilliant blue patch on each side of the neck, lower plumage olive brown tinged with ochraceous and with a large white patch below the throat.

Bill black, iris brown, legs dark horny brown.

Distribution and Habits.— This, the most beautiful of the Niltavas, is not an uncommon visitor to the foothills and plains. It wanders a considerable distance from these and I have obtained specimens at Hasimara and in the Rehti and Moraghat forests. The Rehti forest specimen was obtained on the 20th March, 1945, so it remains in the plains a considerable time. It is a forest bird, found in both humid and dry riverain forest

also in bamboo and keeps much to the undergrowth, it seems to be commoner in the damper areas of forest. It is not obstructive nor is it shy and in Darjeeling, is often seen, at dusk, perched on a railing or on the ground, it feeds much on the latter. It eats berries and seeds as well as insects. It has a lovely note like the other Niltavas and stands captivity well even in the English climate though possibly not in that of the present day, living out of doors all the summer.

145. The Small Black-breasted Niltava

Niltava macgrigoriae (Burton)

Fauna Brit. Ind., 2nd. Ed., No. 685

Description.— Length 5 inches. *Male* : Forehead and in front of the eye black ; forecrown, eyebrow, rump, above the tail and a patch on each side of the neck glistening cobalt blue ; rest of upper plumage deep purplish blue ; chin, throat and upper breast, black, strongly suffused with purplish blue ; rest of lower plumage dark, ashy grey, albescent on the abdomen.

Female : Is rather like a miniature of the last species but has no white patch below the throat.

Bill black ; iris brown ; legs horny brown.

Distribution and Habits.— A very common winter visitor to the forest of the plains, remaining at any rate, upto the end of March. It frequents much the same sort of country as the last. Stevens found it "More partial to mixed heavy mud and grass jungle interspersed with trees than strictly forest land" in Upper Assam. I have seen it in scrub in the Duars, it often comes into forest glades and open places. It is more active than the other Niltavas catching most of its prey on the wing and occasionally on the ground. On account of its small size and dark colouration it is not easily seen, its song is rather loud and may be usually heard in the mornings and evenings.

146. The Duars Paradise Flycatcher

Terpsiphone (Tchitrea) paradisi saturator (Salomonsen)

Fauna Brit. Ind., 2nd Ed., No. 689

Description.— Length $15\frac{1}{2}$ to 16 inches, the elongated central feathers of the male, measure upto about $10\frac{1}{2}$ inches. The females measure $7\frac{1}{2}$ to 8 inches. *Male* : In white plumage. Head, crest and neck glossy blue black ; upper plumage white with black shaft streaks, the wings and tail having them more developed ; lower plumage white. Male in chestnut plumage : I have never seen this plumage but Finn Salomonsen says the chestnut of the upper plumage has a “conspicuous olive-coloured” wash, the rump and the edges of the tail feathers are bright cinnamon. The abdomen is yellowish and the under tail coverts are pure chestnut.” In this plumage there are lengthened tail feathers.

Female : Head much greyer and not nearly as glossy as in the male ; throat and upper breast grey, shading into the yellowish white on the rest of the lower plumage ; the chestnut of the upper plumage is washed with olive. The female has no long streams in the tail.

Bill and rim of eyelid, bright cobalt blue ; legs leaden blue. In the female the colours are duller.

The plumages of the male do not appear to be fully understood yet, it is probable that the chestnut plumaged male, with the long streamers, may be dimorphic to the white plumaged one.

The type specimen of the present race was collected by Mandellis' collectors in the Duars in February, 1878.

Distribution and Habits.— This beautiful Flycatcher does not apparently arrive in the Duars before the middle of March. I have collected about 20 specimens, all in the Moraghat forest, the earliest date was the 17th March and the latest on the 1st

April but never having collected late in the latter month I cannot say how long it remains in the District. O'Donel said it was very common in the forest of the foothills but did not give any particular time of the year. According to Solomonsen it migrates and winters in Tenasserim in Burma, in Peninsular Siam. It is a wholly arboreal Flycatcher, is very partial to forests and secondary growth, also bamboo jungle. I have often seen it on trees alongside forest roads and in clearings in the forest. The white plumaged males, with their long streamers, waving as they fly, are a beautiful sight as they fly from tree to tree, the dark foliage of the latter showing off their beauty to perfection. I have never seen these birds come into gardens as the Indian Paradise Flycatcher so commonly does. They are said to get very tame and make charming pets. Its notes are generally very harsh. There is no information as to whether this bird breeds in the Duars or not, elsewhere it is said to do so freely at 2500 ft. elevation, during May and June. The nest is a neat, compact cup composed of fine grass and bits of leaves, plastered with some spider webs and decorated with their cocoons and bits of lichen, sometimes bamboo leaves are used in its construction, the lining is of fine grass. It is placed in the fork of a branch of a tree in thin or ever green forest or bamboo jungle. The number of eggs is 3 to 4, spotted or blotched with bright reddish brown and sometimes, a few underlying marks of lavender, the markings often form a ring round the thicker end. They measure about 0.85 by 0.60.

147. The Indo Chinese Black-naped Flycatcher

Hypothymis azurea styani (Hartlanb)

Fauna Brit. Ind., 2nd. Ed., No. 693

Description.— Length 6 inches. *Male* : Head, neck and breast lilac blue, the crown and above the eye especially brilliant, a large patch on the nape, point of the chin and a crescentic bar on the throat velvety black ; upper plumage dark rich blue, the wings and tail dull coloured, below the breast greyish and rest of lower plumage white.

Female : Head, neck and breast dull blue, upper plumage, pinkish brown, below the breast grey ; changing to white. There is no black patch on the nape nor a black gorget.

Bill dark blue, edges and tip black, iris dark brown, legs plumbeous.

The black patch on the nape has rather erectile feathers.

Distribution and Habits.— A common resident Flycatcher both in the hills and the plains. I have found it in every part of the district, both in deep and open river bed forest, also in scrub jungle, bamboos and patches of trees well away from any forest. It is usually seen singly or in pairs, flitting from tree to tree and making sallies after insects on the wing. It is, like the last bird, wholly arboreal and has rather a harsh note which it does not utter very often.

The breeding season is from April to June and it makes a beautiful deep, cup shaped nest, composed of grass and vegetable fibres, partially covered with cobwebs to which numerous small white cocoons and tiny pieces of dry leaves and lichen are attached, internally it is composed of fine grass stems well woven together. It is placed in the slender fork of an outer branch of a tree, sapling, high bush or in a spray of bamboo. It lays from 2 to 4 eggs the ground colour is from nearly pure white to salmon pink, speckled with deep red brown, generally dense towards the larger end and forming a zone or cap there. They measure about 0.69 by 0.53 inches.

148. The Yellow-bellied Flycatcher

Chelidorynx hypoxantha (Blyth)

Fauna Brit. Ind., 2nd. Ed., No. 699

Description.— Length $4\frac{1}{2}$ inches. *Male* : Forehead, a broad eyebrow and lower plumage, bright yellow ; upper plumage dark olive green, wings and tails dark brown, all the latter with broad, white shaft streaks and all except the central

pair, broadly tipped with white ; in front of and round and behind the eyes, black.

Female : Only differs in having the front of the eye and orbital region brown, mixed with olive green, instead of black.

Bill dark brown to black, above lower mandible, fleshy horny, gape yellow ; iris dark brown ; legs horny brown to fleshy yellow.

This beautiful little Flycatcher has a very short bill which viewed from above, forms an equilateral triangle and is fringed with many long hairs.

Distribution and Habits.— This, which is perhaps, the most attractive of our Flycatchers is a winter visitor to the district, commonly found in the hills and plain, by the middle of March they are well up in the hills. It frequents deep forest and is especially, fond of the vicinity of streams and also may be frequently seen near the roads leading through the forest and in the spare river-bed forest of the plains. It is a very active little bird, continually on the move, constantly quivering its wings and flirting its outspread tail like a fan, showing off the white markings. Now and again it sallies after some insects on the wing and its twisting and turnings remind one of the next species. It has a weak but quite sweet song.

149. The Indian White throated Fantail Flycatcher

Rhipidura albicollis albicollis (Vieillot)

Fauna Brit. Ind., 2nd. Ed., No. 703

Description.— Length $7\frac{1}{2}$ inches. Sexes alike. A short eye-brow and throat, white, the latter produced up the sides of the neck as a semi-collar ; crown, in front of eye, sides of head and front of chin black ; rest of plumage dull sooty, brown, lighter and more ashy, on the lower plumage ; tail dark brown, all except the central feathers, broadly tipped with white.

Bill and feet black ; iris dark brown.

The bill is long, flat and fringed with long hairs, the tail is very ample and rounded and is spread like a fan.

Distribution and Habits.— A common resident species, generally seen in pairs, but often, joining hunting parties of other small birds. It may be seen in various kinds of jungle, ever green, open forest, bamboo jungle, groves near habitations and often comes into gardens. In the denser forest it is oftenest met with on trees on the sides of roads and in clearings. It is tame and confiding and most attractive, ever on the move, dancing or pirouetting with its tail spread out like a fan and now and then capturing an insect in the air, it really does seem to fully understand the *joie-de-vivre*. It has a pleasant song.

As usual there is no record as to when it breeds in the Duars but elsewhere, the principal breedings months are May and June, nests have been found both earlier and later. The nests are cup shaped and made of fine grass bents plastered all over on the outside with cobwebs. They are generally built on to a horizontal twig, this may either be on a forest tree or in a mango grove. The eggs are 3 to 4 in number, white or dingy cream in colour, with a broad, irregular zone of greyish brown specks and spots near the large end. They measure about 0.65 by 0.49 inches.

NOTES ON THE OCCURRENCE AND HABITS OF BUFO
STOMATICUS (LUTKEN) AT BOMBAY

BY

J. C. DANIEL

The presence of this species in the Bombay area was first noticed during the rainy season of the year 1955. Mr. Abdulali, Secretary, Bombay Natural History Society, collected a speci-

men of the Toad being particularly struck by the difference in its call, to that of the common Toad, *Bufo melanostictus*. Further investigation revealed that the species was breeding in certain shallow, rain water pools, near the southern tip of the Island. A detailed study of the species was undertaken and the observations made are here correlated with that of earlier authors.

History of the species.— Till the early years of the present century, the species was known under two different specific names in the eastern and western range of its general distribution. Specimens from the east being named as *Bufo stomaticus* and those from the west as *Bufo andersonii*.

Bufo stomaticus described by Lutken in 1862, the species was not included in the Fauna of India by later Authors as the type locality was not available. Gunther, however in his monograph on "The Reptiles of India" (1864), refers to the species in a footnote. The species was redescribed by Boulenger in 1891, he regarded it as distinct from *B. andersonii* but omitted it from the list of Amphibians, described in his Volume, on the Reptiles and Amphibians, for the Fauna of British India series.

Bufo andersonii.—In 1871 Anderson described as *Bufo pantherinus* certain Toads collected at Agra. The name *Pantherinus* being preoccupied the species was redescribed as *Bufo andersonii* by Boulenger in 1883. It is interesting to note that the same species was described as new under the identical name by Murray in 1884 in his comprehensive work on the Vertebrate Zoology of Sind.

Annandale (1909) critically examined the differences between *Bufo andersonii* and *Bufo stomaticus* and on the basis of his investigation united the two species under the name of *Bufo stomaticus*.

The examination of a large series of specimens collected from the same locality at Bombay showed significant variation of certain morphological characters, on which specific identification is based. Twenty three specimens (12♂, 11♀) varying in snout to vent length from 34 mm. to 59 mm. were examined.

Snout— Blunt, projecting slightly beyond the mouth, shorter than the length of the Eye and the third finger ; except in two specimens in one of which it equals the Eye, and in the other the third finger.

Interorbital width— is broader than that of the upper eyelid in 12 specimens. It is equal to the upper eyelid in 10 specimens and less than the upper eyelid in one.

Tympanum— vertically oval in the majority and circular in a few of the specimens. It is situated near the eye and separated from it by a ridge. Its vertical diameter is nearly equal to the length of the Eye in 8 specimens and $\frac{3}{4}$ th the length of the Eye in 12 specimens. In three specimens it is half the length of the Eye.

Fingers— First finger longer than the second, except in one specimen. Subarticular tubercles feeble, two large carpal tubercles, the outer larger than the inner. The tubercles brownish in the larger specimens. Tips of fingers cornified. A row of white tubercles occur along the outer edge of the forearm.

Toes— About $\frac{2}{3}$ rds webbed. The web occurs as a fine fringe along the length of the toes. The tarso-metatarsal articulation reaches the front of the Eye or the Eye. In one specimen with exceptionally short legs it reaches only to the Tympanum. Subarticular tubercles very feeble. There are two metatarsal tubercles of equal size and with sharp edges.

Tarsal fold— The presence or absence of the Tarsal fold was one of the key characters in the recognition of *Bufo andersonii* from *B. stomaticus* and still is an important character in the recognition of allied species as *B. stuartii*. In the specimens examined the tarsus has three rows of large tubercles, a central row with one on each edge. Of these, the tubercles along the inner edge joined together form the tarsal fold, however the individual tubercles can be easily made out. Usually white in colour, these tubercles are sometimes tipped with black spines. As mentioned by Annandale (1909) this 'Tarsal Fold' is quite prominent in specimens preserved in strong spirit !

Skin— The skin may be smooth with a few flattened tubercles on the body, or profusely tuberculated. The head region in a few specimens has very few or is devoid of tubercles. This non-tuberculated area ends above the Parotoid glands. In the larger specimens there is usually a row of spine tipped tubercles along the ridge separating the Eye from the Tympanum. The density of tubercles on the body is subject to individual variation. In specimens with a highly tuberculated skin there is usually a row of spine tipped tubercles along the Canthus rostralis. The Loreal region even in these specimens is smooth. Ventrally coarsely granular or smooth, but with the chin and throat always smooth.

Colour— Greyish or Olive, uniform or with darker marblings. Ventrally white, which extends to the upper lip. Male Toads collected at the beginning of the breeding season were a bright yellow in colour. Whether this has any sexual significance is not known.

Juvenile colouration— Light brown with darker marblings, which have a pale pinkish center. The juvenile colouration is lost by the time the specimen attains a length of 30 mm.

Secondary sexual characters.— The male has a subgular vocal sac. The inner carpal tubercle and the inner aspects of the first and second fingers acquire oval, black, cornified patches in the male during the breeding season. These are lost soon after.

Larvae— The Tadpoles were described by Anderson (1895) from specimens collected at Aden. Tadpoles from the Indian region were fully described by Annandale and Narayan Rao (1918). The colouration as noted by Anderson varies from that recorded by the later Authors. Anderson's description reads 'Blackish above and partly so below. Sides of the tail pale greyish yellow finely marked with black pigment, darkest along the back of the dorsal crest. In younger specimens the body and tail are blackish brown and the caudal crest yellowish with fine black pigment spots here and there'. There is no trace

of yellow in the colouration of Indian Tadpoles. The presence of shiny silvery spots on the body which is quite characteristic of Tadpoles from the Indian region is not mentioned by Anderson.

The Tadpoles were collected from shallow rain water pools, about a hundred yards from the sea, on the newly reclaimed areas at Backbay, near the southern tip of Bombay Island. Egg strings of a pale translucent yellowish green colour, were found loosely wound round the base of grass stems submerged by water. The strings were 1 mm. in diameter and the Egg spacing was about 3 mm. It was not possible to determine the number of Eggs laid by a single female as the individual strings could not be separated from the tangled mass.

The Tadpoles hatched out the day after the collection of the Spawn. The hatchlings wriggle within the gelatinous envelope prior to release and making their way out, shoot up to the surface and either swim round vigorously or rest hanging vertically down from the surface. Gills club like, a small knob like inner Gill followed by the second which has three branches. The silver spots on the body appear on the third day of hatching by which time the external Gills are lost and the labial teeth are visible. Development is rapid and the young Toad on metamorphosis measures less than 10 mm. The breeding season apparently is not limited to the early days of the Monsoon as Tadpoles of different stages were noticed even at the end of August whenever continuous rain provided ideal conditions.

Distribution— The species has been recorded from Muscat, Persian Gulf, Aden, Waziristan, Sind, Cutch, Punjab, Agra, Eastern Himalayas, Calcutta and Mysore.

Habits— As evident from its known distribution, it is equally at home under varying climatic conditions. It has been recorded from an altitude of 6000' in the Nepal Himalayas. According to Ingoldby and Procter (1924) it replaces *Bufo melanostictus* above 3000' in the Hills of South Waziristan. Its fossorial habits have been remarked on by C. R. N. Rao (1923) who quotes the field notes on a specimen collected by Ingoldby at

Waziristan. The particular Toad was unearthed from about four feet underground, caked with mud and in an emaciated condition. Annandale regards it as a strictly nocturnal species and lists the various hideouts preferred by them. McCann (1940) records that in Cutch these Toads used to visit regularly a certain Pool and spend some time in it before setting forth on their nightly rounds. During the breeding season at Bombay, the Toads were found hopping around in the long grass near water during the day time.

A few specimens kept for observation usually rested during the day, in a jumbled heap, in a particular corner of the vivarium, even when disturbed the group reformed within a short interval. They burrow easily in wet or sandy soil. Though they fed avidly on white ants they were reluctant to take larger prey.

Related species— C. R. N. Rao describes a race of this species *Bufo stomaticus peninsularis* from Coorg, based on two specimens. The differential characters enumerated by him does appear to fall within the individual variation noticed in the specimens collected at Bombay. Smith (1933) has described an allied species *Bufo stuartii* from the upper reaches of the Brahmaputra, which may prove on comparative study to be of only racial value.

The species can be easily distinguished from *B. melanostictus* by the absence of the cranial ridges, and the black cornified area of the upper lip found in the former. It has also a less warty skin.

REFERENCES

1. Anderson J.—On some Indian Reptiles—*Proc. Zool. Soc.* (1871) P. 203
2. Do On a collection of Reptiles and Batraciens from Aden—*Op-cit* (1895) P. 635.
3. Annandale N.—The distribution of *Bufo andersonii*—*Rec. Ind. Mus. Vol. I.* (1907) P. 171.
4. Do Notes on Indian Batrachia—*Op-cit. Vol. III.* (1909) P. 232.

5. Annandale N.
&
Rao C.R.N. The Tadpoles of the Families Ranidæ and Bufonidæ found in the Plains of India—*Op-cit.* Vol. 15 (1918) P. 25-40.
6. Boulenger G. A.—Descriptions of new species of Reptiles and Amphibians in the British Museum—*Ann. Mag. Nat. Hist.* (5) Vol. 12, (1883) P. 161.
7. Do On new and little known Reptiles and Amphibians—*Op. cit* (6) Vol. 8 (1891) P. 233
8. Gunther A.—Reptiles of British India (1864).
9. Ingoldby C. M.
&
Procter J. B. Notes on a collection of Reptilia and Batrachia from Waziristan—*Jour. Bom. Nat. Hist. Soc.* Vol. 20 (1924) 1, pp 117-130
10. McCann C.—The Reptiles and Amphibia of Cutch State—*Op-Cit.* Vol. 40,3, (1938) P. 427.
11. Murray J.—The Vertebrate Zoology of Sind—1884.
12. Rao C. R. N.—Some South Indian Batrachia—*Jour. Bom. Nat. Hist. Soc.* Vol. 27, 1, (1920) P. 119.
13. Do Notes on a collection of Batrachia from S. Waziristan—*Op. Cit.* Vol. 29 (1923) P. 131.
14. Smith M. A.—On a collection of Amphibians and Reptiles from the Upper reaches of the Brahmaputra—*Rec. Ind. Mus.* Vol. 31 (1929) P. 77.

THE HETEROCERA OF TUKDAH, SEPT.-NOV. 1945.

BY

D. G. SEVASTOPULO, F.R.E.S.

(Continued from Vol. xxi, p. 86)

NOCTUIDAE

1586. **Brithys crini* F. (*Glottula dominica* Cr.)—Larvae fairly common.
- 1612a **Timora albicilia* Hamps.—Very common at rest.
1650. **Rhyacia (Agrotis) flammatra* Schiff.—One at rest.

1671. **Hermonassa consignata* Wlk.—One at light.
1715. **Parastichtis (Euplexia) flavistigma* Moore—One at light.
1717. **Parastichtis (Euplexia) sodalis* Btlr.—A couple at light.
1730. **Lasiplexia (Euplexia) chalybeata* Wlk.—Fairly common at light, mostly *f. albistigma* Warr.
- 1735a. **Euplexia albidisca* Moore—One at light.
1739. **Plexiphlebs (Euplexia) stelifera* Moore— One at rest.
- 1821a. *Acronycta indica* Moore—Not common at light. Larvae fairly common.
1827. *Conservula indica* Moore— One at light and one larva.
1829. **Prodenia litura* F. (*littoralis* Bsd.)— One larva.
1842. *Eriopus (Callopietria) repleta* Wlk.— Larvae fairly common, in two forms possibly representing two hitherto unseparated species.
- 1843a. **Eriopus (Callopietria) reticulata* Pag.—Very common at light and at rest.
1915. **Chabuata (Leucania) fraterna* Moore — One at light.
1939. **Arcilasisa sobria* Wlk.— One at rest.
1940. *Tiracola (Arcilasisa) plagiata* Wlk.— One at rest. Larvae fairly common.
2168. **Dinumma deponens* Wlk.— Not uncommon at light.
- 2279a. **Risoba basalis* Moore—Larvae common.
2300. *Cosmophilla mesogona* Wlk.—Larvae common.
2303. **Cosmophilla fulvida* Guen—Larvae common.
2334. *Carea nitida* Hamps. — A few larvae.
2342. **Torticiforma viridipuncta* Hamps. — One at rest.
2349. *Moma champa* Moore — Larvae fairly common.
2381. *Sypna curvilinea* Moore — Larvae fairly common.
- 2381a. **Sypna latifasciata* — A larva that produced an imago that agrees with fig. c. pl. 67 of Seitz' *Palaeartic Noctuidae*, iii. There is no reference in the text to

this figure, nor can I find any mention of the species elsewhere.

2483. **Achaea janata* L. (*Ophiusa melicerte* Drury) — One larva.
2501. **Parallelia* (*Ophiusa*) *maturata* Wlk. — A few larvae.
2521. **Dermaleipa* (*Lagoptera*) *juno* Dalm.—A single example, found dead.
- 2658a. *Phytometra* (*Plusia*) *tarassota* Hamps. — Larvae common.
2675. **Phytometra* (*Plusia*) *pannosa* Moore — Two at light.
2678. **Phytometra* (*Plusia*) *orichalcea* F. — Larvae common.
- 2684a. **Phytometra* (*Plusia*) *albostrata* Brem. & Grey—One pupa.
2909. *Dichromia quadralis* Wlk. — Common flying and at rest. Larvae fairly common.
2983. **Bomolocha* (*Hypena*) *rhombalis* Guen. — Fairly common at light.
2952. **Bomolocha* (*Hypena*) *divisalis* Moore — Fairly common at rest.

An unidentified *sideridis* sp., an *Euplexia* sp., and three other unidentified Noctuids were caught, as well as larvae of an *Ophiusa* sp., which failed to emerge.

EPIPLEMIDAE

3046. *Epiplema multistrigaria* Moore — At light and at rest, not common.

GEOMETRIDAE

3079. **Urapteryx primularis* Btlr. — Common at rest, very fond of resting on the underside of large leaves.
3080. **Urapteryx sciticaudaria* Wlk. — At rest, uncommon.
3088. *Sirinopteryx rufivinctata* Wlk. — At rest, not common.
3090. *Thinopteryx crocoptera* Koll. — Fairly common at rest, two distinct forms—the type and *f. nebulosa* Btlr. Larvae also fairly common.

3094. **Myrteta planaria* Wlk. — One at rest.
3102. *Myrteta simpliciata* Moore — Not common at rest, but loose wings were found in numbers, presumably dropped by bats.
3112. *Metrocampa haliaria* Wlk. — At light and at rest, not common.
3114. **Caberodes dentisignata* Moore — One at rest.
3133. *Peratophyga aerata* Moore. — Not uncommon at rest. Larvae common.
3175. *Anonychia grisea* Btlr. — Common at rest.
3219. **Luxiaria contigaria* Wlk. — One female at rest.
3227. **Krannanda semihyalina* Moore.—Two at rest. Looks very like a skeleton leaf when resting.
3285. *Psyra spurcatoria* Wlk. — Larvae fairly common.
3298. *Fascellina plagiata* Wlk. — One larva.
3313. **Leptomiza calcearia* Wlk. — One at light. Two larvae.
3315. **Crocallis lentiginosaria* Moore—One at rest.
3319. *Garaeus specularis* Moore. — A few larvae.
3331. **Heteromiza argentilinea* Moore. — One at rest.
3335. **Dalima (Calladelphia) schistacearia* Moore — A pair at rest.
3362. **Elphos hymenaria* Guen. — At rest, fairly common.
3365. *Xandrames albofasciata* Moore. — A severed wing.
3371. *Gnophus eolarius* Guen. — Common at rest.
3372. **Gnophus licheneus* Oberth. — At rest, fairly common.
3385. **Ectropis (Boarmia) duplexa* Moore.—One at light.
3393. *Ectropis (Boarmia) bhurmitra* Wlk. — Fairly common at rest. Also larvae.
3403. **Ascotis (Boarmia) selenaria* Hbn. — Larvae fairly common.
3404. *Boarmia acaciaria* Bsd. — Larvae fairly common.
3413. *Boarmia atrostipata* Wlk. — One at light.

3470. *Medasina mauraria* Guen. — One at rest.
3507. **Erebomorpha fulgurita* Wlk. — One at rest. A number of severed wings.
3509. **Erebomorpha compositata* Guen. — Not common at rest.
3510. *Erebomorpha metachromata* Wlk. — Two at rest.
3516. *Abraxas sylvata* Scop — Uncommon at rest. Larvae fairly common.
3518. *Abraxas martaria* Guen — Uncommon at rest.
3546. *Pernia felinaria* Guen. — One flying. This species was omitted by mistake from the list of species caught in May/June, 1944.
3573. *Iotaphora iridicolor* Btlr. — A severed wing.
3599. *Cryptoloba cinerea* Btlr. — Common at light and at rest.
3607. **Carige cruciplaga* Wlk. — One at rest.
3654. *Cidaria silaceata* Schiff. — Larvae fairly common.
3659. *Cidaria delecta* Btlr. — Larvae fairly common.
3665. *Cidaria aurigena* Btlr. — Larvae fairly common.
3680. **Cidaria obfuscata* Warr. — Two larvae.
3685. *Colostygia (Larentia) albigirata* Koll — Uncommon at light and at rest.
3700. *Larentia maculata* Moore — Fairly common at light.
3730. **Photoscotosia aurantiaria* Moore. — One in a spider's web.
3806. *Phthonoloba decussata* Moore — One at rest. Larvae common.
3836. *Asthenes plurilinearia* Moore — Common at light and at rest.
3844. **Cambogia pulchella* Hamps — Uncommon at rest
3845. **Cambogia pictaria* Moore — Uncommon at rest.
3858. **Scopula (Craspedia) moorei* C. & S. — One at rest.
3861. **Scopula (Craspedia) walkeri* Btlr — One at rest.

- 3879a. *Scopula (Craspedia) cleoraria* Wlk., *effrenata* Wlk.—
Common at rest
3883. *Scopula (Graspedia) remotata* Guen. — Common at
rest.
3916. **Acidalia sanguinaria* Moore — Fairly common at rest.
3926. **Anisodes obrinaria* Guen. — Three larvae.
3958. *Rhodostrophia vinacearia* Moore — Common at rest.
3970. *Calothysanis (Timandra) correspondens* Hamps —
Common at rest. One pupa.
4018. *Dundica (Pseudoterpna) polyphaenaria* Guen.—Two
larvae.
4033. *Chlorodontopera discopilata* Moore. — One at rest.
- 4068 **Tanaorrhinus vitatus* Moore—One pupa.
- 4082a. **Comibaena subhyalina* Warr. — One larva.
4112. **Gelasma (Thalassodes) thetydaria* Guen.—One at rest.
4140. *Berta (Thalera) chrysolineata* Wlk. — One at rest.

In addition I have eleven Boarmiids, nine Larentiids, and two Hemitheids still to be identified. A good number of larvae, which failed to emerge, were also found.

PYRALIDAE

4165. *Crambus latellus* Snell. — Common at rest.
- 4455a. **Locastra cristalis* Hamps. — Larvae fairly common.
4705. *Stegothyris diagonalis* Guen. —Common at rest.
4864. **Caprinia conchylalis* Guen. — Two pupae.
4866. **Filodes fulvidorsalis* Hbn. — One at rest.
4952. **Botyodes caldusalis* Wlk. — Uncommon at light.
4979. *Sylepta deficiens* Moore — Two at light.
5049. **Glyphodes actorionalis* Wlk. — One at light.
5062. **Polythlipta cerealis* Led. — One at rest.

A most disappointing list for this, usually, abundant family. In addition, I bred a *Lumida (Macalla)* sp. not included in the *Fauna of British India*, Moths, iv, and caught two unidentified species. I also found two species of larva that failed to produce imagines.

Calcutta, 7th October, 1946.

LEPIDOPTERA OF DARJEELING AND TUKDAH,
ADDENDA AND CORRIGENDA.

BY

D. G. SEVASTOPULO, F.R.E.S.

For the sake of accuracy and completeness I am recording a few additions and corrections to various lists published in past volumes of this Journal. These have come to light during a recent re-arrangement of my collections.

A NOTE ON THE HETEROCERA OF DARJEELING (1935, Vol x, p. 59).

Corrigenda :— 3422 *Boarmia infixaria* Wlk. Correct to
3404 *Boarmia acaciaria* Bsd.

Addenda :— 3393 *Ectropis (Boarmia) bhurmitra* Wlk.
—One at light.

4409 *Phycita defiguralis* Wlk. — One at
light.

A SECOND NOTE ON THE HETEROCERA OF DARJEELING (1936,
Vol. x, p. 134).

Corrigenda :— 3281 *Hyperythra phoenix* Swinh. Correct to
3291 *Pericallia lugens* Btlr.

Addenda :— 3446 *Boarmia albibasis* Hamps. — One at
light.

4619 *Orybina plangonalis* Wlk. — One at
light.

A THIRD NOTE ON THE HETEROCERA OF DARJEELING
(1936, Vol. xi, p. 28)

Corrigenda :— 3422 *Boarmia infixaria* Wlk. Correct to
3404 *Boarmia acaciaria* Bsd.

THE HETEROCERA OF TUKDAH, MAY-JUNE 1944
(1945, Vol. xx, p. 20)

Corrigenda :— 707 *Leucodrepana obliquilinea* Hamps —
Cancel, species still unidentified.

720 *Albara (Drepana) lilacina* Moore
correct to

720a *Albara (Drepana) simillima* Moore

1344 *Lithosia griseola* Hbn., ab. *flava*—
Cancel ab *flava*, the specimens belong
to the nomino-typical race.

1426 *Asura (Miltchrista) undulosa* Wlk.—
Cancel, species still unidentified.

1899 *Hyphilare (Leucania) subsignata* Moore.
— Cancel, species still unidentified.

2218a *Barasa alopha* Hamps. — Cancel,
species still unidentified.

2500 *Parallelia (Ophiusa) arcuata* Moore
correct to

2499 *Parallelia (Ophiusa) maturescens* Wlk.

- 2944 *Bomolocha (Hypena) obductalis* Wlk.
Correct to
2943 *Bomolocha (Hypena) rhombalis* Guen.
3857 *Scopula (Craspedia) mecysma* Swinh.—
Cancel, species still unidentified.

- Addenda :— 2135a *Zurobata vacillans* Wlk.—One at light
2512 *Parallelia (Ophiusa) onelia* Guen. —
One at light.
5209 *Pionea nobilis* Moore — One at light.

THE RHOPALOCERA OF TUKDAH, MAY-JUNE, 1944
(1945, Vol. xix, p. 146)

- Addenda :— H 85-18 *Rapala buxaria* deN — A single
example.

THE RHOPALOCERA OF TUKDAH, SEPT.-NOV. 1945
(1946, Vol. xxi, p. 22)

- Addenda :— A 4-11 *Papilio arcturus* Westw, *arcturus*—

One of the two bred specimens is
f. privatus Rob.

- H 85-18 *Rapala buxaria* deN. — A single
example.

THE HETEROCERA OF TUKDAH, SEPT.-NOV. 1945
(1947, Vol. xxi, p. 79).

- Corrigenda :— 1318 *Agylla (Gnophria) albocinerea* Moore,
ab. *sericeipennis* Moore correct to
1320 *Agylla (Gnophria) divisa* Moore.

1341 *Lithosia natara* Moore (*antica* Wlk.)
correct to

1344 *Lithosia griseola* Hbn.

1426 *Asura (Miltchrista) undulosa* Wlk.—
Cancel, species still unidentified.

Addenda :— 1189 *Diacrisia (Thyrgorina) nigrifrons* Wlk.
One at light.

London, 6.xi. 47.

A CATALOGUE OF PLANTS OF SIKKIM HIMALAYA

By

B. N. GHOSE

(Continued from page 186, Vol. XXVII, No. 4, 1956)

Note : Figures in columns 4 and 5 stand for the months in the year. In column 10, L. stands for Lepcha, Bg. for Bengali and P. for Parbatia names.

Order, Genus and Species.	Habit of Growth	Flowers.	Flowering Season	Fruiting Season	Locality	Elevation above sea level (in feet)	Rainy or Dry	Distribution	Local name
1	2	3	4	5	6	7	8	9	10
Order XXVII.									
STERULIACEAE—									
STERCULIA, Linn.	Trees or shrubs								
<i>S. villosa</i> , Roxb.	Palmately lobed leaves and white bark.	Panicles Pendulous	1/2	3/4	Gareedhura Golma	1,000-4,000	Dry	Deccan, Sub-Himalaya, Indus East-Ward.	P. Odgal.
<i>S. pallens</i> .	Tree.	Brilliant Yellow	6	8	Tropul	3,000	...	Sivalik and Bhutan.	L. Kaphal

SIKKIM PLANTS

Order, Genus and Species	Habit of growth	Colour of flower	Flowering Season	Fruiting Season	Locality	Elevation above sea level (in feet)	Rainy or Dry	Distribution	Local name
1	2	3	4	5	6	7	8	9	10
<i>S. coccinea</i> , Roxb.	Small tree.	Panicles Lax.	8	5	Jinglam	3,000	...	Eastern Himayas and Assam.	Seto Odal.
<i>S. kingii</i> , Prain.	Tree.	Pale red	6	5/6	Lopchu	5,000	...	...	P. Chivripat.
<i>S. colorata</i> Roxb.	Tree.	Brilliant Scarlet flowers	4	...	Simalbote Sukna	2,000	...	...	P. Phirphiri.
<i>S. lanceifolia</i> Roxb. (Syn. <i>S. roxburghii</i>)	Tree, bark fibrous, leaves lanceolate.	Erect Raceme	6-9	5/6	Tista	1,000-6,000	...	Assam.	P. ustichivripat.
REEVESIA , Lindl.	Lofty tree	Flower buds lytriform	...	8 seeds pendulous	Tropical Darjeeling	3,000-4,000	...	East. Himayas.	...

SIKKIM PLANTS

Order, Genus and Species	Habit of growth	Colour of flower	Flowering Season	Fruiting Season	Locality	Elevation above sea level (in feet)	Rainy or Dry	Distribution	Local name
1	2	3	4	5	6	7	8		10
ABROMA , Jacq.	Trees or Shrub								
<i>A. aungusta</i> , Linn.	Shrub	Purple	8	11 seeds edible	Reang Sevoke	3,400 2,000	Rainy.	India, hotter parts of China.	Beng. Ulat-kambal P. Scinus Kapesi
BUETTNERIA , Linn.	Herbs or shrubs	...	...	...	...	...	...	...	P. Nalgi
<i>B. aspera</i> , Colbrooke	Woody climber	Minute downy	5	6-8 Fruit Lar-ge	Mangpoo Mirik	2,500 200	...	Tibet to China	
<i>B. pilosa</i> , Roxb.	Climbing shrub.	appendage orange	5-7	6-8	Teraï Pankhabari	2-4,000	...	Eastern Bengal Burma	
FARMIANA , Marsili.	Tree	Yellow	...	...	...	...	...	...	P. Labstu
<i>Fr. pallens</i> , K. Sch. (Syn. <i>Sterculia pallens</i> , Wall).			...	...	...	...	...	...
<i>Fr. colorata</i> R. Br. (Syn. <i>Sterculia colorata</i> , Roxb.	A large tree.	Orange red	2-4	5	Teraï	2,000	...	...	P. Seto odal, Phirfoture

TRIUMFETTA , Linn.	Herbs or shrubs	Yellow	9	12	Tista Badamtam	1,000 3,000	...	Simla Africa to Ceylon
<i>T. tomentosa</i> , Boji.	Herbaceous	Yellow	3	...	Rishep	3,000	...	Do
<i>T. rhomboidea</i> , Jacq.	...	...	12	3	Reang Labadh	2,000	...	Beng. Banokra Hindi Chikti
<i>T. pilosa</i> , Roth.	Herb.	Yellow	1	...	Terai	1,000	...	Trop. Africa Himalayas and Malaya
<i>T. annua</i> , L.	An annual herb	about 4'	...	...	Terai	1,000	...	Ven. Chikti
CORCHORUS , Linn.	Herb	Yellow	...	...	Terai	1,000	...	Cultivated in tropical countries
<i>C. capoularis</i> , Linn.	An annual crop	Yellow	...	11	Rongong Singla	3,000	...	Beng. Pat.
<i>C. olitorius</i> , L.	Herb	Pale Yellow	...	11	Sevoke	1,000	...	Pot herb.
<i>C. acutangulus</i> , Lam.	Annual herb	...	...	...	...	...	...	Hotter parts of India, Africa Australia

SIKKIM PLANTS

Order, Genus and Species	Habit of growth	Colour of Flower	Flowering Season	Fruiting Season	Locality	Elevation above sea level (in feet)	Rainy or Dry	Distribution	Local name
1	2	3	4	5	6	7	8	9	10
ELAEOCARPACEAE	Woody plants								
ECHINOCARPUS Blume	Large tree								
<i>E. sterculiaceus</i> Benth.	Tree	...	2-3	11-12 Covered with subulate spines	Terai E. Himalaya Sikkim	2000	...	Eastern Himalaya	P. Gobre
<i>E. tomentosus</i> Benth.	Tree densely covered with spines	...	3	5-9 densely covered with fine bristles	Munsong Pankhabari	4000	...	Eastern Himalayas	
<i>E. dasycarpus</i> Benth.	Tree	...	10	11-12	Darjeeling Falaung	7000	Wet	E. Himalaya	P. Gobia L. Taksol

ELOECARPUS Linn.

<i>E. ganitrus</i> Roxb.	...	White	...	...	Often planted	...	...	India various parts N. E. Himalays Deccan Java	Bg. Rudraksha
<i>E. floribundus</i> Blume (Syn. <i>E. suratus</i>).	Tree, leaves elliptic oblong	White	6-7	8-9	...	Wet	Wet	Wild olive Bg. Jaipai	
<i>E. robustus</i> Roxb.	Leaves ovate oblong	White	5-6	7-8	Tista Valley Kalikhola Singhjora	2000 1000	Wet	Assam Burma Java	P. Batranetri Bg. Jaipai
<i>E. cuneatus</i> Wight.	Tree	...	3	6	Lat Rungeet Tista	4000 1000	...	Eastern Himalaya to Burma Ceylon	P. Badrassi
<i>E. lanceifolius</i> Roxb.	Tree	...	4-5	9 edible	Lat	4000	...	Sikkim Burma	P. Bhadrase
<i>E. sikkimensis</i> Mast.	Leaves elliptic	...	6	8	Peshoke Badamtam Darjeeling	5000 3000 6000	...	Eastern Himalaya	P. Bhadrase
<i>E. arietatus</i> Roxb.	Leaves cuneate obovate	Olive	4-5	...	Sitong in Forests Sevoke	...	...	Sikkim Assam Deccan	P. Nundekhi
<i>E. rugosus</i> Roxb.	Leaves ovate oblong	...	4	...	Sikkim Behar	2000 3000	...	Sikkim to Assam Deccan	
<i>E. varnua</i> Hans.	Leaves elliptic acuminate	...	3-5	9	Kalijhora Ramjohora Tista Badamtam Rungpu	1000 1000 3000	...	Kumaon Assam Malacca	P. Bhadrase

SIKKIM PLANTS

Order, Genus and Species	Habit of growth	Colour of Flower	Flowering Season	Fruiting Season	Locality	Elevation above sea level (in feet)	Rainy or Dry	Distribution	Local name
1	2	3	4	5	6	7	8	9	10
<i>E. prunifolius</i> Wall.	Leaves often recurved lanceolate	...	2	6-9	Lat	1,000 to 3,000	..	Sikkim Kharia	
LINEAE	Woody plants								
REINWARDTIA Dumort	Under shrub								
<i>R. trigyna</i> Planch (Syn. <i>R. tetragyna</i> Planch).	A tufted glabrous under shrub	Pretty Bright Yellow	8-9	10-11	Badamtam	4,000	...	Hilly parts of India Punjab to Assam, Deccan	P. Basant
Var. <i>tetragyna</i> .	Do	Do	8-9	10-11	Damper Localities	...	...	...	...
ANISADENIA Wall.	Perennial herb	...	9-11	...	...	5,500	...	...	...
<i>A. sanatilis</i> Wall.	...	Pink	7	...	Rongpu Talung	6,000 6,000	...	Nepal Khasia	

LINUM Linn. NATANS Maxim.	Herb	...	...	10	Kangma Gyantse	15,000	...	Sikkim
Order XXX MALPIGHIACEAE	Woody Shrub or climbers							
HIPTAGE Goertner	Climbing or suberect shrub							
<i>H. madagabola</i> Goertum.	A tall climber	3-5	5-6-7	Tisia Ryang	1,000 2,000	...	Jammu to Burma and Malacca	P. & B. Madhabi- lata
ASPIDOPTERYS. A. Juss.	Climbing shrub	...	...	...	...	...	...	...
<i>A. glabrescens</i> A. Juss. (Syn. <i>Roxburghiana</i> A. Juss.)	A slender climber	8-10	12 Win- ged fruit	Sikkim Himalaya	1-5,000	...	Sikkim to Burma Deccan	P. Shubung
<i>A. nutans</i> Hook F.	A slender climber	7-8	9-10	Sevoko Galle	2,000	...	Nepal to Burma	P. Shubung Lahara

OBITUARY

DR. S. L. HORA, D.SC., F.N.I.

The death of Dr. S. L. Hora, in December, 1955, has deprived India of one of its most eminent Scientists. Dr. Hora had an heart attack while giving a lecture at the Asiatic Society's Hall at Calcutta on 5th December and was removed to the Hospital where he died on 8th December.

Dr. S. L. Hora, son of the Late Lala Gobind Hora, was born at Hafiazabad, Punjab, on 2nd May, 1896. He was educated at the Anglo-Sanskrit High School at Jullundur and at the Government College, Lahore, from where he passed the M.Sc. Degree in Zoology of the Punjab University standing first in all science subjects and winning the Maclagan Gold Medal and Purse of the University. He joined the Zoological Survey of India as a Research Scholar in 1919 and was appointed as one of its Assistant Superintendents in 1921. He was awarded the Doctorate Degree of the Punjab University in 1922 and by the Edinburgh University in 1928 ; the latter for his dissertation on the "Ecology and Bionomics and Evolution of the Torrential Fauna" which was latter published in the *Philosophical Transactions of the Royal Society of London*. He was the Director of Fisheries of Bengal from 1942-47 and was the Director of the Zoological Survey of India, from 1947 till his death in December, 1955.

Dr. Hora was one of those versatile men whom it is hard to find in these days of specialization. His interest was not limited to his particular subject, Ichthyology in which he was a world renowned authority, but found expression on all aspects of Zoology. Since 1920 Dr. Hora published over 400 original papers in various Indian and Foreign Journals. His contributions include articles on Physiology, Systematics, Bionomics, Ecology, Evolution, Zoogeography and Paleogeography. The History of Science in India has had valuable contributions from his writings, regarding the knowledge of people of ancient days on Fish and Fisheries.



Dr. S. L. Hora, D. Sc., F.N.I.
(1896-1955)

Besides being the Director of the Zoological Survey, Dr. Hora was also the Honorary Secretary-General of the Indian Board for Wild Life ; Fisheries and Wild Life Adviser to the Damodar Valley Corporation ; and F.A.O. Consultant for tropical fish culture. He was also actively associated with the various scientific organisations of the country.

In his death the Society has lost a staunch supporter who was always interested in its welfare.

J. C. D.

VAN INGEN & VAN INGEN

COPY OF
OUR
USEFUL
BOOKLET



SENT
FREE
ON
REQUEST

"THE PRESERVATION OF SHIKAR TROPHIES"

ARTISTS IN TAXIDERMY

MYSORE

S. INDIA

Advertisements
from
firms dealing with Taxidermy supplies,
Scientific instruments, Arms and
Ammunition, Museum
equipment, etc.,

*are invited for publication
in this Journal.*

**For particulars
apply to :**

THE CURATOR

**Natural History Museum
DARJEELING**

Printed by T. P. Ghosh at
The Star Printing Works, 30, Shibnarsain Das Lane, Calcutta
and Published by
Mr. J. C. Daniel, Natural History Museum,
DARJEELING,