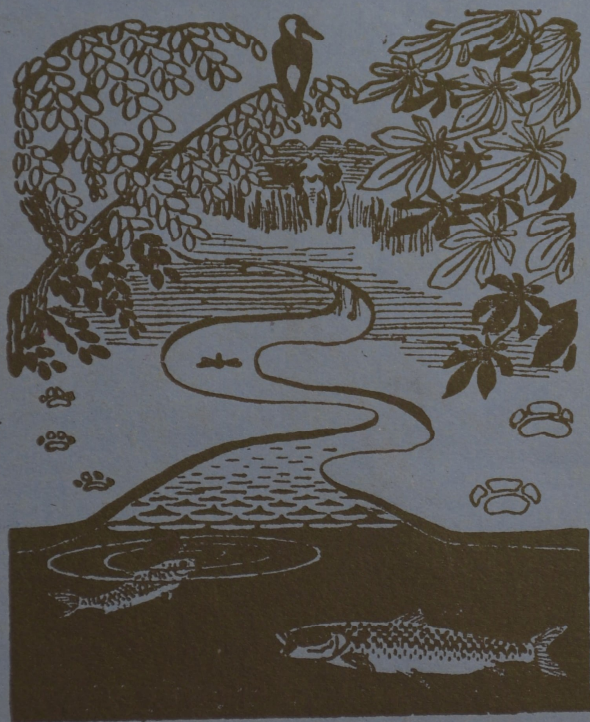


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Government and Municipal grants not being sufficient for our purpose, it was proposed to enrol members so as to increase our funds, and a quarterly journal has been started. The journal is no longer confined to articles on the Natural History of the 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.

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JOURNAL
OF THE
BENGAL NATURAL HISTORY SOCIETY

VOL. XXVI. APRIL, 1954. No. 4

BIRDS OF THE DUARS
(Continued from p., vol. XXVI, No. 3)

BY

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

Subfamily *Sibiinae*.

44. The Nepal Long-tailed Sibia.

Heterophasia picaoides picaoides (Hodgson).

(Fauna Br. Ind. 2nd Ed., No. 310).

Description.—Length $13\frac{1}{2}$ inches of which the tail measures $8\frac{1}{2}$ inches. Sexes alike. Upper plumage deep slaty brown; tail tipped with white and there is a white patch on the wings; throat and breast slaty brown; rest of lower plumage ashy grey, whiter on the abdomen.

Bill black; iris crimson; legs dusky grey.

The tail is very long and much graduated.

Distribution and habits.—I have never seen it in the District, but O'Donel came across a party of them near Baksa Duar. It is a hill species, usually found above 3000 feet and frequents forest country in pairs or parties, and, according to Stevens, in flocks of as many as twenty birds.

It may be seen hunting for insects on *Simal* or Red silk-cotton trees (*Bombax malabaricum*), and other flowering ones. Jerdon says it utters a shrill, but not unpleasant "sort of whistling call".

45. The Nepal Black-headed Sibia.

Leioptila capistrata nigriceps (Hodgson).

(Fauna Br. Ind. 2nd Ed., No. 311 part)

Description.— Length 9 inches, of which the tail is 4 inches. Sexes alike. Top and sides of head, including crest, black; upper plumage rufous-brown; tail rufous for three quarters of its length on the central feathers, then a dark band and a bluish tip; there is more black on the outer feathers; the wings are a mixture of rufous-black and bluish-grey with a white band across the greater-coverts; lower plumage rufous.

Bill black; iris reddish-brown; legs fleshy-brown.

This has a shorter tail than the last but it is also much graduated, and there is a full, bushy crest.

Distribution and habits.— I found this Sibia at Baksa Duar in the hills and at Hantapara, Gorumara and the Moraghat forest in the plains, during the winter. It is really a hill bird, being common at elevations over 5000 feet and is purely arboreal in its habits. It is said to seldom come low down, but I have seen it sitting on a railing, only three feet from the ground, in Darjeeling. It is very agile on trees, clambering about and running along the branches or clinging to the bark; it is acrobatic in some of its movements and most interesting to watch. On the wing, however, it is very slow, erratic and jerky. It is not at all shy and can be observed at close quarters especially as, where common, it does not shun human environment, being commonly seen on trees in the centre of the above-mentioned hill station. Stevens records one coming into his verandah and hunting the flower pots for spiders. Its note is very pleasing and has been syllablized as *titteree-titteree-tueeyo* quickly repeated.

46. The Nepal Barwing.

Actinodura egertoni egertoni Gould.

(Fauna Br. Ind. 2nd Ed., No. 321).

Description.— Length 9 inches, the tail measuring $4\frac{1}{2}$ inches. Sexes alike. Forehead above, and in front of eye, and chin,

refous; crest and sides of head several shades of ashy; upper plumage reddish-brown; wings a mixture of chestnut, ashy and brown, with some black barring on the wing-quills; outer tail feathers brown with white tips and barred with brown, the others are less barred and become more suffused with reddish brown, the central ones being all that colour; throat and upper breast, pinkish fulvous, whiter on the centre of the abdomen.

Bill pale horny-brown, darker above; iris brown; legs fleshy-horny.

The bill is less slender than that of the last species.

Distribution and habits.— I have only seen this bird above Baksa Duar. It is a hill species and resembles the Sibia in habits, but is not so tame and confiding, keeping largely to undergrowth in forest, but also clambering about trees in small parties of about half a dozen birds. Its notes are pleasant and it is insectivorous in diet.

47. The White-browed Staphida.

Staphida (Ixulus) striata rufigenis (Hume).

(Fauna Br. Ind. 2nd Ed., No. 332).

Description.—Length $5\frac{1}{2}$ inches. Sexes alike. Top of head and crest dark grey and upper plumage earthy-brown, both with distinct, white shaft streaks. Sides of head dull rufous; a short, white eyebrow; tail feathers, except central ones, tipped with white; lower plumage pale fulvous.

Bill dark horn colour; iris reddish-brown; legs brownish-fleshy.

This little Babbler has the head crested and the tail, comparatively, long, rounded and graduated.

Distribution and habits.—Oates in the 1st edition of the Fauna of British India gives its locality as "Bhutan Duars", but I can find nothing about its occurrence in the district.

Elsewhere it is found from the foothills up to 5100 feet going about in parties of as many as thirty birds, according to Stevens, during the winter. It is to be found in forest under-growth and secondary growth. Stevens says it is very Tit-like in its habits.

48. The Nepal Blue-winged Siva.

Siva cyanouroptera cyanouroptera Hodgson.

(Fauna Br. Ind. 2nd Ed., No. 335).

Description.—Length 6 inches ; sexes alike. Top of head blue, streaked, anteriorly, with brown ; upper plumage ochraceous ; the visible portions of the closed wings and tail, blue ; sides of head and lower plumage vinous-grey ; abdomen pale yellowish-buff.

Bill yellow, brownish about nostrils and along the top ; iris brown ; legs fleshy.

Birds of this genus are readily distinguished by their tails which have the ends obliquely truncated ; the four central quills are equal in length and the outer pairs are graduated.

Distribution and habits.— This pretty little Babbler is found in the hills, foothills and neighbouring plains. I obtained it at Kartick and in the Rehti and Chupramari forests. It is a busy little bird going about in parties or flocks, very often with other small birds, haunting shrubs and trees for insects. In Darjeeling, it is commonly seen in gardens where there are shrubs and bushes.

It probably breeds in the hills above Baksa Duar. The breeding season is May and June, and it makes a small, cup-shaped nest composed of leaves, grass, roots and moss, lined with finer grass and roots. It is placed in bushes or trees, generally only a few feet from the ground. The eggs number 2 to 4 and are blue in colour, speckled with black or red. They measure about 0.75 by 0.51 inches.

49. The Stripe-throated Yuhina.

Yuhina gularis gularis (Hodgson).

(Fauna Br. Ind. 2nd Ed., No. 339).

Description.—Length 6 inches. Sexes alike. Forehead and crest rich hair-brown; rest of upper plumage fulvous-brown; wings blackish, the first six flight feathers edged with grey and the inner ones with orange-brown, except the first of these; sides of head grey; lower plumage as far as the breast, rufescent, streaked with black on the chin and throat; rest of lower plumage orange-brown.

Bill black above, horny brown below; iris hazel-brown; legs orange-buff.

This genus has a square tail and the head is crested.

Distribution and habits.—I have never come across this bird in the Duars, but O'Donel recorded it as "a rare winter visitor to the plains"; it is usually not found below 3,000 feet. Where common, it is often seen in the company of other birds hunting for insects high up in trees in forests.

50. The Nepal Black-chinned Yuhina.

Yuhina nigrimentum nigrimentum (Hodgson).

(Fauna Br. Ind. 2nd Ed., No. 343).

Description.—Length $4\frac{1}{2}$ inches. Sexes alike. Forehead and crest black, edged with grey; sides of head and neck also grey; remainder of upper plumage olive-green; chin and in front of the eye, black; throat white; rest of lower plumage fulvous.

Bill blackish above and pale reddish below; iris hazel-brown; legs ochreous-yellow.

Distribution and habits.—This little Babbler is far from uncommon from 1,000 feet upwards. I obtained it at Baksa Duar. It is sometimes seen in considerable numbers and is

very energetic in its hunt for insects generally high up on trees. Stuart Baker says it hunts "in the manner of Titmouses, as often hanging head downwards from the underside as surveying along the upper, or even clinging Tree-creeper-like, to the bark, of the trunk itself". He also says it keeps up a constant *chip-chip* as well as a shriller call.

51. The Chestnut-headed Ixulus.

Ixulus occipitalis (Blyth).

(Fauna Br. Ind. 2nd Ed., No. 344).

Description.—Length 5 inches. Sexes alike. Forehead and crest, ferruginous-brown; occipital crest-feathers and nape white; ear coverts white, streaked with rufous; rest of sides of head and neck, ferruginous-brown; upper plumage olive-green; outer webs of earlier wing-quills edged with hoary-grey; chin and throat white; breast pinkish-brown, streaked with brown; flanks and abdomen olivaceous.

Bill black; iris red-brown; legs fleshy-brown or dull olivaceous.

Distribution and habits.— I have not come across it in the Duars but O'Donel recorded it from Baksa Duar. It is a forest-loving bird, very arboreal in its habits and goes about in parties searching trees assiduously for insects. Stuart Baker says it flies well and that its note is "a rather sweet, soft chatter".

52. The Nepal Yellow-naped Ixulus.

Ixulus flavicollis flavicollis (Hodgson).

(Fauna Br. Ind. 2nd Ed., No. 345).

Description.—Length 5 inches. Sexes alike. Forehead, crest and moustachial streak very rich brown; hinder part of neck mouse-grey, with a rusty-yellow demi-collar on the hind-neck; a white ring round the eye; chin and throat white; remainder of lower plumage fulvous; the flanks deeper coloured and streaked with white; upper plumage olive-brown.

Bill dark horny above, fleshy below ; iris reddish-brown ; legs yellowish-brown.

Easily recognised by its rusty-yellow collar and white ring round the eye.

Distribution and habits.—I found this attractive little bird common round Baksa Duar and it wanders well into the plains in the winter. Stevens observed it near Jainti and I obtained it in the Gabur-Busra forest near Hasimara and also in the Tondu forest at Gorumara. It is not a shy bird, commonly entering gardens in the hills and may be seen in parties or flocks, diligently hunting for insects in bushes, shrubs and trees ; it is most active, continually on the move and keeps up an incessant twittering. It feeds on insects, fruit and berries.

53. The Nepal Herpornis.

Erpornis zantholeuca zantholeuca Hodgson.

(Fauna Br. Ind. 2nd Ed., No. 350).

Description.—Length 5 inches. Sexes alike. Upper plumage, including small crest, yellowish-green ; wing and tail-feathers margined with yellow on the inner webs ; in front of the eye, sides of head and lower plumage white, suffused with ashy.

Bill horn-coloured above with the edges fleshy ; lower mandible flesh-coloured ; iris brown ; legs flesh-coloured.

Distribution and habits.—This bird occurs commonly round Baksa Duar and in the foothills. I have seen small parties at Gorumara up to the end of March, but perhaps it may remain longer in the plains. It joins up with parties of other small birds, hunting the leaves and twigs of trees for insects. It is rather a silent bird, but Deignan writes that it utters “notes not unlike those of a titmouse.”

It may, perhaps, be found breeding in the foothills. April and May are the breeding months. Stuart Baker thus describes the nest : “the nest is a cradle of fine roots, mixed with

fibres and fine grass stems and lined with the latter. It may be pendent in a horizontal fork or just hanging from a few twigs either of bamboo or of some shrub within a few feet of the ground.....Its nest is built either in evergreen forest, mixed bamboo and scrub or in bushes in thin cover." The eggs number 2 or 3 and are white in colour with a few pale reddish blotches confined to the longer end. They measure 0.64 by 0.49 inches.

(To be continued).

THE VANISHING FAUNA OF NORTH BENGAL

By

S. DUTT-MAZUMDAR, I.A.S.,
Deputy Commissioner, Darjeeling, and
President, Bengal Natural History Society.

The preservation of Wild Life in India has been engaging the serious attention of Naturalists and the Government. That India was rich in its Wild Life even a few decades ago is well known. With the passing of time, however, conditions have changed considerably, and in consequence 'fauna' is decreasing rapidly. Several species are now either extinct or on the point of extinction and if suitable steps are not taken to create conditions conducive to the preservation and growth of wild life in natural surroundings, many more species will be altogether extinct, and the abundance of Indian Wild Life will be a topic of the past. Almost all books on the subject give lively accounts of wild life in various parts of the country, but there is very little reference to the fauna of North Bengal and few people, therefore, have any idea as to how rich it was and how rapidly it is now being decimated.

The districts of Cooch-Bihar, Jalpaiguri and Darjeeling at one time abounded in Wild Life. Conditions there were conducive to the preservation of fauna because of the advantageous natural features of the country. This tract of land consists of a portion of the outlying hills of the lower Himalayas and a stretch of territory lying along the base of the

hills known as the 'Terai' on the West of the Teesta River and the 'Duars' on the East. The altitude varies from 200 ft. in Cooch-Bihar to about 12,000 ft. in Darjeeling District. Numerous hill streams and rivers intersect the foot-hill regions covered with long belts of evergreen forests. The hill portion is a labyrinth of ridges and narrow valleys—clad in great patches of rocky forests on the crests and green masses of dense mixed forests on the slopes. This area—bounded on the north by Sikkim and Bhutan, on the West by Nepal and on the east by Assam—is what is known as 'North Bengal'. While the Sankosh River separates it from Assam, the Mechi demarcates it from Nepal Terai and in between flow the mighty rivers Teesta, Jaldhaka, Torsa and Rydak. The annual rainfall varies from 80" to 200".

Owing to the marked variation in the physical and climatic features the forests in North Bengal fall under two distinct categories—plains and hills. The diversity of elevation, climate and vegetation has made the fauna varied and interesting. A reference to the District Gazetteers reveals that as many as 100 species of mammals and over 550 species of birds existed not even a century ago. Darjeeling district alone accounted for nearly one-quarter of the species of birds found in India, Burma and Ceylon. To-day some of those species simply do not exist. Many more are doomed to a similar fate if timely action is not taken for their preservation.

For administrative convenience these forests were divided into five Forest Divisions—Darjeeling, Kurseong, Kalimpong, Jalpaiguri and Buxa. After the integration of the Cooch-Bihar State into the State of West Bengal on 1st January, 1950, another Forest Division known as Cooch-Bihar Division has been carved out of the portions of Jalpaiguri, Buxa and Cooch-Bihar forests. It is interesting to note that the first Reserved Forest in Bengal was created in 1865 in the present Darjeeling Forest Division. For conservation of wild life, game sanctuaries were also set up, namely, Jaldapara, Gorumara and Chapramari in the Jalpaiguri district and Senchal in the Darjeeling District. The Senchal Game

Sanctuary was set up in the year 1915 and is the first of its kind in the whole of India. Rights of shooting and fishing in the Reserved Forests of the three North Bengal Districts are leased to three Game Associations, one in Darjeeling and two in Jalpaiguri and Cooch-Bihar, and are federated into "The Game Federation of Bengal", the main object of this body being to preserve the existing fauna, in particular game animals, birds and fish of Bengal, and to introduce suitable species into this area. These Associations, besides regulating hunting and fishing, are also to protect and preserve game within their respective areas with the help and guidance of Government Forest Officers. North Bengal can thus boast of having the first Notified Reserved Forests, the first Game Sanctuary and as many as three Game Associations. Yet little could be done during the period that followed for effective preservation of its rich and varied fauna, mainly due to public apathy towards this question.

In the ever-green forests of Terai and Duars large herds of 'Gaur' or Bison could be met with. Even in the year 1922, one bull bison worked its way up to the 'Chowrasta' in Darjeeling town—an elevation of 7100 ft. He was seen peeping through the window of a house in the vicinity. The inmates raised an alarm and the bison ran away killing two persons on the road. He was ultimately shot. The skull and the horns can still be seen in the Darjeeling Natural History Museum. A few Bison now remain in some isolated forest blocks. Wild Buffalos were plentiful in Eastern Duars and Cooch-Bihar. The late Maharaja of Cooch-Bihar mentions in his book "Big Game Shooting" that he shot as many as 438 buffalos in that area during the period—1871 to 1907. To-day only few can be seen. Both Bison and Buffalos are now strictly preserved. Unless Forest villagers in the vicinity of these preserves can be persuaded to have their domestic cattle inoculated against disease, the ever present risk of the extermination of Bison and Buffalos overnight will always be present. The Great one-horned Rhinoceros was extensively distributed in the riparian jungles of Duars and Cooch-Bihar. Indiscriminate poaching almost exterminated the species. Only as a

result of very strict preservation though woefully belated, a small number now survive and can be seen in the Game Sanctuaries of Duars and in the Patlakhowa Forest in Cooch-Bihar. The Sanctuaries have proved a failure in harbouring rhino as the practice of annual burning of forests in blocks has been discontinued in these areas. Undesirable species of trees are squeezing the rhino out of the grassy plains in which they thrive. Herds of elephants used to roam about in the Terai and the Duars. None can be seen now in the Terai and few remain in Duars. Occasionally a herd or two descend from the Bhutan hills with the advent of autumn, but soon disappear when the harvesting of the paddy crop is over. It is interesting to note that in Darjeeling district there is one place where elephants are still to be found. 'Rishi La' at an altitude of 10,300 ft. and clothed for miles together with virgin forests has been the favourite haunt of elephants for centuries. There are permanent elephant tracks leading from Rishi La to the plains in the Duars. Tiger Pugs have also been noticed on these tracks at elevations of 6000 ft. to 8000 ft. Presumably the tigers, being very fond of baby elephants, follow the herds along those tracks. Hundreds of 'Chital' or Spotted Deer—the most beautiful of all Deer species grazing in glades or grassy clearings in the Terai and the Duars were a common sight not even two decades ago. A few small herds can now be seen in scattered and isolated areas always on the run for fear of extermination. Sambhur—the largest of all deer—inhabiting the plains and hills up to about 3,500 ft.—could be seen all over the region. Only a small number now survive. Even their horns have gone back owing to indiscriminate slaughter. The Bara-Singha or Swamp Deer is practically extinct. A few are reported to have been seen only in Jaldapara Sanctuary. The Indian Chevrotain or Mouse deer was at one time reported to have been seen, but it is doubtful if any exists to-day. Such is the present day condition of the larger mammals—once plentiful in the plains and foot-hill forests!

The hill forests have suffered much more during the last thirty years or so. The Musk deer and 'Bharal' (Blue Sheep)

which were not uncommon near Phalut (12,000 ft.) no longer exist. The Clouded Leopard with its beautiful tortoise-shell markings, the Marbled Cat and the Golden Cat are rarely to be seen. The same is the case with the Pangolin—undoubtedly one of the rarest and most curious of animals. The Serow and the Goral—two of the three existing Goat-Antelope species in India—are rapidly disappearing as their rocky fastnesses are being steadily disturbed. The Pigmy Hog is no more to be met with. Of the Game Birds, the beautiful Monal or Impeyan Pheasant and the Tragopan or Crimson Horned-Pheasant—once plentiful in Singalila ridge in Darjeeling at altitudes between 10,000 ft. and 12,000 ft.—are practically non-existent.

The last fifty years have wrought considerable changes in the number and distribution of animals and birds in North Bengal. Extension of cultivation and consequent reduction in the area under Forest, and the building of a good number of motorable roads have no doubt disturbed Wild Life. But these alone are not responsible for the alarming rate of the disappearance of fauna. A critical examination of the causes leading to this state of affairs by any keen Naturalist points to other factors also. Gun licenses have been issued in ever increasing numbers to cultivators near Reserved Forests ostensibly for the protection of their crops. Most of them have been misused and applied ruthlessly against deer and game birds. Tea-garden labourers in their hundreds ransack the forests—as a regular week-end pastime—and kill countless numbers of deer and pigs for meat. Young boys roam around with their catapults and threaten the very existence of birds of all descriptions. Budding 'Shikaris' armed with modern weapons, spot lights and that wonderful legacy of the 'last Great War'—the Jeep—regularly poach, killing whatever happens to come across their way and perhaps wounding many more—sometimes eluding the Keepers of the Forests and not infrequently taking advantage of their indifference—just for the thrill of slaughtering. The ignorance of the great majority of our people and their apathy in this regard have encouraged the 'Crop Brigades', 'Tea Brigades' and the 'Jeep Brigades'

to continue their depredations with unabated zeal. Though some active members of the Game Associations and some conscientious officers tried to put a stop to the depredations of the various Brigades, their efforts proved abortive due primarily to the lack of understanding and proper co-ordination between the Associations and the Forest Officials. Attempts were made to preserve wild life in certain Sanctuaries. But the Sanctuaries were not maintained on proper scientific lines and the conditions necessary for the conservation and growth of particularly the rarer species did not exist there. The result was not at all conducive to the preservation of Wild Life. All these factors have contributed to the deteriorating state of Wild Life in North Bengal.

How long can we afford to overlook this state of affairs? Will not something be done to preserve this rich and varied fauna of North Bengal? We are no doubt late—but not too late yet to take active steps for the conservation of the species that still survive. It is most gratifying to note that the Government of India have been pleased to constitute and appoint a Central Board for Wild Life. Let a State Board be formed also and let public interest be roused in this regard. The Governmental agency without active public co-operation and help is not likely to be effective. Likewise, Game Associations alone cannot do much either. Past experiences clearly prove that. There should be perfect understanding and co-ordination between the representative Associations and the Governmental agency and both must act in co-operation with the people. Then and then only will it be possible to save the vanishing fauna of North Bengal.

AWARENESS IN WILDFOWL

BY

VICTOR ROSNER

It happened in Kompolla forest. A friend and I were watching a team of Whistling Teal circling a jheel. Six of the team broke away to come down on the branches of a dead tree standing in the shallows. The rest of the flight, near on

three hundred, landed on the water but only for a split second. They took off in a burst of whistling. The ones on the tree lingered for a while. It was a question of seconds. The tree-perching trait of these duck seemed strange, but what intrigued us more was the fact that something had made these duck aware of our presence, and that on a sudden.

All birds and animals have this sense of awareness in a greater or lesser degree. A Peregrine knows the moment it closes its wings for a drive that a hare is its target, just as a leopard senses there is a dog to be had on the bungalow verandah. For some it is a question of keen eyes, others depend more on their ears, and still others on the power of smell. Fish, on the other hand, seem to rely more on their sense of touch, located all over their skin, which is tuned to pick up vibrations transmitted through the water.

In the case of Wildfowl, the subject under consideration, I was inclined to put this awareness down to their sense of smell. The reason being that with an up wind blowing not all the stalking and lying low behind sand dunes and rushes would bring me within range of Brahmini duck. And yet on other days with a favourable wind I could get within snap shot range of Whistling Teal. Brahminis are wary birds, living as they do in the open most of the time, and I have never got that close to them. It was their behaviour that made me finally doubt that their awareness was due to their power of smell.

The fact that if you have hit on the right line of flight and are well hidden, duck will fly up wind well within range, also argued against my surmise. It may be that 'the field of scent' is limited to a certain height, or area. But this does not seem to be the case. We see how very close—even up to catching them by their legs—a trapper can approach a paddling of duck, hidden as he is behind a pile of floating grass or water hyacinth, or with his head enveloped in an earthen pot. If it were a question of smell such practices would not be possible. These methods of approach also rule out the possibility of touch in so far as vibrations transmitted through the medium of water are concerned.

When riding on horseback over the sands of the Sunk, I have, at times, approached within 20 yards of Brahminis. As long as I remained in the saddle they somehow felt I meant no harm. I had only to dismount, and that even a hundred yards away, and the Brahminis would get fidgety, start calling, and be off up-stream. In much the same way if you shelter behind a herd of buffaloes you will find yourself well within range of a gaggle of Grey Lag; approach on a covered bullock cart and you will get your Bar-heads.

Some shikarees are of opinion that the ability to approach on horseback, or with the help of cattle, is because the birds imagine the rider or hunter to be part of the animal or herd. Deer, and as a matter of fact, bison and rhino, make the same allowance for men on elephants. Black buck are hunted with a cheetah from a bullock cart. I would be inclined to think that the smell of the horse or elephant or bullocks were known quantities to these animals and birds, hence nothing untoward. A man on foot is something different.

But there again it is a matter of experience that a fisherman can throw his net under the nose, so to speak, of Brahminis, a ploughman drive his buffaloes down to water beside them, a way-farer pass a few yards from them; the Shelduk will not stir. Hold a gun under your arm and try to approach!

To go back to the jheel of my choice, Gomia, in Kompolla forest, where Whistling Teal linger after Pintail and Pochard have winged north over the Himalayas. After watching other species there did not seem much use in checking up on the sight and smelling powers of these Teal. It would be worthwhile experimenting with noise, and test their hearing powers.

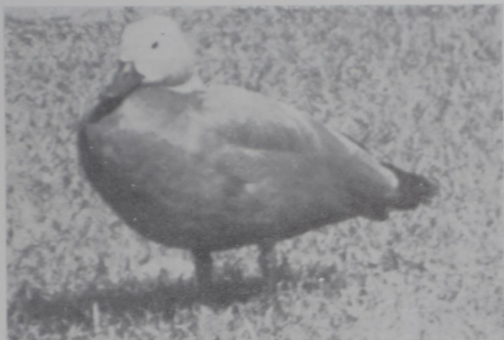
My hide out clung to the slope of the Bundh or dam of the jheel, and overlooked a small bay where the teal were wont to come down time and again. They came that day, too, a team of near on five hundred, dropping down on the water in twos and threes and then in greater numbers. Some took to the dead trees. I had my Kodak with me, but the duck were

not close enough for a good picture. An up wind was blowing. I caught sight of some of the team moving up the short end of the "V" that had just taken shape. A thin branch cut across my view finder. I risked pulling it down, slowly, steadily, to hold it between my knees, and free my hands. Many of the duck had their eyes on me but made no effort to rise. I could, however, see they were keyed up and on the alert. There was a stillness about them that was unhealthy.

I clicked the Kodak. The duck rose in a cloud of whistling, long and loud. They circled the jheel and as the rings grew wider, the teal rose higher. Within ten minutes they were down again. I operated the shutter three times before the duck finally left the jheel for the river.

Would this not show that duck on the water, to all appearances, do have a better sense of hearing than a sense of smell? It required the click of a Kodak to raise them; not movement that was slow and deliberate; not even an up-wind had disturbed them. It was *noise*—and that faint and fast—that finally gave me away. And may not noise account for much of the so-called bad luck that sometimes dogs us on stalks and machans. They tell me even the ticking of a wristlet watch is noise enough to keep a tiger away from a kill.

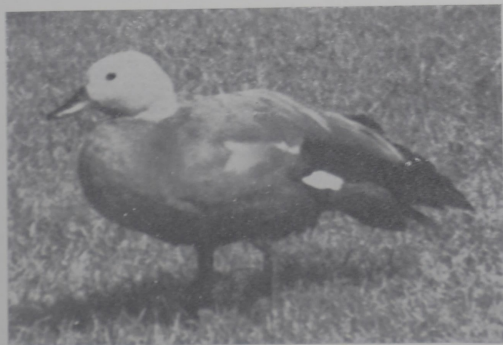
For my own part I have found that each type of duck, and for that matter a given species of animal, depends not so much on just one particular sense to become aware of something untoward, but a complete of all its senses. Though to an observer one sense more than the other appears to be keener and more highly developed than the others. If I did have to pin it down to just one sense it would be *hearing*, for Wildfowl.



Brahmini Duck.



Gomia Jheel. Kompolla.



Brahmini Duck.



Gomia Jheel, Kompolla.



The Author, feeding Grey Lags.



Bar-headed Goose.

PROSPECTS OF BEEKEEPING AT TAKDAH AND THE
DARJEELING HILLS ON A COMMERCIAL BASIS

By

J. R. JOHNSON

Chairman, Takdah Multipurpose Co-operative Society Ltd.

(Continued from p. 115, Vol. XXVI, No. 3)

7. Swarming and Swarm Control.

This is a subject on which many books have been written and the methods recommended for control are too numerous to be discussed in this article. The causes are really a natural tendency to increase the species and to make room when the hive is congested. There is also a tendency to migrate in certain seasons.

This fact should be accepted and our steps should be to profit by the fact and increase our bee colonies by anticipating the bees' plans. I follow two methods more or less the same and found described in books.

(a) Take three frames from a colony which appears to be overcrowded with bees, making sure that the queen is not on any of these frames and that all frames selected have food stored and that at least one frame has freshly laid eggs in it. These frames are placed in a new hive and this hive placed on the stand on which the old hive stood. The old hive is removed to a new site in the apiary. All foraging bees return to the site of the old hive and thus further reinforce the nucleus. The bees finding themselves without a queen set about to and raise one or more.

(b) The second method is the same as the above, with the only difference that a frame with a queen cell in the making or a sealed queen cell is taken and all other arrangements done as above. I prefer the second method as then a queen cell can be cut out and fixed to a frame in the nucleus by selecting one

from a good hive. I have been successful with both methods and find that the swarming tendency is stopped and I get a good nucleus hive.

Believe it or not, it was in last September that I started such a nucleus and in the December-January flow I took 4 lbs. of surplus honey from the six supers which I was able to place on this hive.

In this way also the problem of increasing the size of the apiary is arranged for and the problem of getting wild colonies solved. Eventually I hope to have sufficient to supply beginners with not only the bee hive but also the bees installed.

8. The Collection and Marketing of Honey.

In most countries beekeepers and the Government combine and establish a system for the grading and marketing of honey both in the interests of the beekeeper and the consumer. In fact in England and America the Government make it compulsory that honey cannot be marketed unless tested and passed as pure by a Government or other approved agency, the reason being obvious as no Government should permit any and every type of fluid purporting to be honey to be labelled and sold as PURE HONEY. There must be a standard of integrity that food sold to the consumer should be pure. Honey is a food and therefore even in this country the provisions of the Adulteration of Food Act could and should be applied.

This standard of integrity can only be built up by ensuring that the extraction, storage and sale should be done by some central agency and as far as my scheme is concerned it is intended to be done by the trained staff of the Co-operative.

Incidentally the small beekeeper is saved the unnecessary expense of purchasing an extractor and other incidental expenses such as cost of bottles and containers for selling the honey in bulk, etc.

9. A Suggestion to the Forest Directorate.

I would appeal to the Forest authorities to take up modern beekeeping in this District from a point of view of increasing

their revenues and in view of their being the best suited for collecting statistics on this subject. This collection of statistics as regards nectar-producing flora, the seasons when this flora is in flower, areas where the flora is mostly found, etc., are most essential if beekeeping as an industry is to be taken up. The Forest Directorate are undoubtedly in the best position to do this.

I make the following suggestions for their consideration :—

(a) In the Forest School at Kurseong there should be opened a beekeeping section under a trained beekeeper and a certain number of hives installed and extracting apparatus kept. The beekeeper instructor could be sent for a six months' course to the Government Beekeeping Station at Jeolikote, Nainital District, Ramgarh, U.P., where such courses are given.

(b) At each Range and Beat office three or four modern bee hives should be installed and stocked with bees from the vicinity. At each of these places the staff during the course of their duties in the forest should gather the following statistics :—

1. The names of flora in their charge visited by bees and whether for the purpose of collecting nectar or pollen.
2. The periods of the year when this flora is in flower and whether there are quantities of it available.
3. Their observations should be sent to the beekeeper instructor at the school at Kurseong for tabulation.

In one year there would be a valuable amount of information obtained to assist beekeepers throughout the District.

(c) As regards finance I would suggest the following system. There must be large quantities of small and possibly waste timber available at the Siliguri saw mill which could be utilised

for the construction of bee hives. Instead of having the expense and trouble of making these bee appliances payment for the finished article could be made in wood. We have a price for the completed bee hive and the Forest Department could place a value on the wood and so costs could be adjusted.

(d) To install and look after bees is a very simple matter and if one or more Range Officers be sent to me I could teach them all that is required so that the places where bees are to be located could be periodically visited and the officers given the necessary instructions as to their care. Thus in a short time all the area would be covered and the collection of statistics started.

(e) As soon as it is seen that the supers in the hives were sealed information could be sent to the trained staff who would arrange to proceed to the Range or Beat office with extractor and other apparatus and collect the honey in suitable containers in bulk. The extraction would be done under proper hygienic conditions and by a staff trained in the subject and kept at a central locality such as the Forest School at Kurseong, this establishment being the central agency for the bottling and marketing of honey.

(f) It would soon be established from the statistics collected and the honey yields obtained as to which were the best localities and at these places more hives could be installed so as to increase the forest revenue.

(g) Thus the Forest Directorate would in the first instance increase their revenue and legitimately label their produce as PURE HONEY and build up the necessary integrity of the quality of the product produced by the State of West Bengal.

(h) In addition, the statistics regarding flora, nectar-producing flowers, periods of flowering and the most suitable areas would be invaluable to both themselves and beekeepers of the District. Also, by being the basis of co-ordination they would be mainly responsible for the

establishment of a thriving industry which in turn would be a valuable asset to the State in its production of food for the people.

10. Conclusion.

In view of the fact that in India there is now an "Indian Council of Beekeeping" and also that this subject is included in the National Plan it seems essential that there should be State and District Councils or some such organisations and I would therefore suggest that the Forest and Agricultural Departments take up this matter immediately and materially assist towards making a success of Apiculture in the State of West Bengal. I personally offer my full support and am prepared to place all materials and experience at the disposal of the Forest Directorate, as I am convinced that in the Darjeeling District there are all the essential factors such as the right type of bees in quantity, flora, climate, etc., so necessary for successful beekeeping.

All that seems necessary is that some Government Department should make a start and as I have explained in this note the Forest Department are obviously the most favourably placed in taking up the matter.

(Concluded.)

MOLLUSCS THAT CAN STING

By

S. THOMAS SATYAMURTI, M.A., F.Z.S.

It is generally known that many species of marine animals are either venomous or otherwise poisonous when used as human food. Certain members of the group known as Coelenterata, comprising the Hydroids, Sea-anemones and Jelly-fishes can inflict severe stings with the aid of special stinging cells called nematocysts which are sometimes arranged in veritable batteries. Many species of fishes can inflict either poisonous bites with their teeth or sting painfully by means of spines situated in their fins and are connected with poison

glands; and it is a well known fact that sea snakes of the family Hydrophidae are extremely venomous. But perhaps not many of us are familiar with the fact that even some of the marine molluscs (shellfish) are capable of inflicting such severe venomous stings that they have sometimes resulted in fatal human accidents.

It has been established that the purple glands of some species of the genus *Murex* secrete a poison, but as these, however, have never caused accidents to human beings, they cannot be strictly classed as "Venomous animals."

There is, however, one group of marine Gastropod Molluscs that are decidedly venomous and instances are on record, where these molluscs have inflicted fatal stings to human beings. These Gastropods belong to the sub-division *Toxoglossa*, which includes three families, namely, (1) Turridae, or the slit-lips, characterised by spindle-shaped shells with a definite slit in the outer lip, and including *Turris*, *Brachytoma*, *Turricula* and many other genera; (2) Conidae, or the Cone shells, comprising the genus *Conus* distinguished by their cone-shaped shells and (3) Terebridae, including genera such as *Terebra* and *Duplicaria* which have long, slender and tapering shells.

Members of the family Turridae and Terebridae although some of them are known to be poisonous, have never caused human accidents. But it has been established that at least five species of *Conus* are capable of inflicting venomous stings and have caused serious, and in some instances, even fatal accidents to human beings. They have never been known to be used as food by man, but fishermen sometimes use them as fishing bait and their brilliant multi-coloured shells provide a fascinating attraction for conchologists, so that most of the accidents reported have occurred among fishermen and shell collectors.

It is, however, a curious fact that almost all such accidents which have been recorded so far were mostly confined to the Western Pacific, although the species of *Conus* responsible for

these venomous stings are widely distributed in the Indo-Pacific region. But at least one interesting case of Cone sting has been reported from Seychelles in the Indian Ocean, where the species of Cone responsible for the sting was identified as *Conus geographus*. The shell has a beautiful colour pattern and bears a fairly inflated body whorl and is a common species in the Indian waters. I have collected several empty shells of this species from the Pamban area in the Gulf of Manaar. Other species of *Conus* which are so far reported as having stung human beings are *Conus tulipa*, *Conus aulicus*, *Conus marmoreus* and *Conus textile*.

It might be interesting to recall a few authentic records of Cone stings as they will serve to give us an idea of the nature and effects of Cone poison.

Adams and Reeve in their "Zoology of the Voyage of H.M.S. Samarang" report an incident where the bite of the animal of *Conus aulicus* produced a venomous wound accompanied by acute pain, and made a small, deep, triangular mark, which was followed by a watery vesicle. The incident occurred on the little island of Mayo, one of the Molluccas, where Sir Edward Belcher (Commander of the Samarang) was bitten by one of these Cones which suddenly exerted its proboscis as he took it out of the water with his hand, and he compares the sensation he experienced to that produced by the burning of phosphorus under the skin. The sting was apparently inflicted by the two rows of sharp-pointed teeth on its radula.

Several cases of stings inflicted by *Conus textile* are on record, and at least two of these have been reported to have ended fatally. The animal of *Conus textile*, if carelessly handled, is said to eject a poison which causes, on coming into contact with the hand, an immediate and peculiar sensation, then numbness of the hand and arm, followed by intense pain and severe illness, which not infrequently ends in death. A case which terminated fatally has been reported by Mac Gillivray on New Hebrides where a woman was stung by a specimen of *Conus textile*. She became sick and fourteen days

after the sting her whole right hand and arm were in a state of gangrene with the bone exposed in several places. Eventually, the gangrene spread to the chest and the back of the shoulders with the formation of vesicles, and the woman died. Another fatal case of a sting by *Conus textile* is reported by Rev. W. Wyatt Gill in his "Life in the Southern Isles". On the island of Mare (the southernmost of the Loyalty group immediately to the east of New Caledonia) a native took a fair-sized specimen of the shellfish *Conus textile* and put it in his basket. He immediately felt a painful sensation running up his right arm to the shoulder. On his return home the pain increased and his body swelled enormously. He died the next morning.

Conus marmoreus, a species of shellfish with a typical, straight-sided cone-shaped shell bearing a brilliant checkered colour pattern has also been reported to have caused accidents in human beings through its venomous stings, though no fatal case has yet been recorded. At Mare, one of the Loyalty Islands, this species is said to be particularly abundant, and is reported to have caused accidents through the sting of its radular teeth.

Severe effects are also known to have been caused by the poisonous sting of another species of Cone, *Conus tulipa*. While collecting at the Paumotu in the South Sea Islands, Mr. A. Garret found three specimens of this species and was holding them in his hands while he was searching for other shells, when one of these specimens suddenly threw out its long, slender proboscis and punctured one of his fingers, causing severe pain not unlike the sting of a wasp.

But by far the most notorious among the species of stinging Cones appears to be *Conus geographus*, the venomous sting of which has caused casualties which have sometimes ended fatally. This species has a large, brightly coloured shell, with a rather inflated body whorl. Several shells of this species have been collected in the Gulf of Manaar, near Ceylon. Dr. L. C. D. Hermitte, Pathologist, Royal Infirmary

Sheffield, who has perhaps done the most detailed and comprehensive research in the field of Molluscan venom, reports an interesting case of a sting inflicted by *Conus geographus*, from Seychelles, and it might be interesting to recall this incident here briefly.

In June, 1932, a white Seychellois, residing on Seychelles, was wading at low tide in the shallow water of the lagoon not far from the shore of the island, in search of shellfish, when he found and picked up a medium-sized living male specimen of *Conus geographus*.

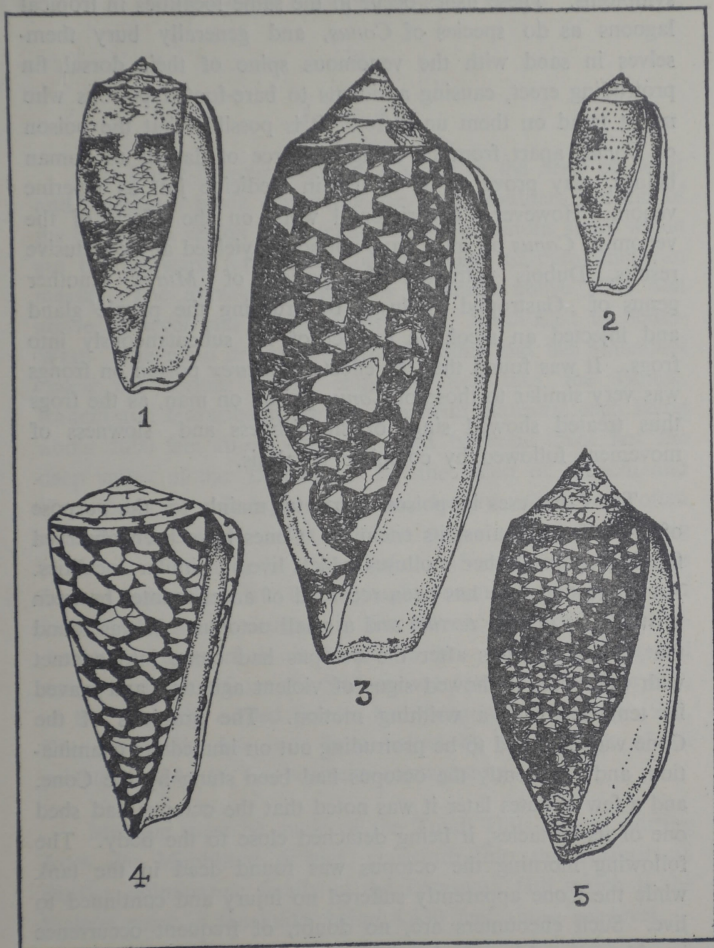
As the shell of the mollusc was covered with a slimy growth of marine algae, he proceeded to clean it up by holding the shell in his left hand, with the aperture towards the palm and scraping the shell with a pocket knife. He had hardly started scraping when he felt a sharp "sting" in the palm of his left hand followed immediately by a burning sensation. He turned the shell over quickly to look at the animal in the shell and he saw the "mouth" of the animal just retracting into the shell and noticed that a "fine" sharp needle" (one of the radular teeth) protruding from a "narrow, tongue-like organ" (the radula) was being gradually withdrawn out of sight into the mouth.

The puncture made by this sharp, needle-like tooth was so minute as to be scarcely visible, but the effects of the sting soon began to become severe. The burning sensation soon gave rise to numbness, and within a few minutes he felt his arm tingling and gradually becoming numb. He then waded back and regained the shore and within an hour he was suffering from dizziness and nausea and he became completely paralysed. It was not until a few hours later that he began to show slight improvement and was taken to Dr. Hermitte's surgery on the main island of Mahe, where he was treated with hypodermic injection of strychnine chloride and general massage. However, in spite of the treatment, it took three days for his weakness and general symptoms to disappear.

It was the occurrence of this interesting case that kindled Dr. Hermitte's interest in the problem of Molluscan stings

and led him to conduct his researches in this field. He collected living specimens of *Conus geographus*, dissected them, and made detailed anatomical and histological investigations to establish the structure of the stinging organs in this mollusc. By these studies, it has been proved that there exists a definite apparatus in these Cones which secretes the poison and is adapted for its ejection. When the body cavity of these molluscs is laid open by dissection, there is exposed to view towards the posterior end, the so-called "Gland of Leiblin" and a coiled duct attached to it. It was originally believed by zoologists that the "Gland of Leiblin" in these Cones was the gland which secreted the poison and the coiled tube was its duct. But it has now been shown, through detailed histological work, that the so-called "Gland of Leiblin" is not really a gland at all, but merely the sac in which the poison is stored, and that it is the long, coiled tube (attached to the sac) that is actually secretory in function and produces the poison. The exact method by which the animal introduces its poison into the body of its victim has not so far been directly observed but a careful study of the mouth parts of these molluscs reveals that the poison is injected through a detached tooth from the radula, used as a hypodermic needle. Each radular tooth is hollow and rolled spirally into a cylindrical harpoon with a lancet point at the front end armed on one side with a barb, being thus eminently fitted to act as a hypodermic needle. Although there may be a number of radular teeth in the radula sac, only a single tooth is found in the prepharynx and it is this tooth that is used in transferring the poison in the victim. Each time a Cone stings a victim the tooth in the prepharynx is lost in the act and is replaced by a fresh tooth from the radula sac.

The chief effect of the venom secreted by species of *Conus* appears to be numbness and paralysis of the centres of voluntary movement. It is interesting to note that this effect is directly the opposite of that caused by the poison of certain species of stinging fishes of the genus *Synanceia*, which excites the central nervous system, producing convulsions or spasmodic



The five species of *Conus* so far reported as having stung human beings.

1. *Conus geographus*. 2. *Conus tulipa*. 3. *Conus aulicus*.
4. *Conus marmoreus*. 5. *Conus textile*.

symptoms. These fishes occur in the same localities in tropical lagoons as do species of *Conus*, and generally bury themselves in sand with the venomous spine of their dorsal fin protruding erect, causing accidents to bare-footed persons who might tread on them unawares. It is possible that the poison of *Conus*, apart from its being a source of danger to human beings, may prove to be of use in medicine just as viperine venom. However, experimental work on the effects of the venom of *Conus* on mice have not so far yielded any conclusive results. Dubois extracted the poison of *Murex* (another genus of Gastropod molluscs) by crushing the purple gland and injected an alcoholic extract of it subcutaneously into frogs. It was found that the effects of *Murex* poison on frogs was very similar to those of *Conus* poison on man, as the frogs thus treated showed signs of sluggishness and slowness of movement followed by complete paralysis.

The Cone uses its poison apparatus mainly for the purpose of self-defence against its enemies. Cones have been observed fighting against other molluscs which live in similar localities. An interesting case has been recorded of an encounter between a live Cone (*Conus textile*) and a small octopus. It was found that, a few seconds after the octopus had come into contact with the Cone, it showed signs of violent agitation and waved its tentacles with a writhing motion. The proboscis of the Cone was observed to be protruding out on immediate examination, and apparently the octopus had been stung by the Cone, and a few minutes later it was noted that the octopus had shed one of its tentacles, it being detached close to the body. The following morning the octopus was found dead in the tank while the Cone apparently suffered no injury and continued to live. Such encounters are, no doubt, of frequent occurrence in Nature, although they have been seldom observed and recorded.

ORCHIDS OF CHOTA-NAGPUR

By

JAMAL ARA

The Chota-Nagpur Division, situated in the State of Bihar and forming a block embracing the entire southern portion of the State, is a region of plateaux and mountainous spurs which are the eastward termination of the huge Satpura-Vindhyan massif. The average elevation is generally above 1000 feet above sea-level and the main strike is North-East to South-West. The main drainage is into the Sone and the Mahanadi rivers, the former finally emptying itself into the Ganga. Ranchi and Hazaribagh are the two main plateaux, each being about 2000 feet above sea-level, and between them lies the deep valley of the Damodar. To the West of Ranchi and Hazaribagh lie still higher plateaux, locally called *pats*, often over 3000 feet in elevation, the best known among them being Neterhat. This area is a wonderland of water-falls, the most famous being those at Hundrughagh, Jonah, Dassamghagh and Lower Ghagri, all situated in the Ranchi District. Unfortunately the destruction of forests in this area has proceeded apace, and apart from the State-owned forests, more than 50% of the privately owned forests had been wiped out by 1946. The destruction has now been halted by the transfer of all private forests to Government management.

Mention must be made of the Tundi Hills which, starting from the Manbhum district, penetrate into the Hazaribagh district, culminating finally in the Parasnath Hill which is the highest point in the State, being 4,430 feet above sea-level.

Climatically the whole area is of the monsoon type and characterised by dry, cool winters from the middle of October to the middle of February; a dry hot season from middle February to June; and a warm wet season from July to September. The bulk of the rainfall is due to the South-West monsoon lasting from July to September. The average rain-

fall is from 50" to 60", the least being in the Palamau district, and the highest in the Ranchi district, but the highest rainfall recorded at any place is at Tholkobad in the Singhbhum district, which frequently exceeds 100" annually. The tops of the plateaux are, however, comparatively cool, and at Neterhat, for example, the hot weather even is not unpleasant.

Floristically, the forests of Singhbhum and of the major portion of the other districts come within the classification "Moist Peninsular Sal" of Champion. On hot dry slopes they change into dry xerophytic types of miscellaneous forests, whereas in the moist sheltered valleys they change into evergreen types. The common associates of Sal are *Careya arborea* and *Dillinea pentagyna* on the moister aspects, and in other places the *Terminalias* and *Pterocarpus marsupium*. The dry mixed forests contain mostly *Anogeissus latifolia* associated with *Dillinea aurea*, *Gardenia* spp. and *Phoenix* spp. The evergreen portions contain *Michelia champaca*, *Anthocephalus kadamba*, *Cederela toona*, etc., and in one particular valley in the Singhbhum district even *Xylia xylocarpa*. The best forests of this area lie in the Singhbhum district, particularly in the tracts known as the Kolhan and Porahat Government Estates. The other districts also have fairly large areas of forests, but the bulk of them are in a poor state due to past maltreatment.

This distribution of forests and rainfall reflects itself in the occurrence of Orchids; and as is to be expected the largest number occur in Singhbhum. On the other hand, the lack of heat at Neterhat leads to the presence of some Orchids there which are not to be found elsewhere. Intermediate distributions occur in between. Below is given a list of Orchids, both terrestrial and epiphytic, with a short description of each:—

Family *Orchidaceae*.

I. HABENARIA. All terrestrial forms, tuberous herbs.

1. *H. stenopetala* : Pale green flowers, 0.7-1", in racemes 4-9" long. Flowers from August to October; found

in Singhbhum, and probably the whole of Chota-Nagpur.

2. *H. digitata* : Greenish or green and white flowers, 0.3 - 0.6" in laxly flowered recemes about 6" long. Flowers from July to September ; found in Manbhum, and near Parasnath Hill.
3. *H. susannae* : Large white flowers, 2.5 - 4" in few flowered racemes. Flowers September to October ; found in Singhbhum, Palamau and Hazaribagh.
4. *H. platyphylla* : Pure white flowers, 0.5 - 0.6", in dense spikes. Flowers August to September ; on clayey ground near streams in Singhbhum.
5. *H. plantaginea* : White flowers, 0.2 - 0.5", in lax spikes. Flowers August to October, found in Singhbhum, Manbhum and Parasnath Hill.
6. *H. triflora* : Large pure white flowers, about 1" across, only 1 to 3 flowers on a stem. Flowers August to September ; found in Singhbhum and Ranchi, on stream banks.
7. *H. commelinifolia* : Numerous white scentless flowers, 0.5 - 0.8", with a funnel-shaped mouth. Flowers, September ; found in Singhbhum, Manbhum, Hazaribagh and Ranchi.
8. *H. furcifera* : Green flowers, 0.6 - 0.7 inches, in a lax spike. Flowers August to September ; found in Singhbhum and Ichadag in Ranchi.
9. *H. affinis* : Green flowers, about the same size as the above, in spikes 4 to 10" long ; found in Singhbhum.
10. *H. marginata* : Yellow flowers, 0.8" ; in a spike 2 to 4" long. Flowers September to October ; found in Manbhum, (Tundi Hills) and Jonah in Ranchi.

11. *H. diphylla* : Flowers greenish white 0.5", in a narrow spike 2 to 4" long. Flowers, September; found in damp places in Singhbhum.
12. *H. galeandra* : Purple flowers, 0.2", in spikes 2 to 4" long. Flowers, July; found in the woods of Chota-Nagpur.
13. *H. stocksii* : Small yellow flowers in lax spikes 3 to 5" long. Flowers, October; found on Parasnath Hill.
14. *H. goodyeroides* : Yellowish-green flowers, 0.3 - 0.4", in dense spikes 4 to 6" long. Flowers September to October; found on Parasnath Hill.
15. *H. constricta* : Yellowish or greenish or white flowers in dense spikes, 4 to 7" long. Flowers June to July; found in the open jungles of Manbhum and Chota-Nagpur.
16. *H. lawii* : Very small white flowers, in narrow spikes. Flowers August to September; found on Ichadag Hill in Ranchi, and on the Parasnath Hill.

II. GOODYERA. Terrestrial.

1. *G. procera* : White flowers, globose, in spikes 3 to 4" long. Flowers March to April; found in Singhbhum near streams.

III. ZEUXINE: Terrestrial, herbaceous, small flowers.

1. *Z. sulcata* : Small white flowers in a stout spike with grass-like leaves. Flowers January to February; found in Manbhum and Singhbhum.

IV. POGONIA. Terrestrial, tuberous herbs with a single remarkable leaf, appearing after the flowers.

1. *P. flabelliformis* : Green flowers spreading and drooping, 0.7". Flowers May to June; found on Ichadag Hill in Ranchi, Palamau and Neterhat.
- V. OBERONIA. Tufted epiphytes with very small flowers in dense spikes or racemes.
1. *O. falconeri* : Inconspicuous greenish-yellow flowers. Flowers in October; found throughout Chota-Nagpur.
- VI. MICROSTYLIS. Terrestrial, with small flowers in terminal racemes.
1. *M. congesta* : Pale dirty reddish or yellow flowers in dense racemes 2 to 4" long, small. Flowers June to July; found on Parasnath Hill.
- VII. LIPARIS. Terrestrial, with small flowers in terminal racemes.
1. *L. bituberculata* : Delicate pink flowers. Flowers in August; found at Neterhat.
- VIII. PHOLIDOTA. Epiphytes, with small flowers.
1. *P. imbricata* : Whitish or yellowish flowers on drooping racemes. Flowers in August; found on trees and rocks in Singhbhum and Neterhat.
- IX. ACANTHEPHIPIUM. Terrestrial, with a few large flowers in lateral racemes.
1. *A. striatum* : Pink flowers with bold red lines and lip tinged with yellow, 1.25" long. Flowers May to July; found throughout Chota-Nagpur.
- X. GEODORUM. Terrestrial.
1. *G. dilatatum* : Very large leaves, 15 to 18" long; white flowers 1.25" long with a spoon-shaped lip,

pink-veined and flushed, in a decurved raceme.
Flowers June to July; found in Singhbhum, Tundi
Hills, Palamau, Hazaribagh and Parasnath Hill.

XI. EULOPHIA. Terrestrial herbs with large flowers in lateral racemes.

1. *E. flava*: In racemes with 12—20 golden yellow flowers about 3" in diameter. Flowers May to June; found in Singhbhum in marshy places, Ranchi and Palamau.
2. *E. nuda*: White or red, or even crimson flowers. Flowers May to June, the leaves appearing after flowering in June; found in Singhbhum, Ranchi and Palamau.
3. *E. campestris*: Greenish or yellowish flowers with red or brown clouds in lax racemes. Flowers in April; found in Singhbhum, Ranchi, Palamau and Neterhat.

XII. DENDROBIUM. Epiphytes with large and handsome flowers in racemes, often scented.

1. *D. herbaceum*: Very small yellow flowers in very short, few flowered racemes. Flowers July to November; found on the Parasnath Hill.
2. *D. formosum*: Beautiful white lily-like flowers with yellow centres on terminal few flowered racemes. Flowers April to May; found throughout Chota-Nagpur. Specimens on the 56th milestone on the Chaibassa-Ranchi road have been noticed to flower every year.
3. *D. bicameratum*: Large yellow or greenish white flowers with crimson spots densely clustered on a

short rachis in a raceme. Flowers August to September; found in Singhbhum and on Parasnath Hill.

4. *D. macrostachyum*: Flowers greenish yellow tipped with pink, in clusters of 2 to 3. Flowers July to August; found in Manbhum.

5. *D. crepidatum*: Pink or white large-sized flowers with a big yellow spot on the lip. Flowers in March; found throughout Chota-Nagpur.

6. *D. fimbriatum*: 2" long chrome yellow flowers with a deep purple blotch on the lip. Flowers in the hot season; found in cultivation in Ranchi.

7. *D. moschatum*: Large yellowish pink flowers with two dark spots on the lip with a delicate scent of musk. Flowers May to July; found only in Leda 3 in the Kolhan Division, Singhbhum.

XIII. ERIA. Epiphytes with not large or showy flowers, racemose.

1. *E. flava*: Moderate-sized yellow flowers with purple markings on the lip. Flowers in February; found in Chota-Nagpur.

XIV. LUISIA. Epiphytes with small drooping flowers.

1. *L. trichorhiza*: Pale yellowish green flowers with purple lines. Flowers March to April; found in Chota-Nagpur.

2. *L. inconspicua*: Small yellowish green flowers in clusters. Flowers June to July; found in Manbhum and Jonah in Ranchi.

XV. RHYNCHOSTYLIS. Epiphytes with flowers in drooping racemes.

1. *R. retusa*: White flowers blotched with pink or violet. Flowers May to July; found in Ranchi and Manbhum.

XVI. DORITES. Epiphytes with flowers in lax racemes.

1. *D. wightii*: Inconspicuous yellow flowers with purple markings on the lip, on short lateral racemes. Flowers in July; found in Chota-Nagpur.

XVII. SARCANTHUS. Epiphytes.

1. *S. insectifer*: Small greenish flowers in few flowered corymbs. Flowers June to July; found in Singhbhum, Hazaribagh and Ranchi.

XVIII. SACCOLABIUM. Small flowers in a lateral inflorescence.

1. *S. praemorsum*: Yellow flowers with transverse red markings. Flowers in the rainy season; found at Hundrughagh in Ranchi.

XIX. VANDA, Epiphytes, with showy flowers in small racemes; lip large with a spurred base.

1. *V. parviflora*: Yellow flowers with pink lips in erect racemes. Flowers April to May; found throughout Chota-Nagpur.
2. *V. tessellata*: Bluish or brown flowers with violet or crimson lips, sepals always tessellated. Flowers April to July; one of the most common orchids found throughout Chota-Nagpur.

A CATALOGUE OF PLANTS OF SIKKIM HIMALAYA

By B. N. GHOSE.

(Continued from p. 141, Vol. XXVI. No. 2)

Note: Figures in columns 4 and 5 stand for the number of 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	Colour of Flower	Flowering season	Fruiting season	Locality	Elevation above sea level (in feet)	Himalaya Rainy or Dry	Distribution	Local name
1	2	3	4	5	6	7	8	9	10
Genus COPTIS									
<i>C. ospriocarpa</i> P. Bruhl.	Herb 1½"	...	6-7	9-10	Chumbe- thang Panigathia	12000	Dry	Himalaya	...
<i>C. teeta</i> Wall	Stemless herb	...	...	...		2000	Do.	Naga Hills	Teeta
Genus ISOPYRUM									
<i>I. adiantifolium</i> H.f. & T.	Perennial herb	Snow white 1"	5	6	Baggoura Tongoo	5000 9000	Moist Valley	Himalaya	...
<i>I. microphyllum</i> Royle	Perennial tufted herb	Do. ½"	5-8	...	Lingey Chu Lonak	17000	Do.	Do.	...
<i>I. grandiflorum</i> Fisch.	Herbs, stems densely tufted	Flower solitary 1½"	7-8	...	Khamba Jongri Lonak	16000	Alpine	Alpine Himalaya Kumaon Balti	...

<i>A. palmatum</i> Don Prodr.	Erect herb 2'	Blue or bluish	9 5 ...	11 9 ...	Megu Tongloo Phalut	14000 10900 11000	Damp	Gharwal to P. Bikhuma Sikkim and Eastward
<i>A. ferox</i> Wall.	Leafy stem erect	Dirty blue or violet	8-9	9-10	Bikhey Bhanjang	11000	Do.	Gharwal to Kalo Sikkim Bikhoma
<i>A. spicatum</i> Stapf.	Robust growth poisonous herb	Pale or dark blue	6-8	10	Tongloo Phalut Thangu	12000 to 12500	Do.	Sub-Alpine P. Bastaneb Bish Eg. Kat Bish
<i>A. laciniatum</i> Stapf.	Herb 2'	Red, purple, or dark red	3-7	8-11	Sandhakpu	12000	Do.	Alpine Himalaya P. Kala Bikhoma
<i>A. hookeri</i> Stapf.	Herb simple or erect or creeping	Bluish violet or deep purple	6/12	10/12	Thangu Megu Emtaso La	12500 14000 14000	Do.	Alpine Himalaya ...
<i>A. naviurure</i> Stapf.	Herb 6"	violet	8 9	11/12	Changu Lonak	13000 14500 17000	Do.	Alpine Gyantse to Phari ...
<i>A. heterophylloides</i> Stapf. var. <i>nirbanshi</i>	Do. Do.	7-9 ...	— —	Singalia Do.	12000 Do.	Do. Do.	Sub-Alpine Himalaya ... Do. ...

SIKKIM PLANTS

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1	2	3	4	5	6	7	8	9	10
Genus ACONITUM (Contd)									
<i>A. leucanthum</i> Linn.	Stem 2'	Bluish white	7-9	10	Jongri Lachen	14000 12000	Damp	Alpine Himalaya	...
<i>A. napellus</i> Linn.	Stem $\frac{2}{3}$ ' to 3'	Blue or greenish blue	9	11	Sandhakpu Chola Range	12000	Dry	Temperate Arctic Region	...
var. <i>rigidum</i>	Stem 2 $\frac{1}{2}$ ' Stem 6"-12"	...	...	...	...	...	Do.	Do.	...
var. <i>rotundifolium</i>	erect or decumbent	...	...	10	Gyantse	14000	Do.	Do.	...
<i>A. gymmandrum</i> Maxim.	Stem 1'	violet or dark blue	8-9	10/11	Tableland of Gyantse	14000	Do.	Alpine Tibet	...
<i>A. gammie</i> Stapf.	Stem 2'	Dark blue	9	10/11	Chola Range	...	Do.	Alpine Himalaya	P. Bikh
Genus CIMICIFUGA .									
<i>C. foetida</i> Linn.	Herb or under shrub	Yellowish	9	10	Lachen Sandhakpu Chumbi	8000 12000	Damp	Temperate East Europe to Siberia	...

SIKKIM PLANTS

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1	2	3	4	5	6	7	8	9	10
<i>M. globosa</i> H. f. & T.	Handsome small tree	White, odorous	6-7	10-11	Sikkim Tongboo	9-10000	Damp	...	P. Kukre Champ
<i>M. pterocarpa</i> Roxb.	Deciduous or Evergreen tree	White	6	...	Lebong	5000 5500	Do.	Tropical Nepal to Assam	P. Tatpate Champ Bg. Dulichamp
<i>M. grandiflora</i>	Large Evergreen shrub	White	...	...	Lebong Darjeeling (cultivated)	6000	...	American	...
<i>M. stellata</i>	Deciduous shrub	White	2-3	9-10	Darjeeling (cultivated)	6000	...	Temperate Japan	...
<i>M. obovata</i>	Deciduous shrub	Purple	3-4	10	Darjeeling (cultivated)	5000 6000	...	Temperate China	...
Genus MECHELIA	Evergreen tree	White	5-6	10-11	Takdah Ridge	5500	...	Temperate Himalaya	P. Tite-Champ
<i>M. cathartica</i> H. f. & T.	Do.	Pale yellow or orange	6	8-11	Mangpu	3000	Tropical	Eastern Himalaya	Bg. Champ P. Auley-Champ
<i>M. champaca</i> Linn.									

<i>M. excelsa</i> Blume	Lofly deciduous tree	White	3-5	10-11	Darjeeling Rangpo Sinal	5000 4000 6000	Damp	Temperate Eastern Himalaya	P. Seto-champ
<i>M. lanuginosa</i> Wall.	Large handsome deciduous tree	White	9-10	12-1	Darjeeling Chongthang	6500	Do	Do	P. Fusrey or Guay-champ
<i>M. pendulana</i> H. f. & T.	Tall tree. Leaves smaller	White 1 1/2 in diameter	...	...	...	3-5000	...	Middle Himalayan forests	P. Champ
<i>M. montana</i> Blume	Medium-sized tree	Yellow	...	...	...	3000	...	Lower Himalayan Forests	P. Aule-champ
Genus SCHIZANDRA.									
<i>S. grandiflora</i> H. f. & T.	Woody climber	Pinky white, fragrant	5	9	Darjeeling Tongioo Lachong	6000 10000	...	Temperate Himalaya	P. Sin-ghatta Lahara
<i>S. propinqua</i> H. f. & T.	Do	Yellow or orange	5	9	Sinal	4000	...	Sub-tropical Sikkim westward	...
<i>S. elongata</i> H. f. & T.	Do	Yellowish	5	9	Paitbong	5000	...	Temperate Sikkim to Nepal	P. Sin-ghatta Lahara
Genus KADSURA.									
<i>K. Roxburghiana</i> Arn.	Do	White	7	8-9	Sitong Chumthang	5000 8000	...	Upper and Lower Sikkim eastward Khasia	P. Pathi-amlo

SIKKIM PLANTS

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Order IV. ANONACEAE									
Genus UVARIA.									
<i>U. Hamiltonii</i> H. f. & T.	Large climber	Brickred	6-8	8-9	Tista-Mangpu Siliguri forests	Teraï	Rainy	Bihar to Assam	...
<i>U. macropoda</i> H. f. & T.	Large woody climber	Reddish brown	9-10	9-10	Mangpu	3500	...	Himalaya and Eastern India	Bg. Bagh Ranga
<i>U. Lurida</i> H. f. & T.	Large woody climber	Flowers 2 ^o	5-10	9-10	Mangpu Reang	2000	Tropical	Assam	P. Rabu Lahara
Genus ARTABOTRYS.									
<i>A. odoratissimus</i> E. Brown	Glabrous scandent shrub	Yellow	Spring	Rains	Throughout India (cultivated)	...	Tropical	India China	Bg. Kantali champa

Genus CANANGA.									...
<i>C. odorata</i> H. f. & T.	Tall tree, large leaves	Yellow, drooping, large	4/6	1/3	Tista Pankhabari	3000	...	Through-out India, Japan, etc.	...
Genus UNONA.									...
<i>U. discolor</i>	Shrub	Yellow Odorous	6	3	Reang	2000	...	Tropical Sikkim to Malaya	...
var <i>pubescens</i>	Do.	...	...	11	Soodong	...	...	Tropical forests	...
Genus POLYALTHIA.									
<i>P. longifolia</i> H. f. & T.	Tall tree	Yellow green	4	8	India	...	...	Tropical India	Eg. Debdaru
<i>P. simiarum</i> Benth. & H.f.	Tree	...	4-7	7	Tista Sevoke Reang	2000	...	Assam to Burma	P. Labshi
Genus GONIOHALAMUS.									
<i>G. sesquipedalis</i> H. f. & T.	A glabrous shrub	Greenish yellow	5-12	7-12	Sittang Rangpu Rangbi	4000 2000 3000	...	Sub-tropical Sikkim to Burma	P. Sani

(To be Continued)

KITE CARRYING ARROW

While at Bagdogra Airport (Darjeeling District) on February 13, 1954, I noticed a Black Kite with a long stick protruding from its belly. On February 16 it was again there, and a closer view through binoculars revealed that the stick was the shaft of an arrow, the head of which was embedded close to the right thigh. The shaft trailed behind at an angle of about 30° to the bird's axis. An official at the Airport informed me that the bird had been carrying the arrow, apparently without grave inconvenience, for over 2 months.

It appears worth while recording this case of a bird being able to carry on with the normal business of life in spite of such a serious handicap.

JULIAN S. HUXLEY

C/o UNESCO Science Cooperation Office
Council of Scientific and Industrial Research Building
Old Mill Road, New Delhi

MISCELLANEOUS NOTES

HIMALAYAN PLANTS APPRECIATED IN LONDON

A selection of Orchids, Begonias and other Himalayan plants were sent by Mr. B. N. Ghose of Town End, Darjeeling, to the Evening News Flower and Country Show in London, in August, 1953, with the co-operation of Messrs. B.O.A.C. and Flywings Ltd., Calcutta. The Evening News have expressed their appreciation of the generous gift of rare and interesting plants which made an impressive group and proved to be of great interest to expert gardeners among their many thousands of visitors, many of whom commented on the rare specimens among them. They included several representatives of the Royal Botanic Gardens at Kew. From garden-lovers in general they won great admiration for their beauty. After the show, they were sent to the Royal Botanic Garden, Edinburgh, and the Regius Keeper while gratefully acknowledging their receipt, stated that the whole collection formed a most interesting addition to the flora of his Garden.



Himalayan Plants as Exhibited at the Evening
News Flower and Country Show in London.

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