

## Coloured Plates and Back Numbers of the Journal.

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The Atlas Moth	...	...	Vol. V.	No. 4	April 1931
The Golden-throated Barbet	...	...	Vol. VI.	No. 1	June 1931
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Coloured Plates and Back Numbers of the Journal—(contd).

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AMPELICEPS CORONATUS (BLYTH)

The Gold-Crested Myna

Adult, above. Immature, below

1 Nat. Size.

**JOURNAL**  
OF THE  
**BENGAL NATURAL HISTORY SOCIETY.**

—v—  
Vol. XVI.—No. 4.  
—\*—

The Starlings and Mynas of Bengal with special reference  
to those of North Bengal.

By

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

PART V.

*(Continued from Page 82)*

**4. The Gold-crested Myna.**

*Ampeliceps coronatus* Blyth.

We include this beautiful Myna on the authority of Stuart Baker who gives it from "E. Bengal".

It has many affinities with the Grackles both in habits and in notes. In fact is used to be known as the Gold-crest Grackle.

*Field identification* :—A glossy black bird with golden-yellow crest and throat seen in pairs, parties or flocks in forest sometimes coming into the open.

*Description* :—Glossy black with green reflections; crest, face, chin, throat and a small patch on the wing golden-yellow; there is a larger white patch on the latter.

Length 8·5; wing 5"; tail 2·4"; tarsus 1". Weight of moles according to Hume, from 2·75 to 3·5 ozs.

The colours of the soft parts are :—Bill wax yellow to orange, bluish at gape; iris dark brown; eyelids dusky black; orbital skin wax-yellow tinged with orange to bright, pale orange in breeding season; legs dull orange yellow.

Sexes alike.

Young birds have no yellow on the head but this appears later on, black streaks and patches remaining until the second year according to Stuart Baker.

*Distribution : In our area :—*We give this bird on the authority of Stuart Baker who gives it from "E. Bengal" but mentions no definite locality. Dr. Bains Prashad, Director of the Zoological Survey of India, kindly tried to find any reference to this bird from Bengal but could find none.

*Outside our area :—*Stuart Baker gives them as :— "Assam.....Cochin China, Siam and South Burma to Trang in the North Malay Peninsula, Annam. It will, probably, be found in the lower hills and broken country throughout Burma to Toungoo the most Northern Burmese point yet recorded."

Stuart Baker found it very rare in N. Cachar and we also did in the plains of Cachar, in fact only one year did we come across it. The late A. M. Primrose did not consider them very rare on the Bagh -o- Bahar T. E. in Cachar. We have specimens from there collected by him.

*Habits :—*This most beautiful of all the Mynas frequents various types of forest. Dr. Armstrong found it in "almost impenetrable underwood of forest jungle," where they chased each other through the thicket. Davison, on the other hand, came across it "in dry, comparatively open tree jungle" in Tenasserim. The only place where we came across it was on the Roopacherra T. E. in Cachar in August 1893. We sent the following note to the Journal of the Bombay Natural History Society about it. "Only one year I saw this bird when for some evenings, large flocks came into our coolie lines, where there are large clumps of bamboos. I first noticed them from my bungalow and not being able to recognize them I went down with my gun and shot a few. They came in flocks of from 20 to 50 and, I think, there were six different flocks. When at a distance they kept very high up but as they came nearer the bamboos they circled round closer and then with

one swoop, vanished into the bamboos. I had to shoot them when they circled as, after circling, they were in the bamboos before one had time to fire. It was, generally, so dark when they got near that I was unable to get as many as I should have liked. I have never seen them again. The young have no yellow on the head, it, gradually, appears as they grow older. The two sexes are identical. I kept a fine adult in a cage for some time and it seemed to take to being confined very easily; but, unfortunately, after its wing had healed up, the servants forgot close the door of the cage and it got away."

The Gold-crested Myna is arboreal in habits, there appears to be no record of it feeding on the ground, certainly not as far as we know.

Stuart Baker says it is not as gregarious as *Sturnia* being found in pairs or three or four birds together. Davison also recorded it in parties and pairs and Dr. Anderson saw 8 or 10 together. Primrose and ourselves, however, found them in much larger numbers. He saw flocks of about 20 to 30 at the beginning of the rains and the flocks we saw we calculated as consisting of 20 to 50 individuals.

Their flight is very fast and Primrose, and ourselves, found them flying high, up out of gunrange. They do however, sometimes, fly quite low.

Stuart Baker says their chattering notes are "sweet and pleasing" but Davison described them as very similar to those of Greckles and "a harsh metallic note."

They feed, mostly, on high trees, on fruit, berries, seed and insects.

Very little is known about their nidification so we quote all that has been said in the hope that some of our friends in Assam may find out more about them.

Stuart Baker in his excellent work *Nidification of Birds of the Indian Empire Vol. II p. 521*, gives all that is known from Hume's time up to now. "Davison found

one nest, which is recorded in Hume's 'Nests and Eggs' as follows:—"On the 13th April 1874 two miles from the town of Tavoy, on a low range of hills about 200 feet above sea level I found a nest of the Gold-crest Grackle. The nest was about 20 feet from the ground in a hole in a branch of a high tree. It was composed entirely of coarse, dry grass, mixed with dried leaves, twigs and bits of bark but contained no feathers, rags or such substances as are usually found in the nests of other Mynas. The nest contained three young ones a day or two old."

"In North Cachar it was a rare bird but occurred between the level of the plains and some 3000 feet, though seldom above 1500. The only nest I ever found contained two young and an addled egg, so fragile that, though I kept it for many years, it has now crumbled away. The nest only consisted of grass and a few supple twigs and had no green leaves for a lining; it was placed in a hole in a tree-trunk about 15 feet from the ground standing in thin forest. The nest was found on the 27th April. "A nest taken by Hopwood at Maungmagan, on the sea-coast of Tavoy, was in a hole in a Casuarina tree about 40 feet from the ground and consisted merely of a few fine Casuarina twigs (Hopwood, as a matter of fact, said there were also some dead leaves.) On the 30th April it contained 3 eggs a rather paler blue than the eggs of *Sturnia malabarica*, with a more glossy shell." Hopwood described them as clear Cambridge blue in colour and gave the measurements as  $1.12 \times 0.78$  " $1.01 \times .78$ " and " $0.97 \times 0.80$ ." "They are broad blunt ovals" (*S. Baker*).

As already noted the wounded bird we kept for some time in Cachar, took to captivity very well. So far as we can recollect we fed it on fruit and *Satoo*.

(To be continued.)

We now reproduce the last of Mr. Lewis' fine photographs of the nesting of Pallas' Fishing Eagle. They show remarkably well the curious appearance of the eye, with the projecting cornice above it.

With regard to birds' eyes it may be mentioned that when fully open they are round. They also have an inner eyelid called a nictitating membrane; this is drawn horizontally, across the eye from the side nearest the bill and protects the eyeball from the sun's glare and from other harm. D. Elliot Cones has described it as "a delicate, elastic translucent pearly-white fold of the conjunctiva. A thing which is, perhaps, not generally known, is that birds alone of animate beings, close their eyes in death.

*Editor.*

Birds of another Calcutta Garden.

I was much interested in the lists given in your previous Journals and it may be of interest to add to the list from my own observations :—

- (1) *Indian Jungle Crow*.—A fairly rare visitor to Alipore but a few usually seen every year.
- (2) *Red whiskered Bulbul*.—Fairly common but nothing like as numerous as the Red-vented.
- (3) *Yellow-headed Wagtail*.—Fairly common and one other I have not identified yet.
- (4) *Blue-cheeked Baebet*.—Nearly as common as the coppersmith.
- (5) *Lineated Baebet*.—Once seen in Zoo but might have been an escape though they are not uncommon within 30 to 40 miles of Calcutta along the Jessore Road.
- (6) *Pied Crested Cuckoo*.—One or two seen every year.
- (7) *Blue-cheeked (?) Bee-eater*.—Seen on race course.
- (8) *Ruddy Kingfisher*.—Two caught in Tolly's nullah and brought to me in the Zoo for identification. The boy who caught one of them told me he had caught it a few hundred yards off Alipore Bridge.
- (9) *Stork-billed Kingfisher*.—Very common and very noisy.
- (10) *Pied Kingfisher*.—Seen by E. A. Paterson in the Zoo.
- (10A) *Common Kingfisher*.—Not so common as white breasted or Stork-billed.
- (11) *Scops' Owl*.—Rare.
- (12) *Verditer Fly catcher*.—Rare seen in Zoo and our garden in the Zoo.
- (13) *White browed fantail fly catcher*.—Our garden. Rare.

- (14) *Red-breasted fly catcher*.—Common.
- (15) *Common Tit*.—Rare. One used to come down regularly to a captive bird I had.
- (16) *Indian Grackle*.—A flock of 10 or 12 round our house and in the Zoo.
- (17) *Ruby throat*.—♀ May be an escape though common just outside Calcutta. Only one seen in our garden.
- (18) *Indian Magpie Robin*.—Very common.
- (19) *Indian Robin*.—Rare, only one seen about 10 years ago and very few others outside near Calcutta.
- (20) *Indian Hoopoe*.—Seen in Zoo and regularly on race course.
- (21) *Black-winged Kite*.—Rarely on race-course.
- (22) *White eyed Buzzard*.—Regularly every year though rare.
- (23) *Rough-legged Buzzard*.—Once only.
- (24) *Peregrine*.—Not rare.
- (25) *Shikra*.—Very common and a darned nuisance with my birds and the birds in the Zoo.
- (26) *Bank Mynah*.—Common and breeds in the Fort.
- (27) *Grey-headed Mynah*.—Common.
- (28) *Jungle Mynah*.—Rare.
- (29) *Brahminy Mynah*.—A few seen regularly.
- (30) *Golden Oriole*.—Once.
- (31) *Wryneck*.—Twice in Zoo.
- (32) *Orange-headed Ground Thrush*.—Seen by E. A. Paterson in our Garden—Breeds Tollygunge.
- (33) *Little Green Heron*.—One or two always in the Zoo.

34. *Garganey Teal*—Come into Zoo tanks at night and very rarely stay during the day.
35. *Common Ibis*—A large flock seen flying over Zoo.
36. *Open-bill Stork*.—Almost every year at a great height.
37. *Pallas' Fishing Eagle* in flight—Once in the Zoo tank where it caused great consternation. Breeds in and round Calcutta.
38. *Snipe*—Probably pintail as late in the year about September. Two seen on Serpentine Tank, Race course. One or two couple have been shot there.

Off hand neither Paterson nor I can remember any more. I have included the race course as it is within almost a stone's throw of the Zoo.

The bird your correspondents refer to which was hawking flying ants with kites and crows may have been a merlin, though I have never been sure myself when I *thought* I had seen it. I never saw it sitting and never had it within range of my 410.

All the birds I have mentioned, with the exception of those seen on the race course, have been seen from, or within, the confines of the Zoo wall which includes our house.

H. A. Fooks.

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A Day's Shooting in the Kalimpong Division of  
Darjeeling District.

By

W. A. MILNE.

The following account is taken from my shooting diary of a day's shooting in the Mal Block of the Kalimpong Division.

My lads had informed me that green pigeons were feeding in the young plantations near our camp. After making enquiries about their feeding time, it was decided to try our luck the next morning.

The following morning tea was brought to me at 5 o'clock, and half an hour later found us on our way. In the forest it was still dark, the heavy foliage of the trees forming a roof above us, while the undergrowth was still heavy, and covered in dew. It was not long before we were all soaked and frozen; early mornings in the cold weather are never to be forgotten, if not suitably clad.

Arriving at the selected spot we were soon in position and ready to meet the worst. Shortly afterwards the sun appeared over the distant hills, and what a magnificent sight it is with the snow clad mountains, and the sun behind, which no artist can really reproduce. While still gazing at the hills and wondering what the day would bring forth, I was brought back to earth by one of my shikari lads telling me that a few early arrivals had arrived and had settled in the trees. Shortly afterwards a larger flock arrived, but this time being ready I accounted for two, and reloading dropped another, while they circled round wondering where the shots had come from, after that they disappeared. Good shooting now continued for an hour.

Just before leaving we heard some jungle fowl calling, so moved off to see if they could be found. Seeing a few fresh scratchings the dog was sent into some heavy undergrowth, to be followed by a certain of cackling as two cocks and three hens rose. A right and left accounted for two, to be

followed by a crashing of jungle as a pig moved off to safer surroundings.

The sun was now fairly well up, and its heat was much appreciated as we made our way back to camp. Altogether it had been a very successful morning 15 green pigeon, and 2 jungle fowl.

Arriving back in camp it was not long before breakfast was announced for which I was ready, as the early morning air had produced an appetite above the usual.

After breakfast was over a "beat" was arranged for pig. I had with me six "mundahs" who are really excellent trackers, and I knew if there was to be anything found they would find it.

The jungle we decided to beat consisted of about 3 acres of heavy undergrowth with very few trees. It was about 60 yards wide, but fairly long, and was known from previous occasions to hold pig.

With pig I have found that they invariably break back, and should the beaters "about turn" they can drive the pig out from the end they originally entered. With this in view, I selected the carting road the only available area being fairly clear of jungle, and told the beaters to move forward slowly, and quietly, and should any pig break back, to beat back to the road, where I would be waiting. On the beaters entering the jungle everything was deadly silent, not even the men moving forward could be heard; occasionally some creeper would move indicating their presence. Soon there was a warning shout, a pig was on the move; had it gone forward—no the jungle was moving, and it was getting nearer. Nearing the road it hesitated, and then with a rush it was out, and across the road, Had my shot taken effect? Soon the beaters appeared, and after tracking for about ten yards found it dead. I afterwards discovered that my shot was a little behind the shoulder passing through the diaphragm. It was a good size boar scaling 312 lbs, and the tusker 7½". Again the coolies beat ahead of me, but except for a muntjac (barking deer) which moved off ahead making that peculiar sound of theirs, (between a rattle

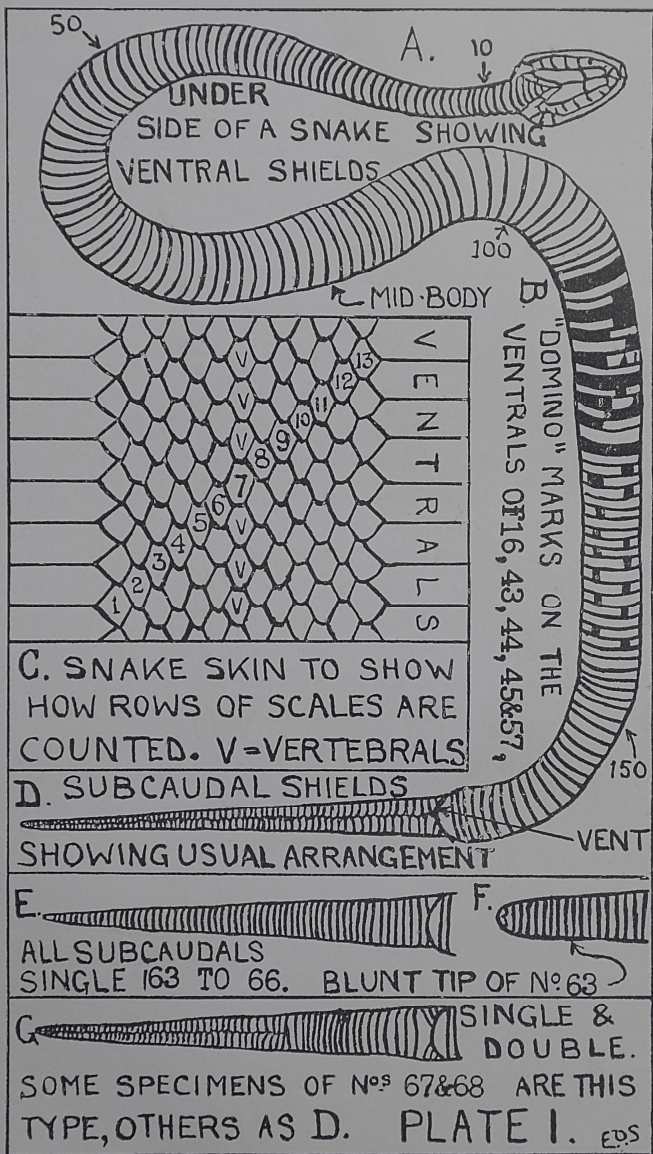
and bell which is said by some authorities to be produced by their two long protruding teeth) and a few jungle fowl nothing else was seen.

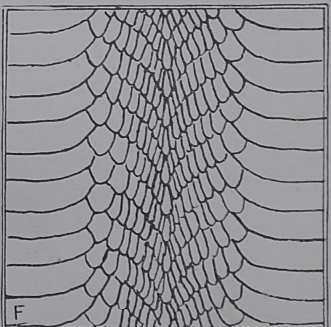
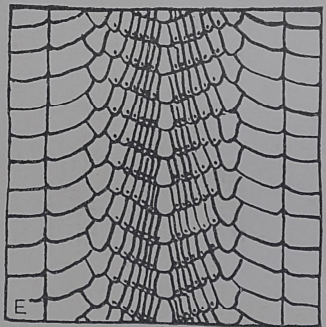
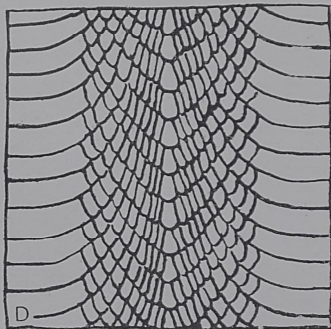
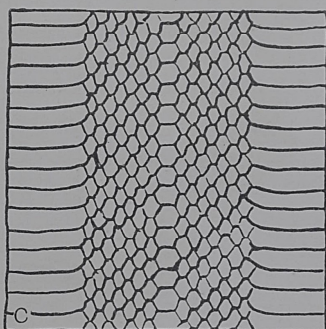
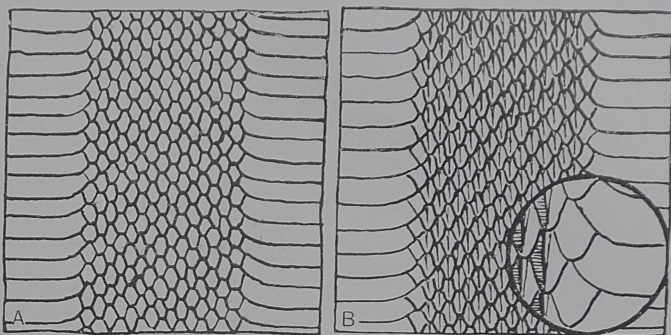
As we had plenty of time on hand, it was decided to move up the river bed, and beat across it for Kaliz pheasant. The six beaters moving along a carting track, while I took the river in the hope of picking up any stray meganser in one of the numerous pools. At the first I drew blank, but at the second three blue winged teal rose up off the water. Being taken completely by surprise I was only able to drop one. These birds I have never seen so far up in the hills, although they are quite common round Jalpaiguri. Having arrived at the selected spot, I waited for about 20 minutes, when my attention was attracted by a crashing through the jungle and then silence. Soon the jungle ahead of me began to move and out appeared two doe Sambhur followed by a really magnificent stag. I changed my shot gun for the .470, missed with the first shot, but dropped him on the far side of the river bed with the second; I changed again to my .16 bore, and was present with an overhead shot at a Kaliz pheasant which dropped well into the jungle on the far side, to be brought back by my dog, who had seen it fall. Shortly afterwards more birds passed over, followed by others. This carried on for about 10 minutes, when the beaters appeared.

These birds being driven down a hill side, produce some excellent shooting, and many escape even a good gun, as although they appear to be clumsy and slow, they are very fast once on the wing.

The Sambhur was next inspected, and after careful measurements it was found to tape  $32\frac{1}{2}$ " & 32" respectively (witnessed later by the forest ranger).

Kaliz pheasant are fairly easily driven, if beaters move forward slowly continually tapping the trees as they go. The birds at first will run, but on approaching a clearing will take to the wing and give some excellent shooting. Should they be suddenly disturbed they are inclined to take to the trees, from where they will fly back over the beaters.





A. SIMPLE  
 C. KRAIT  
 E. BRONZEBACK

B. KEELBACK  
 D. WHIP-SNAKE  
 F. COBRA

PLATE II.

E.S.

At it was now getting late and we had to make arrangements for transporting the stag back to camp, we decided to abandon shooting, also having had no lunch we were ready for a good spread, whether it be rice and curry, or bacon and eggs!

W. A. MILNE.

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The Snakes of Northern Bengal and Sikkim.

By

G. E. SHAW, E. O. SHEBBEARE, AND P. E. BARKER.

PART XI

(Continued from Page 67.)

**THE POISONOUS SNAKES.**

We have now come to the end of the harmless snakes—all those which follow are poisonous. They comprise the remaining members (the poisonous group) of the Colubrine Family and all our representatives of the Viperine Family.

Of the poisonous Colubrine snakes (*Protoglypha*) our list includes five Kraits, two Cobras and a Coral-snake, all very poisonous though the last, owing to its small size and very inoffensive disposition, does not appear to have ever killed anybody.

The Viperine Family is represented in our area by one true viper, the dealy Daboia or Russell's Viper, and four or more\* Pitvipers which, although provided with equally efficient hypodermic mechanism, seem to be incapable of injecting a lethal dose into a normally healthy human being, though well able to kill smaller mammals.

**THE KRAITS** (Genus: *Bungarus*). These appear to keep mainly to the ground although the Common Krait sometimes climbs into lofts and thatched roofs; their principal

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\*It appears necessary to split our Green Pit-viper into at least two species now.

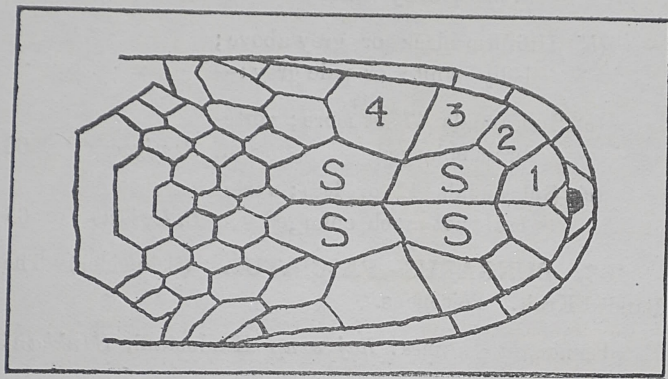
food is other snakes but they also eat mammals, lizards and eggs. They form a very well-marked group with their short heads, absence of any marked neck and small beady eyes but the points which distinguish them unmistakably from all other snakes lie in the arrangement of shields and scales and can best be followed by reference to Plates I and II.

In Plate I the figures D, E, F and G show various arrangements of the sub-caudals or shields under the tail. D. is the normal pattern found in the majority of snakes—a double row of shields placed alternately from the vent to the tip of the tail, the dividing line zig-zagging between them. Fig E shows all the sub-caudals single and extending across the whole width of the tail just as the ventrals, in front of the vent, extend across the whole width of the belly. *This arrangement is found only in Kraits as far as our area is concerned*—it is moreover found in all our Kraits except one—the North-eastern Hill Krait. This rather rare snake may have the “half-and-half” arrangement shown in Fig. G or may have the “normal” arrangement shown in Fig. D—the former is more usual. In these two alternative arrangements the North-eastern Hill Krait resembles only one other of our snakes—the Hamadryad or King-cobra.

In Plate II figure C shows another unmistakable sign of a Krait—an enlarged vertebral row of scales along the centre-line of the back, above the backbone, *combined with a rectilinear scale-pattern*. By rectilinear scale-pattern we mean one formed by the intersection of two sets of parallel and practically straight lines meeting diagonally, each scale being a hexagon, or elongated hexagon, and the whole pattern that of strained wire-netting. Compare the rectilinear patterns shown at A, B and C with the curvilinear ones at D, E and F where the intersecting lines forming the pattern are rather graceful curves. Though the scales in the vertebral rows of both D and E are enlarged they are pearshaped, not hexagonal as they are in C. *This scale-pattern shown in Fig. C is found only*

in *Kraits* as far as our area is concerned. It is an outstanding feature of all our *Kraits* except one—the Lesser Black *Krait*—in which it is not very noticeable.

There is yet one more infallible guide found on the chins of all *Kraits* which is illustrated in the accompanying text-figure.



S, S, S, S. Sublinguals, *i.e.* pairs of shields on either side of the centre-line of the chin, which also touch the infralabials ...

1,2,3,4. Infralabials, *i.e.* shields of the lower lip which also touch the sublinguals. ...

*Note: only 4 infralabials, the 4th. being the largest.*

Found in all *Kraits* & in no other snake with wide ventrals ...

KEY TO THE KRAITS (*Bungarus* spp.) OF  
NORTHERN BENGAL.

- (a) Some or all subcaudals double ;  
dark on both surfaces with  
narrow, irregular white (yel-  
low?) rings encircling the  
body ... .. *B. bungaroides* 67

- (a') All subcaudals single:—
- (b) Wide alternating black & yellow bands encircling the body; tail blunt; a prominent back-ridge ... .. *B. fasciatus* 63
- (b') Dark above with narrow white arches; belly white ... .. *B. caeruleus* 64
- (b'') Uniform black or grey above; belly white or pale grey:—
- (c) Subcaudals 47 or more; vertebrals enlarged ... .. *B. niger* 66
- (c') Subcaudals 42 or less; vertebrals not much enlarged ... .. *B. lividus* 65

**63. BUNGARUS FASCIATUS.** (Schneider) The Banded Krait. Poisonous.

*Vernacular names:* *Raj sanp* Hindustani, *Sankhani* Bengali.

*Costals:* 15-15-15 smooth with a strongly enlarged vertebral row.

*Ventrals:* 200-236, *Anal:* entire, *Sub-caudals:* 23-39 all single.

*Shape:* A thickish snake with no neck and a prominent angular ridge along the back. The tail is quite unlike that of any other snake being short, abrupt and strikingly blunt at the tip, like a thumb. The eye, unlike other kraits in our area, has a narrow golden rim round the circular pupil.

*Colour:* Alternating black and bright yellow bands about equally wide encircle the whole body and tail. There are from 16 to 27 of each on the body and 2 to 5 on the tail and they vary in width from about half an inch to an inch and a half. The neck, except for the centre of the ventrals, is occupied by a black band which extends forward above as a triangle with its apex on the frontal shield. The yellow of the chin, throat and upper labials extends upwards and round this black triangle as a narrow band about one

scale wide in front of which the top of the head is again black. According to Boulenger the snout is brown.

*Size*: Our longest was 6ft. 5 ins., Wall records one of 6ft. 7 ins.

*Habitat*: Not uncommon in the Duars but rarely if ever found in the hills although one of Wright's specimens is labelled Tindharia and the description of a snake killed at about 3,000 ft. in the Rungneet valley some years ago is difficult to reconcile with any other species.

*Habits*: Nocturnal and very sluggish, so sluggish that it is frequently run over by motor cars in Assam. Wall records one that, when discovered swallowing another snake, took no notice of a ring of spectators but continued to engulf its victim. He says he could never succeed in making one angry, yet for food it seems to prefer snakes as big as itself and formidable species too, such as rat-snakes that always put up a good fight.

The venom acts on the central nervous system much as Cobra venom does but also clots the blood like Viper venom. Death from the latter cause may follow in a few minutes. On the other hand primary degeneration of the cells of the central nervous system may cause no serious symptoms for days and death may follow as late as 6 to 12 days later.

**64. BUNGARUS CAERULEUS** (Schneider) The Common Krait. Poisonous.

*Synonym*: *Bungarus candidus* var. *caeruleus*.

*Costals*: 15-15-15 smooth with a strongly enlarged vertebral row.

*Ventrals*: 195-218, *Anal*: entire, *Sub-caudals*: 37-50 all single.

*Shape*: Round in section with little or no neck; tail tapering; eye small and black throughout.

*Colour*: Dark brown to Lustrous black. caerulean blue in reflected light, with white arches, more or less in pairs,

across the back. The width of these arches varies from mere lines to bands two or three scales wide, or there may be single bands four scales wide; they are more conspicuous on the after part of the body. Top of the head black fading to white on the lips. The whole under surface white.

*Size*: It grows to  $4\frac{1}{2}$  feet in length.

*Habitat*: Although this snake is found all over northern India including lower Bengal there is some doubt as to its occurrence in our area and specimens in the Darjeeling museum bear no locality; we have certainly never found it ourselves. It is possible that reports of its occurrence may be confused with those of *Ophites aulicus*, the Common Wolf-snake (No. 21 in our list), which slightly resembles it and is also often found in houses.

*Habits*: Nocturnal and not aggressive but probably responsible for more deaths than any other snake in India. The reason for this is partly its habit of frequenting houses in search of frogs and mice and partly the extreme virulence of its venom, four times that of the cobra. Death is brought about by failure of the respiratory mechanism probably due to the effect of the poison on the medulla oblongata. There is also direct effect on the heart and the red corpuscles are broken down but the blood is not coagulated as by the venom of the Banded Krait. Cobra antivenine is ineffective in cases bitten by this snake and there is difficulty in preparing Krait antivenine because very small quantities of this venom, injected into animals to bring about immunity, cause boils and sores.

Eggs are laid in April and May in a hole in the ground a foot or two from the surface and the mother stays with them, at any rate for a time. Hatchlings are  $10\frac{1}{2}$  to  $11\frac{1}{4}$  inches long. The food, when young, consists of Blind Snakes (*Typhlops spp.*) and, in later life, of mammals, toads, frogs and, once at any rate, a lizard.

**65. BUNGARUS LIVIDUS Cantor.** The Lesser Black Krait. Poisonous.

*Costals*: 15-15-15 the vertebral row very slightly enlarged but the scales mostly longer than broad.

*Ventrals*: 209-221, *Anal*: entire, *Sub-caudals*: 36-42 all single.

*Shape*: Round in section with little or no neck; tail tapering; eye small and black.

*Colour*: The whole upper surface varies from shining black to quite light grey; the grey ones with a sheen like graphite. Black specimens are more Common. Barker points out that the black ones fade to brown in spirit but are dead black in life. The under side is dirty white to pale yellowish with the front part of each ventral shield mottled with grey; this mottling is very variable, in some specimens very faint, in others the greater part of each ventral is grey. Upper lip whitish.

*Size*: Barker says his longest was 45 inches but that they usually measure about 30.

*Habitat*: Fairly common in the Duars and Terai; Barker collected 8 specimens in a few years on Haihaipatha and Tasati and Atkins 5 at Tulsipara. Wright got one somewhere on the D. H. Railway and Shebbeare one near Sukna. It does not appear to ascend the hills to any extent and Shaw, who got several specimens of *B. niger* at Mongpoo, never got this species. Barker notes that it is probably commoner in the Duars than anywhere else, though Wall records it also from Assam.

*Identification*: The only obvious differences between this snake and *B. niger* from which it was separated by Wall, lie in the number of sub-caudals and the much less enlarged vertebral row.

*Habits*: Barker says it is not aggressive and a slow mover; also that none of his specimens were got near bungalows or Cooly lines. One of his specimens had eaten three small shrews. The only case of a bite by this snake that we know of is that recorded by Wall in which the patient died after 15 hours.

**66. BUNGARUS NIGER** Wall. The Greater Black Krait. Poisonous.

*Costals* : 15-15-15, vertebral row enlarged, hexagonal and broader than long. *Ventrals* : 216-231, *Anal* : entire, *Sub-caudals* : 47-57, all single.

*Shape* : Round in section with little or no neck ; tail tapering and rather longer than that of *B. lividus* ; eye small and all black.

*Colour* : Usually black above but one of Shaw's specimens was plumbeous blue-grey Under side as in *B. lividus*.

*Size* : Our longest was 51 inches, which appears to be a record for the species.

*Habitat* : Wall gives Eastern Himalayas and Assam. In Bengal it appears to be confined to the lower and middle hills ; we have found none in the Duars or Terai.

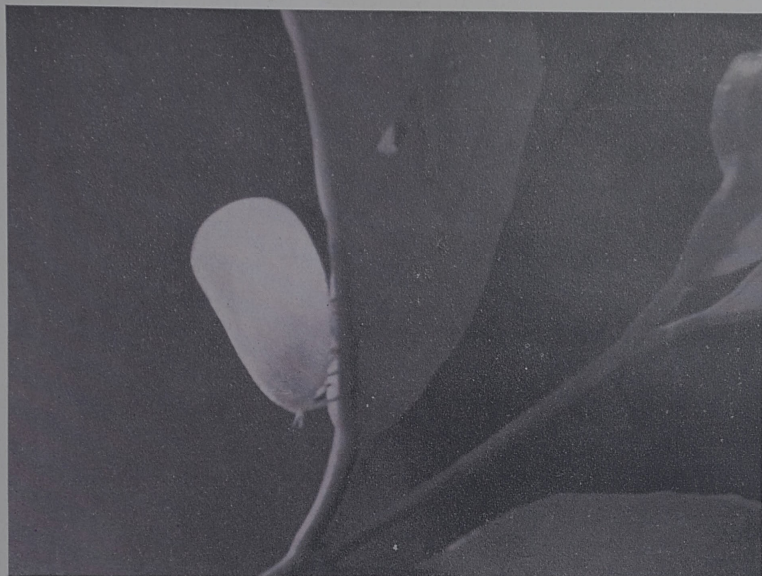
*Habits* : It does not appear to be very aggressive, at any rate Shaw's largest specimen was brought in very much alive tied to a short bit of string and trailing along the ground behind the bare legs of its captor—a small boy. One of our specimens had swallowed a Yellow-bellied Rough-side (No. 19).

**67. BUNGARUS BUNGAROIDES** (Cantor). The North-eastern Hill Krait or Cantor's Krait. Poisonous.

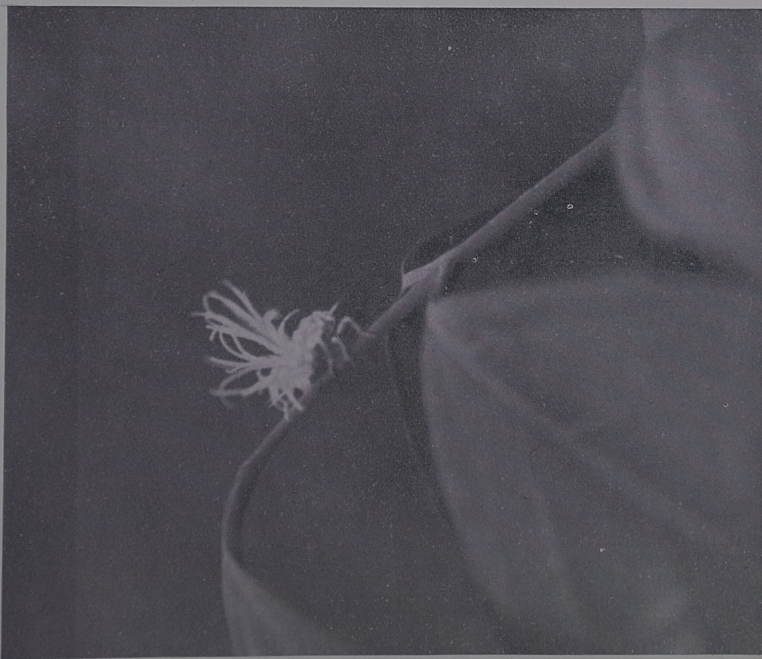
*Costals* : 15-15-15, the vertebral row enlarged & broader than long. *Ventrals* : 220-238, *Anal* : entire, *Sub-caudals* : 43-51, the first few may be single and the rest in two rows or all may be in two rows.

*Shape* : Round in section or slightly ridged along the back ; tail tapering ; eye small and all black.

*Colour* : Black or very dark brown above and a little paler beneath. A series of narrow white (or yellow ?) rings encircle the body. These are formed by the edges of the costals above and are very narrow and slightly zig-zag in consequence ; they widen across the belly, sometimes as much as two scales in breadth. The first of them encircles the snout just behind the nostrils passing square across the prefrontals. The next, starting under the throat, passes upwards and forwards to the eyes and stops there. The



Single Imago.



Single larva.

*Phormia.*



Phromnia.

In line on a stem-feeding.



Phromnia.

Scattered—Camouflaged as flowers.



Phronnia.

Cluster on main stem of bush.



Phormia.

Transition stage on under side of leaf.

third, from the neck, reaches forward to the frontal shield where there is usually a gap. All the rings, but particularly those on the forepart of the body, are bent into a forward-pointing angle on the back.

*Size* : Our longest was  $.47\frac{1}{2}$  inches. It was found by Sir Henry Farrington below the Sureil bungalow where it was watching a dead Large spotted Pit-viper (No. 75 in our list) which it had probably killed and intended to swallow.

*Habitat* : This snake has, as far as we know, been found only in the Khasi Hills and the Darjeeling district. It is not common.

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Phromnia.

( Fulgoridæ family )

In the scrub jungle of the Dooars, particularly around the edges of Tea Gardens, a Bug is to be found which is known as *PHROMNIA*. It only be seen from about the middle of November to the middle of February.

My first vision of this Bug was when a cow pushed her way through the scrub on to the path where I was walking and, gazing in the direction from which she had come, I was amazed to behold what were apparently small white flowers jumping about on a bush. This phenomenon rather upset me, so I went to investigate. I then found that the jumping flowers were not flowers at all but a collection of peculiar white insects which I had never seen or heard of before.

Here was quite obviously a very good subject for photography and one which has proved to be very remunerative.

The single bug, *PHROMNIA*, resembles a miniature porcupine. It can walk or run along the stem of a bush but, when frightened, it generally jumps into the air and lands anywhere, on another part of the bush, or on the ground.

*PHROMNIA* feeds on the green skin-like bark of a shrub which I have not yet been able to identify. I have always found them in colonies numbering from about twenty to two hundred. When undisturbed, they are to be seen either in line, one behind the other on stems of the plant, when they are feeding, or they may be dotted around in twos or threes all over the bush. When thus scattered I think they are deliberately camouflaging themselves as flowers, so that birds shall take no notice of them. They may also be found resting in a solid cluster, generally in the shade, on the main stem of the bush, and fairly close to the ground.

As the weather gets warmer, they are to be found in groups of ten to twenty on the under side of the leaves of the bush. This is the time of their transition, in late February or early March, and gradually the *IMAGO* appears.

The *IMAGO* is pale greeny-yellow and, like the Bug, jumps, but can also fly a short distance. I presume that the *IMAGO* lays eggs and dies in the hot weather as I have never seen any about in the rains.

I shall be very interested to hear from anyone who knows *PHROMNIA* intimately and will correct these notes.

H. E. TYNDALE.

Hatipotha, P. O. DOOARS.

[Specimens sent to us some time ago by Mr. Tyndale are, probably, referable to *Phromnia Marginella* Oliv. This insect belongs to the Sub-family *Flattinae* of the Family *Fulgoridae* in the Order *Rhynchota*.

The imago is said to lay its eggs in December, on the bark of twigs of the food—plant; sometimes a swelling of the wood takes place when laid. The larvæ which are covered with the white flocculent secretions moult several times, until June when the winged *imago* is said to emerge.

The white matter which covers the larvæ is said to be secreted in small glands on the abdomen and opening by minute pores. When excreted it is liquid; this drops on the leaves which it hardens.

It is recorded that in Garhwal, the white secretion of *P. Marginella* is eaten, and is believed to possess narcotic properties.

Specimens of the *imago* received by us have the fore wings grass green, with the interior margins red, the hind wings are milky-white.

This bug is found on several kinds of forest trees as also on tea but is of no economic importance. One species of *Phromnia* found by Y. W. Gregory exists in two forms, one green and one reddish; the green individuals were seen to occupy the upper portion of the stem, while the reddish ones were immediately beneath, thus closely resembling a flowering spike with the green unopened buds above. On the occasions when he found *Phromnia Marginella* in the Himalayan foothills of Kumaon, one green and the other pinkish buff were closely intermixed Professor Poulton suggests that the first specimens of the group to emerge are red, and those that emerge later green. Gregory may have come across undisturbed groups which therefore had the green specimens above and the red ones below.

The group noted by other observers may have reassembled and thus lost the possible arrangement present on the emergence from the *pupae*.

*Editor.*]

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Indian Mosses.

By

IDA COLTHURST F.Z.S., F.R.H.S.

The Musci or Mosses are among the oldest vegetation, "the first mercy of the Earth" to cover the drying rocks and to set the quivering sediment of the soggy wastes after primaeval chaos.

Mosses are of a remarkably gregarious habit, covering immense tracts, sometimes to the exclusion of other vegetation, as is instanced in peat bogs. They have a strange physiology and a mysterious propagation which enables them to range from burning plains to icy slopes, thus showing an unlimited endurance. They possess a peculiar structure of cells forming a stalk which may be long or short, straight or branched with a velvety growth of very fine hairs at the lower extremity, rootlets which in spite of their seeming frailty are capable of penetrating the densest structures so as to convey moisture to the plant.

In the past, when the doctrine of spontaneous generation held good, mosses were believed to originate in the putrefaction of vegetable mould, inept structures incapable of flowering or producing seed—Later, Dillenius revealed their wonderful germination and growth and included them among the Cryptogams, plants of hidden marriage, which present a more or less alternation in their cycle of development, two distinct generations associated with methods of sexual reproduction and a sexual multiplication by means of free cells. These free cells are known as Spores and play the part of seeds in the dispersion of species.

A Moss then is a minute herb with a slender and often wiry stem which is usually clothed with imbricate and spirally arranged tiny leaves; it is destitute of vascular tissue; fructification results in the formation of *either* male or female organs. The male organs appear as flower-like discs, little buds, wee knobs with the leaves reflected, as a mere facet bordered with large leaves, or, as in *Sphagnum*,

in cat-kin like appendages. The female organs are much more complicated in structure and are disposed in small special offsets from the stem or at its tip. The male fruit is known as an *Antheridium*, the female as an *Archegon*. The *Archegon*, when fully formed, is flask-shaped; the cells at the top become loose and detached and some fall off leaving an aperture through which, in moist weather, the liberated *antheridia* find entrance and travel down to impregnate the basal cell, which then proceeds to a cell division within the *Archegon*, forming a cellular mass which is lifted upwards by a stalk. This forms the *Sporangium* or Spore case. It is frequently called the *Theca* or *Capsule*—Knowledge of certain terms is absolutely necessary in studying mosses.

The stem may be simple or branched, erect, decumbent or pendulous, sometimes giving off shoots at the base which creep over the body on which it grows, or are subterraneous; after a time these shoots rise above the surface as new plants. In some cases when the old stem is losing its vitality and has matured its fruit, immediately beneath the fruit, the plant is renewed again by new growths appearing annually. Two such branches are generally produced at the same time and each such fork represents a year's growth. The stems and branches are partially or completely clothed with tiny leaves varying in structure and colour, denser above than at the base, serrated or crenulate, or with thickened margins and surfaces rough or smooth. In every case the leaf is sessile, never deciduous and very frequently imbricate. The colour of the leaves varies with the amount of chlorophyll they contain and the amount of water and sunlight they receive; habitat also plays a part.

The stalk of the spore cases is known as a *Seta*, and the lid closing it until mature is the *Operculum*; when the lid falls off a row of minute teeth around the margin of the sporange is exposed which form the *Peristome*, on the number of which—always in multiples of four—considerable stress is laid in the classification of species. The *Calyptra* is the hood or veil of the *sporange*.

Mosses occur in numerous species. In India they are almost confined to the mountains, growing on trees, rocks, and the ground and always demanding moisture, not only for their growth but as a fertilising medium—hence no member of the vegetable world so vividly creates a mental picture of its habitat as they do, imageries of remote and misty hills, of green wet valleys, a tapestry of secret ravines and stony *ghoras*; in short all places where nature lies undisturbed there will mosses be found festooning the trees or fleecing the earth and rocks.

Actually, this order of the vegetable world has little economic value; a good packing and a soft couch; *Sphagnum* is sometimes ground into a non-nutritious meal; some are converted into artificial flowers others into brooms. However in the household of Nature mosses play an important part; content with a minimum of substance for root-hold they form large colonies which dying down form a vegetable mould where the more highly developed plants find home; the minute seeds of *Rhododendron* for instance find a favourite place of growth among the tufts of *Mnium*; also, by successions of growth and decay in marshy tracts peat is formed, and extensive stretches of moss serve as useful forest reservoirs by absorbing and retaining rain and parting with moisture very slowly.

Mosses are divided into four families. The *Bryaceæ*, which include an overwhelming number of the species, are the Feather Mosses; the *Phasaceæ* or Earth mosses; the *Andreaceæ* or Alpine mosses which occur only on granitic and quartzose formations and the *Sphagnaceæ* or Bog mosses.

(1) *The Bryaceæ* Feather mosses, to which most of our Indian varieties belong, are very handsome and ornamental having broad leaves and an abundance of long stalked capsules. They are arboreal and terrestrial, including (1). *Polytrichisi* carrying the staminate and pistillate flowers on distinct plants; the *sporangium* is squat and angular the *peristome* has from 32 to 64 short teeth; the

*Calyptra* or veil is densely clothed with silky hairs. The Nepalese plant *Lyella* has an oblique capsule. In some places these mosses are converted into brushes and small mats.

(2) *Dicranum*, the fork mosses, are found on rocks, conifer humus and occasionally on Beech trees; the leaves are large and serrated the capsule erect and beaked on a long stalk, the veil hoodshaped and sometimes fringed at the base, and the *peristome* consists of 16 teeth. Pallid *Leucobryum* is found on rocks near Darjeeling.

(3) *Tortula* is very common in the E. Himalayas, growing on the thatch of houses etc. and is perennial. The leaves are spreading, concave and obovate; the *sporangium* is erect with a long beak, the fine teeth of the *peristome* are 32 and so long that they twist around the centre pillar of the capsule. The plants are perennial—*T. Longifolium*, *T. Mutabile* and *T. Cuspidatum* of the sub-variety *Trichostomum* are found near Darjeeling.

(4) *Grimmia* are tufted plants growing on rocks, erect when young and prostrate as they grow older; the *sporangium* is erect or pendulous with a hooded or mitri-form hood and a *peristome* of 16 rather large and bifid teeth. Sometimes the plants show as dense hoary tufts.

(5) *Pogonatum* are very showy with deutate, lance-shaped leaves, the *sporangium* may be oval or oblong, smooth with a densely hairy hood, the teeth are 32 united to a thin membrane across the *peristome*. *P. Himalayinum* occurs at Kurseong and five others in the District.

(6) *Bryum* or the thread mosses grow in tufts on rocks, trees, and banks. The leaves are crowded and clasp the stem. The *sporangium* has a double *peristome*, the outer row of 16 sharp teeth, the inner a membrane which is divided half way down into 16 keeled processes alternating with the outer teeth. *B. Argenteum* *B. Giganteum* and two others have been found in the Darjeeling District in wet places on the trunks of trees.

(7) *Mnium* are mosses with large leaves which under a lens show thick dotted borders, the upper are larger than the lower and all are arranged as stars. The urns are either oval or oblong, pendulous with a double *peristome*, the teeth arranged in 16 inner and outer rows as in *Bryum*. They are found in woods and on shady walls. *M. Sikkimense* (so called by Father Stevens) was found at Darjeeling and three others are known in the district.

(8) *Funaria* are the cord mosses occurring chiefly on calcareous soil or on wood ashes. The urns are pyriform and have a double set of 16 teeth.

(9) *Physcomitrium* is allied to the above; the urn is furnished with a long straight beak and has no *peristome*.

(10) *Fissidens*, the flat forked mosses, appear as minute ferns; the leaves alternate on the stem. The *sporangium* is terminal on a long stalk the *peristome* shows 16 teeth, the hood is mitre shaped.

(11) *Anomodon* is found growing on trees with long, interlacing branches; the fruit stalk is short, the urn oblong, the lid narrow and conical.

(12) *Leskeas* (generally) may be found near stones or the roots of trees as feathery mosses with erect stems and oval urns of a double *peristome*, 16 teeth in each row. This distinguishes them from the next.

(13) *Hypnum*, the true father mosses, have curved *Setae* unsymmetrical urns and a double *peristome* of 32 teeth. The *Hypni* form a very large family, many of which are used in the artificial flower trade. *Bryaceae* also include (14) *Neckera* whose stem is flat and undulating and the *sporangium* erect, with a double *peristome* of 32 teeth. This variety is perennial and is found on trees and stones, especially in calcareous regions, forming large pale yellow, bright green or reddish tufts several inches wide. *N. Crispa* has been found in the E. Himalayas.

(15) *Barbula* has leaves widely spatulate and the teeth of the *peristome*, springing from a membrane, are 32. The Indian varieties are *B. Rufescens* and *B. Maschalogenia*.

(16) *Meteorium* has many varieties two of which have been found by Father Stevens around Darjeeling. Other *Bryaceae* occurring in the same district are *Dicranella*, *Philonotis*, *Sterodon*, *Entodon* etc :—

II *Phasaceae* are small mosses occurring as a green crust on damp earth. The capsule has no *operculum*, the spores escaping in decay.

III *Andreaceae* appear on the highest mountains as small blackish red branched plants with eight rows of imbricate leaves and sessile capsules.

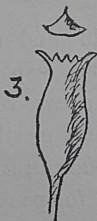
IV *Sphagnaceae* demand cold and moist situations ; the stems are very branched, the capsules are globular without a *peristome* and the *Setae* are very short. India claims *S. Cymbifolium* ; stem robust mostly bipartite, and very elongated whitish leaves. *Sphagnum* forms the peat tracts of Europe and is useful for packing.

Success in making collections of mosses is dependent on residence in one place through a cycle of the seasons as flowers appear in the early rains and the fruit in September or October. In gathering specimens they should be carefully cleaned, dusted and placed separately in folded paper either in a tin box or in a collecting portfolio made of two pieces of cardboard 16" x 10" and fastened by a strap or wide tape and containing some sheets of clean blotting paper. The specimens should be steeped in thin glue with the substance they are found on ; then well dried between 4 or 5 sheets of printer's proof paper, frequently changed. When quite dry, they should be labelled with particulars as to date and nature of place where found. If put in a cabinet herbarium the doors must be a close fit and camphor placed on the shelves, or better still brush the specimens with a preservative solution consisting of two drachms of corrosive sublimate in a pint of spirits of wine. Mark the preservative poison.

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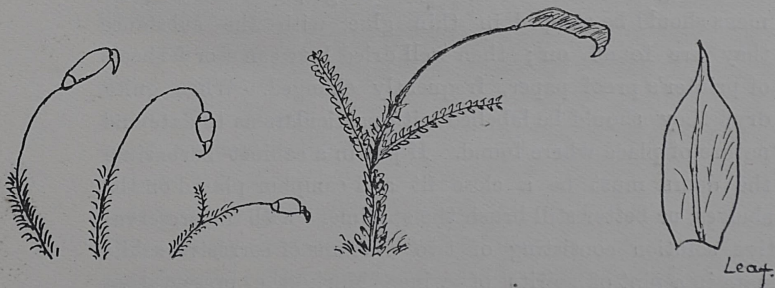


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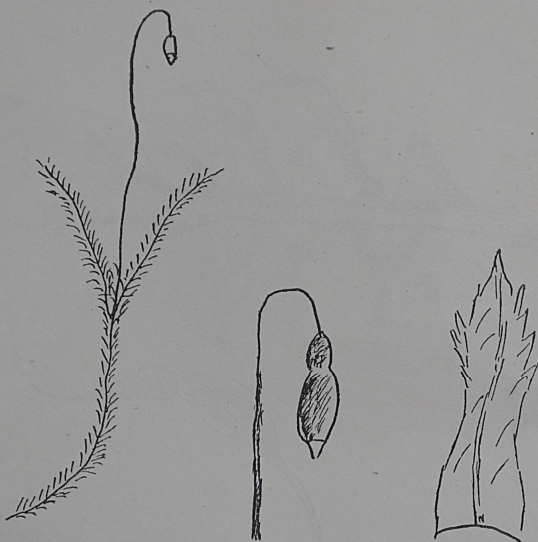


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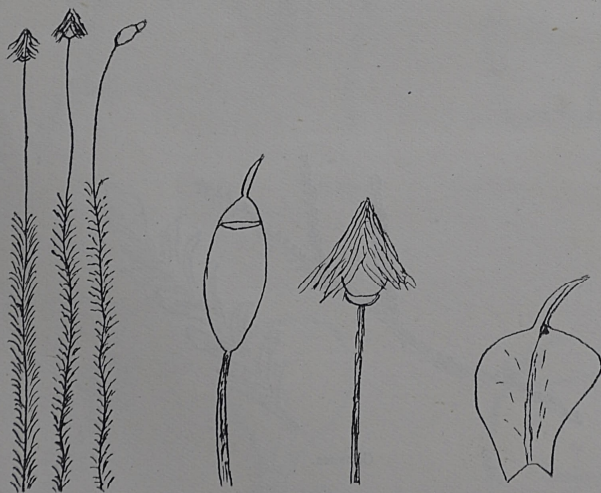
1. Theca of Bog Moss (*Sphagnum*).
2. Theca of Urn Moss with Calyptra.
3. Operculum and Peristome.



*Bryum Albicans*.



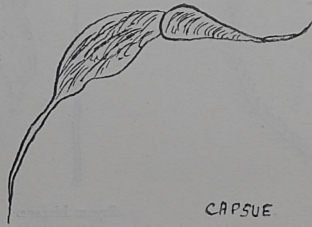
Bryum Nutans.



Polytrichum Gracilis.



LEAF



CAPSUE

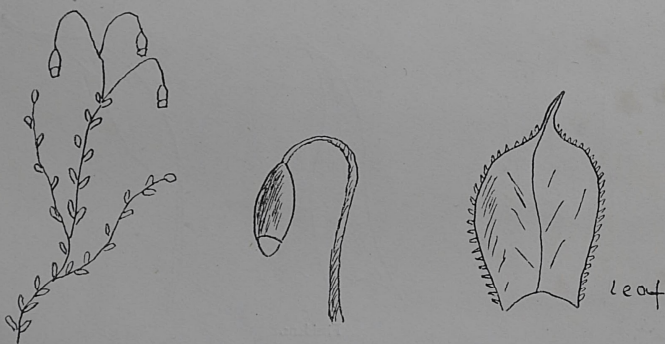
Dicranum.



Grimmea.



Bryum Argentum,



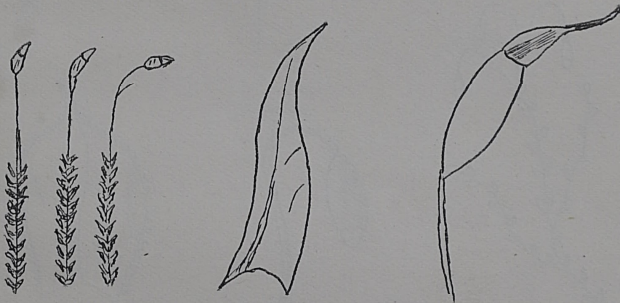
Mnium,



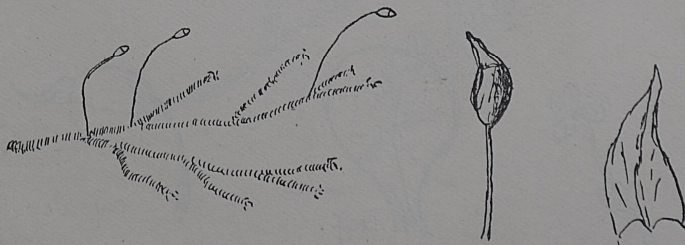
Mnium Punctatum,



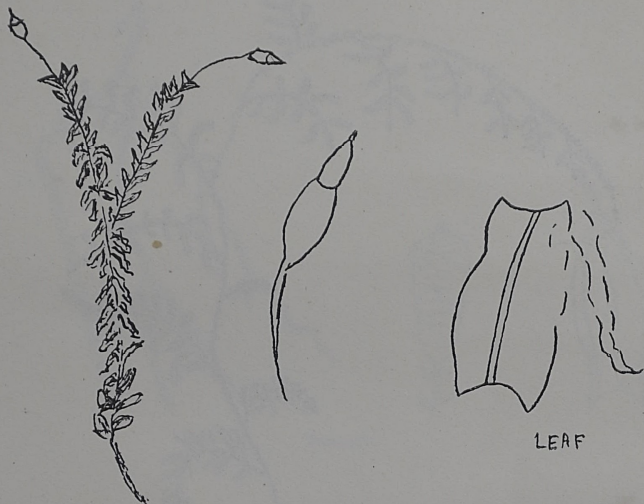
Mnium Hornum,



Fissidens.



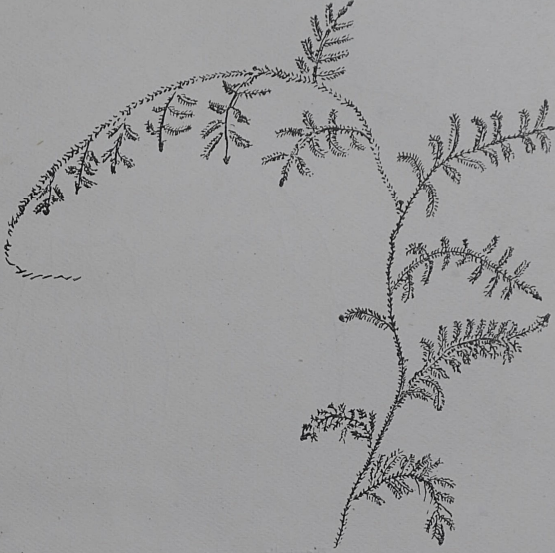
Leskea Polycarpa.



Dicranella.



Philonitis.



Entodon Prorepens.



CAPSULE

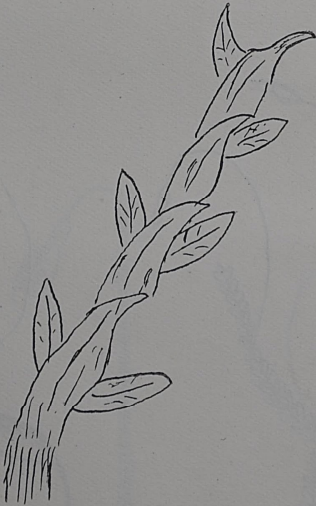


LEAF

Sphagnum.



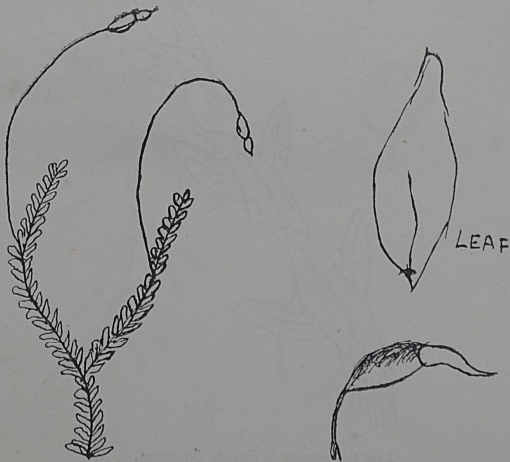
Fontanalis.



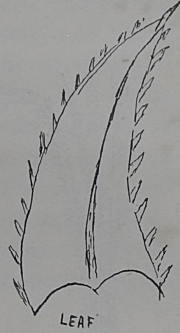
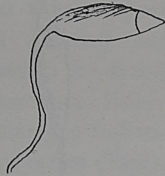
Leaf arrangement in Fontalis Squamosa.



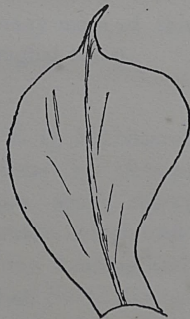
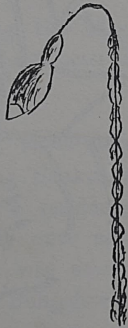
Dichelyma Falcatum.



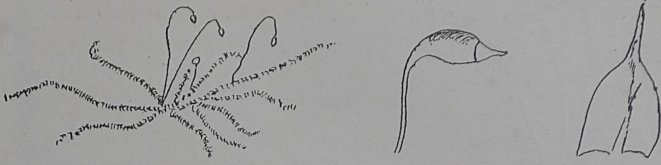
Hookera Lucens.



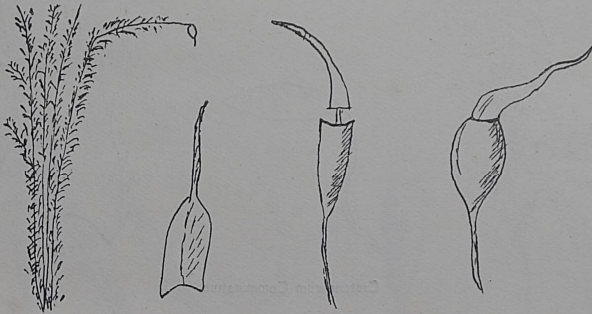
*Cratoneurum Commutatum.*



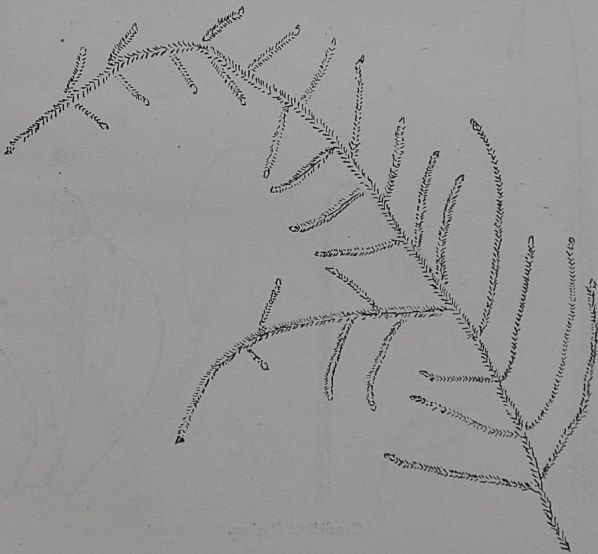
*Cynclidium Stygium.*



*Amblystegium Varium.*



*Hymenostegium.*



*Trachypus Crispatus.*

The Nepal Maroon-backed or Hodgson's Imperial Pigeon  
(*Ducula badia insegrus* Hodgs.)  
in the Duars.

Until last winter I had never seen any specimens of this fine pigeon from any part of the District except the Eastern Duars. I obtained it at Buxa in February and March and the late H. V. O'Donel found it, during the cold-weather, at Chilapota some 20 miles from the foothills. It extends along the foothills in the same District and probably does too in the Western Duars though there are no records from there. On the 13th January and 7th February 1939 specimens were obtained in the Moraghat forest in the Western Duars, the first ever seen there, the common Imperial Pigeon found there being the Indian Green Imperial Pigeon (*Muscadivora aenea sylvatica* (Tick).

I would be very pleased to receive any notes as to the rarity, or otherwise, of the various Green and Imperial Pigeons and also the seasons when they are found also the rarity, or otherwise, of any other game birds found in the Duars and Darjeeling District.

Darjeeling                    )  
1st July 1939.                )  
C. M. INGLIS, F.Z.S., F.R.E.S.,  
B.E.M.B.O.U.

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Since writing the above a good many more of this Imperial Pigeon have been seen in the Moraghat forest.

SIR,

I was very much interested in Mr. E. O. Shebbeare's article on Flying Snakes etc. in your issue of October 1939:—During a residence of 36 years spent chiefly in Assam, I only once came across a snake which could fly. This snake was seen by me one day sunning itself on a wing of my Bungalow fence at Hafflong, North Cachar Hills. It was a most beautiful snake looking like a jewel. It was about 14 inches long: the general color mouled beek but along the latter were numerous turquoise

colored dots of a lovely color. The lips and tongue were a brilliant red and as I watched it kept darting its coloured tongue in and out. As I approached it took a leap down the hill of about 10 yds. or so and I noticed that as it glided through the short grass it kept its head and part of its body raised. The Cacharis did not know of such a snake and I would be obliged to Mr. Shebbeare or to our Editor if either of them have ever seen or heard of such a snake. From its general appearance it appeared to be a non-poisonous one.

VEVEY,  
Switzerland }  
20. 11. 39 }

H. S. WOOD,  
Colonel, Genr.