

THE JOURNAL OF THE
DARJEELING NATURAL HISTORY
SOCIETY



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

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DARJEELING NATURAL HISTORY SOCIETY.

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

The 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. It is hoped that everybody will join the Society and co-operate to make the Museum and Journal a success.

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THE CURATOR,
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The Nepal Collared or Hodgson's Broadbill
(*Serilophus rubropygius* (Hodgs.)).
This is a hen, the cock has no collar.
 $\frac{1}{10}$ Nat. Size.

THE EARLY STAGES & ADULT *Brahmae Wallichii* GRAY.

The following errors have appeared in this article in Vol. XIII No. 1.

- Page 30 line 9 for "*larua*" read "*larva*".
- „ 31 „ 10 for "to" read "with".
- „ 31 „ 14 delete "from".
- „ 31 „ 20 for ";" read ".".
- „ 31 „ 21 after "There is" read "a single process rising from the dorsum of segment 12, and".
- „ 31 „ 29 for "end" read "edge".
- „ 31 „ 29 for "Around" read "A round".
- „ 32 „ 4 after "(*life size*)" insert "Head".
- „ 32 „ 7 delete the second "and".
- „ 32 „ 9 for "end" read "edge".
- „ 32 „ 11 delete "the"
- „ 32 „ 12 delete the second "the"
- „ 32 „ 36 instead of "," read ";".
- „ 33 „ 6 for "stages" read "instars"
- „ 33 „ 22 for "verted" read "vertex"
- „ 33 „ 22 after "vertex" insert ","
- „ 33 „ 22 for "and" read "anal"
- „ 33 „ 27 for "spirades" read "spiracles"
- „ 33 „ 29 for "one" read "area"
- „ 33 „ 30 for "the" read "The"
- „ 33 „ 34 for "and" read "to"
- „ 35 „ 4 for "Scitz" read "Seitz"

JOURNAL
OF THE
DARJEELING NATURAL HISTORY SOCIETY.

Vol. XIII.—No. 2.

The Broadbills of the Darjeeling District and the Duars.

By

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

(With two coloured plates.)

The Broadbills are sometimes placed in an order of their own but are now, usually, considered an aberrant family of the *Passeres*. Some ornithologists place them at the beginning and others at the end of that order but always close to the Pittas, to which they are closely allied, although very unlike them both in appearance and habits.

The most noticeable feature in these birds, and the one from which they take their name, is the, usually, very broad and flat bill. The wing is rounded and weak; the tarsus short but the feet are admirably adapted for perching; the tail varies considerably in proportion of length, and its feathers are graduated.

The range of this family is from Kumaon right across to Assam, Burma, Cochin China, Siam, the Malay Peninsula, Borneo Sumatra, and Java. None occur in the Indian Peninsula. Mr. Chasen gives 23 species, and sub-species, from the Malay Peninsula, Sumatra, Borneo and Java but one or two of these are doubtful.

The family is represented in Africa by a genus (*Smithornis*) of small birds which were, formerly, considered to belong to the Fly catchers.

They are strictly arboreal birds living both in dense and thin jungle or bamboo forest but will, also, come right into the open even, on occasions, near human habitations.

Stuart Baker gives 9 species and sub-species, belonging to 6 genera, as found within Indian and Burmese limits but only two of these, belonging to two genera, are found with us.

Colour and size are sufficient to distinguish our birds.

Hodgson's Broadbill is about $7\frac{1}{4}$ inches long with a tail about 2·8 inches long. It is mostly grey and has some chestnut on the upper plumage.

The Long-tailed Broadbill measures from $10\frac{1}{2}$ to 11 inches in length and has a tail about $4\frac{3}{4}$ to $5\frac{1}{2}$ inches long. It is mostly green in colour, with a black and yellow head and a patch of blue on the crown.

1. The Nepal Collared or Hodgson's Broadbill.

Serilophus rubropygius (Hodgson.)

Field identification :—A rather lethargic slaty coloured bird, about the size of a Bullfinch, darker above than below, with chestnut on the wings, rump and feathers above the tail and with a broad, rather shortish, bill; seen in pairs or parties in most kinds of forest and in bamboo jungle; commoner in the plains and foot-hills. Rather crepuscular in habits.

Description :—*Male*. Upper plumage dark ashy-grey and a broad black streak over the eye to the nape; rump, upper tail-coverts and innermost secondaries of wing chestnut; outer webs of primaries blue at base, the inner sides with corresponding white spots; rest of wing black, most of the feathers tipped with white and some with chestnut; tail black, the three outer pairs of feathers broadly tipped with white; lower plumage ashy-grey and the thighs black.

The colours of the soft parts are given, as follows, by Stuart Baker. "Iris hazel to deep crimson, powdered with gold; base of upper and lower mandible orange-yellow, remainder smalt-blue; legs and feet dull pale green to plumbeous-green."

The length is about $7\frac{1}{4}$ inches; wing 3.3 inches; tail 2.8 inches and bill about $\frac{1}{2}$ inch, from forehead to tip, and $\frac{2}{3}$ inch wide at base.

The *female* only differs in having a demi-collar of white-tipped feathers on each side of the neck.

Distribution—In our area:—All the specimens we have obtained have been from the Duars, except one from Kumani (800 ft.) in the Kalimpong Division, of the Darjeeling District, and adjoining the Duars. Stevens writes as follows:—“Evidently *does not occur much beyond the plains level* as I have nothing to support this statement excepting negative evidence. Gammie is mentioned, by Hume, as having obtained it breeding at Mangpoo around an elevation of 3,000 on one occasion. Mr. G. E. Shaw has, so far, not obtained it from the same locality, so it appears to be confined to lower limits generally.” (*Notes on the Birds of the Sikkim Himalayas. Journal, Bombay Natural History Society, Vol. XXX page 668.*) Jerdon states that he obtained it near Darjeeling and Mackintosh that it is only occasionally met with in the interior of Sikkim, but neither Stevens nor ourselves have ever come across it there.

Outside our area:—Stuart Baker gives the whole distribution as:—“Nepal, Sikkim to East Assam; Cachar, Sylhet, Hill Tippera, Chittagong Hill Tracts, Lushai Hills and Manipur.” (*F. B. I. 2nd Ed. Vol. III p. 471*). He says it ascends the hills up to about 5,000 ft. but, except for Jerdon’s record, we very much doubt whether it does so with us.

Habits:—This is a bird of various types of forest, evergreen, mixed, either dense or thin, scrub, bamboo or wooded country near cultivation. Stuart Baker says “it seems to prefer mixed bamboo and tree forest, especially such as grow on the banks of rivers.” Unlike the Long-tailed Broadbills they seldom seem to enter houses the only record, which we can find, is of one which flew into Cripps’ bungalow, in Assam, at 7 A.M., during a thick December fog. (*Stray feathers Vol. XI, p. 50*).

We have seen them in pairs and small parties but, sometimes, these number as many as twenty individuals. During the day they move about very little and several people have remarked how loathe they are to leave a spot, even when fired at, and Davison stated that they were such stupid birds that a whole flock could be wiped out. This, however, is not always the case. In the early mornings, and as evening approaches, they become more active and are not, by any means, as lethargic as during the rest of the day, moving about freely amongst the trees and undergrowth. Those are the hours when they usually feed. With regard to this Stuart Baker writes :—"When feeding they move about fairly freely on the branches of trees and will also capture insects on the wing though their flight is rather heavy and awkward, except for sudden, short efforts. They feed on any kind of insect food and much on larvæ and grubs which they extract from the bark of trees. Their notes consist of a soft, rather musical whistle and a low *chir-r-r* uttered both when sitting and flying." Hume found the stomach of one "crammed with beautiful little land shells "some of which he was able to preserve entire. (*Stray Feathers Vol. XI, p. 50*).

Gammie was the first man to come across the nest of this bird. It was found at Mangpu, in the Darjeeling District, quite close to his bungalow but although Shaw lived there many, many years and we have collected there every year, for many years now, the birds have never been come across again. This is what Gammie writes about this nest :—"on the 15th May I took the only nest I ever saw of this rather rare bird. It was attached to a slender twig which hung from an outer branch of a solitary dwarf tree growing in a moist hollow, within a few hundred yards of my own house, at an elevation of about 3,000 feet above the sea. So close to the ground was it hanging that the small boy who was with me managed, after stepping gently up to the tree, to put his hand across the entrance and capture the bird, which proved, on dissection, to be the male, but entirely destitute of the silver-coloured neck spots with which the species is generally adorned. [This would of

course be the case as the male bird is without these neck spots.—*Editor*]. Its stomach was well filled with the remains of grasshoppers and other insects, without a trace of either seeds or fruit.

“A quantity of tow-looking fibre was twined round the twig from the top of the nest to its junction with the horizontal branch, about a foot above, and a little of the same kind of fibre, dangled down the bottom of the nest. The twig was worked in with the building material to keep the nest steady. The structure was oval-shaped, somewhat flattened on the entrance side; made of dry bamboo-leaves and grasses, intermixed with a considerable proportion of fibrous material, which gave strength to the nest. The cavity measured 4.25 inches in height, 3 in width and 2 deep from lower edge of entrance. It was very neatly lined with quite green, small, leathery leaves. Externally the body of the nest measured 9 inches long by 5 wide with an entrance 2 inches in diameter, over which the building material bulged out about 2 inches, so as to form a sort of portico.

“The eggs were five in number and as they were slightly set, five is probably the full complement.”

We found a nest of this bird in Cachar on the 2nd September. It hung from the end of a branch of a sapling, near a stream, and about 4½ feet from the level of the water. It contained 4 highly incubated eggs.

Stuart Baker says the nests “have tails consisting of all kinds of oddments, sometimes hanging a couple of feet below the nest; at the same time I should call the nest itself very compactly and strongly built. It is always fastened to a pendant support of some kind, to which it is very firmly attached, much material being passed round and round it, so that it requires a very powerful pull before it can be torn away.

“This is one of the nests of which every one remarks it is so conspicuous that it is difficult to see how it can escape destruction but the fact that it is *always* attached

to very thin pendant supports defeats the attention of monkeys and large lizards, which are among the worst thieves of eggs and young birds. I have myself seen a *Rhesus* monkey stretch over to the nest of a Long-tailed Broad bill until he had got nearly within grasp, and then come a purler into the stream below."

With regard to the locality in which nests may be found and the breeding season of these birds the same naturalist writes :—

"The birds are resident and breed in the plains adjacent to the foot-hills and in the hills themselves up to about 5,000 feet, but are most common between 1,000 and 3,000 feet. I have never been able to detect any special liking of these Broadbills for any special kind of forest or jungle. I have seen their nests in tall evergreen forest on the edge of streams over which the great trees met and shut out the light. I have taken others from thin forest with scanty undergrowth where the sun glistened through on foliage and nest. Some nests have been attached to the pendent ends of giant bamboos either in scrub or mixed jungle, or in jungle consisting of bamboos only. Others have been attached to branches of bushes in scattered scrub-jungle, while yet others have been in canebrakes or on palm trees and fern-palms. One thing, however, the birds do like—that is, the vicinity of water—and two nests out of every three will be found hanging from branches of trees, bushes or bamboos over water, running or stagnant. Even when not actually over water nests are often built in ravines and nullahs which are moist at the bottom and in which water soon runs after any shower.

"The breeding season is almost confined to May and June, a few birds also breeding in April and July. So far as I know they are not double brooded, though if a first clutch be taken they will at once make a second nest and lay again, generally close to where the first was robbed. [We, as already mentioned, took a nest in September the eggs of which must have been laid in August. *Editor.*]

“The normal clutch of eggs is four or five, but I have seen a few sixes and one seven. They are just the same in appearance as those of the Pegu Collared Broadbill, but both pure white and claret tinted eggs are proportionately more numerous.

“One hundred eggs average 23.6×17.3 mm”.

He describes the eggs of the Pegu Collared Broadbill as follows :—

“The ground is generally white but is sometimes tinged with very pale creamy-pink or claret-pink. Very rarely the eggs are spotless, but the great majority are speckled with tiny pin points varying in colour from reddish-brown to deep purple-black. In most eggs these specks are more numerous at the larger end and in a few they are practically absent over the smaller third of the egg.”

With regard to breeding and incubating the eggs the same author writes :—“Both birds incubate, for we have often caught the male or the nest. Both sexes also assist to make the nest. They work only in the mornings and evenings for about three hours, roughly day-break to about 9 A.M. and again about 3 P.M. to sunset, even then breaking off to feed, every few minutes. At the same time considering its bulk the nest takes a very short time to construct. I have never seen the work begun and completed, but I have seen many nests half made and then had to leave, while, on the other hand, I have seen some completed which were half made when found. From these I think it is safe to say the nest takes from five to ten days to build, the decorations often being added after the eggs are laid.”

(To be continued.)

Observations on the Tiger and its Shiker.

By

LT. COL. H. S. WOOD L. M. S.

(Continued from Vol XII page 105).

Some experience in Tiger Hunting.

1. Whilst stationed at Tezpur, a Tiger entered the town. He used to enter byres and kill. One day word was brought to me that he had entered the cow house of our Deputy Commissioner and mauled a large cow, which had a large piece of flesh torn out from its neck. My bungalow was only a short distance away and below the cow house was my drive with a large mango tree near it, on which I decided to place a machan. The cow was carried by my convicts and placed on the road almost opposite my machan. It was winter, and I ascended the perch at 6 P.M. I went up to dinner, placing a sporting *kit* of mine in the machan until I returned at 7 P.M. On my left was a jungle covered hill with a road up to the top, a view point for the town people. It was a beautiful moonlight night. About 11 P.M. I saw an animal coming down the road, it looked like a small pony, as the stripes were not visible. The animal descended with great caution, halting now and then; then some native in the D. C.'s servants quarters coughed and the beast turned and went up the hill and after a while he came along the road. When he reached the spot where this path joined my road, he gave a bound and disappeared; I might have had a shot at him before he leaped and I cursed my ill-luck for not having taken the chance. However, in about ten minutes, with a growl, he leaped on to the cow, his forepaws held the cow's neck as she sat and he was just about to sink his fangs into the cow's neck when I fired and, with a growl, he sprang up against the tree I was in, then rolled into the jungle nullah below. I heard the death gurgle and knew that I had got him. Next morning I had to start very early on census work, but was determined to find him before I started. I told my *syce* that I would do so and, after fortifying his courage with some alcohol, we proceeded down the nullah, there being lots of blood, and

found the Tiger about 20 yards down. I was delighted. He was a young male with a perfect pelt and in splendid condition and measured 8'. 11'. The night I shot him he had tried to enter a cow byre on the other side of my bungalow, but was driven off and then came up to the wounded cow. This was the second Tiger that had been shot in the station.

2. The jungle within five miles of Tezpur held many Tigers. B- myself and my wife went out almost every Sunday for small game, but we always took our rifles with us. One evening we were returning when B- saw a horse behaving in the curious way I have described. He said "Wood, I am sure there is a Panther or Tiger about". No, sooner had he said this than there was a succession of roars in the sun grass not very far from us, and we followed in the direction. The beast kept about 30 yards in front of the elephants—the sun-grass moving gently and every now and then the Tiger roared. We came to a nullah about 700 yards long, covered with null and very swampy, when near the edge of it the Tiger roared again. The jungle on the other side of the nullah had been burnt. I told B- that the beast would probably come out and that one of us should get to the other side and the elephants proceed in line along the bank of the nullah. My mahout, much against his will, and the elephants, crossed the nullah, after nearly sinking in the quagmire. As my elephant reached the far bank I saw the Tiger's head and neck sticking out, but he immediately withdrew. We silently followed along the bank and then came to the end of the nullah. I said to B- "let us wait" as I was sure the Tiger would come out. The elephants were kept very quiet and in about 10 minutes I saw the Tiger emerge about 50 yards away. He put his nose to the ground and followed the track of my elephant, he got within 20 yards of where I was, raised his head and stopped, I fired at his chest and rolled him over. This Tiger made clawing movements in the air and roared. Our two elephants came up and as he was still alive, B- gave him the *coup de grace* unfortunately smashing the skull which I had to piece together afterwards. B- said that I

was a lucky chap as it was the biggest Tiger that he had ever seen. Next morning, I sent out some of my convicts with a cart and the body was brought in. He was a huge beast taping 10' 10½" - the largest Tiger I have shot or seen in Assam. He had a ruff round his neck and was of the *Sher Bag* type. He had a beautiful pelt for which I got a good price from an American. When I was skinning him I found that the pad of one fore-foot had a deep wound right across it, and there were recent wounds, as if from claw marks, on his body. Now, the question arises! 1. Did this Tiger roar at this unusual time and continue it from pain or was he challenging the male to combat with which he had had a fight a few days previous. I am inclined to the latter view. The two males were probably after the same Tigress. One evening, about a fortnight after this incident, we were returning by the way where we had seen the horse behaving in a peculiar manner when a Gurkhali herdsman shouted out to us that a Tiger had just killed a cow. I am afraid that we rather disbelieved him and proceeded to the spot rather carelessly. What was our surprise to find three pigeons on the kill, which dashed off before we could fire. My wife went home on one elephant, and B- and I decided to drag the kill, with the help of the other elephant, up to a Seemul tree not very far away. The pad was taken off the elephant which was sent away and we sat up. We decided not to fire until the Tiger was actually on the kill. I am sorry I agreed. Both our hearts were throbbing like blazes and unfortunately there was no moon. I saw the Tiger, like a shadow, moving round in a semicircle, about 25 yards from the kill. Every now and then he squatted on his haunches and his appearance was like a white pillar as his under parts were exposed. I think I would have bagged him had it not been for our agreement. He never came up, although we waited hours, and I think he must have seen the huge machan. It is unwise to sit up with another person in the same machan, especially with a native who coughs or scratches himself at the crucial moment.

3. G- our Superintendent of Police, was very anxious to bag a Tiger so we made tracks one Sunday for "Tigerland". I spotted two King vultures on a *Seemul* tree; one of them left the tree, flew some distance over the jungle and then returned. I at once said "There is a kill." On going up to the tree we saw the ekra grass jungle, near it, flattened down and, there was also, blood. We took up the trail of the *drag* and found the buf's tail lying on the ground, about 20 yards away from the scene of the struggle. The jungle had been fired, leaving fairly large patches of unburnt jungle here and there. Out of one of these I saw part of the corpse sticking out and also thought I saw the reeds move. We were on a pad, G- was in front so as to have first shot. I told the mahout to go round the patch, and, as we got to the far end, there was the Tiger walking away quietly in the open. I waited for G- to fire, but he got Tiger fever badly, and could not raise his gun. I then fired and the beast raised himself on his hind legs and went off. There was plenty of blood and we tracked him into an unburnt patch; as we reached this we heard him growling, and the elephant, in spite of goading, refused to enter. I proposed to G- that we should get down and dispatch him on foot. G- did not like my proposition at all and looked funky. I sent the elephant to the far end and told the mahout to make as much noise as possible to divert the Tiger's attention. G- and I entered shoulder to shoulder and at the ready, and had hardly gone ten yards when we saw the Tiger crouching, with his head on his paws, looking in the direction of the elephant not five yards from us. We both fired at once and the beast, fortunately, rolled over dead. It was a dangerous thing to do but since then one has learnt a lesson never to go after a wounded Tiger on foot. We passed a Gurkhali Khuti on our way back to the station, and the men and women asked us to show them the Tiger so we got it off the elephant; the women stamped on it, spat and abused it in the choicest Gurkhali for having killed so many of their cattle. It was a young Tiger measuring 8 ft. 6". On examining it I found the wad of G-s. gun in the flesh, he was using a lethal bullet, it showed at what a close range we had fired. My first shot had hit him

high up in the back, fracturing the spine. G., a few days later, went out by himself and nearly got his foot taken off by an unwounded Tiger; this choked him off from going after Tiger again.

4. I had a very exciting time after the Man-eater of Kharupatia in the Tezpur district. I had occasion to inspect a tea garden not far from the place where the beast seized his victims. A *buggy* was sent to the *ghat* for us and, as we were going along, I noticed two *Scemul* trees with fresh claw marks on them. I said to my wife "I am sure the Tiger will return to these trees to-night, I am going to sit up. We had lunch with I- who, afterwards, sent out a *dak* for us. As we were on our return journey the groom, with the spare horse, came running in our direction saying that he had seen a Tiger on the Government road. We reached the spot, which was not very far from the place where I had seen the marks on the trees: the huge pug marks were fresh. This was about 5 p.m. and night was falling fast, so I whipped up the horse and made it gallop to the *ghat*, seized two cushions, my rifle, etc, and galloped back to the tree where I had seen the most recent marks. I placed the cushions in the fork of the tree and waited. It was a lovely moonlight night. About 10 p.m. I heard the Tiger scratching at the tree on my left then saw him cross the road and come along quietly. He came opposite my tree and, as he crossed the road, I let him have it and he dropped in his tracks flat on the ground. Like a fool I thought he was dead and did not fire my second barrel; the next instant, with a *whoof* he leapt up at me, missing my hanging legs by inches! He then plunged into the jungle behind me, growling and making a tremendous commotion in the reeds. I was prepared to spend the rest of the night in my uncomfortable perch, altho' I suffered the agonies of cramp, but about 1 A.M. I heard tinkling of bells and saw carts taking tea chests down to the steamer *ghat*. As the carts got opposite me I shouted "*roko*". A carter said "*arrah Bhai Bhoot hai*" to which I replied that I was a Sahib who wanted to go to the *ghat* on a cart. I made myself comfortable on the top of the tea chests, with my head on the cushions, and had quite a good sleep. One cart I sent

back to I-, to tell him that I had wounded the Tiger and to send 50 coolies at daybreak to look for him. Next morning my wife and I proceeded to the spot, and found the coolies there and followed the track of the wounded Tiger. There was a dried up *bheel* not far from the tree and here we found gouts of clotted blood and the dhoob grass was torn up in all directions by the Tiger; further on he had lain down and then had got into some fearful jungle. I decided that it was unwise to follow, and said I would get an elephant from the Mauzadar and look for him in the afternoon but I could not get one and so lost a fine Tiger. I am certain however that he died as, after this, no more herdsmen were killed. What a narrow shave I had.

(To be continued).

A fortnight in the 'Blue.'

Some people go to the Hills, come to the cities and a few go into the 'blue'.

I chose the last, the reason being that I have never done otherwise.

The first problem was expense and the second, transport. It is not my idea of a good holiday doing everything as cheaply as possible, but there was no alternative.

Having a V-8 twoseater set a problem as to how all the 'mal', cook and pani-wallah were to be carried. This was overcome by removing the dickey and building a very light framework body on the back and covering it with canvas, so that it rather resembled a light delivery van often seen at Home, six feet long and the width of a car. For a bed I made up a roll of laths and canvas—quite comfortable except that on the first night it would insist on acting the part of a venetian blind and on several occasions I awoke to find myself partly suspended in mid-air.

The whole thing took me about a fortnight to build and cost Rs. 25 all told. I had already decided on my particular spot in the 'blue', as, having shot a tusker there on X'mas

Eve, I had to get a corresponding *makhna* to enable me to take possession of the tusks, and according to local information *makhnas* were there in plenty. Also I had in mind an odd tiger or so, as on the same X'mas Eve I missed a fine fellow in rather unusual circumstances.

On that occasion only having two nights' leave, I left home at 2 A.M. and arrived at my destination at 7 A.M., had a second breakfast and started looking round for 'Khubber' of the *hathi* I was after.

On my way back with the necessary information I came across a carcase of a dead buffalo, which had been dead for at least five days, but the night before had been partly eaten by a tiger. Having a spot of time to spare I took a goat along just as it was growing dusk and tied it on the road close to the remains of the buffalo. Having done this, I sat on a wooden bridge close by with one of the locals. We had not been seated more than 20 minutes when there was a scuffle and putting on my torch the light revealed a tiger with the unfortunate goat in its mouth. The local having seen the tiger at the same time, jumped to his feet and loudly entreated me to slay the *Barra Bagh*. I fired at him disappearing in a cloud of dust with the goat in his mouth and missed as he did not drop the goat. On going past the spot next morning to remove the tusks from the elephant I had shot an hour after missing the tiger, I was surprised to find that he had been back and finished most of buffalo, which had died *six days before from disease*.

Now to get back to the trip.

I had everything ready by 2 P.M. on February 25th, and having such a load had to go slowly. I intended staying at Jam Duar the first night and reached there just after dark and was crooned to sleep by Nature's most majestic sound, the sound of a mighty river.

Next morning I wet a line without success and then got underweigh for my final destination with the intention of looking up my old friend the tiger, but he was no more, having been shot by the Conservator's party, which had left the locality the day before.

Being rather disappointed, I made tracks for the house of a Paharia Christian on the edge of the forest, which I decided to make my headquarters. There my spirits rose, as there was good 'Khubber' of a *makhna*. Dawn found me in the Sal forest, and sure enough, after going for an hour, I came upon fresh tracks of a lone *hathi*, which, the basti bloke swore, belonged to the *makhna*. I followed him all day but did not come up with him, nor had I better luck on following days, during which I came on several small herds, and one of fifteen, but not a sign of a *makhna*.

The same night I was awakened by a tiger roaring quite close to Camp, and took things easily getting a *moorgh*i and a few Imperial pigeons for the pot in the morning. In the afternoon I was wakened up with the information that a tiger had taken a cow in a basti about 3 miles away, so taking in the car my portable machan, which I had made to save the bother of building machans, (it consisted of two bent pipes, made to lean against the trunk of a tree and a board on top, and it was just 8 feet high) I arrived at the scene of the kill. It was obvious that I had taken for granted that there would be trees. Two hundred yards was the nearest, so there was only one thing for it. I sent for a rope and we dragged the kill to within forty yards of this tree. I had not sat more than half-an-hour, when I saw a tigress walk across the dhan-khets in full view of the basti and myself and go to the spot, where the cow had been killed, stop for a few moments, and follow where the kill had been dragged. The tigress taped 8' 2".

I did not get back to my basti much before midnight, as seeing a car in the forest Bungalow, I pulled in and found the D. C. and did not need much persuasion to stay and have pot-luck.

Arriving back, I found the bastiwallahs in a great state of excitement. They had tied the cow I had purchased within 200 yards of the basti, and it had been taken about an hour before I arrived. This was not so easy as the first, as the tigress did not put in an appearance before 1 A.M. and measured 8' 6".

Next day, I was to be luckier still. Just as I was about to have tiffin, news came in that a buffalo had been killed about five miles away, so I started off immediately, only to find on arrival that the kill had been removed by Muchis, who, although they will not eat cow-flesh, relish buffalo-meat. The basti wallahs were most upset as this tiger had killed a number of buffaloes in the last few months, and they offered to give me a cow.

Having heard and read a lot as to how tigers kill, I was rather keen to see for myself, and thought that if I sat over the cow I might be lucky enough to get an actual demonstration.

The cow was duly produced and to make certain that the tiger should know of its presence, I had a buffalo bell tied round its neck. I chose a clearing in the Sal, in which to sit and tied the cow where five roads met and about 250 yards from where the buffalo had been killed. The cow was very restless, which kept the bell going pretty well. Whether this had anything to do with it or not I do not know; I had not been sitting very long, the sun was level with the tree-tops, when the cow became rigid and looked hard down the road, which ran from it to my rear. Turning very slowly, I saw a large tiger about one hundred and fifty yards away in the middle of the road looking at the cow. He stood in this position with his head well in the air for at least a minute and a half. He then turned and walked into the Sal at the side of the road and being in very light under-growth, I could follow his movements clearly. He came up very gently, and the only sound was his treading on dead Sal leaves which covered the ground. He stopped every-thirty yards or so and eventually came up behind an upturned root of a blown-down Sal tree and sat there for at least three minutes. He was now about thirty yards from the cow, which was still standing rigid and looking straight at him. Without any noise or hurry he loped up to the cow, both head on. As he reached her, she did not even flinch, but just lowered her head slightly and the tiger pulling up like a polo pony on his haunches, very gently put a paw on each side of her neck, bent over

and bit just behind the horns. The cow-dropped without a struggle, the tiger settling down also, still head on with her and not quite broad-side to me. I did not wait any longer, as I had no wish to be seen by him, being only 8' off the ground. If he had looked round he could not have failed to detect me. He turned out to be the largest tiger I have seen, measuring 9' 9" where he lay.

During the period just described, the cow never flinched yet she could have run the length of the rope to the other side of the tree to which she was tethered.

The tiger did everything very quietly and no rough stuff at all, as one occasionally reads about. Just one bite where the spinal cord joins the skull—no mighty swipes with his fore-paw, or choking the beast to death by a vice-like grip of the throat. The cow was a large one, the size of a ploughing bullock.

This amazing luck could not continue and the next three days I sat, kicking my heels in camp in pouring rain, miserably cold. The next few days were blank, looking for a *makhna*. Then two days and two tigresses, and a tiger, which put one over me and then back across the Sankos river and home on March 10th, and how insignificant tea bushes seem after a fortnight among the mighty Sal trees.

27th June 1938.

M. J. F. BALDWIN.

The Snakes of Northern Bengal and Sikkim

BY

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

PART III.

Family I—TYPHLOPIDEA.

This family has only one genus, *TYPHLOPS*, and only five species have so far been found in our district out of 18 species known in India. There are no ventral shields, the whole body being covered with small round scales. To protect them when burrowing the eyes are also covered with scales and can hardly be seen. Those snakes rarely appear above ground but may be found when uprooting plants from the garden and look very like worms, cigar brown to dark brown and polished, but not moist as a worm would be.

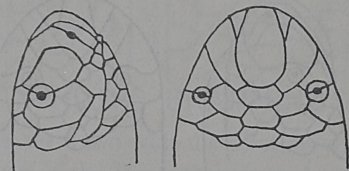
The head is hardly recognisable as such, though the scales are slightly larger above and the eyes can be seen with a magnifying glass as blacker specks.

The tail ends in a spine, in all in our area except *T. oligolepis*, with a sharp point and only about a quarter of an inch long. Identification depends, to a large extent, on counting the row of scales, and this is no easy matter unless the precaution is taken of sticking a pin well into one scale at mid-body and then holding the snake in such a way that it can be twisted right round to the pin again while one eye is glued to a magnifying glass and one hand holds the glass. Try it before actually starting to count. Of course there are dodges for doing it easily such as watch-maker's glass fixed in the eye leaving both hands free, or a piece of cotton to hang the snake up by so that one hand is sufficient to turn it.

1. **TYPHLOPS OLIGOLEPIS** Wall.—The Few-scaled Blind Snake, also called Wall's Blind Snake.

16 rows of scales at mid-body; no spine at the end of the tail.

Nasal shields meet behind the nostril.



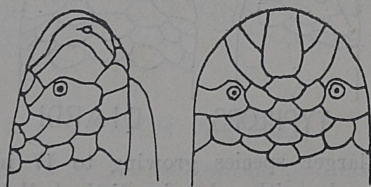
TYPHLOPS OLIGOLEPIS

This snake was first discovered by Col. Wall in a bottle in our Darjiling Museum, the original finder being the late Dr. Seal who picked it up on a road in the Nagri Valley at an elevation of 5,000 feet. This specimen is no longer in the Museum and, as far as we know, only two others have ever been found. It is described as only $5\frac{1}{2}$ inches long and cigar brown above, paler beneath.

It should be looked for.

2. **TYPHLOPS PORRECTUS** Stoliczka.—Stoliczka's Blind Snake.

18 rows of scales at mid-body. Suture above the nostril incomplete.



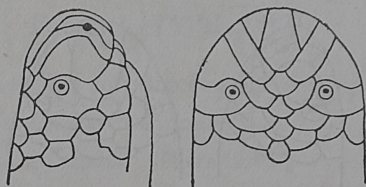
TYPHLOPS PORRECTUS

This cannot be common here for we have no specimen in the Museum though the Indian Museum in Calcutta has one labelled "Darjiling District".

Length $8\frac{1}{2}$ to $9\frac{1}{4}$ inches. The colour is brown above, paler beneath.

3. **TYPHLOPS JERDONI** Boulenger.—Jerdon's Blind Snake.

20-22 rows of scales at mid-body. The suture below the nostril reaches the 2nd labial which does not touch the preocular.

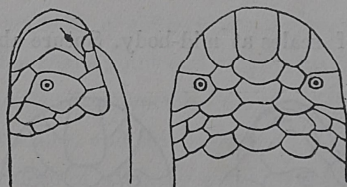


TYPHLOPS JERDONI

This is the only Blind-Snake common in the Darjiling District. Dark brown above, lighter beneath. The tail, bluntly pointed and ending in a minute spine, is whitish below. Usually 9 or 10 inches long but can grow to $11\frac{3}{4}$ inches.

4. **TYPHLOPS DIARDI** Schlegel. Burmese or Diard's Blind Snake.

24 to 26 rows of scales at mid-body. The suture above the nostril incomplete.



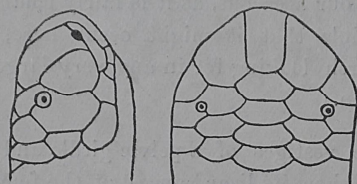
TYPHLOPS DIARDI

This is a larger species growing to 17 inches Colour brown, each scale with a barely distinct light transverse streak. Ants appear to be its staple food.

This species has recently been divided into more than one variety; the one found in our area is probably the typical one.

5. **TYPHLOPS BRAHMINUS** (Daudin). The Common Blind Snake.

Scales in 20 rows at mid-body. The suture below the nostril reaches the preocular. It grows to nearly seven inches in length.

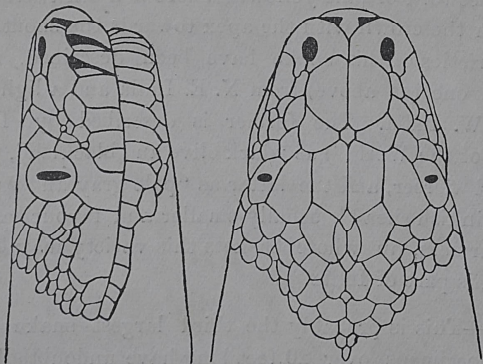


TYPHLOPS BRAHMINUS

It has a nearly world-wide distribution and appears to be fairly common in the Duars though we have never found it in the hills. Barker got three specimens on Haihapatha and says that it is often found when clearing land for planting, either in rubbish or in ant-heaps.

Family II. BOIDAE—(Pythons and Boas.)

6. **PYTHON MOLURUS** (Linn.)—The Indian Python.



PYTHON MOLURUS

This is one of the few snakes that possesses a vernacular name which is understood locally. It is pretty generally known as *Ajgar* or *Ajira*, the real meaning of which is "dragon". It is not poisonous.

Scales in 60 to 75 rows at mid-body, Ventral shields 242-265 (not extending to the full width of the belly). Sub-caudals 60-72, Anal entire. The first two supralabials on either side are pitted. (Note: this character among others

distinguishes it from *P. reticulatus*, the Malayan Python, the longest snake in the world, which has the first *four* supralabials pitted. The Malayan Python has not been recorded from our area but, as it is fairly common in Burma, it is just possible that it might occur here, so that this feature is worth looking for in any very large or unusually coloured Python.)

There are vestiges of a pelvic girdle and hind limbs in this snake to show its lizard ancestry, the femurs, or thigh-bones, terminating in well-marked external spurs on each side of the vent. The spurs of the male are proportionately much larger than those of the female, though the latter seems usually to be a bigger snake. The pupils are vertically elongated.

Colour :—The pattern of this beautiful snake is formed by large squarish or hexagonal reddish-brown patches, each darkening towards its edges to almost black, which are enclosed in a network of pale yellow. There is a dark triangular blotch on the crown with the apex towards the snout. Two colour varieties of this snake have been described, namely a darker one (as above) from N. E. India and a lighter one from S. W. India. The former is described by Ditmars ("Snakes of the World") as "dark olive and blackish", usually larger and fiercer, and the latter as "pale gray and dark tan with a pinkish head" usually smaller and favourites with snake-charmers, in whose baskets this variety may be seen even in this part of India.

Size.—This is probably the third largest snake in the world. Specimens over 20 feet long have undoubtedly been measured in our area and Ditmars gives the maximum length for the species as about 25 feet as against 33 for *P. reticulatus*. The same authority gives about 25 feet as the maximum length, reliably recorded, for the Anaconda (*Eunectes murinus*) of tropical America which is often regarded as the largest snake in the world. In support of this claim, it must be remembered that it is a much thicker snake for its length than the Pythons. A 19-foot Anaconda was 3 feet in mid girth and weighed 236 lbs., a

Python of the same length would be more like 2 ft. in girth and barely weigh 200 lbs. Thus, although the Malay Python is certainly the longest snake, the Anaconda may hold the record for bulk and it is safe to put down our Indian Python as the third largest. The young are $2\frac{1}{2}$ feet long when first hatched and grow rapidly at first, reaching 5 ft. in their first twelve months. Pollack gives the rate of growth in later life as 3 ft. in two years.

Habitat.—The total range of the Indian Python is India, Ceylon and Burma, through Malaya to Sumatra and Java. It is fairly plentiful in all well-wooded country up to about 4,000 ft. but Wall records them up to 6,000 ft.

Habits.—The female may lay from 8 to 107 eggs (Wall), there are usually several dozen, which she coils herself about to incubate. From October to December, in the plain forests of our area, it is not unusual to come across several Pythons together, up to seven or eight but more often four or five. Dent, who saw a number of these collections, pointed out that they usually consist of one large female and a number of males of 12 ft. or less.

Except for a record by Wall of six Pythons in one retreat, and an account of seven in one hollow tree (Darj. Nat. Hist. Soc. Journal Vol. III, No. 1) we have not seen this congregating habit referred to elsewhere. The collections appear to be nuptial parties rather than family gatherings. Whether the comparatively small size of the males indicates that they do not grow so big as females or that they do not breed after attaining 12 feet needs further investigation.

Like most reptiles it seems to prefer its food in large quantities, but at long intervals, and they have been known to fast for 3 years, in captivity, before dying of starvation. Although mammals and birds are its staple diet, frogs, worms and even the berries of *Jamuna* (*Eugenia Jambolana*) have been found in its stomach.

Though the Python is very much on the alert during the day and has often been observed in the act of swallowing

an animal in broad daylight, it probably captures its prey more often at night and for this reason its methods have not been very often observed in the wild state.

Various theories have been advanced and we have been told that it hangs by its prehensile tail and butts its head against a passing animal knocking it over and then coiling round it. We have also been told that it lies along a branch with its tail hanging down ready to encircle any animal coming within its reach. Wall in the *Bombay Journal* (Vol. XXI P. 462) gives a very comprehensive account which we reproduce:—

“The habit of constricting is characteristic of the whole family—boas and pythons alike. The snake roused to activity by the sight of food, advances towards its prey often with quivering tail and makes a sudden dash at it with open jaws which are no sooner closed upon its victim than it throws a coil or two according to the size of the quarry—round it, holding it as in a vice until its struggles have completely ceased when it relaxes its embrace and proceeds to swallow it almost always beginning at the head. Dr Chalmers Mitchell says ‘there appears to be no special attempt to crush the prey, to suffocate it or to break its bones’. I certainly agree that there is no attempt to crush with the intention of breaking bones, and so making the mass more easy to deal with, but if the victim is not suffocated how is it killed? My belief is that the vigour of the embrace is such that the victim’s chest is incapable of expansion, and asphyxia results, or what amounts to the same the heart cannot beat against the pressure to which it is subjected.

“In swallowing a small animal the mouth is widely opened, and the jaws fixed beyond the head of the victim which is easily engulfed. Prior to the actual seizure of the head the python plays about over it with quivering tongue. It does not slaver it as is commonly supposed, but the saliva flowing freely under the stimulus of food wets that part which has been received in the mouth, so that if the victim has been disadvantageously seized, and the snake rejects it

to make a second attempt, the part of the quarry previously ingested is coated with saliva.

“When the animal is large, the snake seizing the head strives to fix its teeth as far back as possible over the victim, when, having got a firm purchase, the jaws—six in all and all moveable—work alternately over the head, one or more at a time relaxing their hold to be pushed further forward and obtain an extended purchase while the others retain the hold already gained. The process is sometimes a tardy one, and if so the snake is frequently observed to protrude its wind-pipe, so that an inch or even two may be seen beyond the mouth, beneath the mass that is engaged within the jaws. This extension of the glottis is however not a peculiarity confined to the python, for it has been noticed in several other snakes, colubrines and vipers.”

Although we have heard accounts of these snakes capturing their prey by means of mesmerism or fascination, we have no evidence to substantiate this.

The Python's swallowing capacity is almost incredible. The actual sight of a deer's carcass ripped out of the snake's paunch leaves one more mystified than ever as to how such a colossal mouthful could ever have passed down such a slender gullet. Rats, monkeys, jackals and even a young bear seem comparatively simple but how those amazing snakes succeed in swallowing porcupines without sustaining internal injuries passes comprehension though the feat has been frequently recorded.

Pythons swallow barking deer, hog-deer and even cheetal often stags with horns. There was until recently a hog-deer head of quite shootable proportions (we have unfortunately lost the measure) mounted on a shield in Tirrihana Bungalow (Terai) which had been taken out of a Python. It is true that if a Python is disturbed and forced to move after swallowing a porcupine, or deer with horns, before the quills or horns have been softened by digestion, they penetrate the stomach and project through the skin with fatal results. That Pythons regard a stag's head as an inconvenience is also shown by the fact that they sometimes remove the head. In

this connection we reproduce an extract from the Darjeeling Natural History Society's Journal Vol II, No I:—

“Two or three years ago I was in camp at Gorumara in the Jalpaiguri District. Grass-cutters who had taken elephants out to collect fodder reported that they had seen a big Python which, having just fed, was not likely to move far. So, C. K. and I got on an elephant and sure enough found the snake which C. K. killed. The length was anything you like to make it. When we cut it open we found the whole of a male hog-deer except the head.

“Dunbar Brander in his book ‘Wild Animals in Central India’ (which I commend to all sportsmen who want to learn about the habits and calls of forest animals) writes:—‘I once came on one which had just swallowed a male barking deer horns and all. It was quite helpless and easily killed. A friend of mine once came on a chital stag which had been killed by a Python. The horns were more than the snake could swallow and in order to get rid of these, he severed a strip of skin along the back leaving it attached to the skull and by this means he bound the head to a small tree. Having accomplished this, the snake then revolved the body until the head was twisted off. Although not actually observed in the act, the circumstances justified the assumption that this is what took place.

“When we found our Python, I had not read this book and had never heard of this theory, I did not go back to search for the head. If any one is lucky enough to come across another full Python, will he search the neighbourhood to see if there is any truth in the theory that he twists the head off.

“It seems reasonable as I cannot see how a Python can get the horns of anything bigger than a barking deer through his mouth.”

An even more startling achievement was that of another Jalpaiguri Python which overcame and swallowed a leopard measuring 4 ft 2 ins, from nose to rump—the tail was too decomposed to measure but say a six-foot leopard. The

snake in this case only received seven minor wounds in the encounter. This incident occurred in the Tondoo Forest near the railway line between the Murti and Jaldahka rivers, and is recorded in the Bombay Natural History Society's Journal Vol XVII, p 1021.

The Python is a good climber and is frequently found in trees at a considerable height from the ground where it often catches monkeys and roosting birds. It often lives near water, is a good swimmer and may be regarded as semi aquatic. It has a habit of keeping still for long periods on land, as well as under water, with only its nostrils appearing. It is generally considered to be a slow mover and this is certainly true of big Pythons though it is possibly more from inclination than inability as a full grown specimen rarely shows much inclination to get away. We have been outdistanced on a river bed by a half-grown one caught unawares, probably drinking, and anxious to get back to cover.

In the plains part of our area Pythons probably hibernate for a few months during the latter part of the cold weather as we have then found them covered with leaves. They are certainly active during October and November as well as during the rains. More information on this point would be welcome. We know nothing about hibernation in the hills.

Fitz Simmons, curator of the Port Elizabeth Museum and Snake-park, gives instances of Pythons insensibility to pain and submitting to be eaten alive by the rats supplied to them as food in captivity. This was not due to hibernating torpor, the victims being healthy Pythons and in their active season. Any one interested in Pythons should read Fitz Simmons book "Pythons and their ways" (Harrap).

(To be continued)

Notes on Indian Hawkmoths.

BY

LT.-COL. F. B. SCOTT, I.A., F.E.S.

(By kind permission of the Author and the Bombay
Natural History Society.)

The Hawkmoths belong to the Natural Order *Lepidoptera*, or scale-winged insects. This Order is divided into the Butterflies (*Rhopalocera*), which have the antennæ ending in a club, and the moths (*Heterocera*) which have the antennæ of various forms other than clubbed at the ends. The moths are divided into Groups, and the Groups into Families, the Hawkmoths or (*Sphingidæ*) being one of the Families. The scientific name is derived from 'sphinx', the designation used by Réaumur for the English Privet Hawkmoth, on account of the fancied Sphinx-like attitude adopted by the caterpillar when it is alarmed, and the name was later adopted by Linnæus for the whole Family.

DISTRIBUTION AND FOOD-PLANTS.

There are but 17 species of Hawkmoths known to occur in the British Isles, and some of them are only rare visitors. In the Indian Empire about 180 species are known to occur, out of a total of about 850 species known throughout the world. Some of the Indian species are very common, others so rare that only one or two individuals have so far been obtained. Some of the species are widely spread, others very local in their occurrence. A few of the species which are found in England are found also in India. These are the Convolvulus, Broad-bordered Bee, Oleander, Humming-bird, Spurge, Bedstraw, Striped and Silver-striped Hawkmoths. Two species of Death's-head Hawkmoths are found in India, but they are not the same as the English species. These are the only species which have been given 'common' names. The rest are known only by their scientific names.

Certain parts of India are more rich in species than other parts. Areas with a heavy rainfall and a large variety of trees and plants produce the largest number, and



INDIAN HAWKMOTHS.

1. *Oxyambulyx sericeipennis*, Butl. ♀ 2. *Rhagastis albomarginatus*, Rothsc. 3. *Marumba sperchius*, Ménétries. ♂ 4. *Theretra nesus*, Drury. 5. *Rhopalopsyche nycteris*, Kollar. One of the Humming-Bird Hawkmoths. 6. *Langia zenzeroides*, Moore. 7. *Clanis phalaris*, Huebner.

dry areas with poor vegetation the smallest number, though individuals of certain species may occur in vast numbers in both wet and dry areas, becoming serious pests on crops and other plants. Probably many new species remain to be discovered, but of those now known 58 species occur in the west Himalaya (west of Nepal), 128 species in the east Himalaya (east of Nepal, and including Assam), 73 species in the South of India and 40 in Burma. Many more species must occur in Burma, but very little collecting has been done there. The North Kanara district of Southern India is very rich, having over 45 species in an area of 3,600 sq. miles. The distribution of the species overlaps, some of them occurring in more than one of the areas mentioned. The plains area of Northern India has no special Hawkmoth fauna of its own, but receives contributions from the surrounding areas. The information on this subject is very scanty and it is worth recording the locality where any Hawkmoth is obtained.

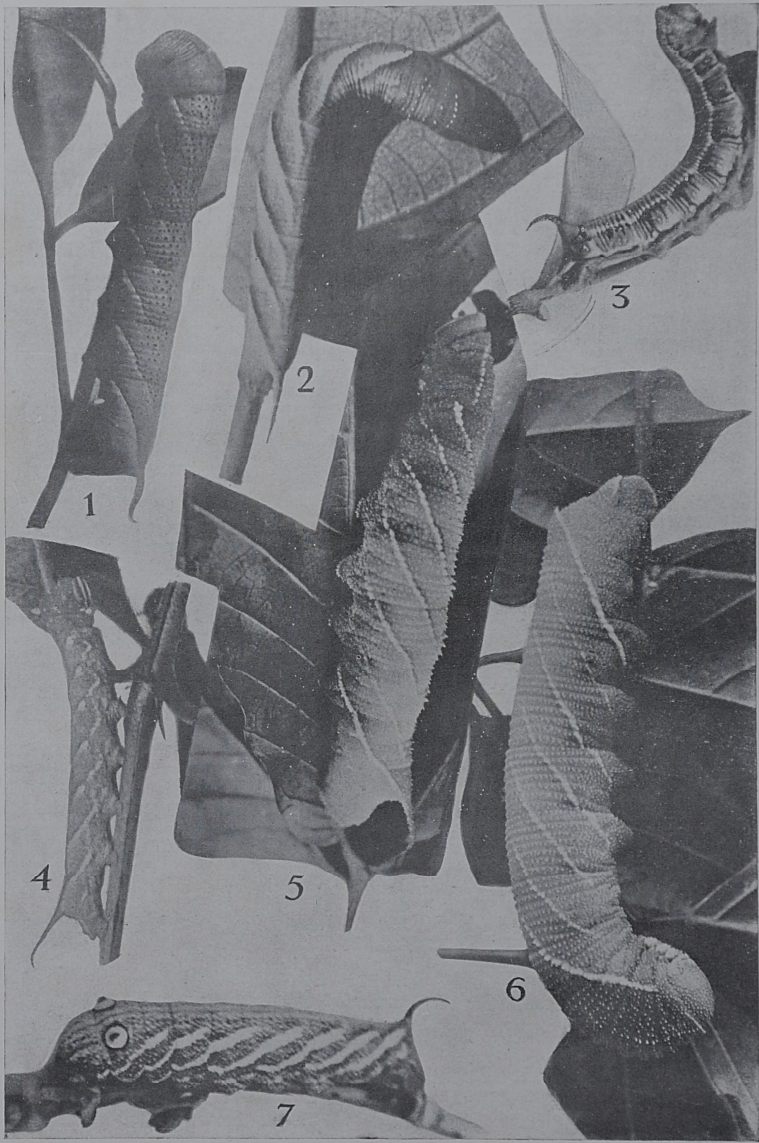
The distribution of the moths is dependent to a great extent on that of the food-plants on which the caterpillars feed, though the moths are such fast fliers that they may be found a long way away from the nearest food-plant. Some species feed on a wide range of food-plants, others confine themselves to one or more. The food-plant on which any Hawkmoth caterpillar is found feeding should also be recorded. Plants belonging to the botanical Order *Rubiaceae* to which *Randia*, *Gardenia*, Madder, Bedstraw and other shrubs, herbs and creepers belong, is the most popular food-plant, about 30 species feeding on plants of this order. Vines (Grape vine, Virginia creeper, *Leea*) and Arums (Garden arum, Caladium, Cuckoo-pint, Snake plant) are the next most popular, with about 16 species each. Leguminous trees and plants (Indian Beech, Shisham, Indian Laburnum, Shiras, Gram, Pulse) come next, followed by Balsams and Spurge. Altogether about 50 Orders of plants are represented in the list of Hawkmoth food-plants known up to the present, ranging from the largest trees to the most insignificant herbs, and including even grasses.

THE HAWKMOTH.

I have often heard the questions asked 'What is a Hawkmoth? How can one tell a Hawkmoth from any other kind of moth?'

In order to do so with certainty, it is necessary to make a minute examination of the veins of the wings and of the organs of the body, but for all practical purposes something more simple will suffice. Hawkmoths can usually be recognised by their characteristic appearance and habits. The fore-wing is long, narrow and sharply pointed; the hind-wing short and rounded; the eyes large; the chest or *thorax* heavy; the body or abdomen shaped like a cigar, or like the pointed end of a cigar. This last character is sometimes obscured by lateral tufts of hairs giving the impression of a broad tail, such as occurs in the Humming-bird Hawkmoths and a few other genera (Plate I, fig. 5); but the other characters are present, and also the clean-cut, high-bred appearance common to all Hawkmoths (Plate I). Finally, if when strolling in your garden in the evening you notice a moth poised almost motionless except for its rapidly vibrating wings in front of a flower, suddenly darting away and as suddenly re-appearing, and never settling, you may be sure you are observing a Hawkmoth, since no other kind of moth is known to feed in this manner. If you look more closely you will see that when poised before the flower, the moth unrolls a long tongue or proboscis, and probes the flower for honey. All Hawkmoths which have been seen feeding, with the single exception of the Death's-head Hawkmoths, have this habit of feeding when on the wing. The Death's-head moths are known to enter bee-hives to steal the honey. The vibration of the wings makes a deep humming note when the moth is flying, and some species produce a similar note when at rest, if they are disturbed.

The Hawkmoth caterpillar can be recognised by the hard, chitinous horn on segment 12, though a few caterpillars of other families have a somewhat similar, but soft fleshy horn.



INDIAN HAWKMOTHS.

1. *Acherontia styx*, Westw. One of the Death's-Head Howkmotths. Note the twice curved horn and oblique stripes. 2. *Psilogramma menephron*, Cramer. Note the wartlike tubercles and oblique stripes. 3. *Cephonodes hylas*, Linn.; in Sphinx-like attitude. Note the tubercles on segment 2 and horn, and the spiracles. 4. *Pseudodolbina* fo. Wlk. Note the wart-like tubercles and oblique stripes. 5. *Marumba sperchius*, Ménétries. Note the tubercles all over and the oblique stripes. 6. *Clanis phalaris* Huebner. Note the very small horn, tubercles and oblique stripes. 7. *Rhagastis albomarginatus*, Rothe. Note the conical ocelli, and oblique stripes.

THE EGG.

The eggs of Hawkmoths are round or oval, and are most commonly of a green colour with a translucent appearance, like a tiny, green grape, but they may be almost white or pale yellow, or more rarely brown or orange, in different species. The egg-shell is either smooth and shiny, or dull, and no sculpturing is visible to the naked eye. The eggs of different species vary a good deal in size, the smallest being about 1 mm. in length, and the largest about 3 mm. The average size is about that of a pin's head.

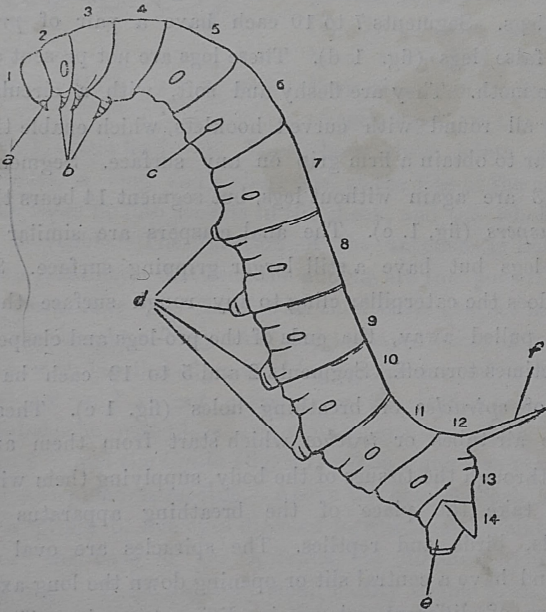


Fig. 1. A Hawkmoth caterpillar, showing segments. 1 (the head) to 14 (the anal segment).

a, the antenna ; *b*, the true legs ; *c*, a spiracle, or breathing hole ; *d*, the prolegs ; *e*, the anal clasper ; *f*, the horn.

THE CATERPILLAR OR LARVA (FIG. I).

The Hawkmoth caterpillar, like other insects, has a head and thirteen other segments. There are different ways of numbering these segments, but we have adopted the

method shown in figure 1, counting the head as segment 1, the segment next to the head as segment 2 and so on. The body of the caterpillar is usually round in section, and is more or less cylindrical in some species (Pl. II, figs. 1 to 6), and in other species increases rapidly in diameter from the head to segment 5, and then becomes cylindrical to segment 12 (Pl. II, fig. 7: Pl III, figs. 1, 2). Segment 2, 3 and 4 each bear a pair of *true legs*. These are hard and shiny, have three joints and a claw for gripping at the tip (fig. 1. b). They are called 'true legs' as they occur on the same segments as they do in the moth. Segments 5 and 6 are without legs. Segments 7 to 10 each have a pair of *pro-legs* or false legs (fig. 1 d). These legs are not present at all in the moth. They are fleshy and soft, with a circular pad set all round with curved hooklets, which enable the caterpillar to obtain a firm grip on any surface. Segments 11 to 13 are again without legs, but segment 14 bears the *anal claspers* (fig. 1. e). The anal claspers are similar to the pro-legs but have a still larger gripping surface. So tightly does the caterpillar cling to any rough surface that if it is pulled away, the ends of the pro-legs and claspers are sometimes torn off. Segments 2 and 5 to 12 each have a pair of *spiracles* or breathing holes (fig. 1 c). These, with the air-tubes or *trachæ* which start from them and spread through the tissues of the body, supplying them with oxygen, take the place of the breathing apparatus in mammals, birds and reptiles. The spiracles are oval in shape and have a central slit or opening down the long axis. They are of different colours in different species. Those on segments 2 and 5 to 11 are placed vertically in about the middle of the segments, and that on segment 12 obliquely. Segment 12 bears the horn which is so characteristic of Hawkmoth caterpillars (fig. 1 f). Segment 13 is narrow and rather difficult to make out sometimes, as it is wedged

between segments 12 and 14. Just above the anal claspers on segment 14 is the *anal flap*, a fleshy triangular flap which covers the anus. The head (fig. 2) is made up of separate chitinous plates fused together into one piece. The front part of the head is called the *face*. This is made up of a triangular plate called the *clypeus* (fig. 2, a) and the frontal portion of the two lobes (fig. 2, b). The sides of the head are called the *cheeks*. Projecting from the lower part of each cheek are the *antennæ*

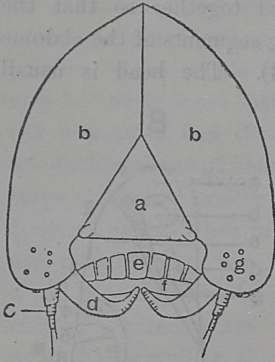


Fig. 2. Head of a Hawkmoth Caterpillar.

(fig. 1, a and fig 2, c). These have three joints and two bristles, a long and a short one, at the tips of the end joint. The bases fit into sockets in the cheek, and the whole organ is moveable. The function of the antennæ is not known with certainty. Between the antennæ are the powerful jaws or *mandibles* (fig. 2. d) with their bases also set in sockets in the cheeks. They are wedge-shaped, curved near the tips, with bevelled edges working against each other sideways, and are used to cut pieces from the leaf when feeding. Behind the mandibles are mouth-parts called the *labrum* (fig. 2 e) and the *ligula* (fig. 2 f) which come into play when the caterpillar is feeding. Above the base of each antenna is a group of five eyes directed forwards, and a sixth eye is near the base of the antenna but directed downwards (fig. 2 g). These are very small hardly visible to the naked eye, but under a magnifying glass appear as circular, convex, black dots. It is doubtful if the caterpillar can see more than a few inches with these eyes. Behind and below the mandibles is a small cone with a perforated tip, which is the *spinneret* from which a thread of silk can be spun at will.

PUPA OR CHRYSALIS (fig. 3, 4 and 5).

The Hawkmoth pupa has a shell or casing of hard chitinous material, inside which the moth forms. The pupa

has the same number of segments as the caterpillar. The head (segment 1), the thorax (segments 2 to 4) and segments 5 to 8 of the abdomen are all fused together so that they are immovable, but the remaining segments of the abdomen are jointed and moveable (fig. 3). The head is usually

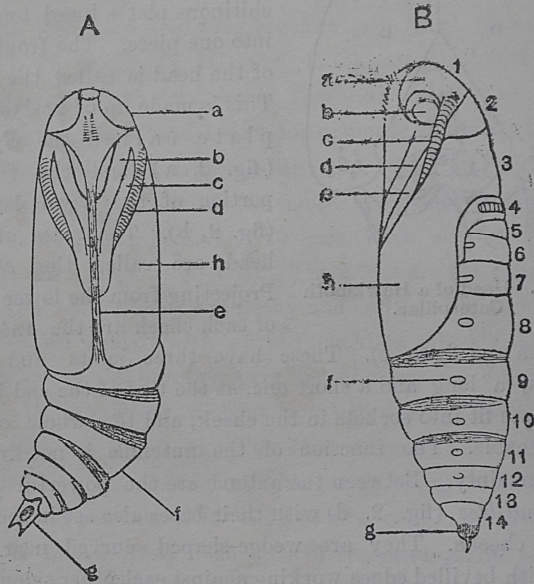


Fig. 3. Pupa or Chrysalis of a Hawkmoth.

A. Ventral view ; *a*, the head ; *b*, foreleg ; *c*, midleg ; *d*, antenna ; *e*, tongue ; *f*, a spiracle ; *g*, cremaster ; *h*, wings.

B. Lateral view ; *a*, head ; *b*, eye ; *c*, antenna ; *d*, foreleg ; *e*, midleg ; *f*, spiracle ; *g*, cremaster ; *h*, wings.

round and blunt, the abdomen pointed as in the moth, the body being thickest in the middle. The case is so moulded that the position of the head, eye, tongue, fore and middle legs, the antennae, folded-up wings and the body of the future moth can be seen (fig. 3). The tongue runs down the middle of the ventral surface, and may or may not reach the end of the wing-cases. On either side of it are the lower part of the fore legs, then the middle legs and then the antennæ. The hind legs are concealed under the edge of the wing-cases, which start near the antennæ and reach

about half way down the ventral surface of the pupa. At the end of segment 14 is the *cremaster* (fig. 3, g). This is an organ of hard chitinous substance, which is either triangular or spike-shaped, and usually branches into two points. These points may again divide into two, and there may be one or more pairs of small hooks. The shape of the cremaster and the arrangement of the hooklets provide a valuable means of identifying different species in the pupal stage. The cremaster does not appear to perform any function except when provided with hooklets. When these are present they are used to fix the tip of the abdomen to a pad of silk woven by the caterpillar at the end of the cocoon. Spiracles are present on segments 2 and 5 to 12 as in the caterpillar, though that on segment 5 is concealed by the edge of the wing-case.

In some species of Hawkmoth the tongue is very long, and it cannot be accommodated in a pupal case shaped as in figure 3. It is then housed (to use a mechanical term) in a special hollow casing which projects in front of the head of the pupa (fig. 4). The *Convolvulus* Hawkmoth

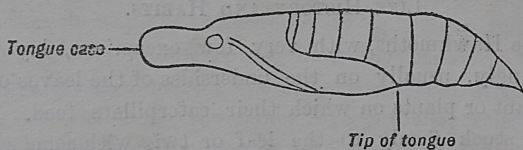


Fig. 4. Chrysalis of Hawkmoth with tongue case.

(and a few other species) has such an excessively long tongue that it cannot be accommodated even in this manner, and it is then housed in a *free tongue-case* (fig. 5). The

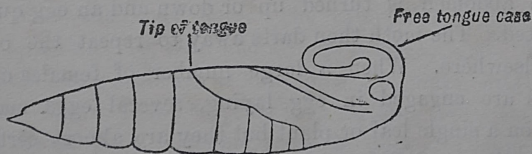


Fig. 5. Chrysalis of Hawkmoth with free tongue case.

tongue starts from the front of the head, runs along the case to its bulbous end where it turns back on itself and re-joins the head casing, then runs between the wing-cases to the end of the latter. This free tongue-case looks like the handle of a jug.

In colour the pupa is chestnut or dark-brown in the case of those species which pupate underground, and of various colours, with dark or pale dots, stripes or patches in the case of those which pupate on the surface. The surface of the pupal case may be smooth and shiny, or dull, and is sometimes shagreened or covered with small tubercles, and sculpturing is sometimes present on segment 4 or near the spiracles and head.

MOTH OR IMAGO

The general appearance of the Hawkmoth has been already described. Those who wish to study the structure are referred to Rothschild and Jordon's great work on the Hawkmoths, *The Revision of the Sphingidae, in Novitate's Zoologica* Vol. IX, Supplement (1903).

LIFE HISTORY AND HABITS.

The Hawkmoths, with very few exceptions, lay their eggs singly, usually on the undersides of the leaves of the food-plant or plants on which their caterpillars feed. Each egg is stuck firmly to the leaf or twig with some sort of gum secreted by the moth. The operation of egg laying has not been observed in natural conditions in the vast majority of Hawkmoths, as it is usually carried out after dark, but a few day-flying species have been seen laying their eggs, and they have done it on the wing, without settling. While poised delicately over a leaf or a young shoot, the tip of the abdomen is turned up or down and an egg quickly deposited. The moth then darts away to repeat the operation elsewhere. When a large number of females of any species are engaged in egg laying, several eggs may be found on a single leaf or plant but they are almost certainly laid singly at different times by the same or different females. Most butterflies, and a few moths also lay their

eggs singly, but the eggs of butterflies can usually be distinguished from those of Hawkmoths by being of various shapes, and by the shells being sculptured into patterns visible to the naked eye. The eggs of some of the swallow-tail butterflies are very similar to Hawkmoth eggs, and one might be taken in by the resemblance until the young caterpillars hatch out. All doubt is then dispelled by the presence or absence of the horn which is the distinguishing mark of the Hawkmoth.

The egg usually becomes paler in colour a few days after being laid, owing to the transparent shell allowing the colour of the caterpillar which is forming inside to be seen. If the egg is examined under a fairly strong magnifying glass just before the young caterpillar is due to emerge, the head and some parts of the body may be made out.

The young caterpillar or *egg-caterpillar* comes out in 5 to 10 days after the egg is laid, the larger species usually taking a longer time to hatch than the smaller species. The egg-caterpillar eats a hole in the side of the egg-shell, and makes its way out in a minute or so. Most commonly it is of a pale yellow colour including the horn, but the horn soon becomes black. The body is covered with hairs which are visible to the naked eye in some species. The caterpillar eats more or less of the egg-shell for its first meal and after resting for a time along the midrib or a vein of the leaf, starts to eat the leaf itself. It often eats small holes in the middle of the leaf at first, and tackles it from the edge when it grows a bit bigger. After feeding for a few days the body becomes too big, not for its boots, but for its head and legs, which are unable to stretch like the skin of the body does. The caterpillar then settles down to change its skin and acquire a larger head. It lies motionless along a midrib or vein for some hours, and then the new larger head may be seen forming under the skin behind the old head. The old head is pushed forward till the skin breaks round the neck. Then by an undulating movement of the body the old skin is worked back, until,

with a waggle of the claspers it is cast off, and the old head is also got rid of. Some species eat the cast-off skin. After resting for a time the caterpillar starts feeding again, and when the body becomes too large for the head it changes its skin again. In most species there are four such changes of skin before the caterpillar reaches the final or mature stage (each stage being called an *instar*), and there is some change of colouring or form or both at each moult. The ocelli or other markings gradually develop, and the shape of the body and of the horn may differ in each successive moult. The caterpillar feeds more and more voraciously as it nears maturity, then suddenly stops feeding and remains motionless for about 24 hours. During this period of rest it often becomes of a darker colour in preparation for its descent to the earth, green caterpillars assuming a pink or brown suffusion along the back, and dark-coloured caterpillars becoming still darker.

Suddenly leaving the food-plant the caterpillar begins to look for a suitable place to pupate. Those species which pupate under-ground get very agitated and hurry along the ground with a quick undulating motion, and if touched, lash their bodies wildly from side to side. Their pro-legs and claspers gradually lose their power of gripping, and the caterpillar falls over lumps of earth and other obstructions in its anxiety to get safely underground. When it finds a soft place, it immediately starts digging with its head, and very soon disappears under the surface. It may dig down to a depth of 6 or 8 inches, and there makes a large oval cell in which it turns to a pupa.

The species which pupate on the surface (these are the larger number) do not have to travel so far to find a suitable spot, and are more leisurely in their movements. They crawl under dead leaves and vegetation, and make a rough cocoon by joining leaves, earth and rubbish together with a few strands of silk from the spinneret.

The change to a pupa takes place from two to ten days after going underground or starting the cocoon, but in one or two species, may not take place for several months.

The change to the pupa is not carried out in the same way as the moults in the caterpillar. When ready to pupate, the head of the caterpillar splits down the front, and the head of the pupa is pushed through the slit. The skin of the caterpillar, with the head attached to it in two halves, is then worked back over the body of the pupa. The pupa is at first soft and shapeless, and the sheaths or cases which will later on contain the antennæ, legs, wings and tongue are separate from the body, but they soon fall into their final positions and become firmly fused to the body. The pupal case hardens and assumes its final form and colouring. After lying nearly motionless for a period of from a fortnight to several months, according to the species and the time of year and other factors, the pupal shell splits open along the dorsal line of the thorax, the head and tongue case breaking away together, and the moth emerges and dries its wings, and darts away to feed and find a mate. After mating, the male dies, the female lays her eggs to start a fresh brood and then she also dies.

This is a short outline of the life history of the Hawkmoth. There are many variations, some common to whole subfamilies or genera, others peculiar to certain species, but it is not possible to give more than a general account in these notes.

COLOUR AND MARKINGS.

When first hatched, the Hawkmoth caterpillar is usually some shade of pale yellow or yellow-green, and is without markings. In a few cases only the colour is brown or black. After feeding for a time the green colour of the food sometimes shows through the body, giving it a green tinge. In the second and third instars, that is, after the first and second changes of skin, the colour is usually green, and the oblique stripes and other markings begin to appear. Where the mature caterpillar has the eye-like markings called *ocelli*, these first show as round spots of a uniform colour, and develop with each change of skin till they reach their final form. In the greater number of species the colour remains green in the fourth and fifth instars (the fifth usually

being the final instar before the caterpillar pupates), but there is in some cases a startling change in the fifth instar, the ground colour of the head and body changing from green to brown, black or purple. The oblique stripes and other markings may remain unchanged or may be greatly modified. Even in the case of those species in which the colour is normally green till maturity, individual caterpillars may assume this dark form of colouring in the final or in earlier instars, and in a few species there are three or more differently coloured forms. The various forms are so unlike each other in colour and sometimes in markings as well, that one would not believe them to be the same species, but the moths bred from the different forms are identical. There are other cases where the change to a dark form is not complete, certain individuals developing dark patches which do not cover the whole body. In the few cases where the egg-caterpillar is black, the colouring may remain black (or dark) throughout, or there may be both dark and green forms. The different cases may be summarised as follows, in the order of their occurrence in nature :—

(a) The caterpillar is always green in the earlier instars, later has both a green and a dark form, or three or more different forms.

(b) The caterpillar is always green from birth to maturity.

(c) The caterpillar is always green in the earlier instars, later has a green form with or without dark patches.

(d) The caterpillar is always green until the last instar, always dark in the last instar.

(e) The caterpillar is dark in the earlier instars and later has only a dark form, or both dark and green forms.

The occurrence of two or more differently coloured forms in the caterpillar, with no corresponding change in the moth, is very curious. It cannot be accounted for by any difference in food, since the different forms are found feeding on the same plants. The green form is usually the most common in nature, or at least the form most commonly

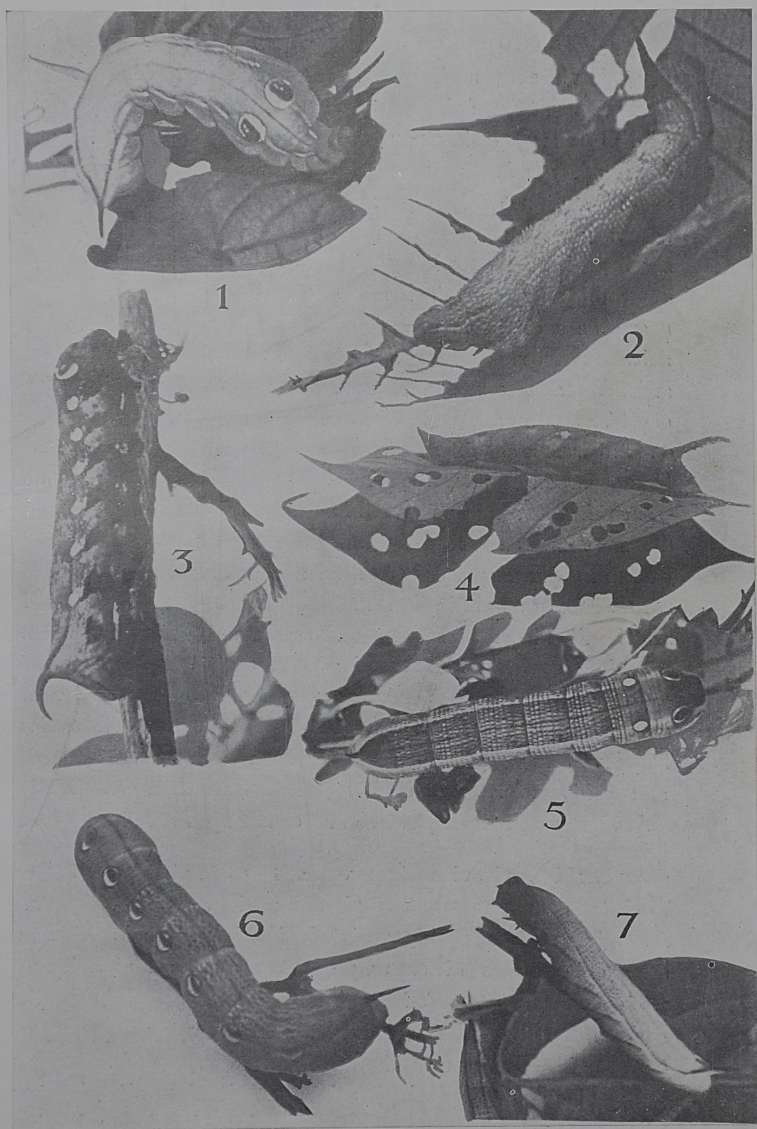
found, but when specimens are bred from an early stage in a dark tin or box, a far larger proportion of them assume the dark form. This seems to show that absence of light is a factor in influencing the colouration. On the other hand, dark-colored specimens are found in nature in the same situations as the green forms, both forms being exposed to the same amount of light. Also, where there is only a dark form at maturity, the dark, mature caterpillars are often found during day-light in the same situations as green forms or other species. I had a curious experience with caterpillars of the *Convolvulus Hawkmoth* at Sheikh Othman, near Aden. There were large numbers of them in the earlier green stages on a certain creeper, but no mature caterpillars could be found. Someone suggested keeping the small caterpillars in more or less natural conditions in a large box. On doing so it was found that all specimens turned to a dark form at maturity, and that during the day they left the food-plant and hid among dead leaves and even buried themselves in the earth to avoid the light. This experience does not lead us to any conclusion, since it may be argued either way—that the caterpillars hid themselves because they had assumed the dark form, or that they assumed the dark form because they had developed the habit of hiding during the day. Further evidence on this question is required to enable the problem to be solved.

In addition to the general colouring, Hawkmoth caterpillars have various markings, the most common style of markings being longitudinal stripes, oblique stripes and ocelli. Longitudinal stripes may be present in combination with either oblique stripes or ocelli, or all three types of markings may appear together. The longitudinal stripes may be present along the back (*dorsal*), high up on the side (*dorso-lateral*), through the spiracles (*spiracular*) or below the spiracles (*sub-spiracular*). The oblique stripes are usually seven in number, on segments 5 to 11: that on 11 extending upwards and backwards over segments 12 to the base of the horn. (Pl. II). The ocelli occur in one pair on segment 5, or two pairs on segments 5 and 6 or in seven pairs on segments 5 to 11. In one species there is an extra pair on

segment 4. The ocelli are round or oval, and usually have a dark centre surrounded by a paler colour and then a dark ring (Pl. III, Figs. 1, 3, 5, 6). In some cases they are convex in section and shiny in appearance, and then the resemblance to a real eye is increased (Pl. II, Fig. 7). The ocelli usually lie on the dorso-lateral line, but in a few cases the spiracle on segment 5 is ringed with colour, so that it resembles an ocellus.

At each change of skin, the shape of the head, body and horn may change, as well as the colouring. In the egg-caterpillar the head is always round, and it may remain round to maturity, or it may become triangular or pointed in the second instar (Pl. III, Fig. 4). In a few cases the head of the egg-caterpillar is round, it then becomes triangular or pointed, and at maturity again becomes round. The body is nearly cylindrical at birth, and remains so to maturity in some species, while in other species the fourth and fifth segments become tumid or swollen. The horn of the egg-caterpillar is always straight, slightly tapering, and *bifid*, or with two points, and each point bears a hair or *seta*. The double point is usually lost in the later instars, but in some cases persists to maturity. The horn may remain straight, or it may become curved downwards, more rarely upwards, and in a few cases it is twice curved, first down and then up, as in the Death's-head Hawkmoths. The shape, thickness and relative length varies greatly in different species, and in some of the genus *Clanis* may be so small as to be overlooked (Plate II, Fig. 6).

In the egg-caterpillar the horn can be moved at will in a vertical plane and this limited power of movement is retained in a few species, where the horn is very thin up to maturity, but in most species all power of movement is lost in the later instars, and the function of the horn, if any, is unknown. In some Hawkmoth caterpillars from South America the horn is very long and whip-like and can be moved freely over the back of the caterpillar like the filaments of the Pussmoth caterpillar. In these species it may serve to drive away parasites, but it is not long or



INDIAN HAWKMOTHS.

1. *Rhagastis confusa*, Rothsc. Note the large ocelli. 2. *Ampelophaga khasiana*, Rothsc. Note the tubercles and the dorso-lateral stripes. 3. *Theretra clotho*, Drury.; dark form. Note the seven pairs of ocelli. 4. *Degmaptera mirabilis*, Rothsc. Note the pointed head and pointed horn. 5. *Hippotion celerio*, Linn. Note the two pairs of ocelli, dorsal and dorso-lateral stripes. 6. *Theretra alecto*, Linn. Note the seven pairs of ocelli. 7. *Macroglossum pyrhosticta*, Butl. A Humming-Bird Moth.

mobile enough to be of any use for his purpose in any Indian species.

The surface of the head, body and horn is usually dull, and either smooth or tuberculate. The tubercles may cover the whole surface, or may be present on certain parts only. Sometimes only the horn is tuberculate, or the tubercles may run along the back or along the line of the oblique stripes. In one species they have developed into long fleshy spines, and in others into wart-like prominences. Hairs are always present, but except for a few on the head, legs, pro-legs and anal flap, are too small to be seen without a lens. (Plates II and III).

(To be continued.)

The Lepidoptera of Peshoke, December 1936.
Supplementary Note.

Since writing my note on the Lepidoptera of Peshoke (Journ. Darjeeling Nat. Hist. Soc. xii, p. 73) most of my larvae have produced imagines and I have been able to determine some of the unnamed species as well as correct two errors in identification. There are still a few unidentified species but as these are female specimens it is unlikely that they will ever be determined with sufficient certainty to justify publication.

The two mistakes mentioned above are :—

H 85/12	R. schistacea is	H 85/13	Rapala
	scintilla, DeN.		
2332	C. chlorostigma is	2342	Tortriciforma viridipuncta, Hmpn.

The additions to the original list are as follows :—

A 6/8	Zetides agamemnon agamemnon, L. One larva.
B 11/5	Catopsilia florella gnoma, F. A couple specimens overlooked in the series of <i>C. pomona</i> .
H 59/5	Pratapa deva lila, Mre. Several pupae on the trunk of an old orange tree.
89	Acherontia lachesis, F. One larva.
.....	Dasychira sp. A female of the <i>mendosa</i> group bred from a larva very different from that of <i>mendosa</i> itself.
1273	Argina argus, Koll. Larvae common.
1585	Sphetta apicalis, Wlk. Larvae not uncommon.
2324	Capotena truncata, Wlk. One male from a cocoon.
.....	Bomolocha (<i>Hypena</i>) ignotalis, Wlk. One female at rest.
3205	Spilopera gracilis, Btlr. One female at rest.
3251	Macaria emersaria, Wlk. One female at rest.
3253	Macaria perfusaria, Wlk. One male at rest.

The following printer's errors were in the original note
on The Lepidoptera of Peshoke.

- p. 74 line 4 semate should be aemate.
p. 76 line 6 oritya should be orithya.
p. 76 line 27 Lycoaenidae should be Lycaenidae.
p. 76 line 30 dilicta should be dilecta.
p. 77 line 14 schistaeaa should be schistacea.
p. 77 line 32 confinia should be confinis.
p. 78 line 24 111 should be III.
p. 79 line 16 Hemigia should be Remigia.
p. 80 line 5 Chlorodontosera should be Chlorodontopera.

- 3263 Hyposidra talaca, Wlk. One female at rest. (mentioned in the original note as an unidentified Drepanid.)
- 3541 Perenia ductaria, Wlk. Larvae common. (A male taken at light recorded in the original note.)

London, 20-10-37.

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

A Supplementary Note on the Heterocera of Darjeeling.

The last few months have given me the opportunity to re-examine the collections of Heterocera made in Darjeeling in 1934 and 1935 and recorded in Vol. 10, pp. 59-63 and 134-145, and Vol. 11, pp. 28-30, of this Journal. The present note records corrections and additions revealed by this examination. Nomenclature and general terms are the same as used in the original notes.

First Collection, 9.8.-12.8.34 (Vol. 10, pp. 59-63).

- Corrigenda :— 1735 Euplexia auroviridis, Moore. correct to
..... Euplexia albidisca, Moore.
- Addenda :— 1989 Lithacodia (Erastria) cidarioides, Moore.
At light.
- 2301 Cosmophila sabulifera, Guen. At light.
- 2837 Mastigophorus vialis, Moore At light.
- 3219 Luxiaria contigaria, Walk. At light.
- 3220 Luxiaria exclusa, Wlk. At light.
- 3380 Ectropis (Boarmia) conspurcata, Wlk.
At light.

Second Collection, 10.5.-9.6.35 (Vol. 10, pp. 134-145).

- Corrigenda :— Rhodoneura taeniata, Warr. correct to
..... Rhodoneura moorei, Warr.
- 1732 Trachea (Euplexia) melanospila, Koll.
correct to
..... Trachea (Euplexia) auriplena, Wlk.
- 2272 Eutelia dulcilinea, Wlk. correct to
- 2270 Eutelia inextricata, Moore.
- 2850 Hydrillodes truncata, Moore. correct to

- 2852 *Hydrillodes nilgirialis*, Hmps.
- 3590 *Ozola biangulifera*, Moore. correct to
 *Ozola sinuicosta*, Prout *grisescens*,
 Prout.
- 3865 *Scopula (Craspedia) ligataria*, Wlk.
 (*nictata*, Guen.) correct to
- 3861 *Scopula (Craspedia) walkeri*, Btlr.
- Addenda :— 332 *Gaurena florescens*, Wlk. Two speci-
 mens at light, overlooked among
G. florens.
 *Diacrisia neglecta*, Roths. One male
 at light.
- 1989 *Lithacodia (E.) cidarioides*, Moore.
 Two females at light.
- 1996 *Maliattha vialis*, Moore. One female
 at light.
- 2278 *Risoba obstructa*, Moore. One female
 at light.
- 2390 *Hypocala deflorata*, F. One male at light
 Overlooked among *H. subsatura*.
- 3438 *Hemerophila (Boarmia) subplagiata*,
 Wlk. One female at light.
- 3671 *Cidaria saturata*, Guen. Common at
 light and rest.
- 4492 *Endotricha ruminalis*, Wlk. One male
 at light.
- 4793 *Agrotera discinotata*, Swinh. One male
 at light.
- 4810 *Pagyda subtessellalis*, Wlk. One male
 at light.
- 4972 *Sylepta mysialis*, Wlk. One female
 at light.

Third Collection, 10.6.-15.7.35 (Vol. 11, pp. 28-30).

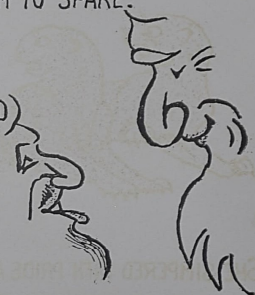
- Corrigenda :— 2499 *Ophiusa maturescens*, Wlk. correct to
 2510 *Ophiusa crameri*, Moore.
- 2640 *Argadesa (Ophideres) materna*, L.
 correct to
- 2639 *Ophideres fullonica*, L.



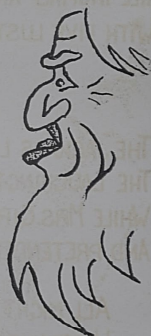
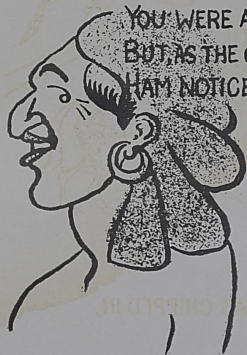
W

HENTHE GANG-PLANK WAS IN AND THE CHECKING BEGAN
OF EACH ZOOLOGICAL PAIR,
NOAH SAW THAT HIS MEASUREMENTS WORKED OUT TO PLAN
WITH DARNED LITTLE DECK-ROOM TO SPARE.

SHEM BEAMED, BUT HIS MOTHER DETECTED THE FRAUD
UNDERLYING THE WHOLE CALCULATION,
THEIR WONDERFUL FIGURES COMPLETELY IGNORED
THE FACTOR OF MULTIPLICATION.



"HOLD YOUR TONGUE, MA," SAID NOAH, "DO YOU THINK WE'RE ALL DAFT?
YOU WERE ALWAYS A ONE TO GET FLURRIED."
BUT AS THE GOOD LADY WENT CHUCKLING AFT,
HAM NOTICED HIS FATHER LOOKED WORRIED.

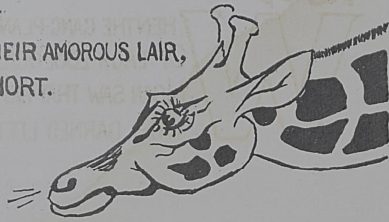


YOUNG JAPHETH SAID "YES, I CAN SEE WHAT SHE MEANS
AND IT WOULD BE A TERRIBLE PITY
TO BE SQUASHED UP IN HERE LIKE A LOT OF SARDINES.
WHAT ABOUT A BEHAVIOUR COMMITTEE?"

"YOU'VE GOT IT," CRIED NOAH, "WE'LL MAKE MRS. GIRAFFE,
WHOSE OUTLOOK IS LOFTY AND PURE,
INSPECTRESS-IN-CHIEF ON THE VIGILANCE STAFF,
SHE WAS BORN FOR THE JOB I FEEL SURE."



THE DELIGHTED GIRAFFE WOULD OBSERVE ANY PAIR
THAT DIDN'T BEHAVE AS THEY OUGHT
AND, GRANING HER NECK TOWARDS THEIR AMOROUS LAIR,
INTERRUPT WITH A SCANDALIZED SNORT.



ONCE GROUNDED ON ARRARAT EVERYONE THOUGHT
HER EFFORTS HAD NOT BEEN IN VAIN;
SHE SEEMED TO HAVE WON (WITH A BIRTH-RATE OF NOUGHT)
HER GREAT ANTI-LITTER CAMPAIGN.

SHE SIMPERED WITH PRIDE AS THE ARK WAS MADE FAST
AND THE CREATURES FILED OUT IN A ROW,
TILL THOMAS AND TABBY STROLLED SHAMELESSLY PAST
WITH FIVE LUSTY KITTENS IN TOW.



THE JACKALS LET OUT A HYSTERICAL BRAY,
THE LAUGHING-THRUSH BURST INTO SONG,
WHILE MRS. GIRAFFE LOOKED THE OPPOSITE WAY
AND PRETENDED THAT NOTHING WAS WRONG.



ALL MIGHT YET HAVE BEEN WELL HAD NOT THOMAS CHIPPED IN,
HIS RAUCOUS TONES VULGAR AND BITING,
AS HE EYED THE GIRAFFE WITH AN INSOLENT GRIN,
"YUS, MISSUS, YOU THOUGHT WE WAS FIGHTING."



The following cutting, from the *Daily News*, was sent us by Mrs. Farquhar, her only comment a large note of interrogation.

“One hour’ Struggle with Snake ?

72-year Old Man’s Ordeal.

“After struggling for an hour, Stephan Najaroff, 72-year old pensioner, succeeded in killing a 12-foot snake which coiled itself round him and almost crushed him to death.

“While sitting in the country-yard of this house in the centre of the city he suddenly became aware that a puff-adder—very rare in Bulgaria—had begun to coil itself around him. Soon his arms were pinned to his sides and he was almost crushed.

“By a great effort he managed to release his hands and with the aid of his daughter, summoned by his cries for help, he struck the snake on the head with a shovel and rendered it unconscious. Then he was able to release himself completely.

“The snake quickly recovered and the old man and his daughter fought it for an hour before they managed to kill it.”

The newspaper correspondent seems to have made a mistake in the species. The Puff Adders (*Bitis arietans* and *B. inornata*) occur from southern Morocco and southern Arabia southwards to the Cape of Good Hope. They belong to the same sub-family, and are not unlike our Russel’s Viper. They are, of course, poisonous and do not constrict their prey. (As they only grow to a maximum length of 4½ feet at the outside they would not be a serious menace to mankind if they did).

One of the Pythons extends to S. E. Europe and the snake with which Stephan Nojaroff and his daughter performed their wrestling act presumably belonged to this species, about which we have no information. For forcibly feeding a 12-foot Python a zoo would employ 4 or 5 men, so that a snake of this size, bent on constricting, would presumably keep an old man and a girl very busy indeed.

Editor.

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