availed me against such formidable odds. It must be remembered that I speak of the case before the consultation in the end of March 1867, for after its deliverance I felt myself tolerably safe.

After the final termination of this eventful, and, during its progress, somewhat annoying case, my first feeling was not to publish it, from a fear that my handling of it might not prove sufficiently delicate to enable me to avoid offending the amour propre of some; and that the act of publication itself might be construed into a desire to exalt myself at the expense of others. To these risks I may be still exposed; and though not conscious of the latter feeling, if I am in this deceiving myself, it may afford another instance of that erring tendency from which none of us are free.

It is not likely that this case will be readily forgotten by those who were actively engaged in it; and while it is to be hoped that we may all profit by it, it is as devoutly to be wished that we may all subscribe to the truth, and join in the spirit of the old aphorism—that "To err is human, to forgive divine."

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**Article VIII.—On the Action of the Cobra Poison.** By J. Fayrer, M.D., F.R.S.E., C.S.I.; Surgeon, Bengal Army; Professor of Surgery in the Medical College of Bengal.

**The Thanatophidia of India.**

(Continued from page 250.)

**The Elapidae.**

This family has several genera in British India. It is subdivided into the Najidae, or snakes with hoods or dilatable necks, and the Elapidae, which have no hoods. In the first section, Najidae, there are two genera—Naja and Ophiophagus. In the second, Elapidae, there are three Indian genera, viz., Bungarus, Xenurelaps, Callophys.

The family of Elapidae is characterized by a cylindrical body; a rather short and tapering tail; nostril lateral. The head has the normal number of shields above, but the loreal is always absent; eye rather small, with a round pupil. The poison-fang has a mark on its convexity, indicating the groove, which is quite open in the Hydrophidae.

**Naja.**

Gunther gives the following description of this genus:

"Body and tail of moderate length; belly flat; head rather high and short, not very distinct from the neck, which is very dilatable, the anterior ribs being elongate. The shields of the head normal, but the loreal is absent; nostril wide, lateral between two shields; eye of moderate size, with round pupil; one præ, three (sometimes two or four) post oculars. Six upper labials, the third and fourth
entering the orbit; the third forms the lower half of the anterior margin of the orbit. Scales smooth, much imbricate in numerous series round the hood; anal entire; sub-caudals two-rowed. The fang is grooved, with foramen at its extremity; one or two small ordinary teeth at a short distance behind it.”

There is only one species, and that is Naja tripudians, or the Cobra di capello or Naja.

Coluber naja. L. sys. nat.
   Naja lutescens. Cantor.
   ” tripudians. Gunther. Gray.
   ” larvata. Cantor.
   ” atra. Cantor.
   ” kaowthia. Cantor.

But there are several varieties, each having a distinct name given to it by the natives. They are all most deadly; and though the snake-charmers consider some more poisonous than others, it is probable that any difference that may exist is more due to the vigour of the individual snake than to anything attributable to the particular variety. They all have the hood, and they never attack without distending it. They raise the anterior third of the body from the ground, slide slowly along on the posterior two-thirds, and with the hood dilated remain on the alert, darting the head forward to the attack when anything hostile approaches. This attitude is very striking, and few objects are more calculated to inspire awe than a large cobra, when, with his hood erect, hissing loudly, and his eyes glaring, he prepares to strike. Nevertheless, they are not, I believe, aggressive; and unless interfered with or irritated, they crawl along the ground with the neck undilated, looking not unlike the innocent snakes, but the moment they are disturbed, they assume the menacing attitude I have described.

The Naja tripudians or cobra grows to the length of five feet and a half, or even more, and is found all over Hindostan up to 8000 feet high in the Himalaya; but Mr Hodgson says he has never seen it in the Nepaul valley. It is equally dreaded and fatal everywhere. The varieties are numerous, and they are distinguished by the markings on the hood, and by various shades of colour, from the darkest olive or black with a purple iridescent, to a pale chocolate fawn or yellow colour. They are all, notwithstanding their differences of colour or markings, considered by naturalists to be but varieties of one species. They have various names in different parts of India, and are regarded by the snake-catchers as different species, and as having different powers of destruction. Such differences probably depend on age, vigour, or other circumstances, as naturally the intensity of the poison of the different varieties is probably almost equal.

The cobra is a nocturnal snake,—that is, it is most active in the

1 I believe it is to be found in the Nepaul valley. I have seen it in the Oude Terai.
night, but it is often seen moving about in the day. It is oviparous; the eggs, from eighteen to twenty-five in number, are obovate, and about the size of those of a pigeon; the shell is white, but tough and leathery. The cobras feed on small animals, birds' eggs, frogs, fish, or insects; they rob hen-roosts and swallow the eggs whole; they prefer taking their food at dusk or in the nights. They are said to drink a great deal of water; but it is certain that they will live weeks, even months, in captivity without touching food or water. They go into water readily, and swim well, but are essentially terrestrial snakes. They can climb, and occasionally ascend trees in search of food. Cobras are not unfrequently found in the roofs of huts, holes in walls, fowl-houses, old ruins, under logs of wood, cellars, old brick-kilns, and old masonry of stone, brick-work, or mud; such are the common dwelling-place of these reptiles, and where they are frequently disturbed by men, who, stepping on or inadvertently disturbing and touching them, receive their death-wound.

The cobra is most deadly, and its poison, when thoroughly inoculated by a fresh and vigorous snake, is quickly fatal. Paralysis of the nerve-centres takes place, and death occurs with great rapidity, sometimes in a few minutes, especially when the fangs, having penetrated a vein, inoculate the poison immediately into the venous circulation. The number of deaths caused yearly in India by these snakes is perfectly appalling. The cases in which recovery occurs are, it is to be feared, very few; treatment appears to be of little avail unless it be almost immediate, and then in the case of a genuine bite there is but little hope of saving life. As to the mode of treatment, and other matters connected with the bite of the cobra, and the great mortality caused by it in India, they will be described subsequently.

The cobras are the favourites of the snake-catchers, and it is astonishing with what ease and freedom they are seized and handled by these men, even when in possession of their fangs. They render them temporarily harmless by cutting out the poison-fangs, but these are quickly reproduced, unless, as most generally happens with the fang, all the reserve fangs and germs are removed, in which case the snake is harmless for life. Their graceful movements in the erect attitude they assume with the hood distended as they follow the movements of the snake-charmer's hands, make them an object of wonder as well as fear to all, and the superstitions of the natives about them are endless. The muntra or spell is far more potent in their ideas than any drug, and to such they generally trust when bitten. How frequently these fail, the records of any civil station in India will prove; and it is to be feared that the more material remedies of the physician are scarcely more potent for good.

The snake-catchers in Bengal describe a great variety of cobras. The following list was furnished by a very intelligent Mohammedan, who has had much experience, and who, though not a snake-catcher
originally by profession, has been one for several years, and is exceedingly expert in catching and handling these reptiles. The first great distinction made by these people, is the cobra with spectacles on the hood, or gokurrahs, and those with one ocellus or other mark on the hood, named keauteahs. They maintain that these are distinct species, and that they vary considerably, not only in appearance, but in habits and properties.

The gokurrah has the following varieties:—
1. Kalla, black. 2. Koyah, black and white. 3. Gomunah, wheat coloured. 4. Puddah, yellow coloured. 5. Doodiah, whitish coloured. 6. Tatuliah, tamarind-seed coloured. 7. Kurrees, earthy coloured. 8. Tameshur, coppery coloured. 9. Puddun nag, golden coloured. The 2d, 3d, and 7th being the most common varieties about Calcutta.

The keauteah has the following:—
1. Kalla, black. 2. Tatulia, tamarind-seed coloured. 3. Kurree, earthy coloured. 4. Sonera, gold coloured. 5. Doodiah, whitish coloured. 6. Bans-buniah, mottled white and black. 7. Giribungha, brownish coloured. 8. Koyah, black and white coloured. 9. Sankha-mookhi, like the sankni or bungarus fasciatus, black and yellow. 1st, 2d, and 6th are most common about Calcutta, and no doubt in different parts of Bengal many other varieties are described, and different names are given to those above mentioned, for the natives are fond of refining on points of this kind.

I append a note kindly furnished by Mr Westmacott, of the Civil Service, of the names of certain varieties described in Purulia, and no doubt many others might be collected, the nomenclature being different as in different parts of the country.

"Notes on varieties of Cobras, taken at Purulia, Maunbhoom, 1866.

"Aird Gahman.—Average length 51½ inches. Top of head, purple brown, shading into bright orange in the lower half of the hood. Back, two shades of vinaceous brown in faint stripes. Spectacles, white bordered, dark brown. Throat-band and spectacles underneath, ashy brown. Belly, pinky white.

"Manilag.—Average length 36½ inches. Not very common. A remarkably slender neck and broad jaw. Top of head, light brown, shading into yellow in the hood, and back and belly yellowish white.

"(Memo.—I cannot recollect whether this was a spectacled Gahman.)

"Bichá Jarmá Gahman.—Average 47 inches. Above, ruddy brown and yellow. Hood, reddish brown. Spectacles, yellow, bordered ruddy brown.

"Kaliy.—Average length 51 inches. The common black cobra, whole body black. Ring on hood, two throat-bands, and a collar below the hood, ranging in individuals from a creamy white to a dirty gray.
"Kánta Káris Gahman.—Average length 48 inches, a light-made snake. Above, vinaceous brown, with yellow tinge in the hood. Spectacles, red. Throat-bands, purple brown.

"Dudhíya Gahman.—Average length 44 inches. Top of head, vinaceous brown, darker on the hood, and lighter along the back. Below, ashy white. Spectacles, white, with a dark brown well-defined border.

"Párla.—A beautiful snake, of which I never procured but one specimen, which I failed in preserving. Length 41 inches. All above a light shade of purple brown. No spectacles. Hood bright red.

"Sorsa Gahman.—The common yellow cobra, largest variety of all.

"Charara Gahman.—A large yellow cobra. I have not noted the differences between these two varieties.

"Basta Karicha Gahman.—Average length 50 inches. A very dark vinaceous brown, white spectacles, bordered light red."

The chief difference, however, insisted on is that between the gokurrah and the keauteah, and these they regard as distinct from each other as is a sankni (bungarus fasciatus) from a krait (bungarus caeruleus). The gokurrah, they say, is essentially a snake of the town or city. The keauteah is of the fields and jungle. The gokurrah is slower to kill, as its poison is thicker, though most deadly. The keauteah poison is thinner; and takes effect sooner, though it is not more fatal than that of the gokurrah. Both, they say, incubate; and the snake-man informs me that over and over again he has dug them out of holes sitting on their eggs. The gokurrah takes to the water reluctantly; the keauteah freely, and will remain for a considerable period under water. The hood of the keauteah is much smaller relatively than that of the gokurrah, and the body is more attenuated; it is more slender and more active than the gokurrah. The varieties of both eat about every sixth day; they deposit their eggs once in the year, and that in the rainy season.

The keauteah is often found during the rainy season in the huts of the villages, where it has been driven to take shelter by inundation. It is as unusual to find a keauteah, though in the ruins or débris of an old building, as it is to find the gokurrah in the open country. The snake-catchers here say, that they believe that whereas the gokurrah is found all over Hindostan, the keauteah is, if not confined to Bengal, rare in the North-West, and other parts of India. This, however, is by no means certain, and requires confirmation.

The snake-catchers have a curious notion concerning the sex of the cobra. They say that the hooded snakes are all females and poisonous, and that the males are all hoodless and innocent; the male, in fact, of the ophiophagus or sunkerchor, as well as of the naja, gokurrah, or keauteah, is the dhamin or ptyas mucosus. They assert that there can be no doubt of this, and that they have irrefragable evidence of it, and that the dhamin is proof also against the cobra poison if bitten.
It is needless to say, notwithstanding all this, that the story is a fable. The pytas is an innocent snake belonging to a different family, and succumbs rapidly to the poison when bitten by a cobra, as I have proved over and over again by experiment.

The cobra is an object of superstitious veneration and awe to the Hindoos, in whose mythological histories it takes a prominent place. In a religion that deprecates the wrath of a cruel and destructive power, by worshipping and propitiating the deity in whom that power is vested, it is natural that the type of destruction and the incarnation of evil, as represented in this reptile, should be regarded with peculiar deference.

Many Hindoos object, I am told, to destroy the cobra; and if they find it in their houses, as sometimes is the case, when one has taken up its abode in a hole or crevice in the wall for years, it is propitiated and conciliated, fed and protected, as though to injure it were to invoke misfortune on the house and family. Should fear, and perhaps the death of some inmate bitten by accident, prove stronger than superstition, it may be caught, tenderly handled, and deported to some field, where it is released and allowed to depart in peace, not killed. This feeling happily is not universal, and the cobra has many enemies to limit his increase. Besides the natural enemies, such as the herpestes (ichneumon) and other creatures, numbers are destroyed by the low-caste people, who follow the vocation of snake-catchers or charmers, and others also search out the snakes and kill them for the sake of reward. But still the loss of human life from their bites is very great, and seems to call loudly for some plan by which it may be mitigated.

An idea of the loss of life caused throughout India yearly by the bite of the cobra and other venomous snakes, but especially the cobra, as it is by far the most common, may be formed from the following information extracted from a recent report of the Commissioner of Burdwan to the Bengal Government:

He says, "The number of deaths from snake-bite during the last nine years is shown in the annual printed police returns to have been as follows:"

| Year | Deaths |
|------|--------|
| 1860 | 878    |
| 1861 | 989    |
| 1862 | 1041   |
| 1863 | 1048   |
| 1864 | 1035   |
| 1865 | 1184   |
| 1866 | 929    |
| 1867 | 984    |
| 1868 | 1144   |

Total, 9232 persons killed in nine years, out of a population of 5,701,072.

"There may be a little inaccuracy in the above figures, but they have been compiled over a series of nine years, and it cannot be questioned that they show that there is a mortality of above 1000 persons every year, in a population of nearly 6,000,000 people."

In the district of Midnapore—which the commissioner considers the worst—in the year 1865 there were 530 deaths from snake-bite recorded, out of a population of 1,200,000 persons.
In the district of Beerbhum, on the other hand, there were in one year sixty cases of death from snake-poisoning, out of a population of 743,685 persons. It appears from the report that women suffer more than men. In 1858, a reward of four annas was given by Government for each venomous snake destroyed in the division, and the magistrate reported in December that Rs.1961.8 had been paid for 1845 snakes destroyed during the year. The reward was reduced to two annas for every poisonous snake brought in; but this was not sufficient inducement, and the numbers rapidly diminished.

| Year | Snakes | Rs. | As. |
|------|--------|-----|-----|
| In 1859 | 957 | 124 | 4 |
| 1860 | 217 | 27 | 0 |
| 1861 | 8 | 1 | 0 |

The magistrate remarked, “that there are few persons who would risk their lives to bring in a live snake for two annas.”

In Bancoorah, another district of the Burdwan division, the magistrate proposed that the reward of two annas shall be given for all poisonous snakes brought in dead or alive. This was sanctioned, with a proviso that the magistrate himself should see the snake’s head cut off. The reward was raised to four annas for each snake in 1862. On the 14th July following, the magistrate reported that the increased reward had produced its effect—forty-seven snakes had been brought in on one day, and seventy on another day; Rs.89 had been spent in less than a month.

On the 21st July of the same year, the magistrate proposed to reduce the reward to two annas: he says, “ninety-seven snakes were brought in on Saturday, and 118 to-day.” The duty of personally supervising the decapitation of the snakes became so irksome, that the magistrate applied to higher authority for permission to depute some one to see this done; but the request was refused.

On the 20th October, the commissioner reported, that from the 29th May to 14th October 1862, 18,423 snakes had been killed, giving an average of 110 snakes a day; and he applied for a grant of Rs.10,000 to provide for the rewards, at the same time proposing to reduce the reward to two annas. On the 6th January 1863, the Government of Bengal remarked, that whereas from 20th May to 14th October, 18,423 snakes had been killed, and from 15th October to 7th December the number had increased to 26,029, giving an average of 463\(\frac{1}{2}\) per diem, the Lieutenant-Governor expressed his surprise that the average number of snakes killed daily should have increased during the cold weather, and the magistrate was requested to submit an explanation on this point. The magistrate explained it by ascribing it to the increased expertness of the snake-catchers, and the large number of persons who had abandoned their occupation and taken to this comparatively lucrative mode of obtaining a livelihood. It was considered probable that many of these snakes might not have been poisonous; but the magistrate rejoined that he had
exercised great care in discriminating, and that 40,000 rupees would not have paid the rewards had they been given for all kinds of snakes. From this one would conclude that the advantages of Bancoorah as a residence must be doubtful. It gives a sad proof of the fatal character of the bites of the Indian Thanatophidia, and there is reason to believe that the greater share of the mortality is due to the cobra.

**Ophiophagus.**

There is only one species of this genus, *Ophiophagus elaps*—Hamadryad; native name, Sunkerchor.

It has a variety of synonyms.

- Naja bungarus. Schlegel.
- " elaps. Schlegel.
- " vittata. Elliott, Madras.
- Hamadryas ophiophagus. Cantor.
- Trimeresurus ophiophagus. Dum. and Bib.
- Hamadryas elaps. Gunther.

This is probably the largest and most formidable venomous snake known. It grows to the length of 12 or 14 feet, and is not only very powerful, but also active and aggressive. It is hooded like the cobra, and resembles it in its general configuration and characteristics.

Gunther’s definition of it is as follows:—"Body rather elongate; tail of proportionate length; head rather short, depressed, scarcely distinct from the neck, which is dilatable; occipitals surrounded by three pairs of large shields, the two anterior of which are temporals; nostrils between two nasals; loreal none; one or two pra3, three post orbitals; scales smooth, much imbricated, in transverse rows in fifteen series round the body, but in many more round the neck; those of the vertebral series are rather larger than the others. Ventrals more than 200, anal entire, anterior sub-caudals simple, posterior two-rowed, sometimes all bifid." Maxillary bone with a large fang in front, which is perforated at the end, showing a longitudinal groove in front, a second small simple tooth at some distance behind the fang. The colour of this snake varies according to age and locality. The adult is some shade of olive-green or brown. According to Gunther it is,—

"1st, Olive green above; the shields of the head, the scales of the neck, hinder part of the body and of the tail edged with black. Trunk, with numerous oblique alternate black and white bands converging towards the head; lower parts marbled with blackish or uniform pale greenish. This variety is found in Bengal, Assam, the Malayan Peninsula, and Southern India.

"2d, Brownish olive, uniform anteriorly, with the scales black edged posteriorly; each scale of the tail with a very distinct white, black-edged, ocellus, as in *ptyas mucosus.*" This variety is not found in Bengal; Gunther says it is found in the Philippine Islands, and perhaps in Burmah.
"3d, Uniform brownish olive; scales of the hinder part of the body and of the tail somewhat lighter in the centre; all the lower parts black except the chin and throat, which are yellow. This variety is found in Borneo.

"The young have a much more varied coloration. They are black, with numerous white equidistant narrow cross bands: one occupies the extremity of the snout; the second across the posterior frontals; the third across the crown of the head, behind the orbit; the fourth across the occiputs to the angle of the mouth; the two latter bands are composed of oval spots. In a specimen from the Anamallay Mountains, the belly is black, and the white bands extend across, being wider than the black; in a second specimen, of which the locality is unknown, the belly is white, each ventral having a blackish margin."

The young ophiophagus might well be mistaken for another genus. Major Beddome says the young ophiophagus is very like the Dipsas dendrophilla, an innocent snake. The shields surrounding the occipitals are large, and give a distinctive character to the snake. "There is one præ-orbital, seven upper labials, the third and fourth entering into the orbit, the third the largest, the sixth and seventh very low, temporals large, 2 + 2, ventrals 215, 262, sub-caudals 80, 100; the number of entire anterior sub-caudals varies much."

It is probably the largest and most deadly of the Thanatophidia; fortunately, though widely distributed, it is not very common. According to Guither, it is found in almost every part of the Indian continent; in the Andaman and Philippine Islands, in Java, Sumatra, Borneo, and, according to Dumeril, in New Guinea. Major Beddome of Madras says he has killed one nearly fourteen feet in length, near Cuttack, in Bengal, where it is common. It does not appear to be much, if at all, known in the North-West or Central India; it is most common in the damp climates of Assam, Bengal, Orissa, and Southern India. It has been caught in the Botanical Gardens, near Calcutta, and it is said by the snake-catchers to be not uncommon in the Soonderbunds.

I have heard of an officer being attacked by one in Assam, and being in considerable danger. Dr Anderson, curator of the Indian Museum, has the dried skin of an individual sent from Assam that measures 11 feet 9½ inches in length; a specimen in the Indian Museum, killed in the Botanical Gardens, Calcutta, measures 8 feet 3½ inches, and 5½ inches in girth. For these measurements I am indebted to Dr J. Anderson.

The ophiophagus, like many other snakes, takes to the water at times. A friend informs me that he shot one in the river near Teryah Ghat, at the foot of the Khasyah Hills, in April last. He was going slowly up a narrow stream in his boat when he met it coming towards him, with its head raised several inches out of the water. A charge of shot disabled it, and it was captured near the
river bank, where it sought refuge. My informant had not the means of preserving the snake, so he cut off its head and made a drawing, which is evidently that of an ophiophagus. It was above nine feet in length.

The Rev. Dr Mason, in his work on Burmah, gives the following account of the hamadryad, which is, if not identically the same, merely a variety of the Bengal species:—

"The natives describe a venomous serpent that grows ten or twelve feet long, with a short blunt head, a dilatable neck, thick trunk, and short tail. It is of a darker colour than the common cobra, nearly black. I have never seen it, but the description given me accords so well with the generic characters of hamadryas, that it must be a species of that genus. 'The hamadryas,' says Dr Cantor, 'is very fierce, and is always ready not only to attack, but to pursue, when opposed;' this, too, is a conspicuous trait in our Tenasserim serpents.

"An intelligent Burman told me that a friend of his one day stumbled upon a nest of these serpents, and immediately retreated, but the old female gave chase. The man fled with all speed over hill and dale, dingle and glade, and terror seemed to add wings to his flight, till, reaching a small river, he plunged in, hoping he had then escaped his fiery enemy; but, lo! on reaching the opposite bank, up reared the furious hamadryad, its dilated eyes glistening with rage, ready to bury its fangs in his trembling body. In utter despair he betook himself of his turban, and in a moment dashed it upon the serpent, which darted upon it like lightning, and for some moments wreaked its vengeance in furious bites; after which it returned quietly to its former haunts. Karens from Pegu describe a species of hamadryad (the belted hamadryad) with black and whitish transverse bands. It is often seen twelve feet long, by a foot in circumference; and one of my informants tells me he has seen them nearly three fathoms long, and proportionately large. It does not appear to be known in these provinces, but the Burmese and Karens have well-established names for the species, and it must be, I think, Cantor's."

Hamadryas ophiophagus. Cantor.
Naja elaps. Schlegel.
" bungarus. Schlegel.
" vittata. Elliott.

The Bengali name is sunkerchor, breaker of shells. It is found in the forest and grass jungle; it is said to live in hollow trees, and to climb them readily, being frequently found resting on the branches. As its name implies, it feeds upon other snakes, though probably when its usual food is not forthcoming it is contented with birds, mammals, fish, frogs, etc.

It resembles the cobra, except that it is longer in proportion to its size, and its hood is relatively smaller; it is, however, more
graceful in its movements, and turns more rapidly. It is occasion-
ally seen with the snake-charmers, who prize it highly as a show;
but they say it is exceedingly dangerous to catch, and difficult to
handle before its fangs are removed.

In September 1868, one of about eight or nine feet long was
brought to me by some snake-men, but its fangs had long been
extracted, cicatricees indicating their former presence. It was of a
light olive-green, with arrowhead-shaped transverse bars. It was
very much under the control of the snake-man who exhibited it,
and sat up, erecting its hood and following the motions of his hand
exactly like a cobra. On two different occasions it ate snakes in
my presence, two specimens of Passerita mycterizans, that had been
killed by a cobra. The snake-man put the head of the passerita
into the hamadryad’s mouth, and in about a quarter of an hour it
gradually swallowed it; during the process it moved slowly about
with the head, neck and hood dilated, and it looked very odd with
the smaller snake hanging out of its mouth. The fangs had been,
as I have said, extracted, but on pressing the poison-gland, a deep
yellow-coloured viscid fluid exuded. I collected a few drops of this,
and inoculated a drop of it into the thigh of the fowl. The bird sick-
ened and died in about three hours, with much the same symptoms
as in cobra-poisoning; the blood of the fowl coagulated firmly after
death. It would appear from this, that although the snake be
deprived of its fangs, the glands still retain the power of secreting
poison, but that it was altered in appearance and properties I think
very probable.

I have just received a living specimen from Rangoon, nine feet
six inches in length. It is of a light-olive colour in front, but dark
towards the tail, with the bands as above described. It seems
sluggish and indisposed to attack; when roused it hisses, and
slightly expands the hood, raising its head some inches from the
ground. A living Passerita mycterizans was put in the cage, but
it has not touched it; a dog was also placed in the cage with it,
but it could not be made to strike. In short, it seemed disinclined
to be troubled, and as though it wished to be let alone. It is very
powerful, and the snake-man seemed disinclined to handle it without
other professional aid, as he was alone.¹

The dilatable neck is not altogether peculiar to the Najidae, but
it is better marked in them than in any other snake. The Tropido-
notus macropthalmus, an innocuous colubrine snake, which attains
a length of thirty-nine inches according to Gunther, and is found in
Khasya and Sikkim up to 4000 feet, has this anatomical peculiarity.
It is known by its large eye and dilatable neck; the scales, Gunther
says, “show an arrangement very similar to that of the cobra, for
which it is frequently taken. All the specimens I have seen show
unmistakable signs that their captors considered it best to kill them

¹ He did so subsequently without difficulty, making a man hold the tail,
whilst he managed the head.
from a distance, aud to inflict a death-wound as near to the head as possible.”

It is of “brown, or blackish brown above, uniform or with a dorsal series of reddish brown spots; neck with an indistinct arrow-shaped mark; anterior part of the belly with large quadrangular blackish brown spots; posterior part and lower side of the tail more or less clouded with brown.

“Young specimens have indistinct square dark spots on the back, arranged in quincunx, and a bright yellow collar broadly edged with black.”

The natives say almost every snake is poisonous, and they give this character to the lizards as well.

The fabulous Biscopra varanus is believed to be as deadly as Cleopatra’s asp; whilst the Touktai platidactylus, Gecko, of Burmah, has got an equally evil repute among the Burmese, and with as little reason. The fact is, that though some of the Sauria may be able to bite hard, they are all perfectly innocent as to venom. There is no such thing as a lizard of any kind with a poison-gland connected with a fang; and, however positively it may be affirmed, it may be as positively denied that any lizard is venomous.

**Bungarus.**

In this genus there are only two Indian species to be described. They are both common, and one of them, the Bungarus caeruleus or krait, is probably, next to the cobra, the most destructive snake to human life in India, though not actually so venomous as some others. The name is of vernacular origin, Bungarum pamah being the native term for the typical species, B. fasciatus, on the Coromandel Coast.

Gunther says of this genus, that “all the species occur on the continent of India; they are extremely closely allied to one another, so that it is sometimes difficult to distinguish species from varieties.” I only know of two species that occur in the peninsula of Hindostan, the B. fasciatus and B. caeruleus, and these are so extremely unlike that it is impossible to conceive how they could ever be mistaken for each other.

Gunther certainly describes two other species: B. Ceylonicus, which somewhat resembles B. fasciatus, and B. semifasciatus, which somewhat resembles B. caeruleus; but as they are not found in India, the first being Cingalesc and the second Chinese, I do not include them in my description. The large black or deep blue and yellow banded bungarss or sankni is, to an ordinary observer, totally different to the smaller and dark-coloured one, or krait, however much they may be alike in more essential characters. Another species of some naturalists, “Bungarus flaviceps,” is placed by Gunther in another genus, of which it is the only representative, Megœrophis. This is placed by some authorities among the bungarums, and is very nearly allied to them. It is not found in India,
but in Borneo, Java, Sumatra, and Penang, where it attains the length of six feet or more.

Gunther gives the following general description of the genus:

"Body rather elongate; tail comparatively short; head more or less dilated, depressed, with broad rounded muzzle scarcely distinct from the neck, which is not dilatable; eye small, with round pupil; nostril between two nasals; loreal none; rostral shield broader than high, reaching to upper surface of snout; anterior frontals half the size of the posterior, vertical, five-sided; occipitals tapering behind; nostrils rather wide, between two nasals; seven upper labials, the third and fourth entering the orbit; one pre, two post oculars; scales smooth, moderately imbricate, disposed in oblique rows forming fifteen longitudinal series round the body: those of the vertebral series are very broad, hexagonal; ventrals between 200 and 300; anal and sub-caudals entire; scales without apical groove; maxillary bone with a fang in front, a second small simple tooth at some distance behind the fang."

The bungarums are diurnal terrestrial snakes, but like others they generally prefer the shade to the sunshine. They are found in the open country, grass and low jungle and fields. They live in holes in the ground, sometimes down among the roots of trees, extending to a considerable depth. They are not frequently seen in inhabited places, though they do at times find their way into native huts and houses. I killed a very large one in Rangoon, many years ago, that got into a hut full of dhoolie-bearers at the field hospital during the last Burmese war. They feed on small animals, snakes, frogs, toads, lizards, and they are very poisonous; but owing to the shortness of the fang, which is much smaller than that of the cobra, their bite is less dangerous, and excision being more practicable, treatment may be useful, and recoveries more numerous. Bites from the B. fasciatus are comparatively rare; those of the krait, B. caeruleus, are very common, and the police returns show a large mortality among the rural population therefrom.

The bungarus is not particularly aggressive, and tries to escape when discovered, but if attacked it retaliates fiercely, and its bite is very dangerous. The B. fasciatus lies coiled in curves, and when disturbed jerks itself out like a spring, but without extending its whole length of body.

The first species to be described is the Bungarus fasciatus or sankni, Bungarum pamah, according to Russell, of the Coromandel Coast, Rajsamp of some natives.

Bungarus annularis. Schleg. Daud.
Bungarus fasciatus. Cantor.

Pseudo boa fasciata. Schneid.

This bungarus grows to a great size—Gunther says, four feet; but it has been found over six feet. I killed one in Rangoon many years ago, over five feet in length. Mason says it grows to six or eight feet. A specimen now in the Indian Museum is 58½ inches
long, \( \frac{43}{8} \) in circumference. It is very remarkable in its coloration, being composed of a series of black or steel-blue and bright gamboge yellow rings. There is a peculiar metallic lustre on the skin, which is very beautiful. Its tongue is flesh-coloured; lips and throat gamboge-coloured. It is tolerably common in Bengal and in Southern India, as well as Burmah, and it is also known in the North-West, where it is sometimes called "koclia krait." Its bite is very dangerous, but the police returns do not show that it causes any deaths; probably because it is not so much in the way of being met with as the cobra or krait. Its fangs are, relatively to those of the cobra, very small, and its bite in dogs causes death much slower than the cobra's bite. It is much less valued by the snake-men than the cobra, as it does not erect its head, nor is it amenable to their tuition. Dogs bitten by B. fasciatus died at various periods from 4 hours 28 minutes to 10 days.

Dr P. Russell has figured it in his great work on Indian Serpents, and in describing it he notices what is very striking, the trigonal shape of its body, the sharp dorsal ridge and declining sides. Gunther's definition of it is as follows:—"The first temporal shield is scarcely longer than high; ventrals 200 to 233; sub-caudals 32 to 36. Body with alternate broad black and yellowish rings, extending across the belly. There are from twenty-five to thirty-three of these black rings round the trunk; the first is the broadest, and produced into a triangular process, the point of which rests on the vertical shield. Head black anteriorly, and on the sides separated from the triangular process by a yellow V-like mark; lower parts and throat uniform yellow. The hexagonal vertebral shields, and the hard, blunt, and almost bony end of the tail, with which some natives think the snake can sting, are very characteristic."

**Bungarus Caeruleus.**

This is the krait of India, and, next to the cobra, is the most destructive to human life. It is figured by Russell in his great work, and is called by him *Gedi paragoodoo.* It has a variety of synonyms:

- Pseudo boa caerulea. Schneider.
- Boa krait. Williams.
- Boa lineata. Shaw.
- Bungarus caeruleus. Daud.
- " lividus. Cantor.
- " candidus. Cantor.
- " arcuatus. Dum. and Bib.
- " lineatus. Gunther.

This snake is described by Gunther as follows:—"The post-temporal shield is considerably longer than high. Ventrals 201-221. Sub-caudals 38-56. Lower parts uniform white. Upper parts bluish or brownish black, uniform, or with more or less numerous, very narrow white cross streaks, not quite as broad as a scale, and
generally radiating from a white vertebral spot; no collar." I would add that the lower part, the ventral and surface, is sometimes, as in a specimen from the Indian Museum, Calcutta, now before me, of a dark livid colour, or of a yellow tinge, and that the light-coloured bands are broader than a scale, uniting with the general light colour of the ventral surface.

Gunther describes three varieties:

1. Upper parts uniform blackish brown. B. lividus from Assam—Cantor. In young specimens, the head is white, with a black line between the occipitals.

2. A vertebral series of equidistant small white spots, from which narrow transverse streaks proceed.

3. Upper parts with narrow white streaks arranged in pairs. B. arcuatus.—Dum. and Bib. The coloration of the dark parts varies from a deep, almost steel-blue black, to a chocolate brown. Tongue white, iris black. This species of bungarus is common all over India; it seems to be more destructive to life in the Upper Provinces than in Lower Bengal. The fangs are much smaller than those of the cobra, and its poison is not so rapid in its action, which, with the comparative smallness of the wound, gives greater hope of cure; but it is, as I have said, very dangerous and destructive, as shown by the police returns.

It grows to a considerable size; the one before me, from the Indian Museum, measures 47\(\frac{3}{4}\) inches in length, and 2\(\frac{3}{4}\) inches in circumference. Dr P. Russell gives 29 inches as the length, but it certainly attains a much larger size than this; Gunther says, 54 inches. The trunk is of nearly equal thickness from the neck to within four or five inches of the tail. The scales in the dorsal ridge are large and hexagonal. Dr Russell says that this snake was sent to him from Masulipatam, under the name of Cobra monil. Gunther says that Europeans in the peninsula of India give the same name, Cobra monil, to the Daboia Russelli or Tic-polonga. It seems to be common all over India. I am not aware if it be found in the Himalaya. It is found in the fields, grassy plains, rice khets, low scrubby jungle, and among debris of wood or buildings. It sometimes insinuates itself into houses, in the verandah, bath-rooms, on the ledges of doors or jhilmils, bookcases, cupboards, etc., and in such a situation it is not unfrequently the cause of fatal accident. I know of an instance where, after a night's dák in a palanquin, a lady, in taking out her things on arriving at her destination, found a krait coiled up under her pillow; it had been her travelling companion all night.

The krait may be mistaken for Lycodon aulicus, an innocent snake, the colouring and general appearance being in many cases very similar. The least examination of the mouth would detect the difference, but at first sight they are much alike, and are often mistaken, the lycodon suffering for its resemblance to its poisonous fac-simile.
XENURELAPS.

There is only one species as yet known of this genus, and Gunther says there is only one specimen of it preserved, and that is in the Museum of the University of Oxford. It is 15½ inches long, the tail measuring 1½ inch. This specimen came from Cherra Poonjee, in the Khasyah Hills: the only habitat given by Gunther.

It is very closely allied to and resembles a bungarus. Gunther gives the following definitions of the genus:

"Body sub-cylindrical, long and slender; belly rounded; head short, sub-trigonal, with rounded snout, not distinct from the neck, which is not dilatable; tail short. The shields of the head normal, but the loreal is absent; nostrils lateral, between two shields; eye small, with round pupil; one præ, two post oculars; scales smooth, not much imbricate, in fifteen rows, those of the vertebral series enlarged, hexagonal; anal entire; sub-caudals bifid; maxillary with a grooved fang in front, and with a small smooth tooth behind."

The single known species is,—

Xenurelaps bungaroides. Gunther.
Elaps bungaroides. Cantor.

Gunther's definition of the species is "very similar in general habits to a bungarus. Shields of the upper surface of the head normal, the occipitals somewhat tapering behind; rostral as broad as high; nostril open, round; loreal none, the præ-orbital being in immediate contact with the post-nasal; two post-oculars; seven upper labials, the third and fourth entering the orbit; temporals 1 + 2 + 3, the anterior in contact with both post-oculars. Six lower labials; two pairs of short chin shields, the anterior in contact with three lower labials. Scales in fifteen series, those of the vertebral series enlarged, hexagonal; ventrals 237; anal entire; sub-caudals 46; upper parts black, with narrow white angular transverse lines, the angle of which is pointed forward; these lines are more distinct in front than behind; there are about forty-eight on the trunk. The lower part of the rostral shield white; a white line across the snout, before the eyes; two interrupted divergent white lines commence on the vertical shield, each descending to the side of the neck; another band descends from behind the eye to the fifth and sixth labial; lower parts whitish, with irregular blackish cross bands."

I have been unable to collect any information about this snake; it is not in the Indian Museum.

Dr Cantor describes it as "black-blue above, with white arrow-shaped stripes; beneath alternately white and black blue."

It is called Elaps bungaroides from its resemblance to B. cæruleus or the krait.

In habits and properties, as in appearance, it most probably resembles the B. cæruleus. Information being much needed about
the snake, it is to be hoped that naturalists on the frontiers will endeavour to procure specimens and such information as to its habits, as will throw light on the subject.

**CALLOPHIS.**

This genus has several species in India; they are all venomous, though from the shortness of the fangs, and as they are generally of small size, it is probable that a fatal result would not be produced by their bite in man. The poison is virulent, nevertheless, and fowls bitten by some of the species succumbed in from one to three hours. The known Indian species are:

- Callophis intestinalis.
- " Macclellandii.
- " anularis.
- " trimaculatus.
- " nigrescens.
- " cerasinus.

They are all more or less distinguished by the presence of a bright colour on the more sombre hue of the general surface of the body.

They are sluggish, apparently defective both in sight and hearing, for they allow themselves to be approached with little sign of fear. They are not aggressive, and bite reluctantly; but if irritated, they can be made to bite, and the poison proves fatal to fowls.

They are ground snakes, and are slow and sluggish in their movements. They seem to prefer hilly to level country, and they live chiefly on snakes. Gunther says, the Calamariae, an innocent family that they much resemble in appearance, are their principal food.

Gunther's description of them is as follows:—"Body sub-cylindrical, very long and slender; belly rounded; head short, obtuse, with broad snout, not distinct from the neck, which is not dilatable; tail short. The shields of the head normal, but the loreal is absent. Nostril wide, lateral between two shields; eye small, with round pupil; one præ, two post oculars. Temporals in a single longitudinal series; six, seven, or eight upper liabials, the third and fourth entering the orbit. Scales smooth, not much imbricate, in thirteen rows; those of the vertebral series not enlarged. Sub-caudals bifid; maxillary with a grooved fang in front, without other teeth behind.

"The Callophides are very similar to one another; their body is cylindrical, of nearly the same width throughout, and much elongate; the number of ventral shields is almost always exceeding 200. The head is of moderate length, slightly depressed, not distinct from the neck, with broad rounded snout. The nostril is lateral, rather narrow, situated between two shields; eye small, with round pupil; cleft of the mouth of moderate width, not much extensible. The shields on the upper side of the head normal; the
occipitals somewhat elongate; loreal absent. The single præ-ocular forms a suture with the hinder nasal, and extends to the upper surface of the head, but does not reach the vertical, which is comparatively narrow. Two post-oculars in contact with the single anterior temporal. The number of upper labials does not exceed eight; generally there are less than eight, the third and fourth entering the orbit. Scales invariably in thirteen rows, smooth, polished, not much imbricate. Tail short and tapering, with bifid sub-caudals.

**CALLOPHIS INTESTINALIS.**

This species is found in Central India (Malwah), according to Gunther. The only specimen in the Indian Museum in Calcutta is one marked from Singapore, under the synonyme of Elaps fasciata, Cantor. The Proceedings of the Zoological Society, part vii., 1839, p. 34, gives the following description of it:—"Pale reddish brown above, with a bright yellow dorsal line, with black serrated margins; in the tail three black bands; the abdominal surface whitish yellow, enclosed on each side by a black line." Habitat, Singapore. Its synonyms are:

Elaps furcatus. Schlegel. Schneider.
Aspis intestinalis. Laur. Syn. Amphib.
Maticora lineata. Gray.
Elaps intestinalis. Cantor.
Callophis intestinalis. Gunther.

Gunther describes the Malwah variety as follows, which somewhat differs from Cantor:

"Head light brown above, yellowish below, spotted with black on the sides; a vermilion black-edged band runs from the occiput to the top of the tail; a buff-coloured band, with an upper and lower border, runs along the joining edges of the two outer series of scales; the upper black border is as broad as the stripe of reddish gray ground colour at the side of the back. Belly with alternate pale citrine and black cross bands, the latter colour occupying three or four ventral shields together, whilst the former rarely occupies more than two; tail with three black rings, which, however, are sometimes absent."

Upper labials six; ventral shields 223-271; sub-caudals 24-26. It attains to a length of 2 feet, the tail measuring 1½ inch.

"At a meeting of the Asiatic Society on the 6th April 1870, Dr Stoliczka exhibited a specimen of the rare Callophis intestinalis obtained from Upper Burmah. The species has the poison-glands extending from the head to about one-third of the total length of the body, lying free in the cavity of the anterior part, and causing the heart to be much further removed backward than is generally the case in other species of snakes."—*Pro. Asiatic Soc.*, April 1870.
CALLOPHIS MACLELLANDII.

Synonymes:
Elaps Macclellandii. Reints. Cal. Journal Nat. Hist.
" personatus. Blyth. Journal Asiatic Society.
" univirgatus. Gunther’s Colubrine Snakes.
Callophis univirgata. Smith. Proc. Zool. Soc.
" Macclellandii. Do. do.

Gunther describes three varieties of this snake:—

1. Belly with uninterrupted black cross bands, alternately limited to the belly, or extending up the sides of the body, so as to cover scales of the four outer rows, and give the appearance of a lateral series of large black spots. The three last cross bands of the trunk form complete rings, crossing the vertebral line; tail with three other black rings. This specimen is 26½ inches long; tail 2½ inches; ventral 196-218; sub-caudals 27-34.

2. Belly with quadrangular black spots rather irregularly disposed, and not extending up the sides; tail without black rings. This specimen is 18 inches long; tail 1½ inch; ventrals 224; sub-caudals 25.

3. The cross bands reach entirely across the back, forming rings, from twenty-two to twenty-eight in number, on black vertebral line, which, however, is indicated by isolated small spots. Ventrals 196-218; sub-caudals 27-34." Varieties 1 and 2 are from Nepaul and Darjeeling; 3 from Assam.

There is a good specimen of this snake in the Indian Museum, but it has been bleached by the action of the spirit; it is from Assam. Museum No. 123.

Gunther’s description of the species, generally, is as follows:—

"Head and neck black above, with a yellow cross band behind the eyes. Body and tail reddish brown, generally with a black vertebral hue from the nape to the top of the tail. Belly yellowish, with black cross bands or quadrangular black spots.

"Upper labials seven, temporal small, 1 + 1 + 12, anal bifid."

CALLOPHIS ANULARIS.

Gunther says of it:—"Head and neck black above, with a broad yellow cross band behind the eyes. Body and tail reddish brown, without longitudinal band, but with forty narrow, equidistant, black, white-edged rings; each of them is about as broad as a scale in the back (those round the tail being broader), and occupies one ventral shield on the belly. Belly yellowish, with a black cross band in the middle between the rings; each of these cross bands occupies a ventral shield, so that about every third ventral is black. Upper labials six, temporals small, 1 + 1 + 1, the first very narrow, the third the largest; ventrals 208; anal bifid; sub-caudals 33."

Gunther says:—"I have examined only one specimen of this
species, remarkable on account of its singular coloration. It is marked ‘India,’ and is 19 inches long, the tail measuring 2 inches.”

**CALLOPHIS TRIMACULATUS.**

**Synonymes:**

Vipera trimaculat. Dand. Rept.
Elaps trimaculatus. Merr. Tent.
Coluber melanurus. Shaw, Zool.
Callophis trimaculatus. Gunther. Proc. Zool. Soc.

"Light bay above; an indistinct line formed by minute brown dots, along each series of scales. The upper side of the head, the neck, and a spot below the eye, black; snout with some irregular small yellow spots; a yellow spot in each temporal shield; a subtriangular yellow spot on the middle of the neck; the back of the neck edged with yellow behind. Tail marked with black below, and with two black rings, each of which is variegated with yellow. Belly uniform white (red during life); upper labials six; temporals elongated, 1 + 1, equal in size; ventrals 258-274; anal bifid; subcaudals 35."

Russell has figured this snake in his “Indian Serpents,” fig. viii. vol. 1. Gunther says he has received one from Bengal, agreeing with Russell’s typical specimen. The snake is very small, being only 12 inches long, tail measuring ⅞ths of an inch.

Museum No. 124. There are specimens in the Indian Museum described as Elaps melanurus, Cantor, from Rangoon. These were presented by Dr Fayrer in the year 1853. They are bleached and altered in colour by the action of the spirit.

**CALLOPHIS NIGRESCENS.**

Callophis nigrescens. Gunther.
"" concinnsus. Beddome.
"" Malabaricus. Jerdon. Beddome.

Gunther’s description is as follows:—

“Upper parts dark blackish ash or black, the lower uniform red; upper part of the head symmetrically marbled with black; a black spot below the eye; another descends from the occipital to the angle of the mouth; a black horseshoe-like collar, with the convexity directed forwards; a narrow black vertebral line, and slightly edged with yellowish, runs from the collar to the tip of the tail; a series of small ovate black spots indistinctly edged with whitish colouring on each side of the trunk, disappearing posteriorly; tail coloured like body, without black rings. In old examples, the black dorsal stripe and the black lateral spots disappear, and only the whitish edge of the latter remain, forming indistinct longitudinal lines.

"Vertical shields elongate; upper labials seven; temporal 1 + 1, the anterior twice the size of the posterior; ventrals 232-247; anal entire, in one specimen bifid; sub-caudals 33-42."
"I have examined three specimens of this species, one of which was sent by Captain R. H. Beddome from the Neilgherries. The largest is 4 feet long, the tail measuring 5 inches."

**Callophis Cerasinus.**

Major Beddome describes a species from the Wynaad, Malabar forests, to 3000 feet high.

"Rostral slightly produced back between the anterior frontals; anterior frontals only half the size of the posterior, the latter touch the orbit; no loreal and no anti-ocular; nostril between two nasals; seven upper labials, third, fourth, and fifth very high; third and fourth enter the orbit; one small post-ocular; vertical six-sided elongated, pointed behind; superciliary small; occipitals large, elongated, pointed behind, with a pair of large temporals on each side; anal entire; back purplish brown, with a shining nacreous lustre, with transverse irregular-shaped black bands extending to the top of the tail (about forty) at nearly equal distances, and which are continued (though not broad) underneath the belly and tail, but do not quite meet; sides (two or two and a half of lowest row of scales) and belly of a bright cherry colour; head black in front, neck with the fifth, sixth, and seventh labials, and a portion of the occipitals cherry-coloured; length 21¼ inches, of which the tail is 2 inches; circumference 1½ inch; sub-caudals 13; abdominals 228.

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**Part Second.**

**Reviews.**

*On the Present State of Therapeutics, with some Suggestions for placing it upon a more Scientific Basis.* By James Rogers, M.D., formerly Physician to the British Legation and to the Abouchoff Hospital, St Petersburg. London: John Churchill and Sons. Edinburgh: Maclachlan and Stewart: 1870.

*Observations on Therapeutics and Disease.* By Donald Campb ell Black, M.D., Glasgow. London: John Churchill & Sons: 1870.

The late Professor George Wilson was wont to say, that suppose all the sciences related to medicine were represented by a group of boys playing at leap-frog, therapeutics would figure as a very lazy boy, whom no compulsion could prevail upon to take his leap.

Convinced of the substantial truth underlying this playful allusion, we hail with pleasure every attempt at really advancing this all-important branch of medical science. The author of the present