

Jackal.—Hardly game in the full meaning of the word, but still a game little beast and, so, worthy of a note.

The first outbreak of any disease that I noticed amongst the jackal was in 1906, when distemper broke out, and swept the whole country east of the Kikuyu Escarpment. The jackal died by the hundred and soon became a rare animal; while even the 'pie-dogs' of Nairobi suffered, and most of them died. The old warriors of all ages went as quickly as the pups. This was, I think, the first outbreak of distemper in British East Africa. I could get no proof that the hunting-dogs or hyenas died, but for some few years they certainly appeared to be much scarcer.

A year or two later the disease spread into the Rift Valley, where again the jackal died and the Wandorobo lost all their little hunting-dogs. Since then several outbreaks of disease have occurred—the latest being in Laikipia, where the jackal seemed to die off. In this case no signs of distemper were seen amongst dogs, nor did any of the jackal show signs of rabies—a disease which apparently affects them. For, every few years, one hears of the jackal either attacking man in a strange way, or inviting their own death by wandering into farms unconcernedly in broad daylight. Though I know of several cases of natives and dogs having been bitten, I have never heard of any further development.

NOTES ON SNAKES IN EAST AFRICA

By A. LOVERIDGE

Pleasant memories of chasing grass-snakes along English hedgerows, of smooth snakes on the Dorset heaths, or adders midst bracken and gorse of Welsh mountains are not effaced by three years' gadding about in East Africa with its greater variety and more dangerous serpent-life.

Indeed, one is prone to think that the former provided better sport. At any rate one could pounce more wholeheartedly upon a grass-snake; probably, however, it is only

the associations that show it in this rosy light. It is interesting to note that all the three genera of British snakes (*Tropidonotus*, *Coronella*, *Vipera*) are represented out here by two species of each.

The two typical vipers are both very local, one indeed having only been discovered in the Aberdare Mountains, British East Africa, during the last decade. The distribution of the other is confined to Delgado Bay as far as German East Africa is concerned. The writer has not been fortunate to visit either of these places.

The commonest viper is undoubtedly the Puff Adder (*Bitis arietans*). In length it is usually about 39 inches, but in girth it is as thick as a man's arm; a female in young is a still more unwieldy creature, and in view of their prolific nature it is strange that the creature is not more commonly met with. One such specimen which I chloroformed to death at Morogoro, and afterwards dissected, had 16 young in the left oviduct and 18 in the right, making a total of 34 young averaging $7\frac{1}{2}$ inches in length (November 16, 1917). This was quite eclipsed by another puff adder killed on November 28, which had no less than 71 eggs in the oviducts. Another female, caught on the western slopes of Mount Kenia in November 1915, had 12 and 13 eggs in the respective oviducts.

The snake-catcher can hold in contempt this snake, with its enormous fangs often $\frac{3}{4}$ inch long. It is so loath to move that it is easy to capture with a forked stick; this same sluggishness also constitutes a danger, as it is overfond of lying immovable across paths or in little clearings. A fine male the writer met with a fortnight ago did not even move when its neck was pressed to the ground with the forked stick, and remained quiet until picked up, when it commenced to squirm and struggle. This same snake on being placed in a wire-netted cage escaped about 4 P.M. and was killed two hours later 500 yards further up the hill.

Another closely-related creature is the handsome Nose-horned Viper (*Bitis nasicornis*), which owes its name to a pair of horn-like points formed by erected scales. One would naturally suppose from the carpet-like, multi-coloured skins of these big snakes that they must be very conspicuous objects

in their native haunts. It is far otherwise, however, for on one occasion, whilst cleaning out the case in which some were confined, three of these creatures were released on a piece of ground covered with short grass. The two larger ones measuring 3 feet 3 inches were secured readily enough, but three of us searched for nearly ten minutes before the writer discovered that he was standing right over the missing snake, which was twisted in and out of the grass and lying motionless right between his shoes.

All the four species of Night Adders (*Causus*) are found in East Africa; they are much the same size as an English adder, but differ somewhat in habits, as they become most active towards dusk. The Rhombic Night Adder (*C. rhombeatus*) is extremely common in Nairobi, and when disturbed crossing the road, as is often the case, it coils itself up and displays a vicious disposition; if unmolested it sails off with the neck flattened out and the head raised about five inches from the ground. Both in a wild state and in captivity it feeds well on young Square-marked Toads (*Bufo regularis*) and mice. The day-time is spent in rubbish-heaps, piles of old stones, or among the litter of outbuildings, whither it has gone in search of its prey.

A specimen of *Causus resimus* was killed on Makindu platform (Uganda Railway) just as our troop-train came in. It is uncommon in the Mombasa coastal region and about Mount Elgon, from which places the writer has examined many specimens. The Snouted Night Adder (*C. de Filippi*) seems to be uncommon, though no less than ten specimens were found preserved in a German house near Morogoro; the writer has only captured two examples during twelve months' residence in the neighbourhood. The still scarcer Lichtenstein's Night Adder (*C. Lichtensteinii*) was found at Yala river, British East Africa, but the writer has not as yet had any living specimens in captivity.

A very interesting group of vipers are the tree-haunting species (*Atheris*); if it were not for their triangular heads and waspish ways one would never suppose these active and brilliant-green snakes to be vipers at all. The writer kept a specimen of *Atheris squamiger* in captivity for some months,

but it did not feed, possibly on account of its quarters being somewhat confined.

A still more specialised and unviperish-looking genus is found in the burrowing vipers (*Atractaspis*), of which there are no less than seven species in East Africa. Owing to their subterranean habits they are rarely met with, and the only living examples that came into the writer's possession were taken near his tent at Morogoro; one (*A. rostrata*) while digging a pit, another under a mass of earth and stones constituting the remains of a demolished building, and a third was seen by one of the natives near a log; it wriggled down a termite hole about four feet from where it had been lying. On digging down it was found about a foot below the surface and squirmed convulsively like a *Typhlops* or worm when disturbed. When travelling over the ground its snout was held downwards in an unusual manner.

It has been said that these snakes are probably not dangerous to man, as their fangs are so enormously developed that it seemed impossible to erect them in its small mouth. This one struck out viciously, but instead of opening the lower jaw, the fangs came down on either side and a little to the front of it; a quantity of pale straw-coloured venom was discharged on to the forceps with which the writer was holding it.

The next group of venomous snakes constitute a division of the family Colubridae known as the *Proteroglypha*, and contain some of the most dangerous species. Unlike the vipers which have movable poison fangs, the *Proteroglypha* are characterised by fixed grooved fangs set well forward in the upper jaws. The viperine tooth is hollow like the needle of a hypodermic syringe; the colubrine tooth is grooved on the anterior surface. Should one of these snakes under consideration bite a man through the wrappings of a puttee or other garment a considerable amount of the venom will be absorbed by the cloth, enhancing his prospects of recovery.

The Mambas (*Dendraspis*) belong to this group and are notorious for the fact that their venom is more toxic than that of any other African snake; moreover, the Mambas are the only African snakes that will attack man without provocation,

but it must by no means be assumed that they will always do so, for generally they attempt to escape.

In one case, of which the writer heard recently, a European entered a banda and, finding it unoccupied, was turning to leave, when a mamba struck him in the back just above the kidneys. Though preventive measures were undertaken immediately he died twenty-four hours later. A native, whilst bringing a tea-tray on to the verandah where his master and a friend were sitting, trod on a mamba which was lying on the mat; dropping the tray he attempted to reach his master, but fell and expired within the minute. My informant (who was the visitor) vouched for this.

A comrade in the E.A.M.R. recounted how on one occasion he was cycling down a hill when a mamba darted across the road. He swerved to avoid it, and then pedalled for his life, but, overtaking him, the snake struck him on the leg; after spending many weeks in Bulawayo Hospital he recovered. A native who has caught many snakes for the writer got bitten by a 5-foot mamba. The bite was given on the back of the left hand in the fleshy portion between the base of the forefinger and thumb. A week after this occurred there only remained an ugly sore, but Mushairi stated he had been very sick for several days.

On January 31 near Morogoro station the writer captured a 5-foot mamba. The day before this occurred, whilst standing under a mango tree watching a carpenter-bee, his attention was suddenly attracted by a movement amongst the foliage of a branch about a yard from his head, and not more than 8 feet from the ground. A snake was slipping quietly away, when his boy spotting it gave a yell which caused it to quicken its pace, climbing straight up through the dense foliage.

Throwing up the only available thing—his net—it tumbled the snake down 4 feet, but before he could pick up the net it had made up the lost ground and was well out of reach. All this time he thought it was the less dangerous Boomslang. The only 'spot' difference between these two tree-haunting reptiles is the larger eye and more oblique scales of the Boomslang; as only the body of this mamba could be seen it was difficult to be certain of its identity.

Returning to the mango tree the following day, and cautiously approaching the bough on which it had been lying, it was easily seen by reason of its having selected some darker foliage against which its bright green coils were conspicuous. At the first attempt the snake was dislodged to a lower branch, and at the second hooked out of the tree on to the ground. It immediately started off, but was overtaken and captured.

Half a mile away on another tree no less than four young mambas were seen, evidently only just born, for the ventral scutes in the umbilical region had not as yet healed up. Three of these were captured and might easily be mistaken for one of the six species of Green Snakes (*Chlorophis*) which are found in East Africa, or for the Spotted Wood Snake (*Pholothamnus semivariiegatus*) which is common enough about Morogoro. They were very fierce, and attempted to use their fangs.

For nearly six months the writer had two fine female mambas in captivity; these measured 8 feet $1\frac{1}{2}$ inches, and 7 feet $3\frac{1}{4}$ inches respectively. They were very active, and when at first confined struck at the glass when anyone approached their cage; possibly realising the futility of this procedure they abandoned it, but continued for a couple of months to draw themselves up and threaten the observer with open jaws. In time even this menace was given up, but to the last they continued to follow every movement of the onlooker with their bright eyes.

They fed readily enough, and it was rather a difficulty to keep up the supply of mice; for though they killed large rats for food they refused to swallow them except on a few unique occasions. Several times they ate dead mice, and once one of them seized upon a dead weaver bird which was put into the cage. Finding itself watched, however, it dropped the bird, and during the period of its captivity never touched another.

On December 7 the smaller mamba killed and swallowed two very large rats, one at 8 A.M., the other at 11 A.M.; owing to carelessness the case containing these reptiles was left in the sun from 4 P.M. till 5.30 P.M., with the result that both creatures died from the heat. On opening the stomach of the one that had recently fed, it was found that the flesh and fur

had already been digested from the skull of the rat which had been swallowed eight hours previously.

During their six months' captivity they only once cast their skins and appeared in fresh clean olive-green coats. All the young mambas under 6 feet which the writer has kept have been of a bright leaf-green colour, those over 6 feet of an olive tone. A reasonable theory is that as they increase in size and give up their arboreal habits their colour becomes black; certain it is that there is no detectable specific difference between the so-called Green and Black Mamba.

The species just referred to is the common South African Mamba (*Dendraspis angusticeps*), which ranges over Central and East Africa, having been taken at Tanga and Mombasa; two other species are known in East Africa, one of which is doubtful, since it rests upon a single specimen collected in the Kilimanjaro region and called *Dendraspis Sjostedi*. Jameson's Mamba (*Dendraspis Jamesoni*), on the other hand, is as common as the South African species ranging over the whole of Tropical Africa and Angola. The writer has examined a number of specimens which were shot in trees in the Yala river district.

It is a matter of surprise to many persons to learn that there are cobras in East Africa, and in many places—Nairobi in particular—the common Black-necked Cobra (*Naja nigricollis*) is erroneously called the Black Mamba. Whereas mambas have only a very limited power of flattening their necks, cobras when startled or enraged will spread a hood two to three times the normal diameter of the neck.

The colour of the Black-necked Cobra at Nairobi is frequently olive-green or brown, with yellow bars on the throat; sometimes, however, as in all the Morogoro specimens yet seen, it is a lead-colour or slaty-black, in which case the throat is barred white or pink. At Longido, however, a beautiful salmon-pink is the normal colour of this snake with or without black spots. Anyone unacquainted with the variable colouration of reptiles could be forgiven for supposing it to be an entirely different species.

On one occasion at Longido a corporal asked the writer if he could tell him the name of a terra-cotta snake. He said 'It is harmless, I think, because when I found it under

my pillow I jabbed a jack-knife into it, and it glided into the wall without attempting to bite.' He and another corporal had made themselves a bivouac by fixing two ground-sheets against the loose-built wall. Nearest the wall this improvised tent was not more than four feet from the ground, and to enter one had to go on hands and knees. Riding into camp about 11 A.M. the writer was hailed by the other corporal who was lying reading, but called out casually 'The snake is here lying on the blankets now if you want it,' and he rolled back to continue his reading.

Picking up a short stick the writer asked him to vacate so that he might come in. On hands and knees he waited on the one bed, whilst the pillow was overturned revealing nothing. With his face to the ground he was able to see the coils of a pink cobra in the interstices of the wall. Cautioning the others as to the snake's propensities for spitting, he pinned the nearest visible piece of snake down with a stick, placing his foot on the other end of the stick, and at the same time rising to a stooping posture.

Almost simultaneously both ends of the snake appeared, the anterior end chawing at his ammunition boots in a very thorough manner. Seeing it was so occupied, he seized the tail which was coiling and squirming, and releasing the stick pulled the cobra off his boot, tossed it out into the open, and before it had recovered from its surprise, pinned it down by the neck. With a thread of cotton wound round its jaws it sailed about the horse-lines, swaying to and fro with spread hood to the interest of all observers.

A specimen alive at the present time was caught three months ago within ten feet of the writer's tent. It was wriggling along in the ditch at the time, and owing to the hardness of the ground, when pinned by the neck, it turned over and spat at its would-be captor. Fortunately he turned his cheek to the enemy at the critical moment and received the charge of venom on his neck and arm from wrist to shoulder.

Unless the venom chances to enter a cut or abrasion, such as anyone might have after shaving, there is no danger. The exception to this of course is the eyes, and it is always at the eyes the cobra ejects its venom, with remarkable precision.

The immediate result is intense pain and blindness caused by the superficial capillaries absorbing the venom. This conjunctivitis subsides in a few days if remedial measures are taken, such as bathing the eyes in a weak solution of permanganate of potash, boric powder, or milk.

One settler, who promised to collect snakes for the writer, disturbed a cobra in the rickyard one day, the reptile taking refuge behind a disused door leaning against a shed. As it disappeared, my friend struck at it with a panga, cutting off a portion of its tail. He then foolishly looked behind the door, with the result that for a moment he saw the cobra with spread hood facing him at close quarters. His brother led him back to the house and then unwittingly bathed his eyes in a solution of formalin, which he admitted to me was as painful as the venom itself. Nevertheless in about three days he recovered.

Another friend was crawling through long grass after a Kongoni. A cobra suddenly rose in front of him, and my friend had the presence of mind to close his eyes tight as the venom was ejected on to his eyelids. Lying back, he waited the arrival of his syce, whom he told to take his water-bottle and empty its contents on his face. After a careful sponging away with a wet handkerchief he opened his eyes, and was none the worse.

The cobra is very nervous in captivity, and for this reason nearly always spits when disturbed. On one occasion it spat on a passing native's neck through the ventilating gauze when the boy was fully four feet from the cage. This happened several times, and for safety the gauze had to be removed from the cage.

Toads seem to be their favourite diet, and the half-grown cobra at present in the writer's possession eats about one per week. On December 7 it killed a very large one, and its deglutition was one of the most difficult and laboured I have ever seen; the head lost all shape, resembling a circular band of skin in which shone two beady eyes, the quadrate bones stuck up against the distended skin like horns about to bud. In conformity with its diet it is nocturnal in habit, though frequently to be found basking by day. One of the most

exciting captures occurred one night last August, when the writer was sitting with a friend and a boy rushed up to the tent gasping 'Nyoka Bwana,' and was away before he could be interrogated.

Seizing the lamp we followed him through the camp till, halting near his banda, he waited for the light by which we were able to see a fine cobra streaking away at full speed in the direction of a marquee, around which some forty boys were sitting on empty boxes and upturned petrol tins. They also caught sight of it, and a fine commotion ensued with the upsetting of tins and the falling over tent ropes as the alarmed natives endeavoured to escape. Shielding his eyes with his helmet the writer headed it off, and when it turned he again got in front of it when it stopped. The night was pitchy-dark, and when the snake was on the move it continually got beyond the rays of the solitary lamp. When a second light was brought the writer pinned the snake down by the neck, but the ground being hard it withdrew its head and spat, although in the darkness one could not see where the venom went. A second attempt was more successful, and the reptile was picked up by the neck.

In the western portions of East Africa the Black-lipped Cobra (*Naja melanoleuca*) is found, and the writer received a number of specimens which were ingeniously caught by means of a bent stick and a snare set over their holes. As the snake emerged from its retreat the spring was released, and the reptile was suspended in the air by its neck. This species is readily distinguished from its near relatives by the vertical black lines bordering the upper lip-scales.

A fine Egyptian cobra (*Naja haie*), probably eight feet long, was shot at Longido West. This snake ranges from Palestine and Arabia to Zululand and the Transvaal, but does not appear to be common in these parts. Like the black-necked species it also has the power of discharging the venom from its fangs to a considerable distance.

Günther's Garter Snake (*Elapechis Guentheri*) is a short viperish-looking relative of the cobras. It is beautifully ringed in coral-pink and black or white and black. It is quite common in Nairobi, where it is frequently to be found lying

among the fallen leaves on the edge of the forest reserve. The writer met with it at Kagiado, but nowhere in German East Africa, though it has been recorded by others from Tanga and elsewhere.

The widely-distributed Yellow-bellied Sea-snake (*Hydruis platurus*), which inhabits the Indian and Pacific Oceans from Australia and India to Panama probably also frequents the East African coasts. A comrade while bathing at Dar-es-Salaam saw what he took to be an eel, but from his description it appears to be more probably this Sea-snake. All sea-snakes are highly specialised for their aquatic life, having vertically flattened tails with which they propel and steer themselves. Their nostrils also are provided with valves enabling them to be closed when the creature dives. All the species are very poisonous.

The next division of the Colubridae comprises the back-fanged (*Opisthoglypha*) venomous snakes, and, by reason of their poison-conducting teeth being situated so far back on the upper jaw, it is difficult for them to inflict a dangerous bite upon man unless the reptile is of large size. Their venom is often highly toxic, in some species approximating to cobra venom in its neurotoxic nature; in others the haemotoxin preponderates as in the vipers.

Whilst searching beneath stones at Longido one frequently met with a terra-cotta-coloured snake with a black head; in bulk they were much the same as a lead pencil and did not exceed a foot in length; their narrow gape rendered them harmless. At Arusha one night the writer was called up by someone who said that there was a snake in one of the tents in the maxim lines. On arrival we found the tent in darkness, and no one willing to move. One complained of a snake crossing his face, having waked him up, and he absolutely refused to move till a light was brought. When an inch of candle was at last obtained, and being assured the snake was not to be seen, he sprang up quickly, and after a brief search, discovered the snake beneath his blanket. It was one of these Jackson's black-headed snakes (*Apparallactus Jacksoni*),—there are seven species of the genus in East Africa.

The common South African Boomslang (*Dispholidus*

typus) occurs here in even a greater variety of colouration than it does in the south. At Handeni a fine green female was killed by natives when clearing the ground for camping. At Morogoro the writer has obtained the vivid green variety, the black variety, and the brown variety. In the Yala river district alone, not only did the all-green and all-black varieties occur, but the intermediate ones in which each green scale had a small black speck giving the appearance of a black-spotted green snake, and a fifth variety in which the black speck is so enlarged as to almost oust the green from the scale, which gives the appearance of a green-speckled black snake.

The following extract from the writer's diary will show how easy it is to confuse snakes when guided by colour alone: "Has the snake-catcher any time to spare?" inquired a Canadian motor-driver putting his head in at my banda. "Ready if it's not too far," I replied, preparing to follow him. His ambulance was stopped some sixty feet from my quarters. "As I pulled up," said he, "the beggar came down the tree, it appeared to form a circle and slid down like a ring in a moment. On reaching the ground it made straight for the car and there it is." So speaking, he pointed to one of the front wheels, around which lay twisted a bright enamel-green snake with its head resting on the tyre under the mud-guard.

"Oh," said I, confidently, "less than a month ago I took a snake of the same species from the back of a car which was standing not thirty feet from where yours is now." Now, having only seen a brown boomslang during the whole time I had been in Morogoro I was unprepared for it, and mistook this specimen for the harmless Spotted Wood Snake, which is so common in the trees forming the avenue. Approaching the snake I made a diversion with the fingers of my right hand whilst slowly approaching those of the left to the snake's neck. It remained motionless till my fingers were within six inches of it, when, slipping from the wheel, it would have made off had I not hastily grabbed it by the tail and swung it round till its body was round my hand, and pressed my thumb on the back of its neck just as its head reached my hand.

'Not till then did I notice the oblique nature of its scales, which immediately showed it was not the harmless species

I took it to be. It was very gentle, making no effort to escape until placed in a vivarium, when it dashed about in the wildest manner, inflating its neck vertically and striking at the glass when anyone came near.

A brown boomslang was bitten by a puff adder, which would doubtless have eaten it had it not been removed from the case. On eviscerating it, the heart was found to be still beating quite ten minutes after it had been bitten; the site of the bite some three inches anterior to the vent was in a fearful state, and, had one not known the circumstances, one would have supposed the creature to be in the last stages of putrefaction. The scales were loose and falling off, pinkish blood oozed from between them and from the vent, the fat was speckled with blood, and the intestines were full and oozing with the same. The whole region was blown up as if with gas and had the puffy appearance of decomposition.

In captivity these boomslang fed well on living or dead birds.

The Bird Snake (*Thelotornis Kirtlandii*) of Tropical and South Africa seems to be uncommon at Morogoro, as only two specimens have been brought in during two months. The angular and elongated head is marked with green, the body is brown, slender and whip-like. It frequents trees.

The next genus is that of the Sand Snakes (*Psammophis*) with six East African species, specimens of all being in the writer's possession. One recognisable feature that they possess in common is a fine speckling of the lip-scales which are usually white. Three species are to be found at Morogoro, namely the Angola Sand Snake (*P. angolensis*), the Hissing Sand Snake (*P. sibilans*), and the Underlined Sand Snake (*P. subtaeniatus*).

Specimens of the last named, which is by far the commonest, were taken at Lukigura and Matomondo, whilst at Morogoro scarcely a week passes without one being seen. It may be crudely described as a brown slender snake with a bright yellow underside which is marked along its length with a pair of parallel black lines. Their favourite food is the Striped Skink (*Mabuia striata*), which they pursue with inconceivable swiftness and hold until the slow-flowing venom has paralysed

the prey, when it is swallowed in a half-dead condition. The writer has been bitten by this species without any unpleasant effects.

On October 20 two geckos (*Hemidactylus*) were chasing each other about the roof of a grass hut; the pursuer was pale grey, the pursued brown-black; before the pursued quite realised it, the writer had seized and popped him into the Underlined Sand Snake's case. To see the snake chase it was very interesting; being midday and the weather hot, the snake streaked and doubled about the case, and the gecko dropped its tail; the snake undeceived by the wriggling of this red herring shortly afterwards seized and chewed the gecko as they usually do; the gecko became very limp, was worked round in its mouth, and swallowed head first.

On September 23 10 eggs were found in a 45-inch female.

„	October	22	8	„	„	39	„
„	„	22	7	„	„	27	„
„	„	22	6	„	„	28	„

From this it may be safely assumed that the number of eggs produced varies in direct ratio with the size of the parent. On the same date, October 23, another snake laid six eggs measuring $1\frac{1}{4}$ inches by 7 inches, and on December 16 and January 1 sixteen newly hatched young ones were taken.

The Hissing Sand Snake (*P. sibilans*), seen at Voi and Bissel and common at Morogoro, is an olive-green, brown or straw-coloured reptile; underneath it is dirty white or yellow. The largest specimen taken locally by the writer measured over five feet.

They feed readily in captivity, so eagerly in fact that they will take their food practically from one's fingers. The writer has watched one kill and swallow three striped skinks in rapid succession. On another occasion one of these snakes, having ineffectually struck at a skink several times, seized the lizard in its coil with the head downwards. After failing to find the head it bit savagely at the base of the tail; finally, loosening the top coil, it bit the skink in the abdominal region, and as soon as it became limp proceeded to swallow it in the usual manner.

I put a live mouse (*Mus belli*) into the Hissing Sand Snake's cage on November 28; it was seized almost immediately and chewed and swallowed. A naked nestling mouse was also swallowed. Then followed two skinks, one of which was taken almost from my hand by the larger snake; the other lizard jumped into the biscuit tin which served as a water tank. After watching it for a moment in the water, the other sand snake, turning, slid up to the snake which already had a skink in its jaw and watched it intently. Gradually approaching, it suddenly made a grab at the skink as snake 'A' was changing its hold. The jaws of 'A' enveloped the upper jaw and head of 'B,' but 'B's' mouth closed on 'A's' lower jaw and both parties worked their fangs vigorously.

Seizing the combatants I attempted to extricate the tangle, but their small hooked teeth were so firmly embedded that I left them in order to get a pair of forceps. On returning I found they had both dropped the skink and 'A' had seized 'B' by the neck—a great commotion ensued, 'B' attempting to get its coils round 'A's' neck. Finally 'B' became exhausted, and 'A,' working 'B's' head round till the snout was in its own mouth, began to swallow. After a foot was out of sight 'A' lost heart and, gaping widely, reversed gear and disgorged poor 'B,' who made off with a gory head and slimy skin. After taking a couple of turns round the case 'A' commenced to poke about till it found the skink, which it very soon swallowed.

On December 7 a second fight began but did not go to such lengths as the first, and 'A' was given a *Gherrosaurus major* lizard, which was a big mouthful for the snake, and served to keep it quiet for a time. On December 9, however, it attempted to take a mouse out of the coils of a *Rhamphiophis oxyrhynchus* snake, and not wishing for further trouble, the writer removed the quarrelsome snake to a cage with an Underlined Sand Snake. On the 30th the latter died, probably because the former had eaten all the food, so after feeding the Hissing Sand Snake with a skink the writer put the Underlined Snake's head into its mouth and it continued swallowing it until it was gone. The digestion of this big meal took precisely eight days.

This snake is preyed upon by eagles, for on June 4, whilst stalking a martial hawk eagle, the bird disappeared for a moment and the next minute rose from a mealie patch bearing one of these snakes in its talons. Whilst circling low over the writer's head it seized the snake in its beak, and still holding it in its talons swallowed it on the wing. On June 8 another species of hawk eagle was shot with a Hissing Sand Snake in its stomach.

There were twelve eggs in a female which was killed on October 22. These eggs measured $1\frac{1}{4}$ inches by $\frac{1}{2}$ inch.

The Short-snouted Sand Snake (*Psammophis brevirostris*) is very common in Nairobi, and the writer has often captured them when crossing paths and roads both there and at Arusha. Its habits of feeding and dietary in captivity are similar to the preceding species.

An unusually coloured specimen of the Two-lined Sand Snake (*P. biseriatus*) was taken basking on a heap of stones on the rifle range at Voi.

A handsome and gentle snake is *Rhamphiophis oxyrhynchus*, which owns no English name, but is called by the natives Earth Snake, probably because its reddish colour is somewhat similar to the soil. When first caught it is naturally wild, but becomes so tame that the writer has moved eight or nine from case to case as they lay in a twisted heap. After a few days in captivity it is safe to handle them freely without any risk of being bitten. They probably eat mammals, birds, and reptiles.

A live mouse being put into the cage on December 9 at 10.30 A.M. was seized and constricted with three coils around it; at 10.31 A.M. a Hissing Sand Snake came up and seized its hind-leg; at 10.33 A.M. the Earth Snake took hold of the mouse's tail at the root and loosening its coils endeavoured to swallow the creature tail first; the hind-legs proving a serious obstacle, however, it moved its jaws round to mid-body by 10.35, when it got the mouse's head into its mouth; at 10.39 A.M. only hind legs and tail were left. At 10.41—50 seconds—the last vestige of tail had disappeared.

On July 12 a live and newly-fledged young sun-bird which I put into the snake-case, where there was a small python

and an Earth Snake, was found dead two minutes later on my return. Its head was swollen tremendously, having been bitten in the throat by the Earth Snake, which, however, was not to be seen; possibly it had withdrawn into the grass at the writer's approach or had found the scimitar-shaped bill too awkward for his small mouth. On December 31 one was seen to eat a striped skink.

The biggest specimens measured five feet; a small female laid thirteen eggs on October 10; young specimens were taken early in January.

The Herald Snake (*Leptodira hotambæia*), which is a Tropical and South African species, is common both at Nairobi and Morogoro. Black above, it is white-lipped and white beneath; the upper surface is freckled with minute white spots, which serve to distinguish it from the otherwise very similar but non-poisonous House Snake which is also very common. The Herald Snake is usually under two feet in length, but occasional specimens are to be found over three feet long, in which cases the colour tends to olive. They frequent tents, outbuildings, or rubbish heaps in search of the mice or toads which constitute their food. Nocturnal in their habits, when molested they squirm like a worm.

Another snake which rambles abroad after dark is the Half-ringed Cat Snake (*Tarbophis semiannulatus*), which the writer never met with till he came to Morogoro, and even here it seems scarce.

The third and last division of the Colubridæ embraces all the solid-toothed and therefore harmless *Aglypha*. Of these by far the most interesting is the almost toothless Egg-eater (*Dasypeltis scaber*). This extraordinary reptile has a most curious development of the vertebral hypophyses; the lower spines of some thirty-two of its vertebræ not only pierce the gullet, but are tipped with enamel and are used by the snake to crush the shells of eggs which it swallows whole. After the contents of the egg are safely received into the stomach, by some curious mechanism the two halves of the shell are fitted into one another and disgorged.

The snake can be readily recognised by the large gular scales which enable it to distend its throat to the capacity of

the egg. The body scales are also exceptionally strongly keeled. The variations in colour are many. The variety found at Morogoro rather resembles the Rhombic Night Adder in colour and markings. Egg-eaters of this type were also collected in a trench at Mbunyi, and were brought into Makindo camp in a hollow log, in which was also a Zonure lizard. At Nairobi both all-black and all-brown varieties are to be obtained.

An insignificant little bronze-olive snake called *Homalosoma lutrix* was taken in the hospital banda at Arusha.

The Spotted Wood Snake (*Philothamnus semivariegatus*), a single specimen of which was found dead in the road at Mombo, is also abundant at Morogoro, a favourite haunt of these reptiles being the acacia trees which form an avenue up to the Secretariat. The method of capturing this snake may be best illustrated by the following extract from the writer's note under date of October 4 :

' A Spotted Wood Snake was seen in the acacia trees near my tent. In a very short time I was after it, and pursued it to the topmost twigs, which I shook violently. With wonderful swiftness it travelled into the next tree, into which my toto climbed, and when it had got to the extreme end of a branch he also began to shake it. The snake wound itself tightly round, but by and by was worked loose and dislodged ; on reaching the ground—a fall of twenty feet—it made off without a moment's hesitation, and when I seized it, it bit a couple of times drawing blood. '

On one occasion, whilst standing under a tree in the native camp, a Wood Snake was blown down by the violence of the wind ; another snake was captured in the hood of a motor standing under the aforementioned avenue of trees. A female taken on November 25, which was 52 inches in length, contained six undeveloped eggs.

The common East African Green Snake (*Chlorophis neglectus*) was a common object lying on sprays of foliage of the bushes which overhung Nairobi river, and when disturbed they slipped quietly into the water. One was seen crossing the lawn of a house at Kerogwe. The writer found that they would feed on small frogs in captivity. From the Yala river

district nearly a hundred green snakes were sent to the writer for examination, and strangely enough they belonged to no less than four different species of this genera (*Chlorophis emini*, *hoplogaster*, *heterolepidotus*, and *irregularis*).

The Mole Snake (*Pseudaspis cana*) was met with in various parts of British East Africa, the farthest north being on the West Kenia plains. Two chequered young ones were unearthed whilst digging trenches at Arusha, and when walking up to camp at 5 P.M. one day a fine female over five and a half feet in length shot across the path, and was at once captured by the writer. This snake was kept alive in a pillow case in his bivouac during the three weeks at that camp. It was always gentle and docile.

The brown or olive adult Mole Snake is extraordinarily similar to a black-necked cobra, and many persons who were familiar with the cobra could not be convinced that the specimen just referred to was not the more dangerous snake. At Makindo some natives were felling a very big but hollow tree, and as it fell a fine mole snake issued from the hollow trunk, only to meet with death from a native's panga. These beautiful and harmless snakes by reason of their diet of rats and mice are most useful to the agriculturist, for they are able to pursue the rodents down their burrows and devour the young in their nests.

The Wolf Snake (*Lycophidium capense*) was taken by the writer at Nairobi, Longido, and Morogoro. It is a small snake under eighteen inches in length and not often met with owing to its retiring and nocturnal habits. A specimen alleged to have been killed on Government Farm was brought to the writer, and was left among some papers on his table, where some hours later it started to move about. On being picked up it appeared quite lively, and was temporarily dropped into a biscuit tin containing a small mouse, but during the two hours that elapsed the mouse had not only killed, but eaten all the flesh off the anterior half of the snake's backbone.

The Brown House Snake (*Boodon lineatus*) is abundant at Nairobi and Morogoro, but, whereas in the former place specimens commonly met with are frequently over four feet in length, in Morogoro they are generally under eighteen inches; from

this it may be argued that some natural enemy prevents their reaching maturity. In captivity they feed well on mice, which they are able to swallow though greater in diameter than their own bodies. The outline of the mouse can clearly be traced by the distended skin in the region of the stomach. The pursuit of their favourite food leads them to frequent the abodes of man, where they meet with little mercy though so perfectly harmless. One apparently resided under the writer's bed for a long time where it was found in a box too gorged to offer resistance. Two cast skins were found under the floor, which looked as if the snake had frequented the spot for several months. They will bite readily enough, and their many pin-like teeth draw blood. On one occasion some time after handling one of these house snakes, whilst drying his hands on a towel, the writer found a tooth embedded in his hand.

A young specimen of the Olive Grass Snake (*Tropidonotus olivaceus*), the East African representative of the English Grass Snake, was found down by the stream at Makindo when taking horses to water; it was unable to get away and had probably been trodden upon. Its eviscerated body when placed in a tin of water overnight was carried off by a rat, whose foot-prints were clearly traceable in the dust. The only other fresh specimens seen were taken in the Yala river district.

The next family under consideration is the Boidae, and here let me say that no Boa-constrictors are found in Africa; the true Boa-constrictor is found nowhere outside South America. A small stumpy Sand Boa (*Eryx thebaicus*), which is more likely to be mistaken for a viper, is found in East Africa, and specimens were collected at Mbunyi and Kahe.

The colouration is a mixture of pink and chocolate. These snakes feed on mice and young birds, which they constrict before swallowing.

The large Python (*Python sebae*), which ranges over the whole of Tropical and South Africa, where it is variously called Rock Snake and West African Python, reaches a considerable size. A headless skin 26 feet long was brought in by natives from Ngeri-Ngeri. The largest of five specimens brought in by Mushairi was 12 feet in length, weighed 30 lbs., and has been in the writer's possession since September 12, when it was

made as comfortable as possible in a netted cage 12 feet long, with a stream of water running through, and a tank sunk in the middle. However, it was not content, and absconded in the night, having found a weak spot or broken strand in the wire through which it forced its way. A broad track led past the tent door and down through the camp amongst the marquees; one old native admitted having seen it about midnight, but 'thought it was a Swahili,' so hurried into bed. This idea, that the souls of certain distinguished people enter into the bodies of big snakes, is not an uncommon belief amongst the natives.

On September 18 about 8 A.M. there were cries of 'Nyoka,' and presently a boy came running to say that a big snake had been seen near the Askari village 120 yards from here. As the snake stick had been broken the previous evening, it was quite ten minutes later before the writer reached the spot where the snake had been seen, just behind the village in thick bush not more than 200 yards from the cage from which it had escaped six days before. Under the brushwood I immediately recognised my escaped python, as it lay half-concealed beneath a fallen tree.

A native woman was hopping about like a restless sparrow on the trunk of the tree and shouting information to three of her sisters, who had withdrawn to what they considered a reasonable distance thirty feet away. All were armed with pangas, with which they had been chopping off the branches of this tree when they had discovered the snake. Despite the fact that the woman was shrieking information about him back to the village, the reptile never moved, not even when a boy lifted off the brambles and thornbush immediately above him.

The first movement was when the writer tried to seize its neck, when he gave a lunge with open jaws, not necessarily with the intention of seizing, but rather to intimidate, after the fashion of a dog showing his teeth. Almost simultaneously he commenced sliding backwards, but this was circumvented by the writer's boot being placed lightly on his neck, which was then grasped with both hands. For a few moments a tug of war ensued, and considerable strength had to be used to get it clear before the beast could be crowded into a sack.

Quoting from my diary of September 20: 'At 1 A.M. this morning I was roused by an orderly "Did I want a fine big snake?" Dressing hurriedly I accompanied him to the Mess tent of the sick officers' wards. We saw its track in the road as we went. It lay extended beneath the table, and as we entered with a feeble lantern, it struck forward with open jaws a couple of times. Obviously it was excited and more lively than in the daytime.

'I made a détour round the table as it started to retire and grabbed it by the neck just as the orderly disappeared to answer a patient's call. For full two minutes I struggled with the creature, slipping off its coils as fast as it put them on my arm; my foot upon its tail gave me an advantage and I managed to get its head into a sack, after which it went quietly enough. Within a quarter of an hour from the time I was disturbed I was back in bed, having first ascertained that it had squeezed its way out through the wire mesh through sheer force.'

Its feeding possibilities proved very interesting. From September 12 to November 27 it only ate three rats, after which it cast its skin.

On November 28 it took a beautiful little malachite kingfisher (*Ispidiana*). On December 1 it caught and killed a young goshawk which was just able to fly. On December 2, hearing the monkeys making a great to-do, I hastened out to find the python sliding silently towards the bush in which was the goshawk's nest; the remaining goshawk was only removed just in time, for a few minutes later the python had climbed up and was nosing round in the nest.

On December 9 it ate a dead fowl. On December 12 a dead rat and also two headless blue rollers that were smelling badly; it defecated a large amount of hair and feathers and apparently disgorged the quills of the fowl swallowed two days ago. On December 14 it distinguished itself by not only taking a dead wingless fruit pigeon, but the skinned body of a little egret. Having got the body crosswise in its mouth it was in great difficulties, but immediately on the writer taking hold of its neck it dropped it easily enough. It then took it again and swallowed it without further trouble. After

this it had several rats, but refused a white-shouldered crow on December 26.

On January 2 it took fully twenty minutes to swallow a large duck, on the 4th it swallowed a fowl which was green and stinking, on the 5th a crow, on the 6th a fowl, on the 7th a fowl and a duck.

On November 3 a 6-foot and an 8-foot python, which were temporarily placed in a sack at the foot of the writer's bed, escaped, and as there had been heavy rain during the night, tracking them was out of the question. During the same afternoon, whilst endeavouring to dig out a monitor lizard, which had retreated into a clump of grass, the boys had a surprise. Having burnt off the tall sedges which overhung and trailed into the water, one native then began to dig with a trenching tool whilst the writer waited with a forked stick for the moment when it should break cover. Seeing the bank was cracked and that the dislodgement of the loose portion would facilitate matters, he reached down with his left foot and calling to the boys to stand clear, pushed it off and it went rolling down into the stream in which the natives were standing knee deep.

Almost simultaneously a handsome piece of scaling slid through the remaining undergrowth and into the water like a flash. Realising it was a python, the writer slid down the bank after it, but all he got for his pains was a smear of mud and burnt grass up his side and a wetting, the snake making good its escape in the water. On December 25 a 7-foot long python was to be seen lying by the path up the mountain, having been killed by a native on the river the previous day.

The five species of East African Worm Snakes (*Glauconia*) belonging to the family Glauconidæ are curious little creatures, not much thicker than the lead of an ordinary pencil and jet black in colour. Their highly polished scales render them very slippery and difficult to hold when they squirm about. They live underground and feed upon ants. The writer once put a specimen of *Glauconia conjuncta* into a box containing two bucketsful of comb of the white ant or termite, with the result that next morning the snake was dead with two of the

soldier ants biting it. The writer has taken quite a number of specimens of *Glauconia conjuncta* at Longido and Morogoro in the following situations : under a wood pile ; among roots of a tree that was being dug up ; in holes being excavated for a banda pole ; crossing paths, roads, &c.

The last and possibly most primitive family of living snakes is the Typhlopidae or Blind Snakes, which are adapted to a subterranean existence like the Worm Snakes, but come above ground after showers of rain. The prevailing variety of the Spotted Blind Snake in German East Africa seems to be a mottled blue-grey with white tongue. At Garagua one was taken under a stone ; at Mbunyi in a tent trench ; at Handeni one came up through the soil during a shower and another was caught in the road ; at Morogoro in a salvage pit and another in the road.

They are uninteresting objects to keep in captivity, as they immediately bore into the soil with their well-adapted head, obtaining a purchase with the spiny-armed tail. They feed on termites, and a large Blind Snake being placed in the same box as the unfortunate Worm Snake just referred to, thrive well.

Another somewhat uncommon snake is Schlegel's Blind Snake (*Typhlops Schlegelii*), a dirty-white or flesh-coloured reptile, of which the writer obtained three specimens at Morogoro. Eleven other species of Blind Snake are to be found in East Africa, but owing to their very local distribution are difficult to obtain.

From the foregoing it will be seen that there is no easy criterion whereby one may readily distinguish between the poisonous and harmless species. The variations in colour are legion, and the shape of the head is no guide. Some perfectly harmless snakes flatten their head until they look very wicked, whilst such a dangerous creature as the Mamba has a head as shapely as those of any of the harmless colubrines to which it is nearly related. Only by constant examination and handling of dead specimens is one likely to be able to identify a live snake as it flashes past across one's path.