

animals, such as worms, larvæ, and burrowing insects. They are found in all tropical countries and the parts adjoining, and some of the small species have a wide range, having been probably transported by accident on floating objects to distant countries. Some species attain to a length of 24 inches, whilst others scarcely grow to one-fourth that size.

An almost unbroken series leads from these degraded worm-like snakes to the typical *Colubridæ*, of which the Smooth Snake of Europe (*Coronella*), the Corn Snake of North America (*Coluber*), the Rat Snake of India and South America (*Ptyas*, *Spilotes*), Esculapius's Snake of the south of Europe, the common Ring Snake of England (*Tropidonotus*), are well-known representatives.

The Smooth Snake (*Coronella lavis*) is common in the warmer parts of Europe, extending northwards into the New Forest district of England. In coloration, general habits, and size it somewhat resembles the viper; but, although it is rather fierce and ready to bite when caught, it is quite harmless and soon becomes tame in captivity. The shields on its head readily distinguish it from the viper. Its chief food consists of lizards, and it attains a length of 2 feet.

The Indian Rat Snakes (*Ptyas mucosus* and *P. korros*) are two of the most common species of India, the former inhabiting India proper and Ceylon, the latter the East Indian Archipelago, Siam, and southern China. *P. mucosus* is a powerful snake, attaining to a length of 7 feet, the tail being one-third or rather more; it is easily recognized by having three loreal shields, one above the other two; its scales are arranged in seventeen rows. Its food consists of mammals, birds, and frogs; and it frequently enters the dwellings of man, rendering itself useful by clearing them of rats and mice. It is of fierce habits, always ready to bite; when irritated it utters a peculiar diminuendo sound, not unlike that produced by a tuning-fork when struck gently.

Esculapius's Snake (*Coluber æsculapii*) was probably the species held in veneration by the ancient Romans. It grows to a length of about 5 feet, is of mild disposition, and can be readily domesticated. Its original home is Italy, where it is common, but it has extended its range northwards across the Alps into the south of France, and thence into northern Spain. Following the course of the Inn and the Danube, it has reached the Black Sea; and it is also now common in several localities along the middle parts of the Rhine. From direct observations made during the last twenty years there can be no doubt that it is still extending its

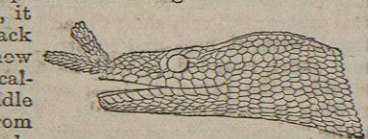


FIG. 8.—Head of *Herpeton tentaculatus*.



FIG. 9.—*Dasypeltis unicolor*, in the act of swallowing a fowl's egg.

range. Naturalists believed formerly that the occurrence of this snake at widely distant and isolated localities was due to its introduction by the Romans, who had settlements in those localities.

The common British Snake or Ring Snake (*Tropidonotus natrix*) is extremely common all over Europe (except in the northern parts), and belongs to a genus extremely rich in species, which are spread over Europe, Asia, India, Australia, and North America. Some of the species, like the Indian *T. quincunciatus* and *T. stolonatus* and the North-American *T. ordinatus*, are perhaps more abundant as regards the number of individuals than any other snake. *T. natrix* is easily recognized even at a distance by two yellow or white spots which it has behind its head. It grows rarely to a length of 4 feet; it never bites, and feeds chiefly on frogs and toads. Its eggs, which are of the size and shape of a dove's egg, and from fifteen to thirty in number, are deposited in mould or under damp leaves, and are glued together into one mass.

A very peculiar genus of snakes, *Dasypeltis*, represented by three species only, is the type of a separate family and is restricted in its distribution to Central and South Africa. In Cape Colony these snakes are well known under the name of "eyevreter," i.e., "egg-eaters." Their principal diet seems to consist of eggs, their mouth and œsophagus

being so distensible that an individual scarcely 20 inches in length, and with a body not surpassing a man's little finger in circumference, is able to swallow a hen's egg. The teeth in the jaws are very small and few in number; but the inferior processes of the posterior cervical vertebrae are prolonged and provided with a cap of enamel, and penetrate the œsophagus, forming a kind of saw. As the egg passes through the œsophagus its shell is broken by this apparatus, and, whilst its contents are thus retained and swallowed without loss, the hard fragments of the shell are rejected. This peculiar apparatus occurs also in another snake, *Elachistodon*, which belongs to the Indian fauna and has been referred (provisionally) to the family *Amblycephalidæ*. Also two prominences at the base of the skull of the Indian Coronelline *Nymphophipidiann* probably have the same function. Besides the snakes mentioned, we have observed species of *Dipsas* feeding on eggs of parrots, the eggs reaching the stomach entire, as these

snakes lack a special apparatus for breaking the shell. The Indian cobra also is said to rob birds of their eggs.

The Tree Snakes (*Dendrophidæ*) are among the greatest ornaments of tropical fauna. The graceful form of their body, the elegance and rapidity of their movements, and the exquisite beauty of their colours have been the admiration of all who have had the good fortune to watch them in their native haunts. The majority lead an exclusively arboreal life; only a few descend to the ground in search of their food. They prey upon every kind of

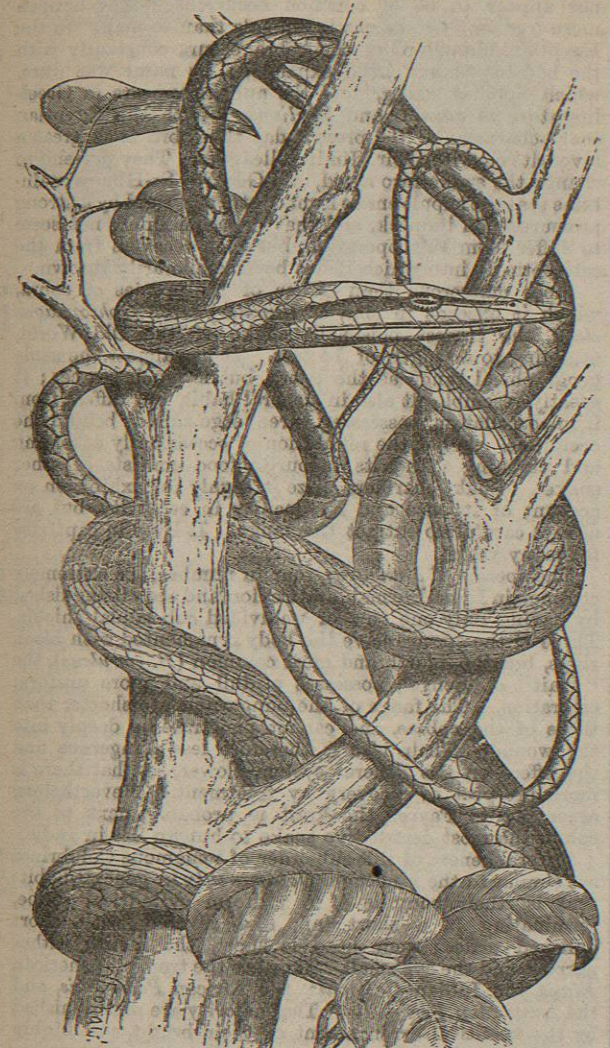


FIG. 10.—Indian whip snake, *Passerita mycterizans*.

arboreal animal,—birds, tree-frogs, tree-lizards, &c. All seem to be diurnal, and the larger kinds attain to a length of about 4 feet. The most beautiful of all snakes are perhaps certain varieties of *Chrysopelca ornata*, a species extremely common in the Indian Archipelago and many parts of the continent of tropical Asia. One of these varieties is black, with a yellow spot in the centre of each scale; these spots are larger on the back, forming a series of tetrapetalous flowers; the head is similarly ornamented. Another variety has a red back, with pairs of black cross-

bars, the bands of each pair being separated by a narrow yellow space; sides brown, dotted with black; belly dark green, the outer portion of each ventral shield being yellow, with a blackish spot.

The features by which the tree snakes are distinguished are still more developed in the family of Whip Snakes (*Dryophidæ*), whose excessively slender body has been compared to the cord of a whip. Although arboreal, like the former, they are nocturnal in their habits, having a horizontal instead of a round pupil of the eye. They are said to be of a fierce disposition, feeding chiefly on birds; and indeed a long tooth placed about the middle of the maxillary seems to assist them much in penetrating the thick covering of feathers and in obtaining a firm hold on their victims. In some of the species the elongate form of the head is still more exaggerated by a pointed flexible appendage of the snout (*Passerita*), which may be nearly half an inch in length, and leaf-like, as in the Madagascar *Langaha*.

The well-defined family of *Lycodontidæ* is chiefly composed of ground snakes, but a few of its members have a sufficiently elongate body to indicate arboreal habits. The Indian genera are principally reptilivorous, while the African prey upon mice, rats, and other small nocturnal mammals. Scarcely any other snake is so common in collections as the Indian *Lycodon arlicus*, which inhabits the continent of India and Ceylon, some of the islands of the East Indian Archipelago (Timor), and the Philippines. It occurs in many varieties, but generally is of a uniform brown, or with some whitish crossbands on the anterior part of the body. Although only 2 feet long, it is a fierce snake, which when surprised bites readily, but its bite is innocuous.

The *Boidæ* are so similar in their habits to the *Pythonæ* Bosc. (see *Python*, vol. xx, p. 144) that it is sufficient to refer in a few words to the species most frequently mentioned in the literature dealing with the fauna of the virgin forests of tropical America. The real *Boa constrictor* is common from the northern parts of Central America to southern Brazil, and is frequently brought alive to Europe. Generally it is only about 7 feet long; but the present writer has seen skins of specimens, which must have been nearly twice that length. The gigantic snakes of from 20 to 30 feet in length

mentioned in books of South-American travels belong to a different species, the Anaconda or *B. murina*, which has the same habits as the *B. constrictor*, haunting the banks of rivers and lakes and lying in wait for peccaries, deer, and other mammals of similar size, which come to the water to drink. It has already been stated (see *REPTILES*) that this family is not restricted to South America, but is well represented in the tropical Pacific region. The Boid most common in that region is *Enygrus*, which ranges all over New Guinea, the Fiji Islands, the Solomon group, Samoa, and many other Pacific islands; it is of small size, scarcely 30 inches long.

We pass now to the Venomous Colubrine snakes, that is, snakes which combine with the possession of a perfect poison apparatus the scutellation and general appearance of the typical non-poisonous snakes. It is a remarkable

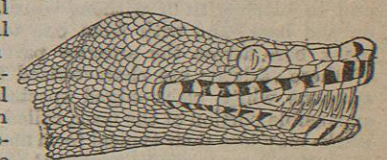


FIG. 11.—Head of *Boa constrictor*.

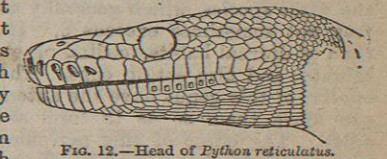


FIG. 12.—Head of *Python reticulatus*.

fact, however, that the snakes of this sub-order agree in the absence of the small shield on the side of the snout, the so-called "loreal"; and this is all the more remarkable as the same shield has by no means a similar taxonomic significance in the non-venomous snakes, many of which are without it, although it is present in the majority. No snake of this sub-order is more widely known and more dreaded than the species of the genus *Naja* or cobras. Probably more than two species should be distinguished; but the two which cause the greatest loss of life are the Indian Cobra or Cobra di Capello or Naga (*N. tripudians*) and the African Cobra (*N. haje*). In a report to the Bengal Government the commissioner of Burdwan states that he has ascertained from statistics collected during a series of nine years that above 1000 persons are killed annually by snakes in a population of nearly 6,000,000, the majority being bitten by the cobra, which is by far the most common. And other districts in India seem to suffer still more severely, although it is difficult to obtain information of all the accidents caused by snakes. The cobra is found throughout India, extending westwards to the Sutlej and eastwards to the Chinese island of Chusan; in the Himalayan alps it reaches an altitude of 8000 feet; it occurs also in abundance in many of the islands of the East Indian Archipelago, and is here joined by another apparently distinct species (*N. sputatrix*), whilst in the central portions of Asia, which geographically separate it from the African cobra, it is replaced by a fourth, *N. oxiana*. The Indian cobra appears in many varieties of colour, which are distinguished by separate names in the nomenclature of the Hindu snake-charmers. The ground colour varies from a yellowish olive to brown and to black with or without whitish or white crossbands on the back, and with from one to four or without any black bars across the anterior part of the belly. Some of these varieties are characterized by a pair of very conspicuous white, black-edged spectacle-like marks on the expansible portion of the neck, called the "hood"; but these marks may lose their typical form and become merely a pair of ocellated spots, or be confluent into a single ocellus, or may be absent altogether. All these varieties, however, are the same species, which generally attains to a length of 5 feet, but sometimes exceeds 6. It is more of nocturnal than of diurnal habits, feeding on every kind of small Vertebrates and also eating eggs. The cobra and the other species of this genus have the anterior ribs elongated, and can move them so as to form a right angle with the spine. The effect of this movement is the dilatation of that part behind the head which is generally ornamented with the spectacles or ocelli. When the cobra is irritated or excited it spreads its "hood," raising the anterior third of the body from the ground, gliding along with the posterior two-thirds, and holding itself ready to strike forwards or sideways. All accounts agree that the cobra is not aggressive unless interfered with or impelled by a sense of danger. It is said to share the habitations of man where superstition prevents people from molesting it, and to live peaceably with the inmates; and there is no doubt that professional snake-charmers exercise a certain control over them, for, although generally the cobras exhibited are rendered harmless by the removal of the poison-fangs, they very rarely attempt to injure their masters even after the fangs have been reproduced. Of the natural enemies of the cobra, the mongoos (see vol. xii. p. 629) does probably the greatest amount of execution; many are destroyed by

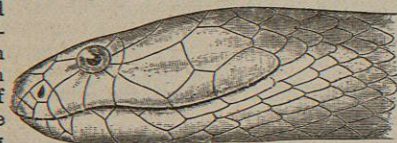


FIG. 13.—Head of cobra.

fowls shortly after being hatched. The cobra is oviparous depositing from eighteen to twenty-five eggs in the year. The African cobra is extremely similar to its Indian congener in size, form, and habits, and varies in coloration to the same extent. It inhabits the whole of Africa, from Egypt to the Cape of Good Hope, but has been nearly exterminated in the cultivated districts of the Cape Colony. One of its greatest enemies (as indeed of all snakes) is the secretary bird of South Africa (*Serpentarius*), which, therefore, is protected by law. Accidents from this snake do not appear to be of common occurrence; they happen more frequently to domestic animals than to man. In the Egyptian hieroglyphics the cobra occurs constantly with the body erect and hood expanded; its name was *ouru*, which signifies "king," and the animal appears in Greek literature as *ouraios* and *basiliscus*. With the Egyptian snake-charmers of the present day the cobra is as great a favourite as with their Hindu colleagues. They pretend to change the snake into a rod, and Geoffroy St-Hilaire maintains that the supple snake is made stiff and rigid by a strong pressure upon its neck, and that the animal does not seem to suffer from this operation, but soon recovers from the cataleptic fit into which it has been temporarily thrown. More dangerous than either of the species of cobra, *Ophis* which it exceeds in size, is *Hamadryas* or *Ophiophagus phagus*, *elaps*, the largest poisonous snake of the Old World, attaining to a length of 14 feet. It has almost the same geographical range as the cobra, but is much scarcer; it greatly resembles it also in general habit, but differs from it in scutellation, possessing three large shields behind the occipitals. It has the reputation of occasionally attacking and pursuing man; its favourite food consists of other snakes. Snake-charmers prize it highly for exhibition on account of its size and its docility in captivity, but are always careful to extract the fangs. It lives in captivity for many years. The species of *Bungarus*, four in number, are extremely common in India, Burmah, and Ceylon, and are distinguished by having only one row of undivided sub-caudal shields. Three of the species have the body ornamented with black rings, but the fourth and most common (*B. caeruleus*), the "krait" of Bengal, possesses a dull and more uniform coloration. The fangs of the bungarus are shorter than those of the cobras, and cannot penetrate so deeply into the wound. Their bite is therefore less dangerous and the effect on the general system slower, so that there is more prospect of recovery by treatment. Nevertheless, according to Payrer, the krait is probably, next to the cobra, the most destructive snake to human life in India. Several genera of this sub-order of Venomous Colubines are similar to the innocuous *Calamariidae* in general habit; that is, their body is of a uniform cylindrical shape, terminating in a short tail, and covered with short polished scales; their head is short, the mouth rather narrow, and the eye small. They are the tropical American *Elaps*, the Indian *Callophis*, the African *Paezilophis*, and the Australian *Vermicella*. The majority are distinguished by the beautiful arrangement of their bright and highly ornamental colours; many species of *Elaps* have the pattern of the so-called coral snakes, their body being encircled by black, red, and yellow rings,—a pattern which is peculiar to snakes, venomous as well as non-venomous, of the fauna of tropical America. Although the poison of these narrow-mouthed snakes is probably as virulent as that of the preceding, man has much less to fear from them, as they bite only under great provocation. Moreover, their bite must be frequently without serious effect, owing to their narrow mouth and the small size of their poison-fangs. They are also comparatively of small size, only a few species rarely exceeding a length of 3 feet.

fortunately the majority are of small size, and their bites are not followed by more severe effects than those from the sting of a hornet, especially if the simple measures of sucking or cauterizing the wound are resorted to. Only the following are dangerous to man and larger animals:—the Brown Snake (*Diemenia superciliosa*), found all over Australia and attaining to a length of over 5 feet; the Black Snake (*Pseudechis porphyriacus*), likewise common throughout the Australian continent, especially in low marshy places, and upwards of 6 feet in length; it is black, with each scale of the outer series red at the base; when irritated it raises the fore part of its body and flattens out its neck like a cobra; the Brown-banded Snake (*Hoplocephalus curtus*), with a similar distribution, and also common in Tasmania, from 5 to 6 feet long, and considered the most dangerous of the tribe.<sup>1</sup>

The small family *Causidae* contains two African genera well known to and much feared by the inhabitants of South Africa. One, *Sepedon haemachates*, is named by the Boers "roode koper kapel" or "Ring-Neck Snake," the latter name being, however, often applied also to the cobra. It resembles in colour some varieties of the latter snake, and, like this, it has the power, though in a less degree, of expanding its hood. But its scales are keeled and its form is more robust. It is equally active and courageous, not rarely attacking persons who approach too near to its resting-place. In confinement it evinces great ferocity, opening its mouth and erecting its fangs, from which the poison is seen to flow in drops. During such periods of excitement it is even able, by the pressure of the muscles on the poison-duct, to eject the fluid to some distance; hence it shares with the cobra a third Dutch name, that of "spuw slang" (Spitting Snake). It grows to a length of 2 or 3 feet. The second African snake of this family is the "schapsticker" (Sheep Stinger), *Causus rhombeatus*. It is extremely common in South Africa and extends far northwards along the eastern as well as western coast. It is of smaller size than the preceding and causes more injury to animals, such as sheep, dogs, &c., than to man. It varies in colour, but a black mark on the head like an inverted V remains nearly always visible.

No part of the world possesses so many snakes of this sub-order as Australia, where, in fact, they replace the non-venomous Colubrine snakes. Of the genus *Diemenia* six species, of *Pseudechis* three, and of *Hoplocephalus* some twenty species have been described, and many of them are extremely common and spread over a considerable area.

The *Dinophidæ* are the arboreal type of this sub-order; they resemble non-venomous tree snakes in their gracile form, narrow scales, generally green coloration, and in their habits; nevertheless the perfect development of their poison-apparatus, their wide mouth, their large size (they grow to a length of 7 feet), leave no doubt that they are most dangerous snakes. They do not appear to be common, but are spread over all districts of tropical Africa in which vegetation flourishes. Of Sea Snakes (*Hydrophidæ*) some fifty species are known. All are inhabitants of the tropical Indo-Pacific ocean, and most numerous in and about the Persian Gulf, in the East Indian Archipelago, and in the seas between southern China and northern Australia. One species which is extremely common (*Pelamis bicolor*), and which is easily recognized by the black colour of its upper and the yellowish tints of its lower parts (both colours being sharply defined), has extended its range westwards to the sea round Madagascar, and eastwards to the Gulf of Panama. Sea snakes are viviparous and pass their whole life in the water; they soon die when brought on shore. The most striking feature in their organization is their elevated and compressed tail. The hind part of the body is compressed, and the belly forms a more or less sharp ridge. The ventral shields would be of no use to snakes moving through a fluid, and therefore they are either only rudimentary or entirely absent. The genus *Platurus*, however, is a most remarkable exception in having broad ventral shields; probably these serpents frequently go on shore, sporting or hunting over marshy ground. In many sea snakes the hind part of the body is curved and prehensile, so that they are able to secure a hold by twisting this part of the body round corals, seaweed, or any other projecting object. Their tail answers all the purposes of the same organ in fish, and their motions in the water are almost as rapid as they are uncertain and awkward when the animals are removed out of their proper element. Their nostrils are placed quite at the top of the snout, as in crocodiles and in freshwater snakes, so that they are enabled to breathe whilst the entire body and the greater part of the head are immersed in the water. These openings are small and subrescentic, and are provided with a valve interiorly, which is opened during respiration, and closed when the animal dives. They have very capacious lungs, extending backwards to the anus, and consequently all their ribs are employed in performing the respiratory function; by retaining air in these extensive lungs they are able to float on the surface of the water without the slightest effort, and to remain under water for a considerable length of time. The scales of sea snakes are frequently very different from those of other snakes: they overlap one another in only a few species; in others they are but little imbricate and are rounded behind; and in others they are of a subquadrate or hexagonal form, placed side by side, like little shields. The less imbricate they are the more they have lost the polished surface which we find in other snakes, and are soft, tubercular, sometimes porous. Sea snakes shed their skin very frequently; but it peels off in pieces as in lizards, and not as in the freshwater snakes, in which the integuments come off entire. Several species are remarkable for the extremely slender

African Causide.

Narrow-mouthed species.

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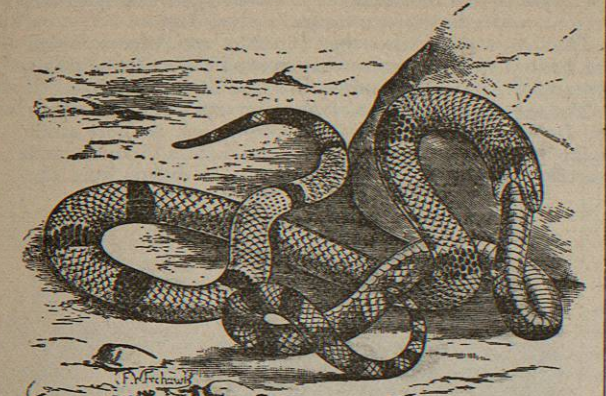


FIG. 14.—A poisonous snake (*Elaps fulvius*) swallowing a non-poisonous (*Homaloceranium semicinctum*).

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<sup>1</sup> Good descriptions and figures of all these snakes are given in Krefft's *Snakes of Australia*, Sydney, 1869, 4to.

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FIG. 15.—Sea snake, *Pelamis bicolor*.

and prolonged anterior part of the body, which is termed the "neck," and terminates in a very small head. The eye is small, with round pupil, which is so much contracted by the light when the snake is taken out of the water that the animal becomes blinded and is unable to hit any object it attempts to strike. The tongue is short, and the sheath in which it lies concealed opens near to the front margin of the lower jaw; scarcely more than the

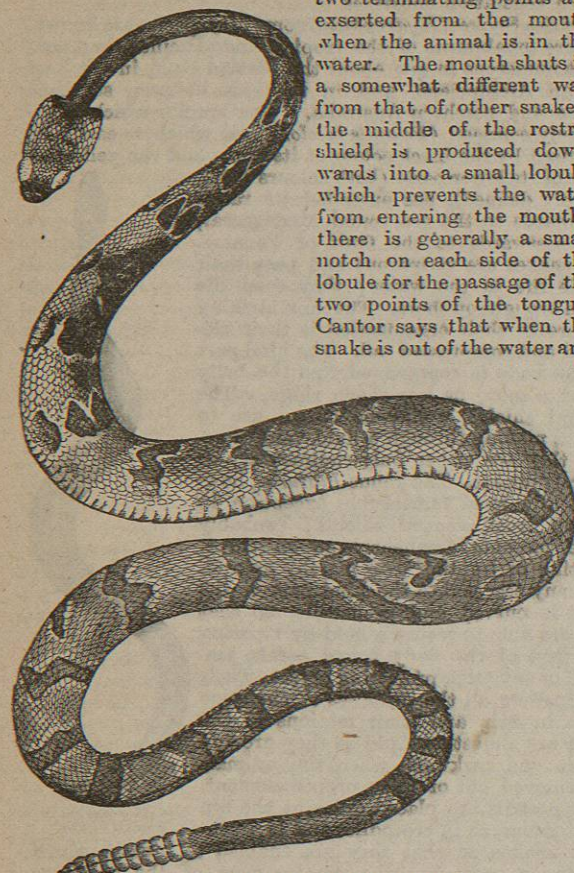


FIG. 16.—Rattlesnake (*Crotalus durissus*).

two terminating points are exerted from the mouth when the animal is in the water. The mouth shuts in a somewhat different way from that of other snakes: the middle of the rostral shield is produced downwards into a small lobule, which prevents the water from entering the mouth; there is generally a small notch on each side of the lobule for the passage of the two points of the tongue. Cantor says that when the snake is out of the water and

even turning round to wound their own bodies (Cantor). They cannot endure captivity, dying in the course of two or three days, even when kept in capacious tanks. The greatest size to which some species attain, according to positive observation, is about 12 feet, and therefore far short of the statements as to the length of the so-called sea serpents (see SEA-SERPENT). The largest examples the present writer has seen measured only 8 feet.

Passing over Rattlesnakes (fig. 16) and Vipers, which are treated of in separate articles, we notice the following types of the fourth sub-order, the *Ophidii viperiformes*.

The sole representative of the sub-order in Australia is the Death Adder (*Acanthophis antarctica*), a short stout snake having a similar habitus and habits to vipers and scarcely attaining 3 feet in length. It differs from the

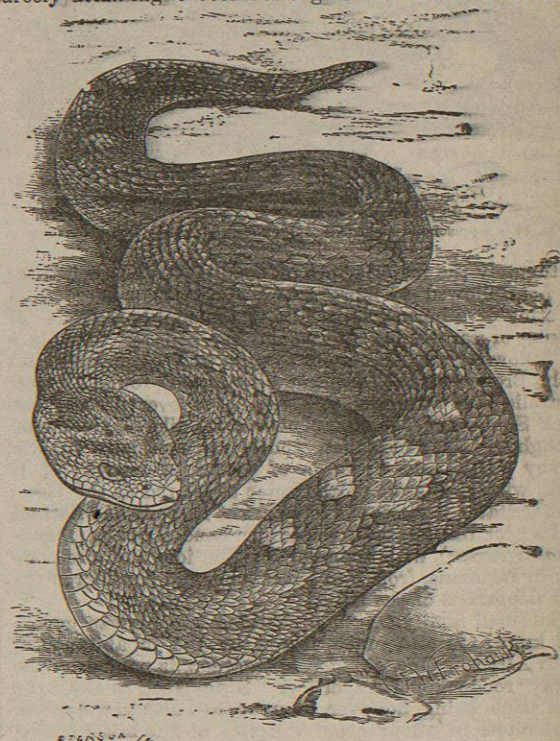


FIG. 17.—*Eklis carinata* (India).

other Viperines in having the poison-fang permanently erect. Although much feared, and justly, there is reason to believe that its bite is not so dangerous as has been represented, and that the majority of the fatal accidents ascribed to it are in fact caused by other snakes, probably *Hoplocephalus curtus*. It occurs throughout the whole of Australia, except Tasmania and perhaps South Australia. Generally it is of a uniform grey colour, relieved by some forty dark rings of irregular outline.

The "tic-polonga" of the Singalese (*Daboia russellii*) is beautifully marked: on a light chocolate ground colour three series of large black white-edged rings run along the back and sides of the body, a yellow line borders the surface of the head on each side, the two lines being convergent on the snout. It attains to a length of 50 inches, and occurs locally in abundance in southern India, where it is called "cobra monil"; in Bengal, where it is called "jessur"; in the plains of central India, as well as in the Himalayas to an altitude of 6000 feet; and in Burmah. It is highly poisonous, probably causing many deaths

Fortunately its loud hissing when disturbed warns those who come within dangerous proximity to it.

The small Viperine snake, *Eklis carinata* (fig. 17), which scarcely exceeds a length of 20 inches, shares with the preceding part of its range, being found in the arid districts of southern India, and extending through the intervening parts of Asia to North Africa. It is a desert type, having the lateral scales curiously arranged, strongly keeled, with the tips directed downwards. It produces with their aid a rustling sound. Whilst some observers deny that fatal consequences have resulted from its bite, Dr Imlach reports that it (the "kuppur") is "the most deadly poisonous snake

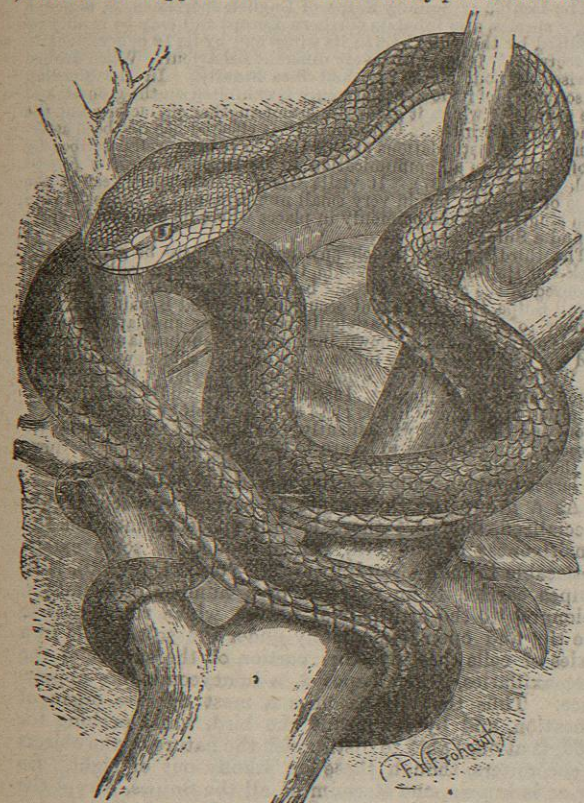


FIG. 18.—*Trimeresurus erythrorus* (India).

in Sind." This desert type is replaced farther south in Africa where vegetation flourishes by a closely allied genus, *Atheris*, which, however, possesses a prehensile tail and vivid coloration and has assumed truly arboreal habits.

Of the pit vipers without rattles the largest and most formidable inhabit tropical America. *Trigonocephalus iavavaca*, *T. atrox*, and *T. lanceolatus* attain to a length of 6 feet, the first two being common in Brazil and northwards to Central America. The last is limited to some islands in the West Indies, especially Martinique and St Lucia, and is generally known by the name of "fer de lance," which has been given to it from the markings on its head. It infests the sugar-plantations, and has greatly multiplied in consequence of the protection which the cover of the cane-fields afforded it, and the abundance of food supplied by the rats which swarm on the plantations. Thus, whilst it did a certain amount of good by the destruction of vermin, it caused a great number of deaths among the black labourers who were engaged in the fields. These three species of *Trigonocephalus* are sur-

passed in size by *Lachesis mutus*, probably the largest of terrestrial poisonous snakes, which is said to exceed a length of 10 feet, and is bulky in proportion. It is confined to the hottest parts of tropical America. Similar snakes, but smaller in size, inhabit the warmer and temperate parts of North America, viz., the Copper-head (*Cenchrus contortrix*) and the Crater-mocassin (*C. piscivorus*), the former of terrestrial habits, the latter being always found near water and feeding chiefly on aquatic animals. Both are much feared and cause accidents more frequently than rattlesnakes, being more aggressive and striking the intruder without previously warning him of their presence. In the Indian region this type of pit vipers without rattles is likewise well represented, one genus (*Trimeresurus*) being adapted for an arboreal life, like *Atheris* among the *Viperidae*. Their body (fig. 18) is not more elongate than that of other ground *Crotalines*, but their tail is prehensile, and their colour generally resembles that of the bright foliage among which they live. Sometimes bright yellow or red markings render these snakes still more pleasing to the eye. Accidents caused by them are of not uncommon occurrence, but fortunately only a few individuals exceed a length of 2 feet, and the consequences of their bite are less to be dreaded than of that of other allied genera. Indeed, numerous cases are on record which show that the constitutional symptoms caused by their poison were of short duration, lasting only from two to forty-eight hours, and being confined to nausea, vomiting, and fever. The bite of larger specimens, of from 2 to 3 feet long, is more dangerous and has occasionally proved fatal. They feed on frogs, mammals, and birds. (A. C. G.)

Snake-stone, a name sometimes applied to Water-of-Ayr stone (see HONE, vol. xii. p. 134). Certain stones reputed, on insufficient grounds, to possess efficacy as antidotes to snake-bites are known as snake-stones (see above, p. 192). The term is also popularly applied to ammonites and certain other fossils which, owing to their spiral shape, were formerly regarded as petrified snakes.

SNEEK, a town of the Netherlands, in the province of Friesland, 18 miles south-south-west of Leeuwarden, with which it is connected by canal and (since 1885) by rail. It is one of the great butter and cheese markets of the country and has communal buildings (1863), a town-house, a court-house, an orphanage, a synagogue, and several churches, in one of which (the Groote or Maartenskerk) is the tomb of the naval hero Lange Pier (Long Peter). The population of the town was in 1870 8456; that of the commune, which numbered only 3253 in 1714, was 9248 in 1870 and 10,496 in 1880.

Sneek appears in the list of Frisian towns in 1268. It was almost reduced to ashes in 1295, and again in 1417 and 1457. In 1515 it was attacked and in 1517 formally besieged by the Burgundians. A diet met in the town in the close of this latter year; and long after, in 1672, Sneek was again the seat of an assembly of the states. In 1570 and in 1825 there were severe inundations.

SNELL, WILLEBRORD (1591-1626), commonly known as SNELLIUS, astronomer and mathematician, was born at Leyden in 1591. In 1613 he succeeded his father as professor of mathematics in the university of Leyden. In 1615 he planned and carried into practice a new method of finding the dimensions of the earth, by determining the distance of one point on its surface from the parallel of another, by means of a triangulation. His work *Eratosthenes Batavus*, published in 1617, describes the method and gives as the result of his operations between Alkmaar and Bergen-op-Zoom a degree of the meridian equal to 55,100 toises = 117,449 yards. (A later recalculation has given 57,033 toises = 121,569 yards, after applying some corrections to the measures indicated by himself.) Snell also distinguished himself as a mathematician, and discovered the law of refraction, which,