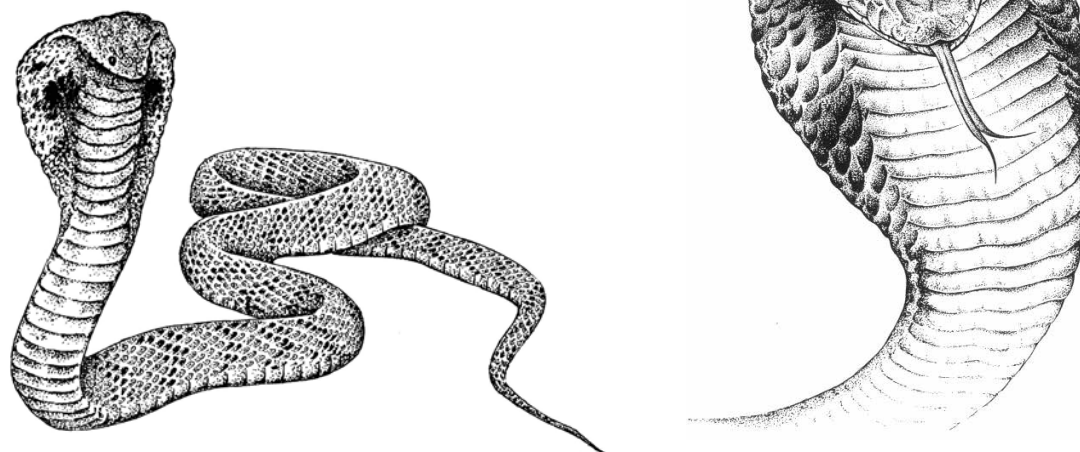


Snakes

(Tamil: *pambu*)



“The snake physically represents, embodies in the material world, the vibration of evolution.”

- The Mother

Of all the creatures on Earth beneficial to mankind, surely snakes are the most widely feared and shunned. Yet in India, particularly, they should be among the most widely respected and appreciated, because they do a crucial job of rodent control; so much so that the government introduced a ban on trade in snake skins when it was found that it was tipping the snake-rodent war in favour of the latter. They also eat other unwanted creatures such as cockroaches and scorpions. (The rats in Mumbai alone are annually calculated to eat or spoil food sufficient to feed a million people for a year. As far back as 1971, damage to food and crops by the estimated 5 billion rats in India was calculated at 750 crores rupees/US \$165million per annum. Recent figures suggest that they eat or destroy over 10 million tons of grain a year!)

Human reaction to snakes

Sadly, largely through ignorance, snakes are a widely persecuted life-form in India. Many people dislike them for their sinuous motion (though some find it sensuously beautiful), or for their feeling when touched (they are cold blooded), but most people are simply afraid of them, fearing them on the assumption that they are venomous. This is most unfortunate, because at the most only 50 of the near-280 species of snakes found in India have a bite giving any sort of toxic symptoms, and of those 50 only around 15 have ever proved fatal (of the 15, just 4 – the Cobra, Krait, Russell’s Viper and Saw-scaled Viper – are regular killers).

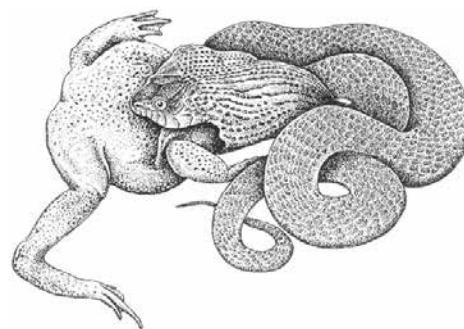
In regard to human fear of snakes, it is a highly exaggerated reaction/emotion, because the chances of being killed by a snake are extremely small. Bus and lorry drivers, for a start, are probably just as dangerous as snakes, in that they almost certainly kill or maim similar numbers of people each year. In the whole of India, with its near-1.2 billion population, of the approximately one million people bitten by snakes each year only 1 in 20 dies. Even those figures don’t represent the actual threat, because a fair percentage of people die more from fear and conviction that they will die than from the venom itself. Finally, to round off such statistics, one can add that of those bitten two-thirds are usually males aged 10-20; most are bitten during the hot summer months and early monsoon between 6pm and midnight; and 40% get bitten on the feet and 25% on the hands.

Snakes in general

Worldwide, snakes – which are little more than legless lizards – are known to range in size from 10cms/4in. to around 7.5m/25ft, though even larger specimens have been recorded. Up to quite recently the biggest officially recorded Reticulated Python measured 10.1m/36ft, but in 2004 Indonesian villagers are said to have captured a gigantic 14.85m/48ft specimen weighing 447 kgs, which they were feeding with 4 dogs a month. However, this has not been officially verified.

Generally, snakes lead a quiet and peaceful existence, avoiding humans, who have killed them for their skin (now illegal in India), collected them for medicinal purposes, and sometimes eaten them. They also try to avoid other predators such as peacocks, falcons, mongooses, owls, kites, and – perhaps surprisingly – fellow snakes, such as the King Cobra, Rat Snake and Krait. Cannibalism is common; even mothers

have been seen eating their young. Their own diet, meanwhile, generally consists of rats, mice, frogs, birds, insects and lizards, all of which they prefer to take alive. The Python, however, which may grow to 7.5m/25ft in length and weigh over 120 kgs, can handle bigger prey and takes the occasional dog, small deer, goat or pig, opening its jaws an incredible 180 degrees – 3 times as wide as its head – to ingest them. (There's a record of a Fer de Lance snake eating a lizard 1.5x its own weight, surely the ultimate feat of terrestrial gluttony?!)



Mating / reproduction

There is no specific mating season for snakes, though quite a number mate during the rainy season. A month or two after mating they lay their eggs in termite mounds, rat burrows, tree holes, under piles of leaves, in sandy soil, etc (except for the King Cobra, which makes a nest), or give birth to young around two months later. (The “or” in the previous sentence is deliberate, because some snakes lay eggs, others – such as vipers, vine snakes and sand boas – give birth to live young.)

Cobras, which seem to be the most intelligent of all snakes, and demonstrate some maternal feeling by staying over their eggs (kraits and checkered keelbacks also do the same), lay up to 50 eggs at a time, which hatch in 50-60 days. From day one the baby snakes are fully venomous, though the amount of venom they can inject at birth is small. They need no maternal support, and begin hunting for themselves within a week or two of birth. They then continue to grow throughout their life, which may be for up to 25 years in the wild.

Need for sun, humidity and shade

Since snakes are cold blooded and have no means of controlling their body temperature, much of their behaviour is affected by the need to find sun, humidity or shade to warm, moisten or cool their bodies respectively. This also explains why many species hibernate for several months in winter in temperate regions, lowering their metabolism and living on stored body fat until ambient temperatures are again conducive to efficient hunting; though this is not true for all snakes, which have varying degrees of heat tolerance. A cobra, for example, will usually die after one hour of continuous exposure to the full summer sun.

Need to shed their skin

Another characteristic of all snakes is the need to shed their skin at regular intervals. The first shedding may be a few days after birth, then it's at steadily increasing intervals, until a frequency of every 2½ to 7 months is established, depending on their age and the time of year (it's more frequent in summer). When about to cast off a skin their behaviour becomes sluggish, and their already poor eyesight is severely reduced by the smoky, opaque nature of the dead skin over the eyes. This skin splits at the head, and they then gradually discard it like an out-turned jacket. If they can't cast off the skin in its entirety, they become ill and may die. The contrast between the tattered sloughing stage of shedding the skin and the sight of the beautiful fresh creature which emerges with its black, white, green, yellow, red, brown or bluish colour or combination of colours is very dramatic.

Swimming ability

All snakes can swim, sometimes staying under water for up to 10 minutes at a time. Some, such as cobras, king cobras, rat snakes, etc, are really good swimmers, and can manoeuvre in water almost as easily as on land. In contrast, sea snakes, which have the reputation of being highly venomous (one gram of their toxin could kill 500 people, though they rarely if ever bite humans), have great difficulty moving about on land.

Sensory capabilities

Regarding their sensory apparatus, firstly, as already mentioned, snakes have poor eyesight (some species are actually blind). Their eyes, which may have a round pupil or an elliptical vertical slit pupil, can each be moved independently, though there is no blinking because they are protected by a transparent film over the surface of the eye which forms part of their body skin. They have no external ear, and only a rudimentary internal 'hearing' mechanism. Where they are particularly sensitive is to smell, heat, touch and vibration. Their sensory organ of smell is their forked tongue, which they constantly flick in and out when hunting. Scent particles in the air are picked up on the tongue and analysed via a structure on the palate of their upper

jaw called Jacobson's Organ. The rate of flicking in and out of the tongue is an indicator of their general state of alertness or excitement; though beware, because it slows considerably just before they strike! Heat, in certain species such as pit vipers and pythons, can also be sensed via a thermo-receptor unit located in pits on their head. This helps such species locate their prey, specially at night.

The most highly developed sense of all, however, is that related to touch and vibration. They sense even the slightest tremor through the ground, so are able to detect our approach in advance and take evasive action, or in the case of prey move in for the kill.

Movement

Snakes can move backwards as well as forwards. On land the four basic types of forward movement, depending on species and circumstances, are horizontal undulation, which involves lashing the head followed by the body from side to side (normally on rough surfaces); straight-line progression; side winding, in which the body is alternately moved ahead of the head/neck area and then used as anchorage to swing the latter to a new forward position (usually in hot desert conditions or on smooth surfaces); and concertina progression (somewhat like earthworms). Of the four movements, the first two are the most rapid. One of them would certainly be seen in the case of the Black Mamba, one of Africa's most dangerous snakes, which can reach speeds of over 20 kph in short bursts!

Feeding

Snakes' prey is first caught in the mouth; only later – in the case of some species – may a coil or two be wrapped around the victim's body. The deadly venomous snakes like the cobras and vipers have two hollow fangs at the front of their mouth via which they inject venom. Other less venomous snakes like the vine snakes and cat snakes have grooved or canalized fangs at the back of their mouth for this purpose. If a fang gets broken off they can re-grow it from a bud at the base in 3-6 weeks. There is no chewing or partial eating of the victim; it is simply swallowed whole, head first, for later quiet digestion.



Ingestion of prey is facilitated by the fact that their lower jaw (which is in two pieces, linked by an elastic ligament) is not hinged to the skull, and can be opened extremely wide. The process is further helped by the fact that their teeth are inward curving, so movement of the food can only be in one direction. They digest every scrap of their victims, except for claws and feathers, the process usually taking several days to complete. During this time they make no attempt to catch other prey. Occasionally they have been observed in captivity (but perhaps not in the wild?) to fast for prolonged periods of several months.

Additional facts

The sound-producing capability of snakes, depending on species, ranges from hissing to bird-like guttural sounds, to rattling noises. Their skeleton may consist of anything from 130 to 500 vertebrae (cf. 24 in humans) which, with the exception of the first two and tail portion, all have ribs. They have a double penis, but have only one lung. All snakes can emit a sometimes foul smelling musk secretion from glands in their cloaca, presumably to deter over-enthusiastic predators. And, like us, they sometimes suffer from worms!

“OK, OK, but what if I am bitten, say by a cobra?”

Firstly, a cobra won't 'attack' you; it doesn't prey on humans, so it has to be provoked, stepped on or cornered for it to bite. Even then, it normally will try to avoid actually biting, either by making threatening mock strikes to drive you back or simply by physically butting you and not biting.

If you were bitten, the first question is whether it was really a cobra, because many snakes of a non-venomous nature – such as the water snakes – also bite. A sometimes visible clue, if the snake was not identified, may lie in the teeth marks. Venomous snakes can leave two larger puncture marks from their poison fangs at the end of curved lines of smaller marks (see A), whereas non-venomous snakes leave only lines of



small teeth marks (see B). However, in reality one can very rarely see the bite pattern, so just because you don't see any larger fang marks you shouldn't assume that the bite was from a non-venomous species.

The next question is whether it actually injected venom? And if so how much, because they often fail to inject a full lethal dose. The venom must have entered the bloodstream to be dangerous. Provided you have no cuts or abrasions from mouth to anus you could even swallow it without coming to serious harm, which is of course more or less what snakes do themselves all the time as they ingest the venom inside their prey, though with the positive advantage for them that the venom assists digestion of their victim.

The worst that could happen is that you are bitten directly into an artery with a full lethal dose of venom. Say your prayers, because symptoms would begin immediately, and you would quickly be in serious trouble. However, this is so unlikely as to be scarcely worth considering. Let's just assume that it was a flesh bite. As quickly as possible you need to get to a hospital where they keep anti-snake venom serum e.g. Jipmer, PIMS or the Government Hospital in Pondicherry, ideally without physical exertion on your part to minimize moving the bitten part and thereby further spreading the venom i.e. by way of a car (motorcycle transportation should be avoided if the car option is available, because the victim could develop paralysis on the way and fall off a two-wheeler). Meanwhile, don't put ice on the bite; don't eat anything or drink alcohol; don't take any sort of painkiller; remain as calm and relaxed as possible; and convince yourself that you're going to come through it OK, which you almost certainly will if you don't panic. If you are also able to obtain and bring with you a photo of the snake by cellphone camera or other means, so much the better, because precise identification will help the doctors to decide on the most appropriate treatment.

Other action to be taken, or not taken

"Meanwhile, should I tie a tourniquet/ligature above the bite site to cut off blood circulation, or make crossed incisions over the fang marks to let the venom bleed out, or even try to suck out the venom?" you may ask. The answer to all three is "No!" Those are old, outdated, potentially dangerous techniques for treating bites, which can cause other serious problems for the victim, or in the latter case for the aid-giver. Up to recently it was also believed that the black "Katanga Stone" could deal adequately with snake bite and draw poison from the bite site, but this is incorrect and a dangerous waste of time; it is imperative to get to a hospital as quickly as possible.

There is, however, one practical thing you can do if – instead of being a victim – you find yourself accompanying a bite victim to hospital who develops breathing difficulties. That is to apply mouth-to-mouth artificial respiration or use a simple 'ambubag' to keep the victim breathing, because in the case of cobra and krait bite the actual cause of death is usually respiratory failure, and if the person can be kept breathing (done in hospital by way of a mechanical respirator, sometimes for several days in extreme cases) the body will gradually deal with the venom.

So much for serious advice, but as a distraction you may be amused to learn of another outdated first-aid approach, recommended in the past for people bitten far from a hospital and aimed at drawing the venom out of the bite sight. (I quote, from an authoritative source...) "*The muscular action of the anal sphincter of a live chicken is said to be usable for drawing poison from snake bites.*" If anyone died of laughing while trying that maybe it was a better way to go than waiting for the snake's venom to finish them off!

OK, back to the serious world. If the bite didn't produce any initial symptoms, still consult a doctor, as krait bite – for example – may not show symptoms for some hours.

What to expect if no action is taken

If a full dose of venom was injected by the snake and it was a cobra (because different snakes produce different symptoms), here's what to expect if you do nothing.

Within 10 minutes the bite area would develop a small reddish weal and become tender, with slight to intense burning pain. After about 25 minutes you would feel sleepy, slightly intoxicated, weak in the legs, and disinclined to stand or move. After 35-50 minutes, you would begin to salivate profusely and perhaps vomit, following which would come paralysis of the tongue and larynx, so swallowing or speaking coherently would become impossible, and opening your eyes would also become impossible. After about two hours paralysis would be complete, your respiration slowing, and your pulse quickening. Soon after, respiration would cease – sometimes with convulsions – and the heart would stop.

Not an experience to be recommended! However, just to restore balance and a sense of normality as we near the end of this lengthy article, please remember that the vast majority of snakes are HARMLESS, and the vast majority of snakebites are neither serious nor fatal (96% of people bitten survive).

How to avoid getting bitten

Tips to minimize risk of snake bite include: wearing footwear and long pants/trousers at night and always carrying a torch; not putting one's bare hand down into termite mounds or holes under tree roots; never cornering a snake in such a way that it has no escape route; and quietly backing-off and away from any snake threatening to strike.

Conclusion

Snakes make a positive contribution to our life on Earth through rodent control, etc. They are essentially peace loving, beautiful creatures, which many people around the world keep as pets, and fully merit our respect, our gratitude and our protection. However, if you're still not turned on to snakes after all the above, and the thought of meeting one absolutely freaks you out, here comes some final good news. According to the sources researched for this article, you are definitely safe from snakes in Antarctica; traditionally safe from them in Ireland; and may also be safe from them in Iceland and Greenland, because none of the world's near-3,000 species are indigenous to those land masses. Other places originally without snakes were New Zealand, Newfoundland, Hawaii and the Falkland Islands, but it seems that in each case species have been accidentally introduced by way of the pet trade, or have been imported in cargo from around the world, so no guarantees can be given for those locations!

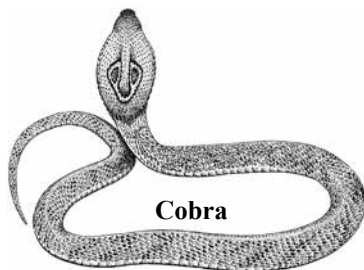
Additional miscellania

- * The bite of a King Cobra can inject enough venom to kill up to 20 people.
- * Should you have the good fortune to see two mature snakes entwined around each other with their heads raised as high as possible above ground level, swaying back & forth, what you are witnessing is not a mating ritual but a trial of supremacy between two males.

* The No.1 killer snake in India is the Russell's Viper, which is responsible for approximately half of the 50,000 annual human snakebite deaths in the country.



Russell's Viper



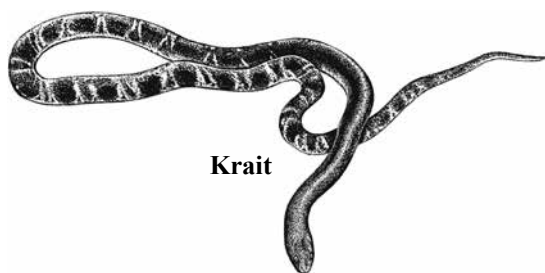
Cobra

* No.2 Indian killer snake is the Cobra, which – although revered and even worshipped throughout India – accounts for approx 30% of human deaths i.e. around 15,000 a year.

* No.3 in the killer table is the Saw-scaled Viper, with around 5,000 deaths credited to it annually. It is in fact every bit as dangerous as the above two, because it is the fastest striker and strikes to deliver a bite every time cf. the Cobra, which prefers not to bite if it can avoid it.



Saw-scaled Viper



Krait

* No.4 in the killer table, the Krait, kills mostly in the villages at night, entering people's houses and often biting them while they sleep, sometimes without their even waking up (it can happen that the victim is simply found dead next morning, obviously having never realized that s/he had been bitten). Of course, the snake doesn't enter houses with any intention of biting humans. More likely, they enter in search of prey creatures like rats, mice or

cockroaches, but if someone turns over in their sleep onto them or hits them with an arm or leg in so doing, then a bite may be delivered.