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Snakes in India: Tradition and the Truth

Aeons ago, the inhabitants of the ancient island of Jambudvipa revered snakes as symbols of fertility and wisdom. These 'deva jana' or god-people of Naga loka or the underworld, were believed to guard fabulous treasures. Their tendency to flicker their tongues had people believe that they ate nothing but air while their ability to shed their skin was associated with mastery over the tenets of liberation and regeneration. Today, where Jambudvipa has morphed into India, snakes are still revered by religion and are yet, feared or even despised. Little wonder considering that on an average, one million Indians are bitten by snakes each year. In order to address this issue, one will have to go beyond this labyrinth of snake-lore understand this creature that science has demystified.

A snake therefore, is a limbless reptile with an elongated body that is covered in scales. Their lengths vary; while some, like the blind snake (about 6-8 inches) may be as small enough to fit comfortably within a crevice in a wall, others like the reticulated python can grow up to lengths of 30 ft. Snakes are ubiquitous in their presence across the subcontinent and are found in tropical forests and deserts as well as seas and scrublands. If you marvel at the adaptability of humans, what does this tell you about snakes? While some snakes lay eggs, others give birth to their young. In both cases, the babies are able to fend for themselves from the start. This has nothing to do with the prevalence of callous parenting traits among snakes and everything to do with natural instincts that border on the prodigious.

While they don't dance, they certainly do move with remarkable grace and agility with the help of special scales on their bellies. By contracting the muscle in these scales, they push against the ground, which in turn, provides a resistance that propels them forward. While this may read like a boring description out of a Physics lesson, it in fact, exemplifies the term 'fluid motion'. Many snakes flatten their bodies into s-shaped coils while others inch along the ground like caterpillars. In areas that don't offer much traction like sandy regions and mudflats, snakes adopt a sideways motion called sidewinding. In spite of the sinuous ease with which they move, snakes do not dance! However, as much as the snake charmer would like us to believe, dancing to the tune of his 'been' (musical instrument) does not come under the repertoire of movements that the snake is capable of. Neither are snakes musically inclined. They cannot hear like we do; however, they do sense vibrations. Their 'dance' is actually a response to the movement of the 'been' which they see as a threat.

In shedding their skin, snakes aren't aspiring towards liberation or other lofty ideals. Snakes lack sweat glands. Hence, the excess salt in their bodies gets deposited in the outer layer of their skin, which is made of keratin (i.e. dead cells that human hair and nails are also made of). In shedding this layer, they rid their bodies of excess salts and other waste products. Nor do are they guard obscene amounts of wealth in their burrows and mounds! Snakes are ectothermic i.e. they don't regulate their body heat in response to the temperature of their surroundings. Therefore, when it is too hot, they retreat into the cooler areas (i.e. burrows and mounds) and vice versa. In periods of extreme temperature, they remain inactive, thus reducing metabolism and consequently, the need to eat.

Exclusively carnivorous in nature, many snakes eat small animals such as reptiles, rodents, eggs, birds etc. Some, like the python may even feed on deer-sized mammals. Others like king cobras and kraits are cannibalistic. In terms of their predatory skills, snakes are evolution's lesson in efficiency. While their hunger isn't satisfied by gulps of air, they do 'taste' the air to find their food. Their tongues are coated with chemoreceptors that pick up scents from their surroundings and then transfer them to a highly specialized organ called Jacobson's organ,

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located in their mouths, which identifies the various scents and their source.

These chemoreceptors are used to detect prey as well as the presence of other snakes. On account of their forked tongues, they can detect scents from different sources simultaneously. In addition, some snakes like pit vipers and pythons have special depressions or 'pits' near their eyes or nose that can detect the heat emitted by warm-blooded mammals, thus enabling them to gauge the location of their prey. Once identified, the quarry is then ambushed and swallowed headfirst. In order to enable this, the upper jaw is attached to the skull through the means of tendons and ligaments, thus allowing greater movement. Moreover, unlike in mammals, their lower jaw isn't fused. Instead, it is divided into two parts that are connected by a ligament, thus providing greater mobility. Given that many snakes don't believe on picking on targets their own size, this flexibility allows them to open their mouths really wide to swallow their prey.

Some snakes like constrictors wrap themselves around their prey and suffocate them while others simply swallow them whole. However, venomous snakes usually immobilize their prey by transmitting venom into their bodies when they bite. Venomous snakes have two special teeth called fangs in the front or back of their upper jaws. These fangs are connected to a venom duct, which is attached to a venom gland, which is located under the snake's eye. When it bites, venom passes from the gland and finally through the hollow fangs into the body of the victim. Venom is a complex combination of proteins, which are designed to cause bedlam in the body by damaging it at a molecular level. While some types of venom make the nervous system go haywire, others affect the heart and blood. The primary function however, is to break down the tissues, thus making it easy for the snake to digest.

Snakes don't bite humans unless in self-defence and the bite is not dangerous if from a non-venomous snake. Not all venomous snakes in India are dangerous to humans; however, there are four species of snakes that are responsible for most of the snakebite related injuries and deaths reported here. These are:

Common Krait



This snake is found all across India up to Assam. It hunts other snakes, rodents, lizards and frogs at night. Most krait bites have mostly been reported to occur at night, especially where people sleep on the ground. Also, this snake isn't aggressive- its likely that the victims would've rolled over or touched the snake in their sleep resulting in snakebite. As the fangs are short, the bite tends to remain undiscovered if the victim is asleep. The venom of this snake is neurotoxic.

Russel's Viper



This snake lives in scrublands, rocky outcrops and mangroves. It is found all across the Indian subcontinent. It feeds on rodents. In the face of a perceived threat, it produces a hiss that sounds like the whistle of a pressure cooker. While it moves very slowly, it can strike with surprising speed. It only strikes as a last resort. Most people are bitten when they inadvertently step on it. Its venom is haemotoxic.

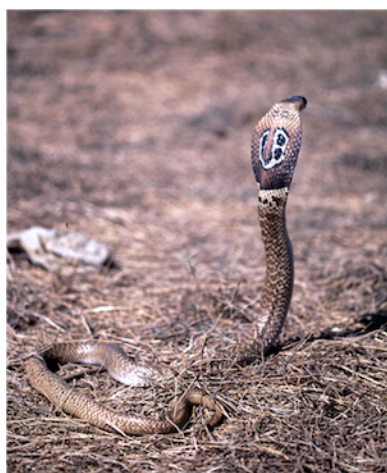
Saw-scaled Viper



provoked. The venom is haemotoxic.

It inhabits open, dry, sandy or rocky areas in the plains and hills. It also favours rocky terrain that is prone to heavy rainfall. This snake is found across the Indian subcontinent except in West Bengal and Northeast India. It eats mice, lizards, frogs, scorpions and insects. During the day it may rest under rocks and atop low bushes. It is active at night. It is named for the rasping sound that it emits by rubbing its scales together when threatened. It strikes unhesitatingly when

Spectacled Cobra



This shy snake is active both during the day and night. It is found across India except in the Northeast. It is a good swimmer and frequents waterlogged areas in fields, rocks and trees. It is also found in granaries, where it feeds on rats. It also eats small reptiles and frogs. It lives in burrows and termite mounds. When alarmed, it raises its body and spreads its hood. If threatened further, it hisses loudly and strikes forcefully. Its venom is neurotoxic.

Victims affected by neurotoxic venom may exhibit minimal swelling at the site of bite. Other symptoms include drooping eyelids, drowsiness, affected speech and difficulty in breathing. Paralysis may also set in. Some of the effects of haemotoxic venom include painful swelling at the site of the wound with bruises and blisters. Profuse bleeding occurs from the wound, nose and gums.

All of the above-mentioned snakes prey on rodents and smaller reptiles that are common in areas frequented by humans such as agricultural fields and other open spaces that have vegetation. Most cases occur when people walk through undergrowth, either barefoot or when wearing open-toed footwear. Given their affinity for dark, cool places, these snakes remain hidden in roofs, piles of bricks and leaves, wells etc. Consequently, they may be picked up or disturbed unintentionally. Therefore, a person may unwittingly come into contact with a snake and consequently get bitten.



However, in a considerable number of snakebites by venomous snakes, either very little or no venom is injected. While these 'dry-bites' are harmless, they must be confirmed by an expert or a qualified medical practitioner.

The only scientifically proved treatment available for snakebites is Anti Snake Venom Serum (ASVS), which is made from the venom of snakes itself. In this process, snakes are 'milked' by professionals who extract the venom from the snake and later release them back into the wild. This venom is then injected in small quantities into mammals like horses and sheep, which generate anti-bodies that are then collected from their blood and processed into ASVS. Currently, in India, polyvalent serum has been found to be effective against the bites of the above-mentioned snakes. However it is imperative that ASVS be administered within 48 hours by a qualified medical professional. In the event of snakebite by a venomous snake, the following steps should be followed:

- Reassure the victim. Panic will increase pulse and blood pressure, causing venom to spread faster through the body.
- Immobilise the affected limb. Do not use any type of compression bandages or tourniquets.
- Get the victim to a hospital immediately.

Very common but unequivocally ineffective remedies to cure snakebite include the use of 'snake stones', chants and magic potions among others! While certain homeopathic and ayurvedic remedies are used to treat bites, these may be useful in treating the symptoms only. Envenomation can only be countered by using ASVS.

Most incidents of snakebites can very well be avoided by following some basic and commonsensical measures. When walking through foliage, always wear closed shoes. In areas known to harbour snakes, always use a torch at dawn and nightfall, as this coincides with the period when snakes are most active. Open piles of garbage and waste attract rats, which consequently attract snakes, so here's another incentive to clean up the filth around you! Seal drains and other openings in kitchens and bathrooms as snakes may enter the house through these. In gardens, be careful around rocks and ponds, as snakes tend to rest in cool, dark places like these. If you come across a snake, stay calm and let it pass. If the snake must be removed from that area, call a professional snake rescuer to handle it. Do not attempt to catch or handle or kill it. Not only will this show of bravery be foolhardy but can attract penalties under the Wildlife (Protection) Act, 1972, which provides legal protection to snakes.

Snakes are a vital component of the ecosystem and furnish useful services to man by feeding on rats and other pests, thus keeping their populations under control. Consider the importance of this function when reports indicate that rats destroy nearly 30% of India's total grain each year while an individual rat can contaminate about 700 kg of rice alone with its urine, fur and faeces. Moreover, research has shown that, venom, which has been the bane of the snake's existence, may actually be a panacea to a whole host of diseases. By studying how toxins in venom interact with the cells in the body, researchers have made remarkable medical breakthroughs. For example, the venom of the Russel's viper and the saw-scaled viper causes severe internal bleeding. However, the venom of both snakes is used in the diagnosis and treatment of clotting/coagulation disorders. Likewise, krait venom, which affects the nerve impulses and causes paralysis, is used in the detection and cure of neuromuscular disorders.

In spite of their usefulness to man, snakes today are in grave danger. While many are killed for their beautiful patterned skin, which is highly coveted in the leather industry, others are losing the battle to habitat loss. They are often killed on the basis of baseless myths propagated by the

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very culture that reveres them. Speaking of cultural reverence, note this hymn in the Atharva Veda that sought the favour of snakes, “Ye gods.....be kind and gracious to us. To you be reverence, to you be welcome!” If we must resort to age-old myths and traditions in the way we treat these wonderful and most useful creatures, let us take some lessons from this!

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*All pictures courtesy of Kedar Bhide.

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