

SNAKES



Two words:

Lassie; *cuddles?*

Snake; **LUNCH!**

Snakes are largely out of sight and out of mind but a past an “encounter” with a snake has had a major influence on our western culture and also given rise to the largest single construction by man until the modern age.

Known by a variety of names, including serpents, adders, vipers, which generally apply to the smaller, while the python tag is used for their larger cousins. They are all members of the Class Reptilia. The name snake is from the Old English *snaca*, itself from the Proto-Germanic *snak-an* with the roots in the ancient Indo-European language.

Snakes comprise over 3100 species ranging in size from the worm-like 10cm thread snake on Barbados in the Caribbean to the giant Anaconda of the Amazon jungle which grow up to 7.6 metres. The highest concentration of snakes and pythons is in the warm tropical regions due the fact that they are all cold-blooded and need to control their body temperature by external means; by sunning to increase and retreating to the shade to cool.

Here in Australia we have over 110 different species of land snakes including 22 species of harmless blind snakes and 10 species of python ranging in size from the northern inhabiting scrub python growing to 7.5m to the pigmy python of Western Australia growing to only 60 cm in length. The largest group are the elapids (Family Elapidae), which are the front-fanged venomous land snakes. They range in size from the taipan growing to 3m in length, and one of the worlds deadliest and Australia’s most venomous snakes, to the wood-jones snake growing to only 20cm.

The most obvious feature of snakes is the lack of limbs. Their bodies are elongate and the spinal column may contain 200 to 400 vertebrae. In cross section bodies are generally rounded but in the aquatic snakes is more flattened to aid in swimming. Although not obvious at first they lack both eyelids and external ears which distinguishes them from the legless snakes. However they are capable of picking up both ground and air vibrations. And as for the famous Indian snake charmers with flute in hand and cobra in the basket. Sorry it’s all misinformation as snakes have no external

ears and consequently hear very little. Rather it is the rhythmical movement of the flute which captures its attention, so it does not matter how badly you play just keep swaying with the music!

The eyes are protected by transparent scales and are always open. Vision varies between different groups.

A sense of smell is used to track prey. The continued flickering in and out of the distinctive forked tongue is constantly sampling the air and on retraction into the mouth the collected smells are passed over a vomeronasal organ and analysed. This even works underwater for the Anaconda.

Infrared is employed, particularly by the pythons, allowing them the ability to detect warm blooded prey in the dark.

All snakes are carnivores, preferring live prey, the size of which depends on the size of the snake. Prey ranges from small animals, lizards, other slow snakes, small mammals, birds, eggs, fish, frogs, snails and insects. A few species even specialize in catching bats on the wing at the entrance of roosting caves.

Snakes come in a wide variety of colours and patterns. A dull colour is good for blending in with the background while the patterns of the python is the ultimate in camouflage. At the other extreme some are brightly coloured, a very clear warning to all predators, danger, poisonous do not touch! The bodies of snakes are covered in overlapping scales which are an extension of the epidermis with the belly scales modified to permit surface gripping and facilitating movement. Despite the lack of limbs snakes are very agile and can move with incredible speed. Rather than just slithering along snakes have a number of sophisticated movement variations. The most common is the lateral undulation which is used by the majority of terrestrial snakes and also the sea snakes. Other variations include sidewinder, concertina and rectilinear. The rectilinear involves no lateral body movements but utilizes the belly scales being lifted, moved forward, lowered and pulled backwards. An excellent strategy when slowly stalking prey without displaying any telltale lateral body movements.

Snakes shed their complete skin at regular intervals replacing the worn skin and helping to leave parasites and mites behind. The moulting includes the transparent scales over the eyes which cloud prior to moulting. Disturb a snake at this time and it has a bit of an attitude problem, if shedding the old skin was not enough it is also vision impaired for a time. Skins are shed multiple times throughout the year; 1-2 times for old, and up to 4 times per year for the younger.

Limited by the body configuration paired organs are arranged one behind the other. Snakes generally have only one functional lung. The left lung may be absent or very small. In aquatic snakes part of the lung is involved in buoyancy.

The largest of the species can lay up to a 100 eggs while the smallest produce just a single egg. Generally eggs are abandoned after laying, however a number of species including most pythons will stay and guard the eggs until they hatch. Some species are ovoviviparous and retain eggs within their bodies until they are almost ready to hatch. Some of the largest pythons are fully viviparous and nourish their young through a placenta as well as a yolk sac. Previously a placenta has been considered as something only achieved in the mammals.

With the exception of Antarctica snakes are found on all other continents. No snakes are found in Ireland (St. Patrick fixed them!), Iceland (too many volcanoes!), New Zealand (who wants to tangle with the All Blacks Rugby team!), and Greenland.

Most snakes are non-venomous and those using venom do so to subdue and kill prey rather than for self defence. Venom is modified saliva and is delivered by two techniques. The first is by hollow fangs permitting the direct injection into the prey, a very efficient hypodermic syringe. Many have the ability to control how much venom is injected. In the second the venom dribbles down grooved teeth and into the puncture marks/lacerated wound in the bitten prey.

The venom can be a mixture of neurotoxins which attack the nervous system, hemotoxins which attack the circulatory system, and a variety of others attacking a specific part, or organ in the body. Most snake venom contains the enzyme hyaluronidase which facilitates the rapid diffusion of venom through the prey.

With the lack of limbs and teeth to reduce prey down to mouth-sized chunks snakes must swallow their prey whole. To aid in this snakes have the ability to swallow prey larger than the diameter of their own head and body. Small prey can be literally swallowed alive, however struggling large prey can present a problem and pythons in particular will suffocate the prey by constriction before swallowing whole. The swallowing in both is achieved by means of a flexible ligament joining the two halves of the lower jaw. No social graces, these guys really stuff their faces. After a good feed the larger anacondas and pythons can survive up to one year before the next feed.

The age is variable but most fall within a 15 to 30 year range with a longer range for those in captivity. The Australian Carpet Python growing to 1.5-2m lives 20-30 years and pythons elsewhere in the world have been recorded as living up to 50 years.

Small delicate bones which are rarely preserved in the geological record. Like many groups the origins are unresolved with competing proposals centring on either a burrowing or aquatic lizard. The oldest known fossil found in Algeria is dated at 112 Ma placing it in the mid-Cretaceous. The famous K/T boundary at 65 Ma ago saw the extinction of the dinosaurs. In the following 10 million years to 55 Ma ago during the geological time division known as the Paleocene there was a rapid divergence of modern snakes. This timing also corresponded with rapid divergence of the mammals.

And just when our very distant lemur-like ancestors thought it safe to venture out into the light and down from the trees only 6 million years after the K/T event along comes *Titanoboa cerrejonensis*, the mother of all pythons. Found in a coal mine in Northern Columbia it measured a mere 12-15m in length and weighed in at over one tonne! If that is not enough, it is believed to have eaten 2m+ crocodiles!

And no the *jonensis* part of the name does not derive from Indiana Jones who is well known for his phobia of snakes! Afraid is this beastie was still on the loose Jennifer Lopez, even with a wet T-shirt, would still be waiting for a red blooded male to dip his toe in the water of the Amazon and come to her rescue!

Even Australia up to 50,000 years ago was not particularly safe as it was home to two species of giant primitive snake growing to 5-6m in length. These were not pythons but members of a now extinct family of snakes that evolved 55 million years ago and survived only in Australia. The first

found has been named *Wonambi naracoortensis* and was found in cave deposits from Naracoorte, South Australia where an excellent reconstruction is displayed in the local museum. It appears that this was an ambush predator which killed its prey by constriction like the pythons rather than venom. Recent archaeological work in Australia suggests our First Nation People first arrive between 50-60,000 years ago giving an overlap with this giant and the still living pythons of northern Australia. These, either individually or together, may well have formed the basis of or added to the Rainbow Serpent stories.

From the dawn of our time mankind has had a very much ambivalent relationship with the snake. In ancient times serpents had a clear phallic connotation, were a symbol of fertility, associated with great knowledge, and of immortality implied from the ability to shed its skin.

Perhaps the oldest myths/legends of the snake surviving in the world to this day come from our own First Nation People with the stories of the Rainbow Serpent, the great creator spirit, who not only left his memory in the stories but in the very landscape he traversed leaving water course, gorges, waterholes in his wake. In central Australia to this day many of the older traditional people have an unshakeable belief that he still can be glimpsed in the billabongs and waterholes.

Elsewhere in the world mankind has had a long association with snakes. In the middle-east archaeological excavations in 1995 outside of the Turkish city of Urfa revealed early Neolithic structures dated at over 10,000 years. A debate continues as to whether these are domestic dwellings or temples. On the columns of these structures are inscribed carvings of snakes, scorpions, foxes and other animals. Later in ancient Egypt the Nile Cobra was considered sacred and a symbol of power and is prominent on the Pschent, the combined crown of Upper and Lower Egypt.

In ancient Greece snakes make their appearance when a pair of them were sent to finish off the babe Hercules, however the plan backfired and he strangled both, one in each hand. Perhaps best remembered story is that of Medusa with snakes replacing her hair and the power to turn to stone any man who gazed upon her. The Greeks however did not have a completely negative attitude to snakes as three medical symbols from ancient Greece are still in use today. The Bowl of Hygieia, associated with pharmacy, the Caduceus with medicine, and Rod of Asclepius with healing. In the later Judaic tradition the snake of brass was also a symbol of healing.

And northwest of Greece in the land of the Celts the snake here was revered and a symbol of eternity as depicted on the famous Gundestrup cauldron (found in Denmark) where a deity crowned with stag horns holds the torque, a symbol of power, in the right hand and the snake, a symbol of eternity, in the left.

In India there has been a long veneration of snakes and even today they are worshiped as gods. In the Chinese Zodiac the snake is one of the 12 signs of the Zodiac, each ruling the year in turn within the 12 year cycle. People born in the year of the snake include none other than Mao, Gandhi, J F Kennedy, Nasser, Goethe, Hans Christian Anderson, Johannes Brahms, and Schubert.

The snake was of major importance in the ancient Central American pre-Columbian cultures, and is first recorded by the Olmecs. The plumed serpent, Quetzalcoatl, has a pervading presence with his image adorning many of the pyramid temples. The tradition was assimilated by the following Toltec,

Maya and Aztec cultures. The Aztec described Quetzalcoatl to the Spanish as *a tall white man with flowing beard who came from across the sea with companions in a boat that moved by itself without paddles from the direction of the rising sun*. Quetzalcoatl condemned sacrifices, except for fruits and flowers, and was known as the god of peace and presided over a golden age of peace and plenty and taught compassion and a religion of intelligence. According to tradition he promoted a religion of just a single god. Curiously at almost the same time half a world away in Egypt during the mid 14th century BCE, the pharaoh Akhenaten replaced a pantheon of gods with just one, the Aten, the sun disc.

The reverence in which Quetzalcoatl was held in the minds of the people is perhaps best reflected in the pyramid temple of Tlachihualtepetl dedicated to him at Cholula in Central Mexico. This was constructed in the 3rd century BCE, 2300 years ago during the time of the Olmec whose culture dates from 1500 BCE and is considered the mother culture of Central America. Tradition has it that the core was constructed of adobe bricks by a mystical individual who escaped a flood in the neighbouring Valley of Mexico.

The original pyramid measured 450m x 450m with a height of 66m. It covered 18 hectares and the volume is calculated at 4.45 million cubic metres. In comparison the Great Pyramid of Egypt (Great Pyramid of Khufu, or Cheops) is higher at originally 146.5m, but covers only 4.86 hectares with an



internal volume of only 2.5 million cubic metres. Up until modern times the pyramid at Cholula dedicated to Quetzalcoatl qualified as the largest pyramid and largest monument ever constructed by man. The largest structure ever, and dedicated to a snake.

Needless to say with the rise of Quetzalcoatl all the out of work priest were not impressed and tradition has it that he and his companions had to flee over the seas in direction from whence they first came, the direction of the rising sun, and proclaiming “ I will return.”

In February 1519 Hernan Cortes and band of 508 mercenaries arrived on the shores of Mexico. Time-wise in the Aztec ritual calendar this was the year Ce Acatl (One Reed) and associated with Quetzalcoatl. At the arrival of these fair-skinned strangers in “*mountains which moved upon the waters*” and coming from the east, the Aztec emperor Montezuma ,mindful of the ancient stories held in high reverence, hesitated in what would have been an otherwise ruthless response to the invasion of his territory. As a consequence of his hesitation we have ended up with an alternative world history.

And just for the record there is no evidence that Quetzalcoatl, bedecked as he was in exotic bird plumage, was either cross-dressing or on his way to the Mardi gras in Rio!

From our Christian and Judaic roots the poor old snake has had bad press ever since the comments in Genesis implying he led a young lassie astray with an apple of all things. Likely story! In a completely opposite view the Gnostics do not see the serpent as a villain but rather as a hero and benefactor of mankind.

The old Hebrew religious text, the Book of Enoch, makes mention of an immense sea serpent, the leviathan, created, and a pet of Yahweh and who soon became increasingly hard to control. This story appears to have been adapted from the local Canaanite myth of Lotan, the seven-headed monster which in turn was borrowed from the Babylonian she chaos-dragon, Tiamat. The serpent-like dragons of the Western Asian mythology are believed to have also sprung from these Babylonian roots. The Hebrew leviathan was later identified with hell in medieval Christianity.

The story of the infamous threesome, Adam, Eve and the snake in Judaism, Christianity and Islam has significantly moulded and shaped mans attitude to women, dictated the relationship between them and has had a profound influence on the course of western history.

So on both sides of the world a serpent has put world history on a different course.

Snakes and pythons do not eat people; however the reverse is not true. For much of the third world python in particular is considered good bush meat. In many Asian countries it can be a food delicacy, an essential ingredient in traditional herbal medicine and even soaked in alcohol to give a drink with that extra bite! Even in the western USA cooked rattlesnake is considered good fare. Not to be outdone our very own Black snake has a consistency and taste similar to chicken.

Snakes in particular to those of us in the west, are seen as a potential problem and with most people safety conscious for their family and pets, and will go to almost any lengths to ensure that their immediate environment is free from them. Pythons are viewed more sympathetically and make good low maintenance docile pets although they can wreak havoc on the local cat population. Some may live up to 40 years.

Snakes are in fact probably the best mousers we have, the perfect stealth hunter ideally suited to narrow spaces and total darkness. Small baby rabbit will also make for a quick snack. Unfortunately when a rapid increase of rodent numbers occurs a variety of poisons are used to rescue crops. Most poisons are based on anticoagulants which reputedly have no secondary poisoning. However overseas research has found that secondary poisoning does occur in mammals and birds with some deaths. To date there does not seem to be any in depth serious research relating to snakes and pythons.

Recently published research from the University of Colorado in the USA has found that the blood stream of feeding pythons contain an extreme concentration of fatty acids and these actually promote healthy heart growth. Current investigations are focussed on potential beneficial outcomes related to human heart disease.

To learn more of these fascinating creatures the NNRC is presenting a Snake Workshop to be held on Saturday 14th January 2012 at the Yankalilla Youth and Community Centre. To register please contact the NNRC at 85583644, email at admin@nnrc.com.au or book one line at <http://www.nnrc.cm.au/eventbooking.php>

