

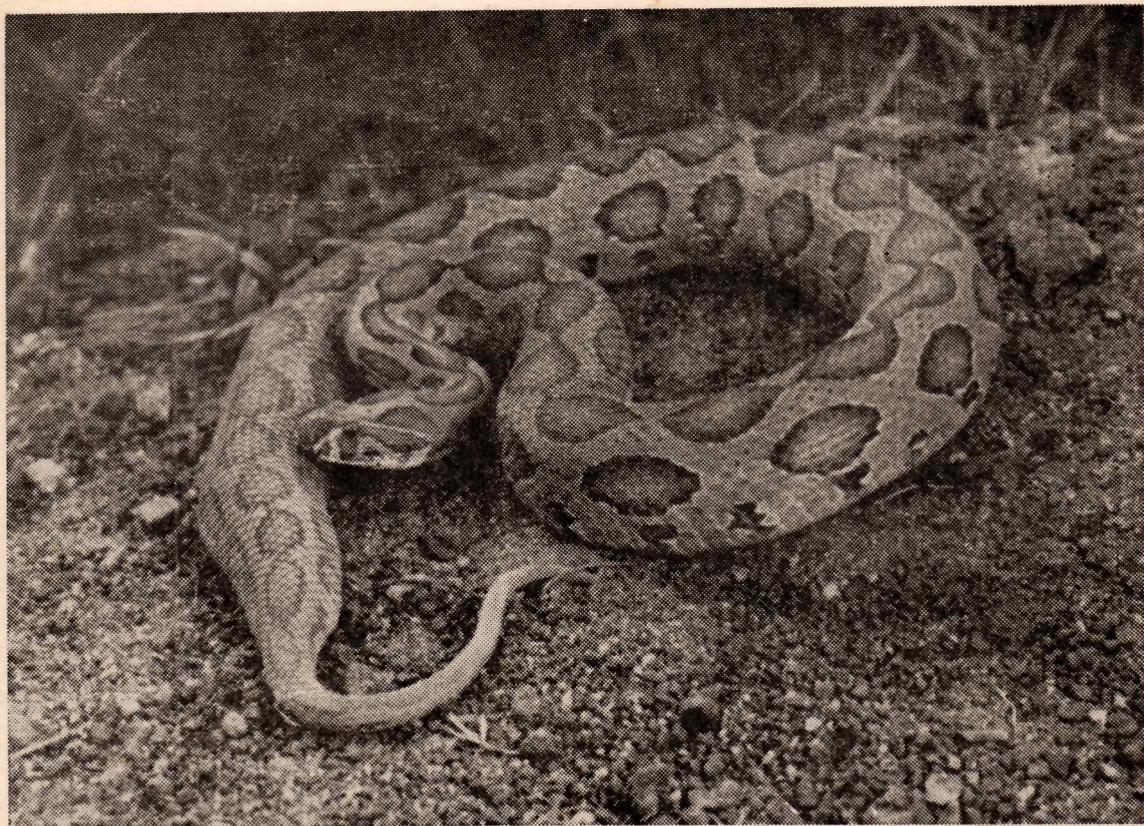
# Cobra

Number 12

Quarterly Newsletter

April - June '93

V Kalaiarasan  
13/11/93



**Russell's Viper** (*Vipera russelli*)

— Photo by : M. KRISHNAN.

Madras Snake Park Trust  
Guindy National Park - Guindy  
Madras - 600 022. - India

## WELCOME TO MADRAS SNAKE PARK TRUST



- \* The Madras Snake Park Trust was established in 1971 on a one-acre plot of forest land leased by the Govt. of Tamil Nadu at Guindy, Madras. Managed by a Trust, the MSPT is a centre for Education, Tourism, Conservation, Service and Research on Reptiles.
- \* A variety of live Reptiles, both Indigenous and Exotic are displayed which include Marsh Crocodile, Giant Tortoise, Reticulated Python, South American Iguana and other species of Snakes, Lizards and Turtles. Besides, a Snake Lore Centre and a Muscum of Reptile specimens are maintained.
- \* The Park is open from 8-30 a.m. to 5.30 p.m. on all days of the year.
- \* **Entrance fee :** Adult Re. 1/- and Child Re. 0.50.
- \* Photography charges are Rs. 5 for still cameras and Rs. 50/- for Video Cameras. For commercial Video contact office.
- \* Hourly Demonstration of a few kinds of live Reptiles with commentaries is conducted.
- \* Nearly 12 lakh persons visit MSPT in a year.

# COBRA

## Quarterly Newsletter of the Madras Snake Park Trust

### CONTENTS

### Page No.

Madras Snake Park Trust Programme for "Indian Tourism Year 1991-1994	2
Conservation Status of Common Indian Monitor ( <i>Varanus bengalensis</i> ) in North Madhya Pradesh—Rajiv Saxena	3
Classification, phylogeny and zoo-geography of Indian snakes—R.C. Sharma	7
Indian Reptiles in Religion—T.S.N. Murthy	10
Control of external mite infection in snakes—Tej Prakash Vyas	11
Snake Lore	12
Reptiles in the News	14
Comments by some important visitors to Madras Snake Park Trust	21
News from Madras Snake Park Trust	22
Current Research Projects at Madras Snake Park Trust	23
Surplus Reptiles available at Madras Snake Park Trust for exchange	24
An Appeal	25
Details of cost of construction and display	26

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(including postage)

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**MADRAS SNAKE PARK TRUST PROGRAMME FOR  
"INDIA TOURISM YEAR 1991 - '94**

1. Special pamphlets on common poisonous snakes and non-poisonous snakes with special legends about them to be issued at Rs. 3/- and Rs. 5/-.
2. The regular hourly reptiles demonstration now being conducted in Hindi / Tamil / English will also be extended with special tapes in several Indian languages like Kannada, Telugu, Malayalam, Bengali, Oriya, Marathi, Punjabi, Gujarati, Goanese, Urdu, etc. and Foreign languages like Russian, Japanese, Spanish, German, French, Chinese, Italian etc.

Tourist groups could avail of these special demonstration at Rs. 50/- Indian and Rs. 100 or US \$ 5 for Foreign languages.

3. Opening of the Exhibition Building displaying—

—Reptile lore around the world.

—Myth, Mythology, Worship and other interesting facets of Reptile-lore in our Indian Culture to commemorate the India Tourism year 1991—1994.

# CONSERVATION STATUS OF COMMON INDIAN MONITOR (*Varanus bengalensis*) IN NORTH MADHYA PRADESH

RAJIV SAXENA

M.I.G. 853, Darpan Colony, Thatipur, Gwalior 474 011. (M.P.)

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## Introduction :

It is common knowledge that all four species of *Varanus* which live in India, are killed for various purposes. 17,000 untanned skin pieces of monitor lizards were seized from a lorry en route to Bombay (Barzdo, 1990), and 70,500 skins of *Varanus* species were destroyed in Madras (Lochen and Thomsen, 1991). These two incidents are enough to show the magnitude of their persecution. Earlier Inskipp (1981) had assessed Indian trade in their skin. Killing of monitor lizards coupled with their habitat destruction has resulted in rapid decline in their population.

Out of the four *Varanus* species, the Common Indian Monitor (*Varanus bengalensis*) is widely distributed and lives in all biotopes from evergreen forests to the fringes of desert (Daniel, 1983) and therefore, it is the most persecuted species. The decline in its population can be easily felt in most places.

## Study Area :

The study was conducted in Morena District which lies in extreme north Madhya Pradesh, just south of river Chambal bordering Rajasthan and Uttar Pradesh. With an area of 11683 Sq. Km., its coordinates 25°15'—26°52' N and 76°22'—78°41' E. As one goes from north to south in the district, the topography changes from Chambal ravines of loamy and sandy loam soils to dry deciduous mixed type forests and agricultural farms dotted with rural and urban settlements.

In this area only common Indian Monitor (*V. bengalensis*) is found. Yellow-headed or Yellow Monitor (*V. flavescens*) and Desert Monitor (*V. griseus*) have been reported from Agra region (Auffenberg *et al*, 1989, 1990) just north of river Chambal but there is no authentic record of their presence south of this river.

## Method and Material :

The tribal people of Morena District are very knowledgeable about the behaviour of monitor lizards, and the people belonging to a particular tribe "Nad" are expert in finding out their locations and in catching them. The people of this tribe were first contacted in 1988. This author accompanied them on numerous occasions to know how they find out, catch and kill these reptiles. Data on the number of tribalmen involved, the frequency of hunting monitor lizards and the use of their different parts were collected.

## Results :

### (A) Killing per year:

On the basis of data collected from August 1988 to December 1992, the people catching monitor lizards are about 300 in this district. They catch most of the lizards from termite mounds where the lizards have dug burrows with two entrances. They depend more on ravine and rural areas than forests for their catch.

These 300 persons can be divided into following two categories —

(a) Professionals — About 140 persons are professional trapper of monitor lizards, who catch 3—4 lizards per person per week for about 20 weeks (late June to late October) and 1—2 lizards per person per week for the rest of the year. Thus total number of monitor lizards killed per year was calculated to be between 12,800 and 20,160.

(b) Non-professionals — Out of the remaining 160, about 70 persons were primarily snake-charmers who only occasionally catch monitor lizards; and 90 persons were found to be basically agriculturalists who rarely kill them only for some domestic use. On an average these 160 persons killed one lizard per person per month. The total number of monitor lizards killed by them in a year came to 1920.

In early 1980's it was a common sight to come across the crushed bodies of monitor lizards on National Highway No. 3 which passes through the study area. But they are rarely found now. Is it an indication of the decline in their population ?

#### (B) Uses :

The knowledge of the use of monitor lizard for various purposes is by no means new. *Varanus* bones have been found in Harappan excavations (Prasad, 1936) which shows that this lizard was used in 2500 B.C. In many parts of India, tribal people eat its flesh besides using its parts for various other purposes.

In Morena District, nobody admitted to eat the flesh of monitor lizard. Its abdominal fat is used as a salve for epidermal bacterial infection and its oil for haemorrhoids. The oil is also used as an aphrodisiac lubricant. Its skin is used by local people to make drum heads of percussion instruments called "Dholak" and "Dugdugi"

An interesting fact is that the sub-adults of the monitor lizards are considered a different and poisonous species, and therefore, they are not caught and killed.

Despite all these local uses the total number of monitor lizards killed is far too greater than necessary, and this means that they are basically killed for their skin trade. Although nobody would admit his involvement in such an act, but during the study period, an untanned skin with tongue and nails intact was available for Rs. 15 to 25. This author got indirect evidences that untanned skins are sent to some places in Uttar Pradesh to tan and onward transmission to Calcutta. If all these trends continue, monitor lizards may become a rare sight in the next decade.

#### Conclusion :

Monitor lizards are, in general, long-lived; upto 25 years in captivity. Most of them die before they become mature, falling prey to a host of carnivorous birds and mammals. Even larger snakes, such as the King Cobra and Python are known to prey on monitors (Auffenberg, 1986). Since only a minor portion of their population attain sexual maturity, killing a large number of adult monitors in Morena District is making a great adverse effect on its population.

In the long chain of middlemen in the illegal skin trade, these tribal people work most to get least benefit. During talks with the tribalmen it became clear that if more lucrative jobs are offered to them, they will abandon catching the monitors. If this is done, the illegal trade may come to an end because other people in the chain do not have the expertise to locate and catch monitor lizards.

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## CONTRIBUTIONS ON REPTILES INVITED

COBRA solicits papers on snakes, lizards, turtles and crocodiles for *quick* publication.

Paper may be on any aspect : Ecology, Biology, Natural History or Conservation.

Faunal and Behavioural aspects are also welcome.

Snake-lore, Myths and interesting personal observations are also accepted for publication under Miscellaneous Notes.

Contributions may be sent to Dr. R.S. Pillai, Editor, COBRA, Madras Snake Park Trust, Guindy National Park, Madras-600 022.

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MAP OF MORENA DISTRICT



Chart: R. Saxena

# CLASSIFICATION, PHYLOGENY AND-ZOO GEOGRAPHY OF INDIAN SNAKES

R.C. SHARMA

The idea of a creature with creeping zig-zag motion, shining, agile cold body immediately puts a wave of fear and repulsion in our mind. This is nothing except an animal generally known as Snake. At present 3271 species, 357 genera and 12 families of snakes are present, almost in all regions of the world except Arctic, New Zealand and Ireland. Snakes have adapted to the most varied and diverse ecological conditions and have predominantly colonized the warmer densely vegetated areas of the tropics. India is also having numerous colourful species of fascinating snakes, ranging in size from 100 mm. worm snakes to 6 metre long pythons. In India out of the 222 known species of snakes, about 52 are partly or wholly poisonous. These species comprise capable swimmers, fast runners, accomplished burrowers, tree dwellers and perfect gliders. They exhibit remarkable arboreal, scansorial (climbing,) saltatorial (fossorial or burrowing), cursorial (running), aquatic (swimming) and voltan (flying or gliding) adaptations.

Indian Snakes are broadly placed in 11 distinct families namely 1. Typhlopidae comprising the blind snakes or worm snakes; 2. Leptotyphlopidae comprising the thread snakes; 3. Uropeltidae comprising the shield tail snakes; 4. Boidae comprising the Pythons and Boas; 5. Xenopeltidae which includes Sunbeam Snakes; 6. Acrochordidae having the Elephant trunk snakes or wart snakes; 7. Colubridae including the colubrine snakes; 8. Dasypeltidae having Indian egg-eater; 9. Elapidae including cobras, kraits, and coral snakes; 10. Hydrophidae comprising the sea-snakes,

and 11. Viperidae which includes the Vipers.

Typhlopids are the oviparous, burrowing, insectivorous and earth-worm eating worm-like snakes and are distributed in South West Asia, South Europe, Mexico, Tropical America, Africa, West Indies, Madagascar and numerous Islands of Indian and Pacific Oceans. The family is represented in India by a single genus *Typhlops* including 14 species.

Family Leptotyphlopidae includes the thread snakes which are oviparous, feeding mainly on the termites and minute soil arthropods, make galleries by burrowing in the soil and decayed leaf and vegetable litter, distributed in South West Asia including the Rajasthan, Africa; South West U.S.A. and Tropical America. The family is represented in India by a single species *Leptotyphlops blanfordi* from Punjab and Rajasthan.

Family Uropeltidae comprises Shield tailed or Rough-tailed snakes which are restricted to South Indian hilly areas and Sri Lanka. The main food of these secretive snakes consists of insects and earthworms. The Uropeltids are distributed in 8 genera and 40 species.

Family Boidae includes Pythons and Boas which includes largest of the snakes reaching upto the length of 10 metres or more. Indian record for the Python is about 6 metres. Their main food comprises small to medium birds, mammals, lizards

and amphibians, the prey is killed by constriction. Pythons inhabit marshes, gallery forest and rocky areas near marshes, streams and other water bodies and their main abodes are burrows in moist areas, dense undergrowths and around the stems of small bushes, large rotted logs, caves and abandoned buildings. Boa, *Eryx johni* prefer to live in flat desert with loose clay soil with thin vegetation but *Eryx conicus* prefers to live in comparatively more moist areas like Python. The family is distributed in Africa, South-East Asia, Islands of Indonesia and the Philippines. From world 22 genera and 90 species are known. From India two species of Pythons (*Python molurus* & *Python reticulatus*) and two species of Boas (*Eryx johni* and *Eryx conicus*) are known.

Family Xenopeltidae includes the single species Sunbeam Snake, which is the nocturnal, burrowing, gentle creatures feeding on small vertebrates like rodents, birds, snakes, frogs and toads. The species is distributed in India, Burma, Malaysia, Indonesia, Thailand, Southern China and Andamans.

The family Acrochordidae is represented by the two species of large fish-eating "Wart Snakes", frequenting the rivers, estuaries and coastal waters from India to New Guinea.

Colubridae is very large and widely distributed family comprising the terrestrial, burrowing, arboreal and aquatic snakes. About 2500 species and 250 genera of Colubrine snakes are recognized all over the world.

Family Elapidae includes extremely poisonous, terrestrial snakes available throughout the tropical and subtropical regions of the world. The family includes the snakes like Cobras, King Cobra, Kraits, Mambas and Coral Snakes having the grooved fangs in the front part of the mouth which are firmly attached to the anterior end of the maxillary

bone and are generally followed by one or more solid teeth. This family includes 41 genera and about 180 species.

Family Hydrophiidae includes the deadly poisonous Sea snakes which are partly or entirely pelagic. They either live on the shore but make excursions out to sea for feeding or remain in the sea for the entire life. Most of the species are viviparous and have no need to come on land. The main food of all the marine snakes comprises different kind of fishes.

Family Viperidae includes ordinary Vipers, Pit Vipers, Rattle snakes and Adders. These viviparous, poisonous, terrestrial snakes are available in forest, grassy areas and deserts. Few species are arboreal and saltatorial. Their main food comprises the small vertebrates and arthropods. Vipers are widely distributed in Asia, Europe, Africa, North America and South America. About 150 species and 14 genera are recognised.

#### Phylogeny :

Now it has been established that the ancestors of the snakes were certain burrowing and aquatic saurian (lizard-like) creatures. The fossil records of the snakes are not complete and never go back than lower cretaceous period (180 million years ago). Modern lizards and snakes have evolved from a common ancestral diapsid reptile-stock living on Earth roughly 155 million years back in the middle of the Jurassic period of Mesozoic Era. The Squamatan reptile fossils are not known before the Jurassic period and the lizard remains are not common until the late cretaceous period (110 to 115 million years ago). Triassic Eosuchians seem to be the real ancestors of modern lizards, snakes and Rhynchocephalians.

Eosuchia is the order of fossil reptiles of sub-class Lepidosauria of class Reptilia

and includes fossil reptiles like *Youngina* (Upper Permian period or 190 million years back), *Thalattosaurus* (Upper Triassic period or 160 million years back) and *Prolacerta* (Lower Triassic period or 175 to 185 million years back). Almost all the Eosuchians perished by the beginning of the cretaceous period or early Mesozoic Era (roughly 100 million years back) and it was the chance for lizards and snakes, when these creatures flourished vigorously. The true fossils of snakes have so far not recovered beyond the cretaceous period (130 million years back). In one view it is believed that the modern snakes have been evolved from a Varanoid or Platynotan lizard like ancestor. Snakes show many similarities with the fossil *Lanthanotus* (Family Aigialosauridae, Infra order Platynota or Varanoidea, Sub order Sauria, order Squamata). The early snakes were short, medium and large water loving creatures with a mixture of lizard and snake characters like their amphibious or aquatic allies of those times namely Aigialosaurs, Dolichosaurs and Mosasaurs. That was the age when dinosaurs like Mixosaurus, Triceratops, Archaeopteryx, Tyranosaurus and Brontosaurus were dominant in different biological scenes. Fossil remains of family Boidae go back up to the Eocene epoch (50 million years back). *Gigantophes* which is ancestral to the modern Python was more than 50 feet long. Fossil remains of family Elapidae (Cobras and allies) dates back to Miocene (30 million years) and Pliocene (20 million years) Epochs.

### Zoogeography :

The following distinct Zoogeographical Regions are recognised in Indian sub-continent. 1. The North-Western Arid or Semi-arid Region. This includes the portion of the Palaearctic region in India including Punjab, Western Rajasthan as far as Aravalli range and Cutch and its adjoining areas in Gujarat. The species of snakes found in

this area belong to the genera *Leptotyphlops* and *Eirenis* (Contia).

2. Palaearctico-Oriental Sub-Region : This includes major portion of Kashmir, Himachal Pradesh, Kumaon and Garhwal Himalayas upto Western Tibet, Alpine Punjab and major portion of North-western India excluding the desert portion. The mixing of the Palaearctic and Oriental snake species took place long after the uplift of the Himalayas. The numerous species of snakes belonging to the various genera like *Typhlops*, *Python*, *Eryx*, *Elaphe*, *Ptyas*, *Coluber*, *Sphelerosophis*, *Leopeltis*, *Oligodon*, *Lycodon*, *Xenochrophis*, *Trachischium*, *Boiga*, *Psammophis*, *Bungarus*, *Naja*, *Ophiophagus*, *Vipera*, *Echis* and *Ancistrodon* are available in this region.

3. Indian Sub-region of Oriental Region. This includes mainly the Indian Peninsula. The following snake genera which are endemic to this region are the 6 genera of family Uropeltidae namely *Melanophidium*, *Platyplecturus*, *Teretrurus*, *Plecturus*, *Uropeltis*, *Rhinophis* and 3 genera of family Colubridae namely *Coronella*, *Pseudoxenodon* and *Xylophis*.

4. Assamese and Eastern Himalayan sub-region of Oriental: This sub-region includes whole of Assam, north Bihar, north Bengal, and the Himalayas to the east of Nepal. The large number of species of snakes belonging to the numerous genera like *Xenopeltis*, *Pareas*, *Stoliczkaia*, *Zaocya*, *Opheodryas*, *Colamaria*, *Dinodon*, *Pseudoxenodon*, *Blythia*, *Fordonia*, *Cantoria*, *Achrochordus*, *Ahactulla*, *Chrysopelae*, *Dryocalamus*, *Sibynophis*, *Xenochrophis*, *Atretium*, *Rhabdops*, *Enhydris*, *Cereberus*, *Gerardia*, *Elachistodon*, *Callophis* and *Trimeresurus*.

Indian snakes are mainly of the Indo-Chinese Origin. Palaearctic and Ethiopian elements could not have much influence.

## INDIAN REPTILES IN RELIGION

T.S.N. MURTHY

The Indian folklore and the Hindu scriptures abound in references to the reptiles especially the snakes. The giant crocodiles, the harmless turtles and wall lizards and the most feared venomous snakes have so closely been associated with the Hindu Gods that the reptiles have acquired mythological powers.

It is believed that the River Ganga stands on the back of a crocodile. Yet some others believe that the crocodile is the carrier of Goddess Durga. Some Hindu temples located along rivers keep turtles in the temple tanks to which the pilgrims throng to offer food to the sacred reptiles. The River Yamuna, which flows past a Hindu-Jain temple in Boteshwar (M.P.), is a usually nicknamed 'the river of turtles' because of the huge congregation of turtles that inhabit its waters. One of Lord Vishnu's incarnations is a tortoise (Sri Kurmavata) and in Andhra Pradesh, there is a temple named Srikurman where the presiding deity is a huge tortoise.

The small house lizards (geckos) too are not exempted from acquiring the powers of divinity. The pilgrims visiting the Lord Varadaraja Swamy's temple in the holy city of Kanheepuram will not return without paying their respects to the golden and silver geckos.

It is perhaps because of our fear for snakes that we venerate them most. Hindu mythology constantly refers to Nagas, a rare supposedly intermediate between snakes and humans. They have a king, the eternal and never to be seen Vasuki, also called Nagendra living in a World of their own—Naglok. The affinity of these nagas to snakes, especially to the Cobra is a valid reason for the devotion paid by the Hindus and hence the belief that any one who causes injury to the cobra would not only incur the

wrath of the Nagas but also invite the vengeance of the cobra.

The cobra is always associated with the Hindu Gods. Lord Shiva wears a necklace of cobras. Lord Vishnu reclines on a seven-headed cobra, 'Adishesu'. This eternal serpent, represented in ancient mythology as the supporter of the universe, is said to have accompanied Lord Vishnu in the course of his earthly incarnations. Thus Lakshman, Sri Rama's brother and Balaram, Lord Krishna's brother are but the earthly human guises of the holy snake. Even the seven hills of the famous Tirumala, the abode of Lord Venkateswara, are referred to be the seven hoods of this great serpent. In the Hindu Almanac, a separate day—Nagpanchami—is set apart to appease the cobra.

The origin of the colour markings on the cobra's hood dates back to some ancient legends. Some believe that the markings on the hood of the cobra depict the footprints of Lord Krishna. Young Krishna, whilst playing with friends on the bank of a river, was attacked by a huge snake Kaliya but He vanquished it. In doing so Lord Krishna left the impressions of His feet on the snake's head which are passed on to its descendants. Another story has it that Lord Buddha, during his wanderings, had to cross a desert when he fell asleep in the scorching sun. It is said that the cobra passing by took pity on the holy man and protected him by spreading its umbrella-like hood over his head. When Lord Buddha woke up refreshed and saw the cobra still protecting him, he placed his tro fingers on the serpent's hood as a mark of appreciation for the service done to him.

The religious association of the reptiles with man may be a fact or fantasy but it has certainly helped in conserving some of the reptiles from the wanton destruction. ●

# CONTROL OF EXTERNAL MITE INFECTION IN SNAKES

TEJ PRAKASH VYAS

P.G. Department of Zoology, Govt. College, DHAR. 454001

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While working on the breeding and biology of snakes, a large number of them were collected and kept in captivity. The following observations were made during this period.

Although usually free from mite infection, snakes are at times seen harbouring mites externally, particularly the rat snake, *Ptyas mucosus*. Rat snakes were found to carry the larvae and adults of mites as ectoparasites. When kept along with other snakes, these mites are readily transferred to them. Mites carry pathogenic microorganisms which may induce mortality. As mites are able to move from one vivarium to another, it is necessary to examine freshly caught specimens for mite infection before they are put along with the others. Infected specimens should be segregated and treated for eradication of these parasites.

The preliminary sign of infection is the presence of whitish deposits of mite faeces on the body scales of the snake. If the snakes are then carefully examined, the presence of mites of  $1.00 \pm 0.25$  mm size can be seen as black dots on the body. The young mites can be seen moving on the scales of the snakes. Acute mite infection is fatal for the snake.

The following treatments and precautions should be adopted to keep the snakes mite-free in a serpentarium.

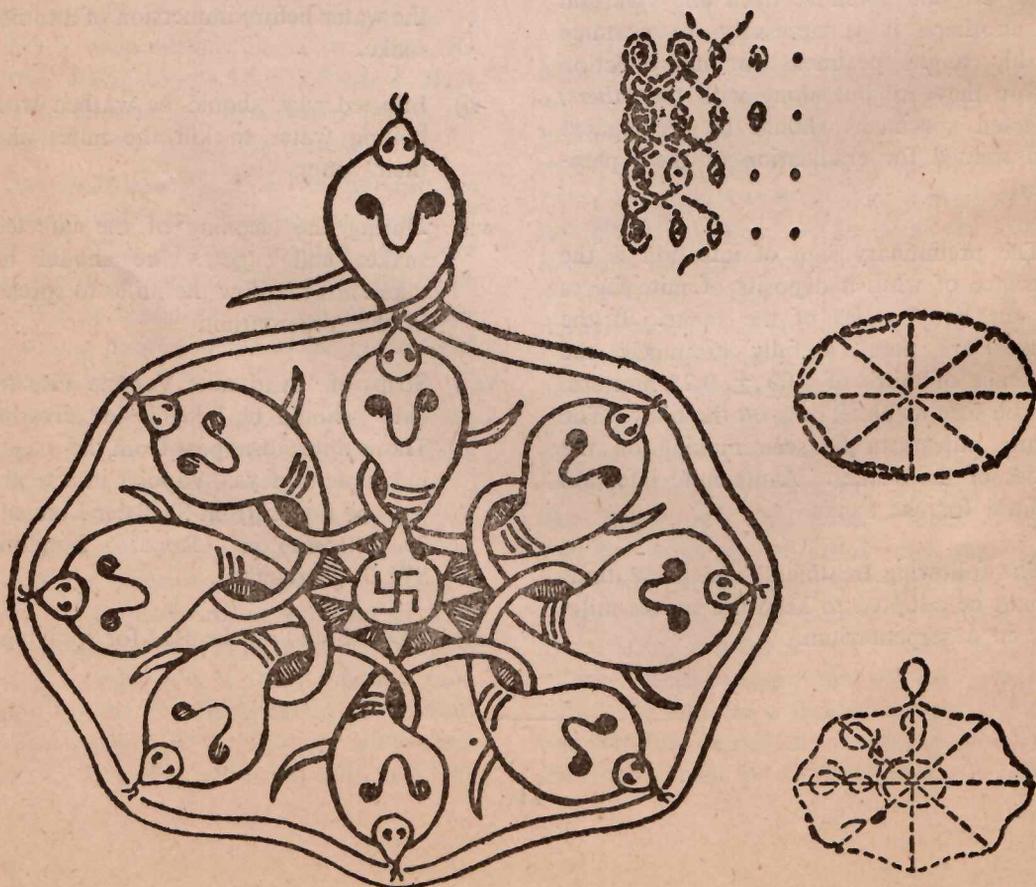
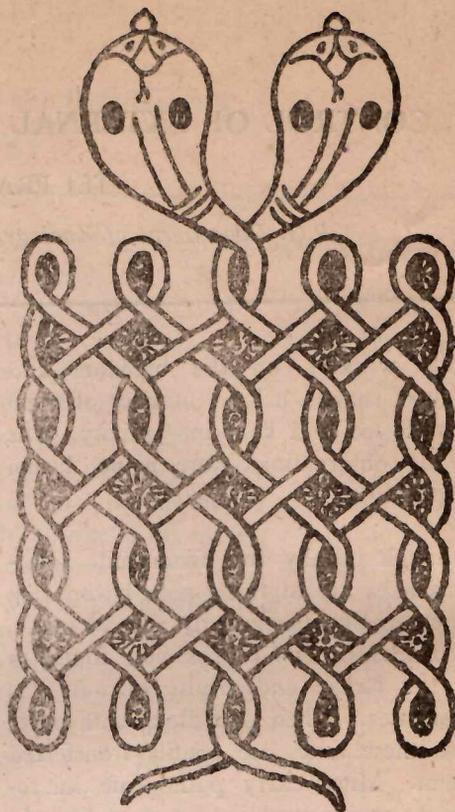
- i) Freshly caught snakes should be carefully examined for mite infection before being added to the serpentarium.
- ii) Infected snakes should be segregated.
- iii) Infected snakes and cages should be thoroughly cleaned.
- iv) Infected snakes should be washed several times in a tub containing warm water and then wiped with cotton cloth.
- v) All the mites should be removed from the water before immersion of another snake.
- vi) Infected cage should be washed with boiling water to kill the mites and their young.
- vii) During the cleaning of the infected snakes and cages, care should be taken not to allow the mites to spread in the serpentarium.
- viii) Strips of "Anti mite Vapona insecticide" should be hung inside vivaria. These mites disappear from the cages in couple of days. Vapona insecticide can be bought from Shellster Limited, 70, Brompton Road, London, SW 3, England.
- ix) DDT should not be used for spraying.

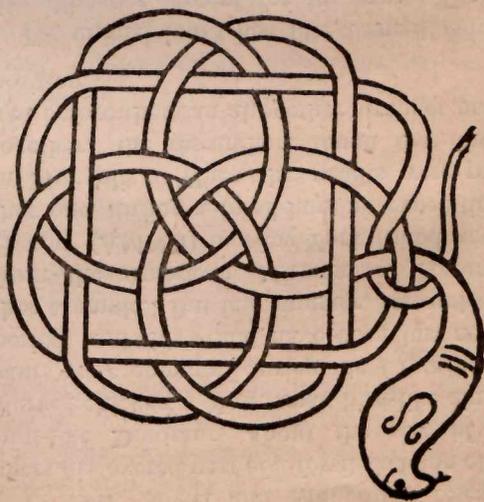
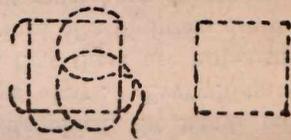
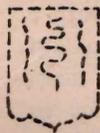
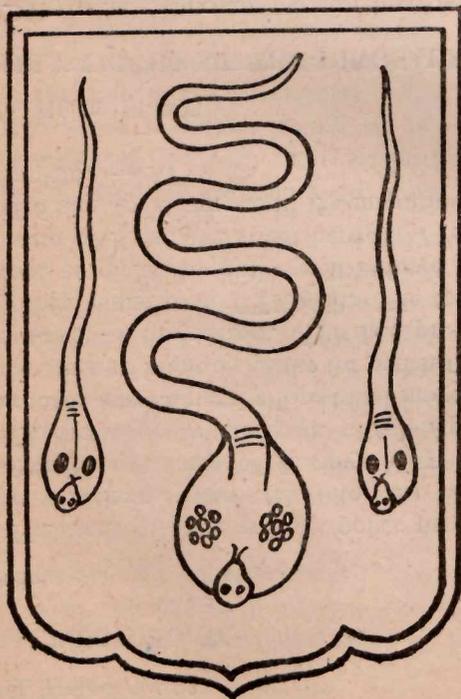
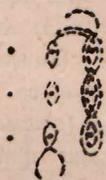
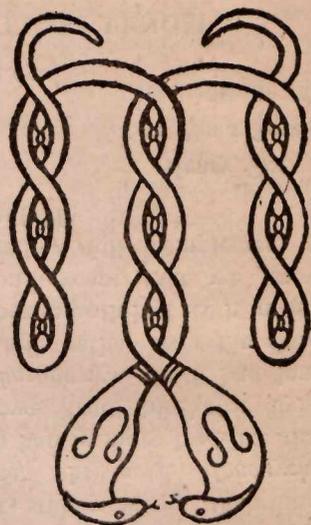
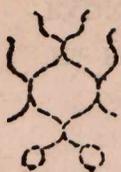
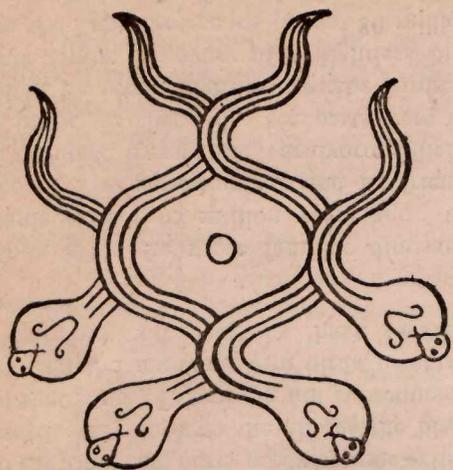
# SNAKE LORE

## SNAKE RANGOLI ART

Indian houses have lovely art designs drawn at the entrance of Buildings as auspicious symbols. These designs use Rice flour to help feed Ants and birds as a pious Dharma. During 'NAGPANCHAMI' the festival time of snakes designs of SNAKES are made as shown.

A.N. JAGANNATHA RAO.





## REPTILES IN THE NEWS

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**The Hindu** 8-4-93

### HALT FOR TOADS

**Prague :**

Hundreds of toads will get police protection on their spring trek into the west Bohemian spa town of Karlovy Vary, the CTK news agency has said. Each April, the toads leave a nearby forest and move to their summer home in a lake for which they must cross a busy street. This had proved perilous in the past, CTK said. The toads travel at night, so police will enforce the closure of Krizikova street between 7 p.m. and 6 a.m. local time until the migration is completed. — AP

**The Hindu** 14-4-93

### EARLY FLIGHT OF THE DINOSAUR

Did you have dinosaur eggs for breakfast? This is a question that is more than one for the birds: for it is becoming ever clearer that the dinosaurs never really became extinct. Instead, they took to the air, as the birds. Not that some of them did not subsequently fall to Earth: many modern birds, as varied as ostriches and penguins, have lost the power of flight.

Soon after the more familiar dinosaurs became extinct 65 million years ago, the place of *Tyrannosaurus rex* and its friends was occupied by gigantic, carnivorous flightless birds. Earlier still, seacoasts were inhabited by large, flightless aquatic birds.

But a new discovery of a flightless bird from the Late Cretaceous (about 80 million years ago) blurs the distinction between birds and dinosaurs so utterly that we can no longer say that dinosaurs became extinct without issue.

In 1987, Soviet and Mongolian researchers discovered part of a fossil skeleton of a bird-like Dinosaur, about the size of a starved chicken. Now, small bird-like dinosaurs were common during the Cretaceous period, and this could have been just another example. But last summer, researchers from the American Museum of Natural History (AMNH) in New York found another one, during a fossil-hunting expedition in Mongolia. When the results were put together, the researchers found that they had before them an altogether stranger proposition.

The animal looks just like a small, bird-like dinosaur, except for its arms. These are tiny and atrophied, the hands reduced to single, large claws. Everything about them suggests that these are not arms but the vestigial wings of a flightless dinosaur—a dinosaur that must have descended from flying dinosaur ancestor.

Apart from its stubby 'wings,' the animal (which has been christened *Mononychus olecranus*) looks hardly more bird-like than the earliest-known true 'bird' (or flying dinosaur). *Archaeopteryx*. Both had long, bony reptilian tails rather than the short, stubby tails of birds; both had teeth in their beaks and soon—except that we know. *Archaeopteryx* had a full complement of feathers and could fly.

**Henry Gee**

*Nature News Service*

**The Hindu** 25-4-93

### RADIOACTIVITY OF VENOM

Two Russian scientists are asking colleagues elsewhere for help in measuring radioactive contamination in the former Soviet

Union by unorthodox means: analyzing venom from snakes.

In a letter in a recent issue of the journal *Nature* they asked Western recipients of Russian snake venom to check it for radioactivity to help determine the extent of contamination from radioactive waste, nuclear accidents and nuclear explosions, they said.

The only venomous snake widespread in the main part of the European zone of the former Soviet Union is the viper, *Vipera berus*, and its migration is limited. Its venom is collected and sold in other countries.

"It is highly likely that the snake venom is contaminated with radioactivity," they wrote. In fact, they said, at least one four-pound consignment of venom was impounded by customs officials because of its radioactivity.

Snake venom has research and medicinal uses. But no medicine licensed in the United States contains snake venom.

The appeal in *Nature* was made by Andrei Nedospasov of the Russian Academy of Sciences and Aleksandr Cherkasov of the Kurchatov Institute, both in Moscow.

**Indian Express 26-4-93**

## **ALL ABOUT TURTLES**

Sir, — This refers to the item 'Turtles in hills' (TN Notes, April 12). The term 'turtle' is usually confined to the marine forms, while the other two terms 'terrapins' and 'tortoises' refer to the freshwater and land forms respectively.

The type reported from the hills may be *Testuda travancorica* which exists in parts of Western Ghats and hills of Kerala. *Testudo elegans* is the starred tortoise of India, which is widespread throughout the peninsula and parts of south-east Asia. These

are true land tortoises adapted to terrestrial habitat and do not reach the sea or take to rivers as reported.

**G Swamidoss Daniel**

Sir, — The report on star turtles was interesting, though I would like to comment on a few inaccuracies that have crept into the write-up.

The star turtle, though predominantly found in sandy coastal areas, is a land tortoise, as its scientific name *Geochelone elegance* testifies. The conjecture that the species may have been a cryptic endemic one all along, could be a possibility. A couple of years ago, the rare Forest Cane tortoise was discovered for the first time ever north of the Palghat Gap.

A more plausible theory could be that these isolated stars represent the abandonment of the pretty specimens by poachers and illegal traffickers. A flourishing market exists for the tortoises and they are very popular pets. The very fact that the trekkers toted these specimens for some time (till they got tired) and only *then* released them much further away, shows how easy it is for man to extend artificially the extent of faunal biosphere.

I request the DFO to monitor the specimens, for if it is an unknown endemic tortoise, the star could represent a new addition to the fauna of Nilgiris.

**Dr. Arunachalam Kumar**

Sir, — Turtles and tortoises are absolutely different. A layman can differentiate between the two as the former have large flippers and the latter have short, stumpy foot-like limbs for walking on land.

A colossal unscientific story the writer has given is that the turtles had migrated from the shores of Cochin to the hills of Ooty! Turtles die if out of water for a day. They never leave the sea, except to lay eggs

on the shore. They are also massive, clumsy and heavy, requiring three persons to turn them upside down.

What the writer speaks of is the ordinary terrestrial commonly found in the South.

V.D. Spurgeon

#### Our correspondent replies :

The star turtle (*Geocheyleone hemidactylus*) was identified with the help of Forest Department officials as well as scientists at the Salim Ali Centre for Ornithology and Nature, Coimbatore.

Regarding the use of the terms 'turtle' and 'tortoise', it may be noted that in the past, British zoologists termed both land and fresh water turtles as tortoises. The marine forms with paddle-shaped forelimbs were called turtles.

On the other hand, American zoologists, who were familiar with a greater variety of the species, broadened the meaning of the word 'turtle'. Soon, such terms as sea turtle, land turtle and snapping turtle (not tortoise) came into use.

This confusion has been sorted out in recent years and the Random House dictionary defines turtle as 'any of various water and land reptiles having toothless jaws and soft body enclosed in a bony shell.' A tortoise is now defined as 'a turtle that lives on dry land.'

The report in TN Notes did not state anywhere that the rare star turtle had migrated from Kochi. The District Forest Officer was only quoted as saying that the rare turtles, which had so far been seen only on the sandy, coastal regions of Western India and Ramnad, had now been spotted 100 km inland from the nearest coastline at Kochi.

The Hindu 2-6-93

#### GLOBAL CATASTROPHE KILLED THE DINOSAURS

A catastrophic event that caused the mass extinction of the dinosaurs 65 million years

ago could also have wiped out up to 80 per cent of all plant and animal species on Earth. A study by researchers at the University of Chicago, published in *Science* (May 14) suggests that whatever killed the dinosaurs was a global catastrophe, rather than just regional. Paleobiologist David Jablonski and researcher David Raup based their conclusion on the study of clam fossils collected from 106 points around the world.

The fossils belonged to a period of geological time when the dinosaurs died out, called the cretaceous-tertiary (K/T) boundary. Analysis of the fossils showed that about 70 per cent of the mollusc species were destroyed at about the same rate in points as far north as Alaska and as far south as New Zealand. Raup said that something happened that was powerful enough to make life impossible both for huge dinosaurs on land and for many species of small molluscs living in ocean depths.

Many scientists had estimated that the catastrophic event at the K/T boundary wiped out about half of all life on Earth. The higher estimate of destruction in the latest study would make the K/T event comparable in magnitude to the mass extinction that occurred at the end of the Permian period 250 million years ago, when it is estimated that 90 per cent of all life-forms were wiped out.

The Permian catastrophe is considered the worst of five mass extinctions believed to have occurred on Earth in the last 500 million years. While the cause of this global catastrophe remains unknown, the main cause is suspected to be a monstrous volcanic eruption that covered much of Siberia with molten rock, touching off an ice age and a worldwide deluge of lethal acid rain.

The most widely accepted theory of what caused the extinction of the dinosaurs at the K/T boundary is that a huge asteroid smashed into Earth, with recent evidence indicating that it hit near what is now the

Yucatan Peninsula in Mexico. According to this theory, the crash pulverised enough rock to enshroud the entire Earth in a sun-light-blocking dust cloud that cooled the planet, halting plant photosynthesis and wiping out the dinosaurs and many other lifeforms that dominated this time in Earth's history.

Other theories say the extinction could have resulted from massive volcanic eruptions lasting thousands of years, or possibly a combination of volcanic eruptions and asteroid impacts. The K/T extinction occurred about the time of a huge eruption of volcanoes in what is now India, which some scientists believe significantly changed the climate.

Some researchers have disputed the latest findings that the K/T event wiped out lifeforms at about the same rate around the globe, claiming that more species were actually destroyed in the warm climates. But Jablonski said that previous studies of K/T fossils may have been distorted by the presence of a large population of reef-building clams in the tropics that were wiped out in the extinction. He said this calm species give a statistical impression that more species were lost in the warmer climates. When the reef-building clams are removed from the statistics, he said, it is clear that the extinction was about the same everywhere on Earth.

**Jim Fuller**

*Science News (USIS)*

**The Hindu** 8-6-93

## **TEPPAKULAM TO BE DRAINED TO CATCH CROCODILES**

**From Our Special Correspondent**

Tiruchi, June, 7

The District Forest officials have asked the Tiruchi Municipal Commissioner to

pump out the water from the Teppakulam in the heart of Tiruchi town, in order to catch alive the two crocodiles in the tank, which have been posing a threat to human beings.

Mr. S. Govinda Rao, District Forest Officer said on Monday that in the past two months, two persons who had got into the tank just managed to escape when the crocodiles chased them. The fire service personnel who went to rescue the two found it tough with the crocodiles moving around with open jaws.

Since the attempts to catch the crocodiles by using nets and baits have proved futile the authorities have asked the municipality to pump out the water, so that the two animals could be caught alive easily. People concede that the presence of the crocodiles has been very useful in keeping the water clean in the tank which has become a dumping ground for the hundreds of shop owners all round. Vegetable and fruit vendors also throw left over garbage into the tank.

### **Environment workshop:**

Mr. Govinda Rao, who delivered the valedictory address at the environment awareness workshop organised by the Khajamalai Ladies Association said that one of the main reasons for deforestation was the heavy demand for fuel in the town areas. Daily over 50, lorry loads of firewood came to Tiruchi, to meet the demand of hotels. As much as 100 lorry loads of fuel wood was needed daily for the dyeing industry in Erode. These heavy consumers of wood should take to other forms of fuel and this would be a vital step in saving the forest wealth in the country, Mr. Rao said.

Mr. Sheerin Hasrat, secretary of the Khajamalai Ladies Association, welcomed the gathering.

## A SERPENTINE CENTURY

By C.V. Sukumaran

After being once bitten by a snake of all the places in this concrete jungle of Bombay, I have been twice shy and cautious about snakes. So during a recent visit to my native village on a holiday, my first after the snake-bite, my fear of this reptile variety knew no bounds. Much as I should, have liked to walk and jog along the narrow twisting paths of the village, inhaling the pure, leaf-filtered air, feasting my eyes on the beautiful greenery, I seldom ventured out of the house, if occasional visits to close relations and friends are discounted, because of a fear of snakes.

During the holidays, I often found myself engaged in the chore of watering the plants by drawing water from an uncared-for well in the garden. One morning, while pulling up the water-laden bucket. I happened to crane forward and look into the well casually. Lo! Floating in the bucket, with its head jutting out was a big snake. Seeing a snake unexpectedly at an unusual place had its impact on me. I screamed out, "snake, snake" and involuntarily let go the rope which slid rapidly along the groove of the pulley until I heard a loud thud of the bucket plunging into the water. My scream and the sound from the well had brought the entire household to the scene with anxiety writ large on their faces. I told them of what had happened in incoherent words with gestures.

A snake park being close to our village, a man from the park was soon in the midst of us to fish up the snake from the well. He was lean, tall and swarthy and wore a snaky look. This made someone amongst us to quip, out of the man's hearing, that when he reached the bottom of the well, it would be difficult to tell him from the snake! I tried to give the man an account of the morning's happenings like a victim of rob-

bery narrates to the police his traumatic experience with the malefactor. Evincing little interest in what I was trying to say, he merely asked us to show him the well. When we did so, he cast a quick glance into the well and like an eagle soaring in the air spots its quarry on the ground with effortless ease, discovered the snake, "Ah, there he is," he said with his face lighting up with an enthusiastic smile. He lowered himself into the well immediately with the help of a thick rope. A curious crowd collected around the well, making it impossible for me to go near let alone look into the happenings inside the well.

It did not take long for the man to come out and when he did, the snake was with him inside a cloth bag he was carrying. "I was eagerly looking forward to this catch," he said taking the snake, a cobra, out of the bag and holding it aloft, with admirable dexterity, so as to enable us to have a good look at it. "This is my 100th snake since I joined the park three years ago. I have hit a century," he hissed triumphantly and putting the snake back into the bag he slid away.

**The Hindu** 16-6-93

## CANNIBAL TADPOLES

There are no lengths to which creatures will not go in the furtherance of their own genes. So much so, that in the presence of non-kin (or even distant cousins), tadpoles of an amphibian called the Arizona tiger salamander (*Ambystoma tigrinum nebulosum*) turn from peaceful browsers of pondlife to large, ravening cannibals that consume as many other salamanders as possible.

In the April 29 issue of *Nature*, Dr. David Pfenning of Cornell University, New York and Dr. James P. Collins of Arizona State University at Tempe, Arizona, show that this tendency is finely tuned to the degree of relationship between salamanders in a pond or aquarium. Should a female lay

her eggs in a pond unsullied by other salamanders, none of the progeny will, in general, turn against its fellows—unless the population becomes very dense. In those cases where one of the progeny becomes a cannibal, it will do so relatively late in larval life, when it will pose less of a threat to its fellows.

But if two unrelated broods share a pond, the race is on for one of them to produce a cannibal as soon as possible to consume the tadpoles of the other, allowing only its own kind to colonise the pond. In fact, the researchers show that the more different broods share a pond, the sooner cannibalism will develop in one of them.

Nobody would suggest that salamanders are consciously able to discriminate between siblings, cousins and strangers, particularly as the transformation from a normal salamander into a cannibal needs physical remodelling: cannibal mouths and jaws are modified to allow them to consume salamanders of their own size. Given that the transformation involves more than a quick change of costume, why is the cannibal development so finely tuned to degree of relationship?

The researchers think that cannibalism develops in response to substances released into the water that are detected by smell. In the past two years or so, experiments with mice have shown that animals can judge relatedness depending on the degree to which they share genes that contain instructions to build highly variable proteins in the immune system. These variations are, of course, inherited, and breakdown products of the proteins presumably appear in urine, giving the animals a family smell.

**The Hindu** 18-6-93

### MIRACLE OF MODERN SCIENCE

One does not have to be a closet palaeontologist to appreciate the technical achievements of the team that created the prehistoric stars of "Jurassic Park."

Whether it is a stampeding herd of ostrich-like gallimimus, a quietly foraging long-necked brachiosaurus or a thundering bloodthirsty tyrannosaurus rex, the film's monster makers and computer jocks have joined animation and live action in a seamless construction sure to amaze viewers of all ages and scientific predispositions.

The notion behind the movie, adapted from Michael Crichton's bestseller, is that a billionaire theme park promoter has discovered a way to re-create dinosaurs on his private island using million as last count to convince audiences they are witnessing a miracle of modern science.

The average adult viewer may not be able to tell a dilophosaurus from a velociraptor, but Spielberg, with children of his own, knows any preadolescent worth his Nintendo can. It is for these amateur critics that he has gone to all the trouble to film what are no doubt the most sophisticated and anatomically correct prehistoric behemoths ever to grate the silver screen.

The creation of the dinosaurs began simply enough with pen-and-ink drawings. These were followed by full-color renderings.

From these, employees at monstermeister Stan Winston's studios ("Aliens," "Terminator 2") together with palaeontology consultants constructed metal skeletons to house hundreds of electric motors. On top of these were layered foam rubbers, latex and paint to create full-size replicas of the giant creatures who once ruled the earth.

During filming the life-size dinosaur replicas, six species in all, were manipulated by a team of 20 puppeteers stationed at a human size model called a "Waldo." Each of the metal-framed Waldo's mechanical parts correspond to a leg, arm, tail, or other part of the life-size version. By manipulating the Waldo, whose movements were programmed into a computer, they could

get the dinosaurs to swing their heavy tails or open their ferocious mouths.

The most incredible and ambitious recreation was a 3,000-pound, 20-foot carnivorous T-rex, which was mounted on a hydraulic platform operated on the same principles as a military flight simulator. Flashing red lights warned crew members to stay clear of its powerful, whipping tail.

Producer Kathleen Kennedy, who collaborated with Spielberg on "E.T.," "The Color Purple," "Empire of the Sun" and "Hook," was impressed with the dinosaurs for more than aesthetic reasons. Unlike human actors, she says. "They were incredibly reliable. It was amazing. They never broke down."

Wide angle or long shots utilised miniatures, photographed by effects wizard Phil Tippett with his Go-Motion System, a refined version of the stop-motion technique used in the old Godzilla pictures.

Other scenes, including one where dinosaurs chase a jeep carrying Jeff Goldblum and Laura Dern, were turned over to the creative geniuses at George Lucas' Industrial Light and Magic. Here, graphic artists manipulated digitised image to create visual effects not possible with the models.

In one scene where youthful Ariana Richards and Joseph Mazello are nearly crushed by a stampede of dozens of dinos, one reptile was replicated many times. By changing the phase of their movement, it appeared that there were many different animals, rather than clones of just one.

For all the attention to prehistoric accuracy, however, there is something disturbingly familiar about the movements and characteristics of these long extinct creatures. This can be explained by the fact that the technical team watched nature tapes and visited a zoo to learn how contemporary animals, like elephants and crocodiles, move their limbs, bodies and heads.

Roars, snorts, screams and hisses coming from the dinosaurs' mouths were also fabri-

cated from the sounds of mating tortoises, hissing geese and screeching dolphins.

So convincing and appealing were the life size replicas that even actor Sam Neill, who plays palaeontologist Dr. Alan Grant in the movie, found his first close encounter with an ailing triceratops on the set in Hawaii to be strangely moving.

"There was this big dinosaur lying on its side, breathing and making noises," he recalls. "It seemed so absolutely real I had an emotional response I was not expecting I was touched. With the T-rex, I wasn't as touched."

**Mark Harrison**  
*Atlantic News Service*

**The Hindu** 18-6-93

### 'JURASSIC PARK' IN DEVON

Some people just could not wait for the release of Steven Spielberg's new blockbuster "Jurassic Park". So Mark Livesey and Martin Clements built a dinosaur park of their own:

They took a leaf out of the movie mogul's book to create his very own version of the prehistoric monsters.

Mark and Martin's dinosaur den is at Ilfracombe in North Devon, England. They have used conventional engineering methods to create lifelike monsters which move and roar. Martin and Mark are two of Europe's finest model-makers.

They built 14 dinosaurs, including Tyrannosaurus rex, pterodactyls, a terrifying triceratops and six velociraptors. They are all lifesize and triceratops, at about 15 metres, is one of the biggest dinosaur models ever built. They are built from steel and glass fibre, covered with a latex skin; movement comes from air compressors—there is even a dinosaur's nest to help educate children. Coupled with sound effects, the T-rex can be seen and heard. All children are fascinated by dinosaurs and a visit to the park owned by Bob Butcher, will be educational as well as fun. — Gamma. ●

## COMMENTS BY SOME IMPORTANT VISITORS TO MADRAS SNAKE PARK TRUST

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Madras Snake Park has done a great job in educating the public about Snakes generally. Now, we know snakes are like any other species and we have nothing to be afraid of.

Three cheers to the Park.  
In future they have a great role to play.  
Good luck  
24.4.93

M.K. Sharma  
Trenels Opus  
4, Seetha Nagar Main Road,  
Nungambakkam.

Madras Snake Park is a small field institute to educate public on reptilian species. It should be strengthened. Staff is very much practically involved and efficient to manage all the affairs on their own.

Sd.....  
Dr. B.M. Arora  
Director  
National Zoological Park, Delhi,  
7.5.93

This snake park and the response of the staff towards the public are very good and educative. I don't know much about their financial constraints, but the park requires little more beautification as it is serving not only the Madras residents but also many public from the adjoining places. I appreciate very much the way they display the snakes and educate the people.

Sd.....  
P. Prasada Babu, I.F.S.,  
Conservator of Forests,  
Trivandram, Kerala.  
10.5.93

I have gained a lot by my visit to Madras Snake Park Trust.

The MSPT is indeed playing a significant role in promoting awareness into REPTILE KINGDOM and furthering the cause of ANIMAL WELFARE.

I wish them all success in thier endeavour and assure them of the full support of AWBI.

Sd.....  
N. Ravi Shankar,  
Secretary, AWBI  
Madras, 8.7.93

## NEWS FROM MADRAS SNAKE PARK TRUST

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6th May'93

Mr. A.N. Jagannatha Rao, Hony. Secretary attended All India Zoo Directors' conference held at Aringar Anna Zoological Park, Madras 600 048. During the conference session, the Zoo Directors of various Zoos of India visited Madras Snake Park Trust. on 7th May' 93.

8th May'93

Mr. A.J. Ganesh Prasanna, our part-time research scholar, from Wayne State University, U.S.A., continued his research work on Chameleon using high speed camera at Madras Snake Park Trust with the collaboration of Aerospace, I.I.T Madras.

*Compiled By*  
**R. RAJARATHINAM.**

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### MISCELLANEOUS NOTES

COBRA invites contributions under "Miscellaneous Notes". Short notes and interesting personal observations on Reptiles and Amphibians are invited for publication. Myths, lores and beliefs which highlight these animals from the cultural and traditional point of view are also welcome.

### PAPERS ON AMPHIBIA

In deference to the wishes of a number of herpetologists, it has been decided to enlarge the ambit of COBRA to incorporate articles and papers on Amphibia as well. Contributions on ecology, conservation, fauna, behaviour and other aspects on Amphibia may be sent to Dr. R.S. Pillai, Editor, COBRA, Madras Snake Park Trust, Guindy, Madras-600 022.

—Editor

## CURRENT RESEARCH PROJECTS AT MADRAS SNAKE PARK TRUST

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1. Ecology of Reptiles in scrub jungles of Tamil Nadu" by Mr. V. Kalaiarasan for his Ph.D. Programme under the guidance of Dr. R. Kanakasabai, Prof. and Head, Dept. of Zoology A.V.C. College Mayiladuthurai. This project is being co-ordinated by Mr. A.N. Jagannatha Rao, Hony. Secretary and Dr. R.S. Pillai, Research Officer, Madras Snake Park Trust.

2. A research project on "Rodent control using harmless Reptiles" is being undertaken by Mr. T. Raveendra Babu for his Ph.D. Programme under the guidance of Dr. P. Vivek Raja, Lecturer in Zoology, Govt. Arts College, Madras-35 co-ordinated by Shri A.N. Jagannatha Rao, Hony. Secretary and Dr. R.S. Pillai Research Officer Madras Snake Park Trust.

3. Mr. R. Aengals is working for his Ph.D. on "Studies on Iso-enzymes of Snakes"

under the guidance of Dr. E. Prabhakaran Selection Grade Lecturer in Zoology' Presidency College (Autonomous) Madras-600 005. This project is being co-ordinated by Shri A.N. Jagannatha Rao, Hony Secretary and Dr. R.S. Pillai Research Officer, Madras Snake Park Trust.

4. The following Research programmes on captivity studies are being undertaken:

- a) Studies on Chamaeleon—R. Rajarathinam and R. Aengals.
- b) Studies on Turtles and Tortoises—R. Rajarathinam and V. Kalaiarasan
- c) Captive breeding in Green Iguana (*Iguana iguana*)—R. Rajarathinam and T. Raveendra Babu
- d) Correlation between morphology and habits of Snakes—Mrs. R. Chitra.

**SURPLUS REPTILES AVAILABLE AT  
MADRAS SNAKE PARK TRUST IN EXCHANGE**

*(Subject to approval by the Government)*

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**WE OFFER**

**Snakes**

1. Indian Python (*Python molurus*)  
(Babies and Sub-adults)
2. Reticulated Python (*Python reticulatus*)  
(Single specimen not pair)

**Turtles, tortoises and Crocodiles**

3. Pond turtle (*Melanochelys trijuga*)
4. Star Tortoise (*Geochelone elegans*)
5. Marsh Crocodile (*Crocodylus palustris*)  
(7 year old)

**WE ARE LOOKING FOR**

**Snakes**

1. Black Cobra (*Naja naja oxiana*)
2. King Cobra (*Ophiophagus*)
3. Banded Krait (*Bungarus fasciatus*)
4. The Indian Egg-Eating Snake  
(*Elachistodon westermanni*)
5. Flying Snake (*Chrysopelea ornata*)

**Monitor Lizards**

6. Desert Monitor (*Varanus griseus*)
7. Yellow Monitor (*Varanus flavescens*)
8. Water Monitor (*Varanus salvator*)
9. Common Indian Monitor (*Varanus bengalensis*)

**Turtle**

10. Fresh water turtles-any species.

**Crocodile**

10. Estuarine Crocodile (*Crocodylus porosus*) (Juveniles and sub-adults)
11. Preserved specimens of 5 species of Sea turtles
  - a) Leatherback turtle (*Dermochelys coriacea*)
  - b) Green turtle (*Chelonia mydas*).
  - c) Logger Head turtle (*Caretta caretta*)
  - d) Olive Ridley turtle  
(*Lepidochelys olivacea*)
  - e) Hawksbill (*Eretmochelys imbricata*)

## An Appeal

The Madras Snake Park Trust has obtained, with the help of the Govt. of Tamil Nadu, 2.5. acres of land in the old Mahabalipuram Road on the outskirts of the city of Madras to establish an elaborate Reptilium on modern scientific lines to promote Tourism, Conservation, Education, Service and Research on Reptiles.

The proposed layout and estimates of the various units are shown on the next page. The total cost of the project is estimated around Rs. 180 lakhs or 6,00,000 \$(US).

The MSPT now seeks financial contributions from various organisations and individuals to fulfil this ambitious future programme unit/block-wise.

Grants and donations are exempted by the Income Tax authorities under 80G vide Ref. No. DITE/1146/(34)/78 dated 1-4-89 to 31-3-92.

Generous contributions are solicited. Contributions may be sent to "The Madras Snake Park Trust" Guindy National Park—Guindy, Madras-600 022 India.

*Trustees of the Madras Snake Park Trust, Madras-600 022.*

## DETAILS OF COST OF CONSTRUCTION AND DISPLAY

### **Building 1 and 2 (3 floor)**

Each floor has 40' — 40' area and will house Rooms, Mess, Recreational area for Research students, each building 12 students.

Cost per floor Rs. 6 lakhs or \$ 20000.  
Total cost of building 18 lakhs or \$ 60000.

### **Building No. 3 and 4 (3 floor)**

Each floor has 70' — 40' area and will house Research Division, i.e., Library, Laboratory etc.

Cost per floor Rs. 10 lakhs or \$ 35000.  
Total cost of each building Rs. 30 lakhs or £ 105000.

### **Pit No. 5 and 6 (1000 sq. ft.)**

Specially designed, natural setting with pond etc., to house 3 species of Indian Crocodiles

Cost Rs. 1,50,000 or \$ 5000.

### **Pit No. 7**

This will house exotic reptiles like Iguanas, etc., in 500 sq. ft. area.

Cost Rs. 75,000 or \$ 2,500.

### **Pit No. 8 and 9 (area 1000 sq. ft.)**

Skunks, Chamaeleons, Monitors etc., will be exhibited in these enclosures in specially designed habitats.

Cost Rs. 1,50,000 or \$ 5000.

### **Pit No. 10 and 11 (area 1000 sq. ft.)**

Specially landscaped to display land tortoises, marine turtles and fresh water terrapins.

Cost Rs. 1,50,000 or \$ 5000.

### **Pit No. 12 (Area 500 sq. ft.)**

Giant tortoise of Seychelles, Komodo dragon etc., will be displayed.

Cost Rs. 75,000 or \$ 2500.

### **Building No. 13 and 14 (area 1000 sq. ft.)**

Different poisonous and non-poisonous snakes of India will be exhibited in specially designed habitats. King Cobra will find a special habitat cooled by air cooler.

Cost Rs. 1,50,000 or \$ 5000

### **Building No. 15 and 16.**

Indian snake lore and myths which are in plenty will be elegantly brought out and made interesting and attractive for tourists. Simple hall 40' x 40' with a sloping roof.

Cost Rs. 6 lakhs or \$ 20,000 — each building.

### **Building No. 17 (Demonstration shed— 3000 sq. ft.)**

To educate the public on reptiles. Hourly display of live reptiles with commentaries in English, Tamil and Hindi. Tapes in 10 Indian languages and choice of 6 Foreign languages will be available for large groups for a special fee.

Cost Rs. 10,00,000 or £ 35,000.

### **Building No. 18 and 19.**

40' X 40' to house preserved specimens of Indian and exotic reptiles for Research purposes. Sloping roof.

Cost Rs. 6 lakhs or \$ 20,000 each building.

**Building No. 20.**

This is a storeyed building. The ground floor to be used by visitors as a Rest-shed. The second floor for the Administrative Office of the Madras Snake Park Trust. 3rd floor for Guest house.

Each floor is 70' × 40' Cost Rs. 10 lakhs or \$ 35000. Total cost of the building would be 30 lakhs or £ 105000.

**Building No. 21**

3 floors each of 70' × 40'. To house an auditorium, a conference hall and a records room.

Each floor cost Rs. 10 lakhs or \$ 35000 and the total cost of building Rs. 30 lakhs or \$ 105000.

**Building No. 22 and 23.**

These are quarters for watchman, on either side with 300 sq. ft area.

Cost Rs. 1,00,000 or \$ 3500. The 2 units cost Rs. 2,00,000 or \$ 7,000.

**Building No. 24 and 26**

Open wells of 6' diameter each costing Rs. 37,000 or \$ 1250. Together they cost Rs. 74,000 or \$ 2500.

**Building No. 25**

General store Room of 20' × 10'.  
Costing Rs. 75,000 or \$ 2500.

**Building No. 27 and 31**

Large underground storage tanks to hold water, each 15,000 litres capacity.

Cost Rs. 75,000 or \$ 2500/- each 2 sumps together would be Rs. 1,50,000 or \$ 5000.

**Building No. 28 and 30**

10' × 10' rooms for electric meters and water pumps, each room Rs. 37,000 or \$ 1250.

Cost of 2 room Rs. 75,000 or £2500.

**Building No. 29**

10' × 10' Security room. Cost Rs. 37,500 or \$ 1250.

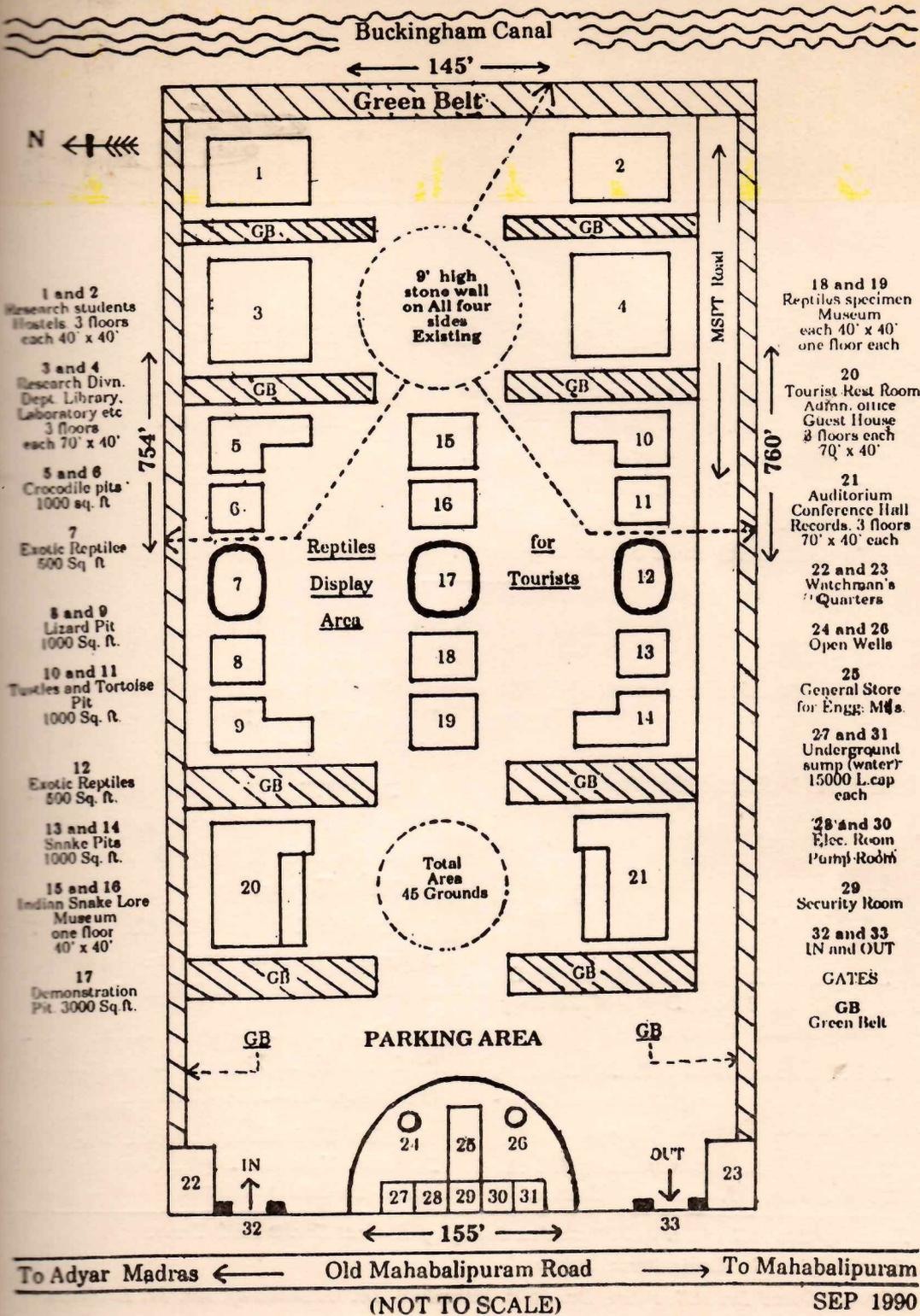
**No. 32 and 33**

IN and OUT gates Each cost Rs. 15,000 or \$ 500. Cost of 2 gates Rs. 30,000 or \$ 1,000.

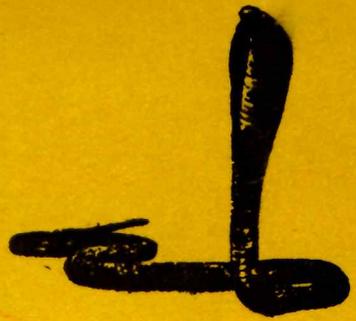
All costs are worked out on present exchange rate of US \$ — 30.00 as on date March 1993.

ALL GRANTS WILL BE DISPLAYED ON A MARBLE SLAB ON THE RESPECTIVE FLOOR/BUILDING.

# Proposed Layout of Madras Snake Park Trust at Kottivakkam, Madras



SEP 1990



## MAJOR OBJECTIVES OF THE TRUST

1. To dispel blind fear of snakes in people
2. To highlight the usefulness of reptiles in controlling rodents and pests.
3. Efforts towards conservation of reptiles.
4. To promote Tourism.
5. To promote scientific Treatment of Snake bites.
6. To conduct Research on the Eco-biology of Reptiles.

## TRUSTEES OF MADRAS SNAKE PARK TRUST

- |   |   |
|---|---|
| 1. Shri S. Meenakshisundaram, M.A.,B.L.,<br>Advocate, Labour Law Consultant, Trustee<br>& Chairman.                       | 7. Shri Sugato Dutt, IFS, The Wildlife<br>Warden, Forest Dept. Govt. of Tamil<br>Nadu, Ex-Officio, Trustee.                                       |
| 2. Shri A.N. Jagannatha Rao, B.E.,<br>Industrialist and Retd. Engineer, Trustee &<br>Hony. Secretary.                     | 8. Dr. P.T. Cherian, M.Sc., Ph.D.,<br>Officer-in-charge, Zoological Survey of<br>India, Southern Regional Station, Madras.<br>Ex-Officio Trustee. |
| 3. Shri M. Krishnan, M.A.,B.L., Artist<br>Photographer, Writer and Naturalist<br>Trustee.                                 | 9. Shri P. Kannan, M.S., Regional Dy.<br>Director, Wildlife Preservation, Southern<br>Region, Madras. Ex-Officio Trustee.                         |
| 4. Dr. M.V. Rajendran, M.A., Ph.D.,<br>Retd. Prof. and Head, Dept. of Zoology,<br>Herpetologist and Trustee.              | 10. Dr. G. Durairaj, M.Sc., Ph.D.,<br>Prof. and Head, Dept. of Zoology, Madras<br>University. Ex-Officio Trustee.                                 |
| 5. Dr. R.S. Pillai, M.Sc., Ph.D., Retd. Jt.<br>Director, Zoological Survey of India, Scien-<br>tific Officer and Trustee. | 11. Shri S M Sankaralingam, B.Sc., B.L.<br>Director, Tourism Dept., Govt, of Tamil<br>Nadu, Ex-Officio Trustee.                                   |
| 6. Shri P.V. Laxminarayana, B.Com.,<br>F.C.A., Chartered Accountant, Trustee.   |   |

*Edited by Dr. R.S. Pillai and Printed on behalf of Madras Snake Park Trust.*

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*Editorial Board Dr. R.S. Pillai, Dr. M.V. Rajendran, Dr. G. Durairaj, Mr. M. Krishnan,  
Dr. P.T. Cherian, Mr. Sankaralingam and Mr. A.N. Jagannatha Rao.*