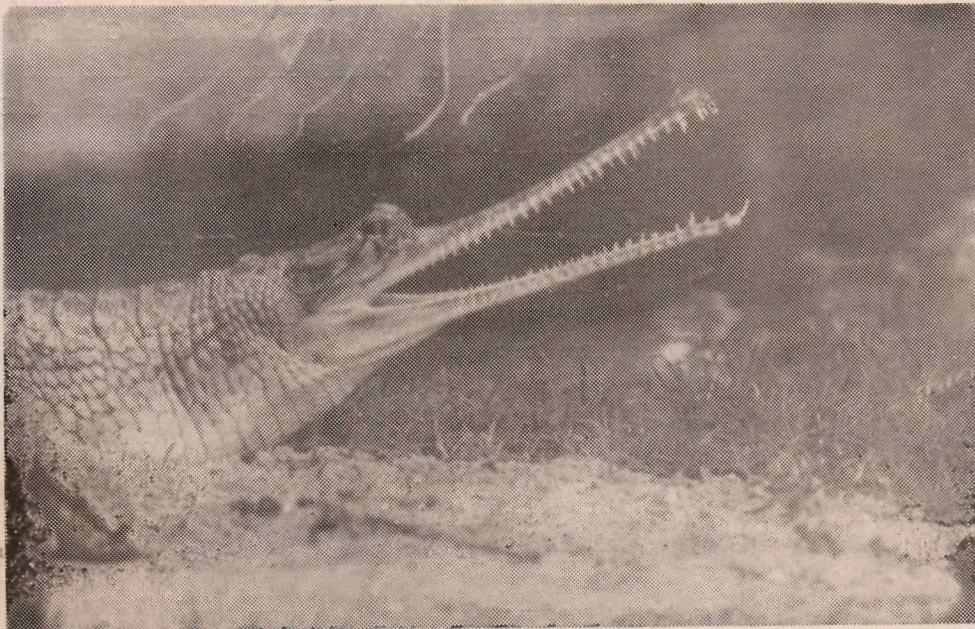


# Cobra

Number 7

Quarterly Newsletter

Jan.-March. 92



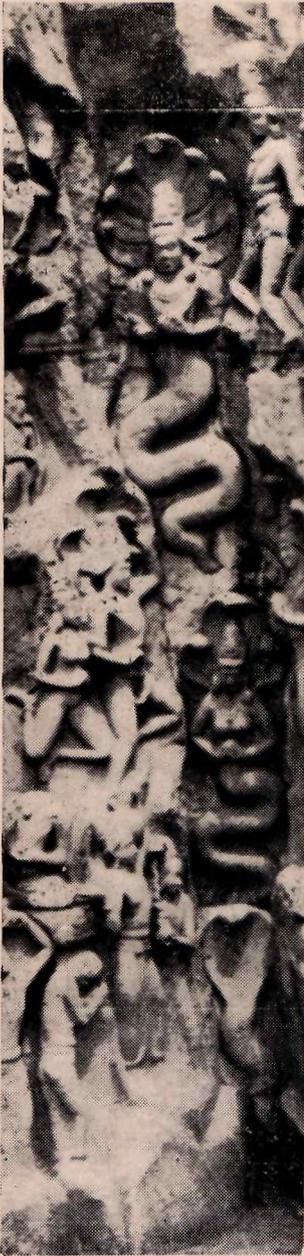
THE GHARIAL  
(*Gavialis gangeticus*)

*Courtesy:* All Color book of Reptiles by Laurence Perkins

*V. Kaluvaran*

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 Museum 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—free for still cameras and Rs. 100/- for Video Cameras. For commercial Video contact office.
- \* Hourly Demonstration of a few kinds of live Reptiles with commentaries is conducted.
- \* Nearly 12 lakhs persons visit MSPT a year.

# COBRA

## Quarterly Newsletter of the Madras Snake Park Trust

### CONTENTS

Page No.

Madras Snake Park Trust Programme for "India Tourism Year 1991-1992"	2
Capturing a fleeting phenomenon—The chameleon's tongue in action— Ganesh Prasanna	3
Amphibia of Javadi Hills, North Arcot District (Tamilnadu)— R.S. Pillai and M.S. Ravichandran	5
Impact of snakes on Human Culture—Mrs. R. Mathew	8
Spawning Behaviour of <i>Rana tigerina</i> Daud.—Pranab Kumar Mallick	13
Snake Lore	16
Photographs	17
Reptile News in Press	20
News from Madras Snake Park Trust	24
Comments by important visitors to Madras Snake Park Trust	24
Current Research Projects	25
Surplus reptiles available at Madras Snake Park Trust for exchange	26
Details of cost of construction and display	28

---

Annual Subscription for 4 issues  
of COBRA commencing from  
the date of Subscription

Rs. 75/- Inland  
US \$ 10/- Overseas  
(including postage)

---

## **MADRAS SNAKE PARK TRUST PROGRAMME FOR "INDIA TOURISM YEAR - 1991-1992"**

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 - 1992.

# CAPTURING A FLEETING PHENOMENON

## —THE CHAMELEON'S TONGUE IN ACTION

GANESH PRASANNA

*Department of Biology, Wayne State University, Detroit, Michigan-48202, U.S.A.*

---

It has been well documented that the chameleon is capable of protruding its tongue to a distance approximately twice its own body size, to capture a prey (Schwenk and Bell 1988, Bell 1990). There have been several attempts to study and analyze this act and many of them have been successful. This article will just emphasize on a few techniques that were used to capture and analyze this rapid tongue projection. The high speed camera that is being used here is KODAK SP 2000 MOTION ANALYSIS SYSTEM capable of capturing upto 2000 frames per second (FPS). This requires atleast 8x320 W bulbs for illumination. The FPS used here is 500.

Chameleons (Family : Chamaeleonidae) usually feed by this method and use the typical "sit and wait" strategy in order to capture prey although they do try to get near the prey so as to get near the firing range. Bell (1990) has calculated the maximum velocity of the tongue to be about 4.25 m/s. There appears to be one phase in the projection where acceleration is achieved followed by a deceleration while the tongue is retracting, with or without the prey.

Ordinary home video cameras are capable of capturing images at a rate of 30 frames per second which means each frame has a time domain of 0.33 milliseconds. This could be compared to setting the shutter speed of a still camera to 1/30 of a second and one would need a very steady pair of

hands to hold the camera but better results are obtained when mounted on a tripod stand. When preliminary analysis was done by the author on the kinematics of tongue action, it was found that the complete act was over within 4 frames or 5.32 seconds. Zoond (1932) has studied the mechanism of tongue projection by electrically stimulating the lingual nerves of etherized chameleons and has measured the physical characteristics of the tongue like length, width and distance of tongue projection. Gans (1967) has used movie cameras with strobiscopical exposures of the frames upto 1/12 of a second. Schwenk and Bell (1988) and Bell (1990) have made extensive use of movie cameras like Bolex 16mm and Nizo Super-8, the latter having the capacity of capturing 54 FPS. Even with the help of strobes and other sophisticated lighting equipment it was not possible to calculate exact rate of acceleration of the tongue from the state of mouth gaping and tongue projection to the point of contact with the insect prey. Schwenk and Bell have also used a Hycam K 220/R camera with eight 115 V 750 watt bulbs for illumination. Hycam had a film speed of 2000 fps and the average projection sequence comprised of 2500 frames.

In the present study being conducted at Dept. of Biology, Wayne State University, Michigan under Dr. C.J. Swanson, attempts are being made to study the tongue ballistics and bio-mechanics of the Indian Chameleon, *Chamaeleo zeylanicus*. Video camera and recorders are being used to

capture tongue projection, instead of movie cameras. Once the images are captured at the desired high frame rate like upto 2000 fps. computer software is used to perform Post Acquisition Data Analysis (PADA) where the data is quantified and put to hypothesis testing. The software used here is MacVision Image Processing (MVIP) software version 4.0 and is compatible for use with Macintosh Computers. Image from the real world that are captured using video cameras can be enhanced by using this software. The video input is in the analog form and the computer uses a Mac-Vision Digitizer to convert this input into digital units and is stored in the memory of the computer.

Once the desired frames are selected, they are to be digitized and the Mac-Vision takes 640 samples of each of the 3 colors (RGB) of 480 scan lines and stores the result in memory as a collection of Bits that actually describe the video frame. After all the frames are digitized and stored as files, analyses of selected frames is made possible, here the picture quality can be enhanced,

brightness and color contrast could be adjusted and hard copies may be obtained using a dot matrix printer. Along with qualitative options one can get quantitative parameters measured too. As this study requires frame by frame analysis of the various stages of tongue projection, it would be necessary to measure acceleration, velocity, distance, volume changes etc. Thus this methodology of PADA by using the MVIP software will be easy and accurate. Another ongoing study here, is the quantitative measurement of color changes in the chameleon and again this software will be extensively used in data analysis.

#### REFERENCES :

- Bell D.A. 1990 Kinematics of prey capture in chameleons Zool. Jb. Physiol. 94 247:260
- Gans. C. 1967 The Chameleon Nat. His. 76 52:59
- Schwenk and Bell D.A. 1988 A cryptic intermediate in the evolution of chameleon tongue tip projection. Experimentia 44 (8) 697:700

---

### 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-000 022.

# AMPHIBIA OF JAVADI HILLS, NORTH ARCOT DISTRICT (TAMILNADU)

R.S. PILLAI and M.S. RAVICHANDRAN

Zoological Survey of India, Madras-600 028.

## Introduction

In contrast to the Western Ghats, the Amphibia of the Eastern Ghats is very poorly known. More over, North Arcot District has been included as one of the faunistically unsurveyed Districts of Tamilnadu. To fill up these lacunae, the Southern Regional Station, Madras, carried out a series of faunistic surveys in the Javadi Hills of the District and the present paper is the outcome of the study of Amphibia collected during these surveys.

Four surveys were undertaken from 1982-84 covering the following localities:- Virappanur, Pattarkadu R.F., Nellivasal, Podur, Kavalur, Kuttathur, Paramanadal, Odugathur and Amridi. In all, 226 examples of Amphibia brought from these areas have been examined which fall under 4 families, 5 genera and 8 species.

All the species dealt with here constitute new records to Javadi Hills and North Arcot District.

The colour description provided is in the preserved state.

The eight species of Amphibia are listed below :

## LIST OF AMPHIBIANS FROM JAVADI HILLS :

Class : Amphibia  
Order : Anura  
Family : Bufonidae  
Genus 1 : *Bufo* Laurenti

1. *Bufo melanostictus* Schn.  
Family : Ranidae  
Genus 2 : *Rana* Linnaeus
2. *Rana hexadactyla* Lesson.
3. *Rana cyanophlyctis* Schn.
4. *Rana tigerina* (Daud.)
5. *Rana limnocharis* Boie  
Genus 3 : *Tomopterna* Dum. & Bibr.
6. *Tomopterna breviceps* Schn.  
Family : Rhacophoridae  
Genus 4 : *Polypedates* Tschudi
7. *Polypedates maculatus* (Gray)  
Family : Microhylidae  
Genus 5 : *Microhyla* Tschudi
8. *Microhyla ornata* (Dum. & Bibr.)

## TOPOGRAPHY, CLIMATE, VEGETATION ETC.

Javadi Hills which form part of the Eastern Ghats rise rather steeply from the plains, constituting an undulating plateau with an average elevation of 800 metres. The highest point is Kanbangudi (1166 meters). Cheyyar River, a tributary of Palar forms the main drainage. Rainfall is fairly distributed in these hills with an average of 850 mm. Pattarikadu and Komatteri Reserved Forests receive the highest rainfall during August to November. The climate is pleasant and cool, the winter months have some frost. The types of soil met with are sandy, red loam and Kalleri soil. Three forest types are available

viz 1) Southern Dry Deciduous scrub forest  
2) Tropical Dry Riverine forest and 3) Tropical Dry semievergreen forest.

### SYSTEMATIC ACCOUNT

#### 1. *Bufo melanostictus* Schneider

37 examples of toads have been examined. The largest is 70mm in head and body. Most of others are smaller in the range of 30 to 45 mm.

#### Distribution :

Oriental Region and Malaysia.

#### 2. *Rana hexadactyla* Lesson

A single example measuring 46.5mm in head and body is available in the collections, taken at Vannanthurai.

Dorsally dark grey, particularly in its anterior half, a faint vertebral line from tip of snout to vent. Ventrally white with two broad longitudinal lines along the hind limb.

#### Distribution :

Typically a peninsular form, extending on the eastern coast upto Calcutta.

#### 3. *Rana cyanophlyctis* Schneider.

115 specimens, both adults and juveniles, have been taken.

All the examples agree well with published descriptions. The largest example, from Bheema madugu measures 58.5mm.

Dorsally grey or greyish dark with irregular darker patches. Ventrally white with black spots in the larger examples. There is a blackish streak on the hinder under-part of the thighs.

**Distribution :** Found all over India.

#### 4. *Rana tigerina* (Daud.)

A single female (56 mm in head and body) collected from Vannanthurai is being referred to this species.

Brownish grey above with patches of dark circular marks and clear longitudinal folds. Ventrally white with black spots on the throat.

#### Distribution :

Throughout India, Sri Lanka, Burma to Indo-China; South China and Formosa.

#### 5. *Rana limnocharis* Boie.

As many as 89 examples of the above species were examined from a number of localities.

The largest is a female collected from Theertha Kanaru.

Grey or brownish above with a series of darker markings which often assume regular and irregular symmetrical patterns. The median vertebral band which is seen in many is thin and narrow or broad and conspicuous. Ventral aspect immaculate. Small cutaneous warts or longitudinal folds are present.

#### Distribution :

Eastern Asia from Pakistan to Japan.

#### 6. *Tomopterna breviceps* Schneider.

Two examples were collected which measure 54.5mm and 42.5mm in head and body.

Brownish above with darker symmetrical markings. A narrow vertebral line is present in the smaller example. Scattered tubercles on skin. Lower part white, throat region faintly mottled.

#### Distribution :

Throughout India, Ceylon and Burma. Normally a species found in subterranean habitats in the plains, the present examples are from altitudes of 540 and 800 metres.

#### 7. *Polypedates maculatus* (Grey)

Three examples were collected from a bush, very close to a stream. The speci-

mens were leaf-green in life. In the preserved state, light grey above with a few circular and longitudinal patches on dorsum, an inter-orbital band connecting the two upper eyelids, a dark streak originating at the nostril, extending backward over the tympanum and terminating a little above the shoulder. Posterior part of thigh sepia with rounded white spots, limbs cross-barred. Belly granulated, under parts white.

**Distribution :**

Southeast Asia. Known from Darjeeling, Nilgiris, Bombay, Malabar and Madras.

8. *Microhyla ornata* (Dum. & Bibr.)

A small frog collected from Amiridi Aru at an altitude of 230 metre, is being refer-

red to the genus *Microhyla*. Though only 12mm in head and body the following features are clear. Upper jaw not toothed, vomerines absent, papillae absent behind internal nares, tongue oval, interorbital space double the width of upper eyelid, toes with a rudiment of web, the two metatarsal tubercles fairly developed. Taking into consideration the typical colour pattern, we have no hesitation in referring this tiny frog to *Microhyla ornata*

**Distribution :**

India, Ceylon, Southeast Asia, S. China and Formosa.

The authors are thankful to the Director, Zoological Survey of India, Calcutta.

---

## CONTRIBUTIONS ON REPTILES INVITED

---

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

Papers 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 not exceeding 8 typed pages may be sent to Dr. R.S. Pillai, Editor, COBRA, Madras Snake Park Trust, Guindy National Park, Madras-600 002.

# IMPACT OF SNAKES ON HUMAN CULTURE

MRS. R. MATHEW

*Eastern Regional Station, Zoological Survey of India, Shillong-3.*

---

Humans spend their intellectual energies in 3 basic areas of activity- surviving, using practical learning (the application of technology); seeking pure knowledge through inductive mental processes (science); and pursuing enlightenment of taste and pleasure by aesthetic exercises that may be referred to as the "Humanities". Ethnozoology deals with all forms of animal-human interaction in so called primitive societies. Man in the beginning feared all the powers of nature, that were not under his control or beyond his knowledge. The snake, clearly won the heart of man. It had the power of inflicting death, the crawling body, spreading hood, powerful venom, sharp teeth, the agility it needs and a marvellous speed. Moreover it had all the nature's colour and designs; all qualities to captivate the fantasy of man. He therefore, willingly surrendered to a devout worship of snakes.

## Literature :

Man did try to understand, early in history, all about snakes. Some *puranas* throw considerable light about snakes; their habits etc. A fairly exhaustive classification is found in Umasvati's Tattvarthadhigama, a Jaina Work (Chapter II. Sutras. 24, 34). The classification is primarily based on the number of senses possessed by the creatures concerned. Thus they were classified as (1) Those having the sense of touch and taste (2) Those having the sense of touch, taste and smell (3) Those having the sense of sight, smell, taste and touch and (4) Those having the sense of sight, hearing, taste, smell and touch—this include

fish, snakes etc. According to the Bhavisya Purana serpents copulate in the month of Asadha (May-June), gestate in the following rainy season and deliver about 240 eggs each in Kartik (Nov.). The parents eat most of them. The remaining ones burst forth in about 2 months (or one month according to the Agni Purana). Eggs of a golden colour bring forth male offsprings, the paler elongated, ovoid shaped variety produces females and those having the colour of Sirisa flowers yield hermaphrodites. In about a week the young snakes become darker. In a fortnight or three weeks their teeth appear. In 3 weeks time their poison is formed in the fangs. In 6 months they cast off the slough. As a snake creeps along the ground, the folds of the skin under surface expand and contract alternatively. It seems as though it puts out and withdraws fine filament like legs which number about 240. Teeth are 32 in number, of these two on either side called kala ratri and yama dutika are venomous.

## Worship :

The aboriginal and Dravidian races of India have been for ages devout worshippers of the serpent. Since the serpents have the power to inflict death, they became object of wonder, fear and veneration to the Aryan race. Most of the objects of worship in Hindu mythology had their origin in the mysterious powers attributed to them which not being explainable were looked upon with awe. To prevent the use or abuse of their powers, these objects had to be propitiated and they were worshipped

in the belief that by such means their wrath would be appeased. In the early ages of mankind, the human mind invested snake with supernatural qualities. As for the snakes, their large size, temperament, movement, poison, habits etc. were all advantageous qualities which inspired fear and reverence among the humans. Thus in India cobras are worshipped by majority of Hindus and many do not kill them for fear of ill luck. They are also believed to preside over the generation of male children. It was supposed to be able to heal diseases, prolong or even beget life. Moreover, it was looked upon as a wise one. Thus in the ancient world, the serpent held great power in the affairs of man.

The snake-spirit, half-human, but with a serpent's tail, were very ancient objects of worship. They dwelt in the beautiful underground city of Bhogavati, and guarded great treasures, some of which they occasionally bestowed on mortals whom they favoured. They could take wholly human form, and more than one dynasty of Ancient India claimed descent from the union of a human hero and a nagini (Basham, 1954).

Christianity attributes false and evil qualities to the serpent. It was the serpent who by tempting the Eve made her eat the forbidden fruit in the Eden garden, thereby causing the down fall of Eve and the mankind. And then God cursed the snake "You will be punished for this; you alone of all the animals must bear this curse. From now on you will crawl on your belly and you will have to eat dust as long as you live. I will make you and the women hate each other; her offspring and yours will always be enemies. Her offspring will crush your head, and you will bite their heel". There are also references of John the Baptist calling guilty lot "You serpents, brood of vipers, turn away from your sins" and St. Paul handling poisonous serpents

in the name of Lord. Nevertheless, there are biblical references to the cunningness of the serpent.

The association of snakes with mythological creatures, specifically chaos monsters, in relation to the creation of the world in the literatures of other ancient near Eastern peoples is echoed in the Old Testament. During the Israelite's journeys through the wilderness, God responded to their complaining at one point by sending poisonous ("fiery") snakes among them, which killed many of the people (Num. 21-5:6). The solution given by God was a bronze serpent made by Moses, which the afflicted were to look upon. Just as other ancient near Eastern peoples associated snakes with deities, the bronze serpent later came to be worshipped as an idol and therefore had to be destroyed (2 kgs. 18:4). Poison is commonly referred to as characteristic of snakes in the Old Testament, even though many Palestinian snakes are harmless. This understanding of snakes as generally poisonous was the basis for the strong and varied association of snakes with evil. A number of figures of speech arose from this association, including figures for the effects of violence on society, every kind of danger that a person might encounter, the effects of wine, violent enemies, evil people and evil and violence in general. This use of snakes and their venom in figures of speech for evil culminated in the personification of evil in the snake.

As a symbolic figure the serpent is important in the religions of the Ancient Near East and in Old Testament and New Testament. The serpent is a demonic figure in many regions of the world, and it is such in the mythology of Mesopotamia, Persia, Egypt, Greece and Rome. As a demonic figure it may be beneficent or maleficent. The serpent is a divine or demonic symbol on Mesopotamian boundary stones and is

included among the Gods who are invoked to bring imprecations on the trespasser of the boundary. A serpent headed dragon appears on the Ishtar Gate of Babylon as a guardian spirit of the gate. More commonly it is a maleficent demon, there can be no doubt about its character where it is grasped in the hand of the Lamashtu of Mesopotamia. The serpent is not only a demonic figure: it is also a divine figure or a divine emblem, but its symbolism here becomes obscure. Its association with the deities of fertility is assured. The nude Canaanite goddess of fertility is represented in Egyptian scenes grasping a serpent in the hand. As a symbol of fertility the serpent becomes a figure of life and health as in the modern caduceus, the emblem of medicine, which is derived from the emblem of the Greek healing God Asklepios (Salvation). The serpent is also a cosmic figure, identified with the monster of chaos which is conquered by the creative deity (creation). As such it is the very emblem of the powers of evil and darkness.

Serpents were worshipped by Egyptians, Greeks, Romans and Europeans alike. For the Egyptians, snake was a symbol of creation; the Lord of the Universe. A Greek prince Asklepios became the God of medicine. In the United States, the Hopi Indians dance with live snakes (many of them poisonous) in their mouth. In the Burmese "snake-dance ritual" the kneeling girl, "kisses" the upright King cobra on its nasal scute. There are also evidences that children were sacrificed to rattle snake Gods in pre-Columbian America. Rattle snakes like the cobras, were objects of various taboos in some areas, and still are in a few areas. These were worshipped as rain gods for good harvest. Many believed them to be evil spirits. Boids too have played a role in cults and religions of many peoples. There were priestesses (in Dahomey) who carried venerated pythons in procession.

If any one killed a python, the person was shut inside a hut, and the hut ignited. However, he went free if he was able to break out of the hut before the fire got to him.

The legends of the tribal peoples and the undying traditions of the Hindu scriptures abound in references to a great variety of animals. In the first 5 of the avatars referred to in the Hindu scriptures are each associated with a common animal. The Hindu Trinity and other Gods never disdained the use of animals and their products of various kinds, as their vehicles, ornaments, weapons etc. Lord Vishnu has the use of many headed serpent as the bed where as Shiva has live snakes as garland ornament. The Mahabharata has many references of snakes. When the Gods with the help of the Asuras churned the ocean Kalasa, it was the Naga king Ananta who helped to uproot the king of the mountains, Mandara.

When Duryodhan in his younger days poisoned Bhim and threw him out to the water after binding his legs, the cobras in the water bit him and nullified the poison. When Bhim awakened from the slumber, he wards off the snakes but they take him to Vasuki. There he meets his great grand father Aryaka. Thus the belief that a person bitten by a snake or poisoned should be thrown into a river, which might undo the poison. This belief is well borne out in the famous story of Manasa—the snake goddess where Manasa sends serpents to kill the son of Chanda (a devotee of Shiva)—who would not worship her. The people then put the corpse on a raft and send it along the Ganges, the deceased man's wife accompanying the dead body. The tale ultimately has the dead man restored to life due to the good officials of an old woman who was deputed by Manasa herself. Manasa is also known as Visahari Devi.

According to Mahabharata, Garuda established a shivalinga the worship of which checks the snake poison. Thus the Brahmins of South India pray to Garuda to ward off snake bite before going to bed.

### **Myths and Folklore :**

The snake stood as the head of the human race in some myths. John's earth-snake is believed to move forward or backward, with equal agility alternatively every six months. The tail of this snake is blunt and looks somewhat like its head. Snake charmers take advantage of this fact, and making a slit at the end of its tail, give the tail the appearance of a mouth, to exploit the credulity of ignorant people. In many parts of India the harmless rat snake or Dhaman is considered to be a male cobra. Should anyone see a dhaman and cobra together he loses his eyesight. There are also stories saying that Dhaman sucks cattle dry and kill them; that if it strikes at the eye of a person he becomes blind and that even its shadow kills them. In some regions it is still believed that giant boids will kill bulls but spare cows and only squeeze their milk from their udders. In Nepal it is believed that they do the same to women who are suckling babies. Some Tanzanian tribes believe a dying python spits out a gem just before it dies; and if people can not find the stone, the tribes accuse each other for stealing it. In India people believed that if a person kills a cobra, he will not have any male children for 20 generations. If one dreams that he was bitten by a cobra that is proof against snake bite and it also proves that his wife has conceived. It was also believed that the cobra keeps a stone with bluish light and as it grows old it uses it for light. Another belief was that the cobra will follow a person for any length of time to take revenge on him if he has harmed the snake; and that it would recognise him by his voice alone. It is so vindictive that it waits days, even years

to take its revenge on an offender. The harmless whip snake too was not spared. It was believed that when it has bitten its victim, it would ascend a tall tree and there remain till it sees the funeral pyre; and then it would come down from the tree.

### **Food:**

Another important aspect of the impact of snakes on the human race is its availability as food. Many Indian tribes cherished the flesh of many reptiles especially snakes. Among snakes python yielded the most quantity of meat; the rat snakes were also eaten. The rattle snake meat is even today served as a delicacy in some foreign countries. The sea snakes too are a good supply of protein.

### **Medicine :**

Many would be surprised to learn that snakes have long been used to cure diseases. The history of western medicines are full of references to concoctions with at least some snake in them. In the United States, snake oil was once a favourite remedy for various aches and pains. Hindus are pioneers in the use of serpent poison as medicines. Many tribes in India, even today make use of one or the other part of the snake for various medicinal purposes. The homoeopathic system of medicine makes use of the venom of many snake species. Venom refers to chemical substances that can cause severe injury to humans and other animals when injected in small quantities. Snake venoms are used for treating various diseases like epilepsy, asthma, arthritis, chorea etc. The discovery of the "anti-venom" had been a tremendous boon to the humanity.

### **Anthropology :**

In the northern part of Bastar, the Muria Gonds, are divided into exogamous phratries bearing totemic names in Hindi

or Gondi. Thus Bakravans—Goat stock; Kachhim vans—Tortoise stock and Nagvans—Cobra stock. (Man in India XX 1940 pp 270-1)

#### **Hides :**

Many are the uses of snake skin for which countless numbers are killed.

#### **Snake charming :**

Snake charming is a way of life for a section of the Indian community. The harm these snake charmers do to the snakes were highlighted in an article by Mrs. Maneka Gandhi, the honourable Minister of State for Environment and Forests. According to her 60 to 70 thousand snakes die on each Nagpanchami day (Illustrated weekly of India, April 1988).

#### **As symbols :**

Snakes are used as symbols for campaigning purposes eg. Anti-drug addiction drive; election etc.

#### **Pets :**

Snakes can be good pets if one has the time and patience.

#### **Art, Films, Recreations :**

Snakes appear in Hindu religious art. Among such symbols are the garland of

Shiva and the bed of Vishnu. Snakes play a major role in many of our films; (most often as an avenging female). Many of our textile designs and colours are borrowed from them. Many have served as models of decorative jewellery. There are musical instruments too shaped and called after them

#### **Biological control :**

Snakes play a major role in the biological control of our ecosystem.

Thus we see man had been throughout the ages, both attracted and repelled by snakes. It is perhaps because man is an upright animal that he has a deep aversion toward all crawling creatures. This may well be the biological basis for the nearly universal dislike of snakes. It certainly is not the poisonous quality of some snakes that has produced the general aversion humans feel toward snakes. There is no evidence of an innate fear of snakes, both human and monkey babies have no fear of snakes up to the age of 2-3 years and they readily play with snakes. After this they experience a fear for snakes which may be due to what adults tell them or show them.

---

## 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.

—Editor.

# SPAWNING BEHAVIOUR *RANA TIGERINA* DAUD

PRANAB KUMAR MALLICK

Research Centre on Natural Science, Dullya, Howrah, West Bengal—711 302.

Suggested by Noble (1931) and established by workers after him, the mode of amplexus in anurans has been accorded systematic significance. The inguinal amplexus being considered to be a persistence of the ancestral anuran condition, bufonids are believed to be more "primitive" than ranids in which the amplexus is axillary. Graybeal and Queiroz (1992) have in a very recent paper dealt with the inguinal amplexus found in *Bufo fastidiosus* and have highlighted the use of amplexus as a character relevant to systematics.

Although some information is available on the spawning of Indian anurans, the behaviour and role of the individual partners, particularly that of the male have not been properly dealt with. The present paper is an attempt to fill this gap in respect of the Indian Bullfrog, *Rana tigerina* along with observations on the extrusion and fertilisation of ova. In two earlier observations, the author (Mallik, 1982, 1985) had studied the mating behaviour of two other species of ranids viz. *Rana verrucosa* (= *R. keralensis*) and *R. cyanophlyctis*.

The studies were carried out in an area of about one kilometre across at Dullya, Howrah, West Bengal. The breeding ground was surveyed for three consecutive years (1989-1991) from dusk till mid-night during monsoon period (middle of May to middle of August) to record the spawning behaviour of *R. tigerina*. Most observations were carried out by the help of a torch light in field conditions. Pairing partners

were at times removed to the laboratory and allowed to breed within a tank for more detailed observations.

*Rana tigerina* (Plate 1; Fig. 1 and 2) has territorial habit and prefers mostly accumulated rain water in shallow depressions in grassy fields for spawning. Shallow ditches and ponds with permanent water are also utilised.

Spawning generally commences early with the monsoon rains. The rate of breeding depends on the rate of rainfall. Maximum breeding occurs during the first phase of rainy season, the rate decreasing thereafter. A shower during the evening or at noon or a continuous shower from evening is enough stimulus for spawning.

It has been noted that the male and female get locked into an axillary amplexus (Plate 1; Fig. 3) between 7.30 to 10.00 P.M. The pairing partners usually remained immobile upto the time of oviposition. However, in some cases they left the original pairing spot in search of more suitable oviposition sites within the boundary of the breeding territory. After 2 hours of amplexus they generally appear sluggish and after  $3\frac{1}{2}$  to 4 hours of amplexus they jumped into the shallow water (Plate 1; Fig. 4). Before oviposition, the female partner was found to spread out her legs wide apart bringing the thighs at  $90^\circ$  with her abdomen. The amplexed male partner approximated his vent just over that of the female. The thighs of the male were pressed in between the thighs of the female. After the completion

of such preparation by both the partners, the female pressed her toes and palms on the bottom thereby raising her vent. Perhaps this process could be a signal to the male partner about the commencement of spawning. On receiving such a signal, the male quickly applied his toes and feet on either side of the vent of female thereby exerting pressure which helped in dilating the vent for easy extrusion of eggs (Plate 1; Fig. 5). Shortly after signalling to the male the female partner started oviposition by contraction of her belly and the first batch of eggs (1.5 mm in diameter) were extruded. These eggs were fertilized by the male who relaxed his legs immediately after this (Plate 1; Fig. 6). The jelly coat of the fertilized eggs imbibed water, swelled up, adhered side by side due to sticky nature of the jelly and finally formed a floating sheet of eggs.

The partners were found to rest for a short time and then changed their position for further spawning. The liberation of batches of eggs were repeated 17 to 20 times till all the ripe eggs were released and fertilized. The time gap between 'successive' batches of eggs was very short upto 10th or 11th batch, then the gap gradually increased. The total time taken from amplexus to final extrusion of eggs and fertilization was  $4\frac{1}{2}$  to 5 hours.

*Rana tigerina* has a breeding period of about 2—3 months. Oviposition sites are usually near the calling sites of the males. Amplexus and the individual role of the breeding partners are largely similar to that seen in *R. cyanophlyctis* (Mallick, 1985).

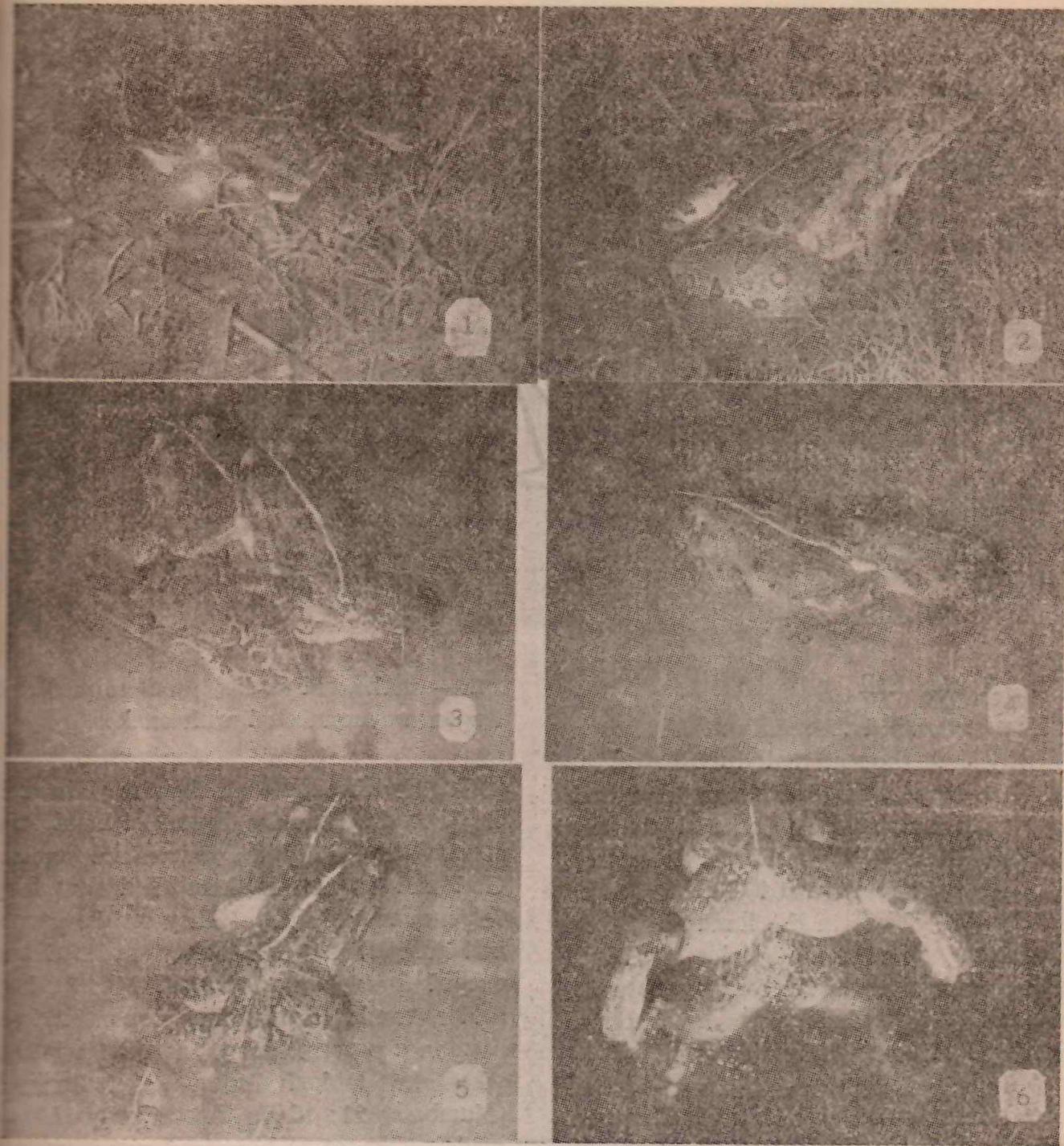
#### Acknowledgements

The author is grateful to Late Prof. S.C. Mallick, Retd. Head, Dept of Zoology, B.B. College, Asansol, Burdwan and Dr. S.K. Ghoshal, Prof. of Zoology, Burdwan University, Burdwan, West Bengal for their helpful criticism.

#### REFERENCES

- Graybeal, A. and De Queiroz, K., 1992. Inguinal amplexus in *Bufo fastidiosus*, with comments on the systematics of bufonid frogs. *J. Herp.*, 21 (1) pp. 84-87
- Mallick, P.K., 1982. Breeding behaviour of *Rana verrucosa* Gunther (Late Abstract) 69th Indian Science Congress p. 46
- Mallick, P.K. 1985. Breeding technique of *Rana cyanophlyctis* (Abstract). 72nd Indian Science Congress. p. 144.
- Noble, G.K. 1931. *The Biology of Amphibia*, McGraw Hill, New York, 577 pp.

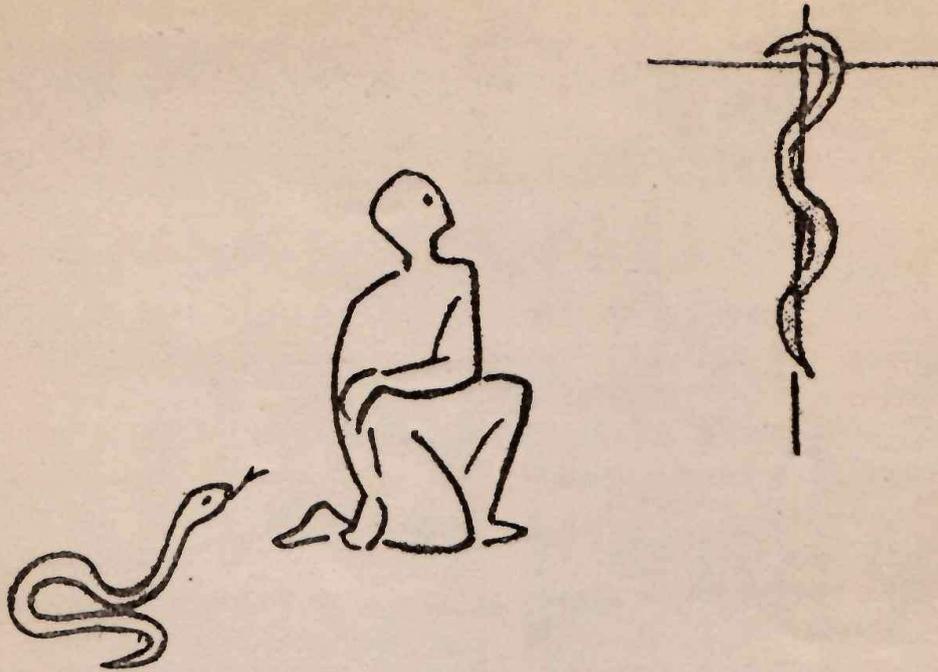
PLATE—I



Amplexus in *Rana tigerina*

1. A calling male with inflated vocal sacs.
2. An approaching female.
3. Axillary amplexus
4. Amplexed partners in shallow water
5. Male partner widening vent of female before spawning
6. Legs of male and female in relaxed state after fertilization. A batch of fertilized floating eggs.

## SNAKE LORE



### Snake, A wise Evil

“Thou art cursed above all cattle . . . upon thy belly shalt thou go and dust shalt thou eat. I will put enmity between thee and the woman and between thy seed and her seed; it shall bruise thy head and thou shalt bruise his feet”, so cursed God the snake for being an object in the hands of Satan in tempting man in the garden of Eden, leading to his fall. The enmity between man and snake, which exists even today, probably had its origin in this curse.

According to the Jewish and Christian teachings snakes epitomise evil. Jesus taught his disciples to be “wise as serpents and harmless as doves”. But snakes symbolise cunningness which made the author of the book of Genesis in the Bible say “the serpent was more subtle than any beast of the field which God made”. Of the twelve names used in the Bible to refer to Satan,

four— snake, old snake, great serpent and dragon are connected with snakes.

The Jewish people on their way through the Sinai desert to the Promised Land, the present day Palestine, murmured against God and to punish them God sent fiery serpents among them. They bit the people and many died. When they repented and prayed for mercy, God told Moses, their leader, “make them a fiery serpent and set it upon a pole . . . every one that is bitten, when he looketh upon it, shall live” (Numbers 21: 6-9). Accordingly Moses made a serpent of brass and put it upon a pole. Any one who was bitten could look at it and be healed. Christians believe that the raised pole symbolises the Cross and the victims of Satan can have salvation through the Cross.

Dr. P.T. CHERIAN

A sculpture of a Nagini  
from Orissa.



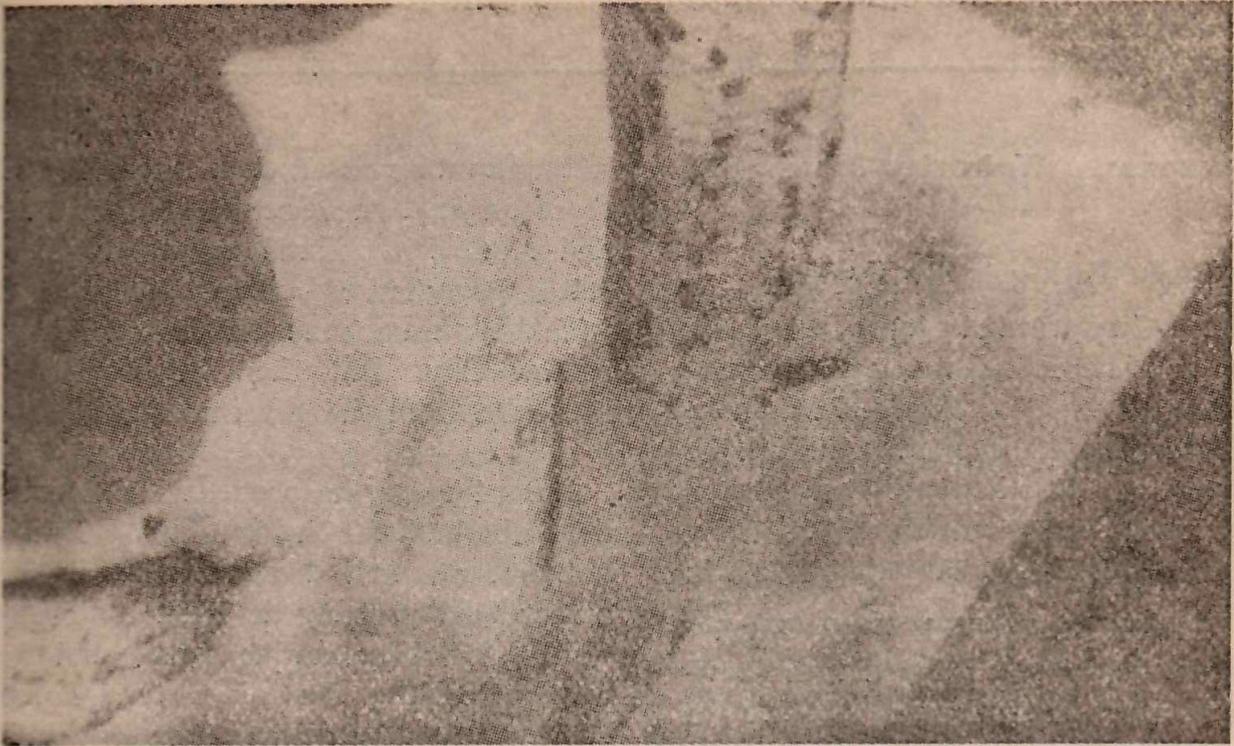
Hony. Secretary and Research Officer, MSPT, at the Nandankanan  
Zoological Park, Orissa.



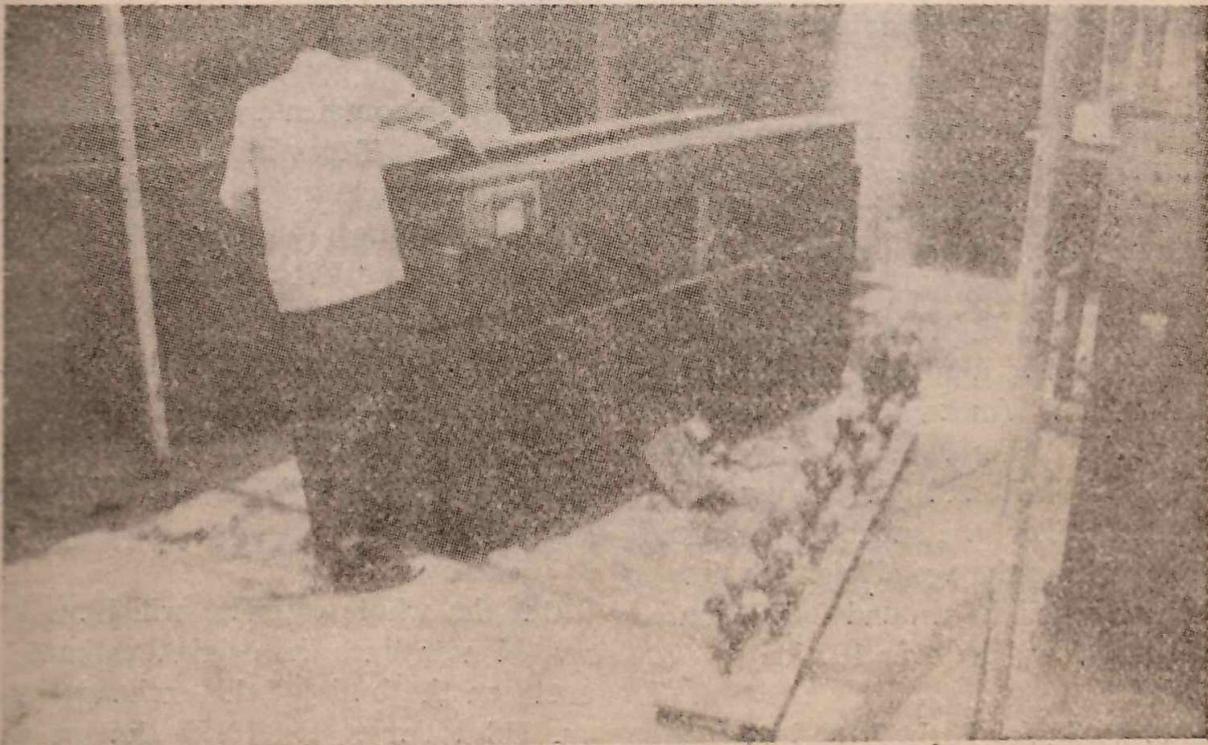
The MSPT Team at the First International Conference of the IUCN/SSC—ISRAG held at Orissa in Feb. '92.



Hony. Secretary, Research Officer and Research Scholars at the National Botanical Garden, Bhubaneswar, Orissa.



Rudimentary hindlimbs, as claw-like processes, highly developed in the male python.



Designed by Shri A.N. Jagannatha Rao, this equipment was used for observing and photographing colour changes in the chameleon.

## REPTILE NEWS IN PRESS

---

**Indian Express, Wednesday March 18th 1992.**

### **Guindy Snake Park gets Six gharials.**

Madras—Curious and agile, the six long-snouted juvenile gharials (Asian crocodile) new entrants to the Madras Snake Park, crawl out of their pond to bask in the sun's warmth. But these pre-teen gharials are shy. And, highly sensitive to any noisy intrusion into their cosy habitat in the park.

The Madras Snake Park Trust founder trustee Mr. Jagannatha Rao, said on Saturday that these gharials were brought in January in exchange for the iguanas given to the Nandan Kanan zoo in Orissa.

“Arrival of these juvenile gharials to the park is part of an effort to improve their stock which has started dwindling since 1970s. Skins of gharials were fetching US \$400 in the market, and exploiters started killing and skinning of the gharials made the government ban the gruesome activity.

But the coordinated efforts at various centres in India in breeding these fish-eating harmless gharials in captivity had proved successful. There are over 3,000 of them now in the country” he said.

Pointing out that an adult male gharial could be identified by a pot-like projection, known as ‘ghara’ (meaning pot), on its snout, he added, “gharials are between 200 to 300 mm at birth and they grow 200 mm per year. They are capable of reproduction on reaching the age of eight or nine years when they will be around 2,500 mm. An adult gharial weighs over 100 kg.

The Madras Snake Park Trust had sent proposals in 1990 to the government for

setting up a reptilium, at a cost of Rs. 1.25 crore on modern scientific lines in a two-and-a-half acre of land acquired with the state government's help on the Old Mahabalipuram road on the outskirts of Madras City. But, there has been no sign of action from the government till now.

According to the proposal, 25 buildings are to be built for the reptilium. Two will house a research division. Five separate pits will be specially designed for reptiles, skinks, tortoises, marine turtles and fresh water terrapins. One pit, costing Rs. one lakh, will be for the three species of Indian crocodiles, while another pit of 500 sq. ft. will display the giant tortoise of Seychelles and the Komodo dragon which are to be procured.

Under the proposal there will be one special feature with two buildings elegantly bringing out exhibits, lore and myths on Indian snakes. A demonstration shed of 3000 sq. ft. will give hourly displays of live reptiles with commentaries in English, Tamil and Hindi. Tapes in 10 Indian and six foreign languages are to be made available for large groups for a special fee. It is estimated to cost Rs. 7 lakh.

An auditorium, a conference hall and a records room, at an estimated cost of Rs. 7 lakh, is also planned. There will be two large underground water tanks with 15,000 litres capacity.

But the whole estimate will have to be revised now since the original estimate was made on the basis of the exchange rate of one US dollar at Rs. 18.50 that prevailed in September 1990.

## Indian Express

Sunday February 16, 1992

A novel programme in animal breeding  
—by Rajaram Sankla

If an experimental project of the Centre for Cellular and Molecular Biology (CCMB) in Hyderabad on crocodile eggs comes through, it is expected to revolutionise certain animal-breeding programmes.

The CCMB scientists are trying to isolate the gene in crocodiles that becomes active at higher incubation temperatures and leads to the birth of only males. And if they succeed in the experiment, "transgenic" animals could be made to grow into a particular sex using genetic engineering.

In poultry farming, for example, it could be ensured that only "laying" are bred to provide eggs. In the alternative, only male "broilers" would be bred and sold for meat because of their higher weight content. It also holds the prospect of similar commercial exploitation in duck-rearing and fish culture.

Temperature dependent: Explaining the project to the Express News Service, Mr. Lalji Singh of the CCMB pointed out that sex of an offspring is temperature—dependent among crocodiles, as also among certain species of turtles and fishes.

A study by a scientist, Mr. J. Lang, had demonstrated that in clusters of crocodile egg only females were produced at a temperature of 28 degree Celsius to 31 degree Celsius, while at 32.5 degree Celsius, only males were born.

This indicated that male and female genes were present in both the sexes, but the male-determining genes were activated only in embryos incubated at 32.5 degrees Celsius.

For the CCMB, the crocodile thus offers an "attractive" scope for investigating the molecular basis of environmental sex-determination, in which 100 per cent males or females could be produced simply by incubating the fertilized eggs at appropriate temperatures.

It is stated that the CCMB is the only laboratory in the world where the molecular approach of temperature-dependent sex is being undertaken. It is this technique which could facilitate production of "transgenic" animals.

The procedure: For the experiment, the CCMB entered into an agreement with the Nehru Zoological Park in Hyderabad here for the supply of 300 freshly-laid mugger crocodile eggs per annum. The crocodile breeding pool at the zoo was recently inaugurated by his holiness the Dalai Lama of Tibet.

Each cluster of eggs in the zoo is transported to the CCMB within a day. There, it is divided into two batches. While one is incubated at  $30 \pm 0.1$  degrees Celsius, the other is incubated at  $31.5 \pm 0.5$  degrees Celsius.

The developing embryos are dissected after 35 days in case of eggs incubated at 30 degrees Celsius and 35 to 45 days in case of eggs incubated at 32.5 degree Celsius since these are the periods after which the commitment to develop into one sex or other becomes inevitable.

The CCMB has collected embryo tissues like potential gonadal ridge to identify the sex-determining factors. Right now, the lab is at the stage of isolating RNA (ribonucleic acid).

From the RNAs, they would make complementary DNA (Deoxyribo-nucleic acid) libraries, by cross-hybridisation of compli-

mentary DNA clones from male and female embryo clones present only in male embryos would be identified.

This would lead to determination of the sex-controlling element that is sensitive to temperature and at higher temperatures leads only to males.

Scientists involved in the five-years research project of the CCMB say once the temperature dependent sex determining gene is isolated, it would be possible by genetic engineering to construct and produce "transgenic" animals.

The eggs of these animals could be made to grow into a particular sex depending on the temperature they are incubated at, scientists contend.

**THE HINDU, Sunday, June 12, 1988**

### **It's a Siamese snake**

For most, one snake is enough. Well, then one snake with two heads is more than you can handle...Fortunately for us all, *Pituophis melanoleucus* is not the size of a boa.

Here is the case of a Mole Snake, a Siamese snake with two heads which would most probably not survive in nature with its double instincts. The snakes had started off as twins, but their development was cut off in the egg and the result is not twins but one snake with two heads.

Harvey Fisher, in charge of the reptile department at the Los Angeles zoo, has called his favourite snake Reginald and Llewelyn for Right and Left respectively.

His 'only problem is when both try to nibble the same morsel in their plate...

### **VENOM CURE**

#### **Express Science**

An extract of snake venom shows promise as a treatment for stroke victims,

according to researchers looking for ways to dissolve blood clots before brain damage can occur. The treatment, called 'ancrod,' is derived from the venom of the Malaya pit viper. Doctors have given it to 10 patients, and although the results are still preliminary, the therapy appears to help. Dr. Charles P. Olinger, of the University of Cincinnati presented his findings at a stroke meeting sponsored by the American Heart Association. (AP)

#### **Indian Express—20.10.87**

### **ILLEGAL SKIN TRADE THREAT TO SURVIVAL OF REPTILES**

QUITO, Oct. 19 (PL-Pool)

More than one million crocodile and alligator skins are illegally exported from Latin America, the scientific coordinator of the Convention on International Trade in Endangered Species (CITES), Abdulio Menghi has said.

The illegal traffic in skins from the region to Europe and Japan is a serious threat to the survival of a large variety of crocodiles and alligators, all listed by CITES, Menghi said.

The specialist said that a crocodile or alligator skin fetches between 35 and 40 dollars on the international market.

In Europe a handbag made from the skin of the almost extinct black cayman *Melanosuchus Niger*, sells for 2,500 dollars.

Brazil is the continent's largest illegal exporter of skins on CITES register, with annual sales to Europe and Japan of almost a million items.

Menghi said that the importers of these animal skins are mainly industrialised countries which blame South America for the illegal trade. It is they who need to improve customs control, to prevent the clandestine market harming various species, he added.

He further maintained that the trade in crocodile and alligator skins detected by his organisation and proven with figures worked out from imports of 2.5 million pelts between 1980 and 1984 is only part of a much greater trade than the data show.

The CITES official said that there were also instances of official connivance with illegal exporters.

In Venezuela, the Government gave export permits to individual ranchers. During 1984-85 it exported 232,000 skins to Europe.

Ecuadoran researcher Eduardo Ansanzo, who has studied the four types of local Amazonian crocodiles, charged that settlers were destroying forests and agro-industrial firms, contaminating rivers, and seriously threatening those reptiles.

**Indian Express—19-10-86**

### **ROCKS IN CROCS**

Adult crocodiles carry stones, weighing approximately one per cent of their total body weight, in their stomachs. It is believed that the stones act as a ballast, enabling the crocodile to adopt the fami-

liar, almost sub-merged, log pose. The stones may also serve another purpose. Crocodiles have a two-chambered stomach, the larger part of which is very muscular and usually contains a few kilos of pebbles. Crocodiles cannot chew, and so swallow their food in large lumps. As the stomach churns, the action of the pebbles helps grind food, facilitating efficient digestion.

**The Week Oct. 9-15-1988**

### **VENOM CURE FOR CANCER**

Chinese cure for cancer sounds as if it is from Ripley's *Believe it or Not*. A pill made from snake venom has cured innumerable people of cancer during the last 10 years.

The pill is named '787'. According to Dr. Zhu Shital of Shanghai's Xinle Hospital venom contains protein, polypeptide, two nerve toxins composed of amino-acids and anti-coagulation blood properties. This hospital, which opened a centre for the treatment using the venom pill in 1978, has so far catered to more than 20,000 patients with about 70 per cent of them having benefited. The venom pill is effective in treating heart and skin diseases, too—  
CEE-NFS. ●

## NEWS FROM THE MADRAS SNAKE PARK TRUST

---

### 1. Reptile Exchange with Nandankanan Biological Park.

The Madras Snake Park Trust has received 3 pairs of Gharials in exchange for one pair of Iguana, one subadult and a baby Regal Python during the Month of Feb. 1992.

### 2. IUCN-SSC/ISRAG Conference at Bhubaneswar 23-25th Feb. 1992.

The Madras Snake Park Trust participated in this conference. Mr. A.N. Jagannatha Rao made a video presentation on "Some behavioural aspect of Reptiles in the Madras Snake Park Trust. Dr. R.S.

Pillai presented a paper on "A plea for inclusion of a few anurans in the threatened category". The M.S.P.T. Research scholars also participated in the conference.

### 3. Gift of Reptiles to National Zoological Park, New Delhi.

National Zoological Park at New Delhi recently established a Reptile House for the purpose of conservation and education. Reptiles like Indian Python, Tree Snake, Green snake, and exotic species like Regal Python and Iguana were gifted from the Madras Snake Park Trust during the month of March 1992.

---

## COMMENTS BY IMPORTANT VISITORS

---

It was a wonderful experience to have gone round the different reptile enclosures with the Research scholars of Madras Snake Park Trust. I am very much impressed with the various research activities that are being carried out in this park. I wish all the best for the Park.

4.1.1992

Sd.....

DR. L.N. ACHARJIO

Senior Veterinary Officer

Nandan Kanan Biological Park,

Orissa-754 005.

## CURRENT RESEARCH PROJECTS AT MADRAS SNAKE PARK TRUST

---

1, Status, Distribution and Ecology of Reptiles pertaining to Tamil Nadu by Mr. V. Kalaiarasan M.Sc., M. Phil. for his Ph.D. Programme under the guidance of Dr. R. Kanakasabai, M.Sc., M.Phil, Ph.D. Prof. and Head, Dept. of Zoology A.V.C. College Mayiladuthurai and field guidance of Dr. M.V. Rajendran M.A. Ph.D.

This project is being co-ordinated by Mr. A.N. Jagannatha Rao, Hony. Secretary of Madras Snake Park Trust, and Dr. R.S. Pillai, Research Officer, MSPT.

2. Studies on chamaeleon by Mr. R. Aengal's M.Sc., Mr. B. Rathinasabapathy M.Sc., M.Phil and Mr. P. Tamilarasan, M.Sc., under the guidance of Dr. R.S. Pillai M.Sc., Ph.D., Dr. M.V. Rajendran M.A. Ph.D. Dr. G. Durairaj, M.Sc., Ph.D., Dr. R. Kanakasabai M.Sc., Ph.D., Mr. M. Krishnan M.A.,

B.L., and Mr. Jagannatha Rao who is the co-ordinator of the project.

3. A research project on "Rodent control using harmless Reptiles" is being undertaken by Mr. T. Ravendra Babu M.Sc., M.Phil. B.Ed. at MSPT under the guidance of Dr. P. Vivek Raja M.Sc. Ph.D., Senior lecturer of Zoology, Govt. Arts College, Madras-35. coordinated by Shri. A.N. Jagannatha Rao Hony. Secretary and Dr. R.S. Pillai Research officer, MSPT.

4. Studies on Turtles and Tortoises by Mr. R. Aengals M.Sc., Mr. B. Rathinasabapathy M.Sc., M. Phil and Mr. P. Tamilarasan M.Sc., M. Phil., under the guidance of Dr. R.S. Pillai, M.Sc., Ph.D., and being co-ordinated by Mr. A.N. Jagannatha Rao.

5. Relationship between morphology and habits of reptiles by Mrs. R. Chitra B.Sc.

# SURPLUS REPTILES AVAILABLE AT MADRAS SNAKE PARK TRUST IN EXCHANGE

(Subject to Approval by the Government)

## 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*)  
(4 year old)

## WANTED IN EXCHANGE

### Snakes

1. Black Cobra (*Naja naja oxiana*)
2. King Cobra (*Ophiophagus hannah*)
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. River turtle (*Hardella thurgi*)  
and  
Fresh water turtle—any species.

### Crocodile

11. Estuarine Crocodile (*Crocodylus porosus*) (Juveniles and sub adults)
12. 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, an extent of 2.5 acres of land on 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. 125 lakhs or 60,000 \$ (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. 4 lakhs or \$ 20000.  
Total cost of building 12 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. 7 lakhs or \$ 35000.  
Total cost of each building Rs. 21 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. 1,00,000 or \$ 5000.

### **Pit No. 7**

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

Cost Rs. 50 000 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. 1,00,000 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. 1,00,000 or \$ 5000.

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

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

Cost Rs. 50,000 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. 1,00,000 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' × 40' with a sloping roof.

Cost Rs. 4 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. 7,00,000 or \$ 35,000.

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

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

Cost Rs. 4 lakhs or \$ 20,000 each building.

**Building No. 20.**

This is a 3-story 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. 7 lakhs or \$ 35000. Total cost of the building would be 21 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 costs Rs. 7 lakhs or \$35000 and the total cost of building Rs. 21 lakhs or \$ 105000.

**Building No. 22 and 23.**

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

Cost Rs. 75,000/- or \$ 3500. The 2 units cost Rs. 1,50,000 or \$ 7,000.

**Building No. 24 and 26**

Open wells of 6' diameter each costing Rs. 25,000/- or \$ 1250. Together they cost Rs. 50,000/- or \$ 2500.

**Building No. 25**

General store Room of 20' × 10'.  
Costing Rs. 50,000 or \$2500.

**Building No. 27 and 31**

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

Cost Rs. 50,000/- or \$2500/ each. 2 sumps together would be Rs. 1,00,000 or \$5000.

**Building No. 28 and 30**

10' × 10' rooms for electric meters and water pumps, each room Rs. 25,000/- or \$1250.

Cost of 2 rooms Rs. 50,000 or \$2500.

**Building No. 29**

10' × 10' Security room. Cost Rs. 25,000/- or \$1250.

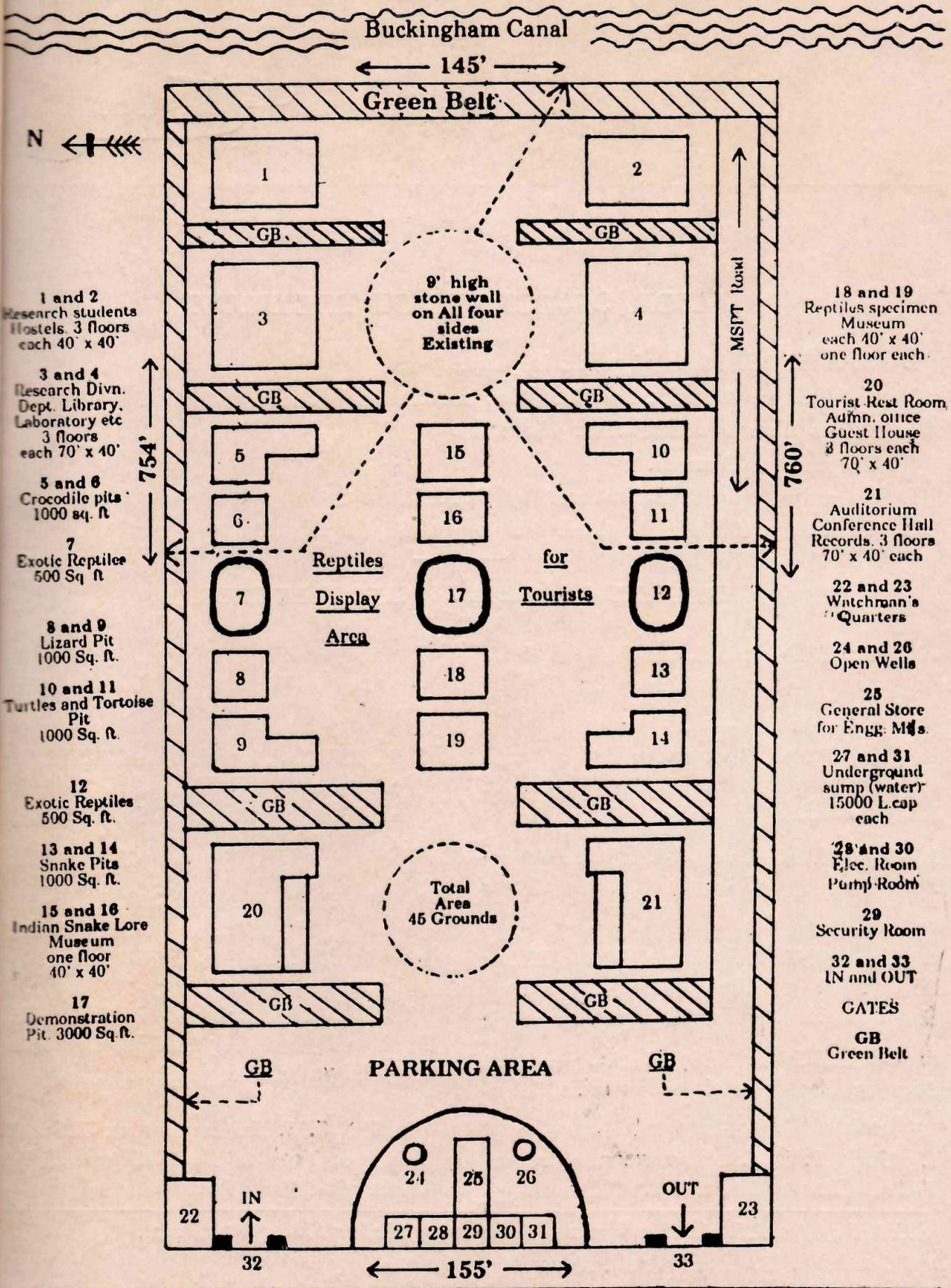
**No. 32 and 33**

IN and OUT gates Each cost Rs. 10,000/- or \$500. Cost of 2 gates Rs. 20,000/- or \$1,000.

All costs are worked out on present exchange rate of US \$ = 18.50 as on date 1.9.1990.

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

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



To Adyar Madras ← Old Mahabalipuram Road → To Mahabalipuram  
 (NOT TO SCALE) 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

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

*Edited by Dr. R.S. Pillai and printed on behalf of Madras Snake Park Trust,  
Printed by : St. Louis Press, Adyar.*

*Editorial Board: Dr. R.S. Pillai, Dr. M.V. Rajendran, Dr. G. Durairaj, Mr. M. Krishnan,  
Dr. K.V. Lakshminarayana, Mr. Sankaralingam and Mr. A.N. Jagannatha Rao*