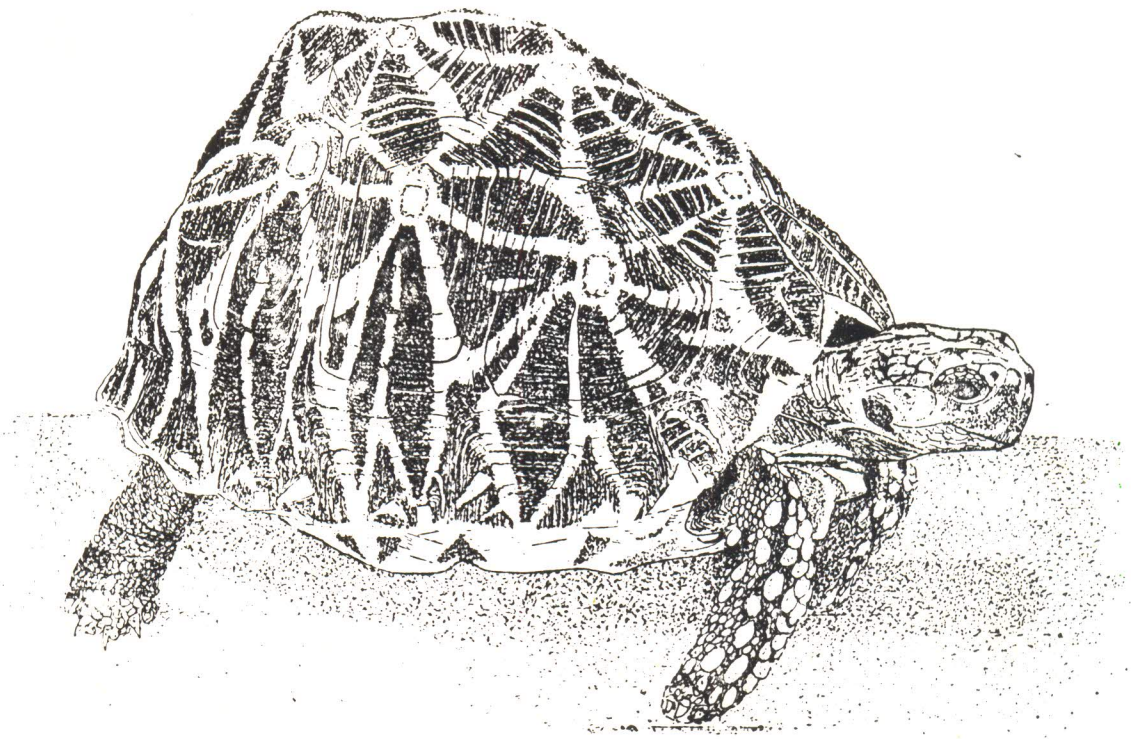
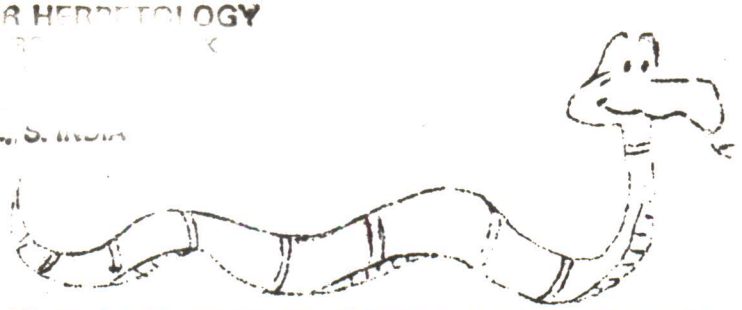
HAMADRYAD

13 No : 2 DECEMBER 1988



Star tortoise, Geochelone elegans

CENTRE FOR HERPETOLOGY
T.N., S. INDIA



STUDY OF A RARE CASE OF COMMON KRAIT ENVENOMATION

Gautam Pradhan, 3 years of age, was sleeping on the floor of a thatched house with his father who saw a pair of snakes on the bed, (on 8.8.88 at about 3.30 a.m.). One was a common krait and the other was a common wolf snake. He then supposed that his son might be bitten by one of them. Thereafter, he rushed to an ojha (tribal medicine man) who treated the boy. At about 10.30 a.m. he developed moderate ptosis, drowsiness, dropping of the head, saliva dribbled from the corner of his mouth, mild abdominal cramp, inability to sit or stand, moderate fever etc., and did not take any food or drink on that day.

On 9.8.88 chief complaints were mild ptosis, drowsiness, dropping of the head, could sit with support, but unable to stand. He took liquid food. Stool and urine passed. The patient was kept at home for the next 2 days without any medical treatment.

On 10.8.88 at 3.30 p.m. he was brought to this hospital by his father and relatives with complaints of mild ptosis, moderate dropping of the head, mild drowsiness, apathy, unable to stand or walk, but able to swallow food and drink. He was conscious during the whole course of his illness. He was kept under close observation without giving any medicine with the hope that he would recover naturally. On 13.8.88, he was discharged from the hospital in good condition after natural recovery.

Comment: Though the young boy developed typical neurotoxic signs and symptoms of common krait envenomation, yet he surprisingly recovered naturally without any antivenom serum therapy. It is a very very rare occurance and probably indicates that a low dosage of venom was injected.

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PEOPLE DYING DUE TO SCARCITY OF ANTIVENOM SERUM IN WEST BENGAL

Due to scarcity of anti snake venom serum the doctors of hospitals and health centres of West Bengal are feeling helpless. A number of patients bitten by venomous snakes are dying because of the unavailability of antivenom serum.

According to Dr. S.G. Saha, Medical Officer of Raidighi Rural Hospital, Dt.24 Parganas (S), this year (from January to October, 1988) 17 (11 males, 6 females) poisonous snakebite cases were admitted at Raidighi Rural Hospital. Of them 5 cases were transferred to Bangur Hospital, Calcutta due to scarcity of antivenom serum. All the patients died. In one case antivenom serum was purchased from an outside medical store. According to Dr. Saha about 200 vials of antivenom serum is needed for Raidighi Rural Hospital per financial year. It is noted that Dr. Saha is an expert of snakebite treatment. He has treated about 1000 snakebite patients till now.

At Kakdwip Primary Health Centre of 24 Parganas (S) one Sasthicharan Ari (26 years) died on 26.10.88 due to lack of AVS. He was bitten by a common krait at night while asleep.

This year, in other districts of West Bengal, the picture is the same. On 4.9.88, at Village Chanduria in Nadia District, two brothers namely Anil Sarkar (14) and Ganga Sarkar (11) died due to lack of antivenom serum. Both of them were bitten by a common krait at night while sleeping.

On 25.9.88 a young man of Ramnagar, in Bankura District was bitten by a cobra. The patient was rushed by motorcycle to Bishnupur Sub-divisional Hospital, which was 6 km away from the village. There was no antivenom serum in stock. After first-aid treatment the patient was transferred to Bankura Medical College Hospital, which is about 40 km away, but the unfortunate patient died enroute.

On 23.9.88 at Barbaria Health Centre in Midnapur District, a young man died due to lack of antivenom serum. At Mugberia - Bhupatinagar Health Centre, in Midnapur District, a young lady died for the same reason on 20.9.88. Both of them were bitten by cobras.

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According to the Department of Health of Government of West Bengal, 50,000 vials of antivenom serum are needed per year in this State. Bengal Chemicals in Calcutta manufacture antivenom serum. They produce 12,000 vials of AVS per year, which is not sufficient. In addition, the AVS produced by Bengal Chemicals is not polyvalent, thus only Russells viper and cobra bite cases can be treated with this AVS.

The State Government could buy polyvalent AVS from Haffkine Institute, Bombay; Central Research Institute, Kasauli; and Serum Institute of India in Pune, to relieve the scarcity of AVS in West Bengal which has a large population of dangerous snakes.

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* * * * * *

EXTENSION RANGE OF THE STRIPED CORAL SNAKE (Callophis nigrescens)

During the month of October 1987, a snake was collected by Mr. C. Jhala, near Sunset Point at the Saputara Village (abode of serpents) Dang District, Gujarat. During the monsoons, snakes are very common around the villages. It was identified as the striped coral snake (Callophis nigrescens Gunther).

Scale, colour and other details:

Body length 57.8 cms tail 6.4 cms; supralabials 7, 3rd and 4th touching the eye; preocular 1; postocular 2; lower labials 10; scale in 13 rows (smooth); ventrals 245; caudals 45 (divided); anal plate 2; sex: female.

Body uniform black. A white colour oblique bar on nape, also a white streak behind the eye to the angle of the mouth, a white streak covers the preocular and second and third labial. A white spot on each parietal scale, belly coral red.

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According to Smith (1943), this species is known from the Nilgiri, Anaimalai, Travancore and Shevaroy Hills and the Western Ghats as far north as Panchgani. As per Wall (1913) this kind of variation (khandallensis)is found near Khandalla in Maharashtra. Thus the present C. nigrescens record extends the range of the species.

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SNAKEBITE CASES IN CHINGLEPUT DISTRICT, TAMILNADU TREATED BY IRULA TRIBAL MEDICINE MEN

Patient	Sex/ Age	Date/ time of bite	Date/ time of treatment	Site of bite/No. of fang marks	Location	Snake	Symptoms	Treatment/ recovery period.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Munuswamy	Male 46 yrs.	30.9.88 5.00 p.m.	Immediately	Left hand; two	While catching snakes	Saw-scaled viper	Pain, swelling	Herbal medicine for 10 days.
Loganayaki	Female 31 yrs.	7.11.88 4.00 a.m.	-do-	Left foot; one	-	Water snake	Pain	Herbal medicine
K.Rajendran	Male 21 yrs.	12.11.88 10.00 a.m.	-do-	Left thigh; two	While catching snakes	Saw-scaled viper	Pain	Herbal medicine for 10 days.
K. Kutty	Male 39 yrs.	16.11.88 2.00 p.m.	-do-	Right hand finger; one	-do-	Saw-scaled viper	Swelling	Herbal medicine for 7 days.
S.Rajendran	Male 24 yrs.	17.11.88 1.00 p.m.	-do-	Right hand finger; one	While extracting venom	Saw-scaled viper	-	Herbal medicine for 3 days.
Kothandam	Male 29 yrs.	26.11.88 3.00 p.m.	-do-	Right hand finger	-do-	Saw-scaled viper	Swelling	Herbal medicine treatment.

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
V. Kumar	Male 26 yrs.	26.11.88 4.00 p.m.	Immedia-tely		While extracting venom	Saw-scaled viper	Pain, swelling	Herbal medicine for a week.
P.Chakarni	Male 35 yrs.	6.12.88 12.30 p.m.	-do-	Right hand finger	While digging a snake burrow	Cobra	-	Herbal medicine for 15 days.
Appavu	Male 21 yrs.	9.12.88 1.00 p.m.	-do-	Left thumb; two	While releasing snake into mud pot after venom extraction	Saw-scaled viper	Pain, swelling	Herbal medicine for 2 days
K.Rajendran	Male 21 yrs.	17.12.88 2.00 p.m.	-do-	Right hand finger; two	While extracting venom	Saw-scaled viper	Pain, swelling	Herbal medicine for 1 day.
Appavu	Male 21 yrs.	19.12.88 9.45 a.m.	-do-	First left toe; two	While walking inside the snake pit.	Saw-scaled viper	Pain, swelling, uncons-ciousness	Herbal medicine for 7 days.

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NEWSPAPER CLIPPINGS

"SNAKE CATCHER SURVIVES WORLD'S DEADLIEST BITE": 'The Age' 3rd May 1988.

A snake breeder has survived a bite from what is recorded as the world's deadliest snake, the western taipan. Doctors said Mr. Joe Bredl, 65, had to be given six times the standard dose of antivenom, but his recovery was remarkable. Mr. Bredl, who has been bitten by snakes many times, said in his bed at the Royal Adelaide Hospital, Australia, that he would be returning to his reptile park and zoo at Renmark. He described himself as "a tough cookie" who liked living dangerously, but "this bite taught me a lesson - not to take risks".

He was bitten on the chest while catching snakes along the Birdsville Track in South Australia's north-east. He had already bagged one western taipan, when a second one bit him and escaped. Mr. Bredl spent 14 hours in a critical condition after a doctor and a paramedic flew to his aid. Dr. Julian White, the clinical toxicologist who treated Mr. Bredl, said the western taipan was recorded as the world's deadliest snake because of the quantity and strength of its venom. Its poison is twice as toxic as that produced by a brown snake, and ten times as toxic as that from a tiger snake. Dr. White said there were only two other recorded cases of bites by western taipans in remote areas, both victims survived.

* * * * *

"SEA ALERT ON YELLOW SNAKE PERIL"

Rough seas have brought poisonous sea snakes inshore along N.S.W. beaches, Australia. Of the 50 species, the most common one that gets washed up is the yellow bellied sea snake. It is probably sick and will not attack unless provoked. Most sea snakes are one to two metres long and come inshore to breed. Their venom will immobilise small fish and there are some reports of accidents involving people. With their large lungs, sea snakes can stay underwater a long time and they have a natural device which keep their mouth clamped shut. They can dislocate their jaws to swallow a fish larger than their body and some species live and hide among seaweed and will bite if accidentally stepped upon.

John West, a Taronga Zoo specialist on sea snakes, says the yellow-bellied snake sometimes gets washed up after rough seas and is very venomous. "You can come across them anywhere from the tropics to the Victorian border , he said. "If you stay still they only show idle curiosity, but any sudden movement may cause them to be agressive - the advice is never to touch one".

* * * * *

WORLD'S LARGEST PYTHON IN NICOBAR" 'News Today' 27th Dec.1988

A 33 foot long python, believed to be the world's largest has been found in the Great Nicobar Islands. Giving this information, noted naturalist Romulus Whitaker who visited the islands recently, said that the Andaman and Nicobar Islands had many species which were not found in the mainland, Burma or Sumatra. He said that other venomous snakes found in the islands were krait, king cobra, black cobra and 'andha saap'.

* * * * *

"HUBBY MAILS RATTLESNAKES TO WIFE" 'Sun' September 22nd '87

Donna Wrightman got more than she bargained for on her 50th birthday when she opened a package from her estranged hubby and was savagely bitten by an outraged rattlesnake. Another deadly serpent lay asleep in the box beside a half-pint of bourbon and a dead mouse. A neighbour heard Donna's shrill screams and rushed her to a hospital, where she was treated for snakebite and released.

Jock Wrightman, 55 (her husband) has been jailed for attempted murder. The Wrightmans had been married 32 years before Jock moved out in 1985. He said his wife was having an affair with their mailman. Jock, (who may be a victim of Alzheimer's disease) confessed to his dastardly deed at the time of his arrest. "I thought I'd surprise Donna on her birthday", he said. "I knew her lover would deliver the package. I was hoping he'd be there when she opened it and the rattlers would get them both". Postal authorities are amazed Wrightman slipped the snakes past them.

"CROCODILE MENACE" 'The Light of the Andamans' 11th July 1988.

It is reported by the residents of Jirkatang No.2 that more than 15 buffaloes, cows, goats and dogs were lost and eaten away by crocodiles found in abundance in the creeks nearby. The villagers have reported the incidents to the forest authorities but to no avail. No compensation has been paid to them yet.

Killing of crocodiles is forbiddon under the Wildlife (Protection) Act, 1972. These dangerous reptiles kill the domestic animals while crossing the creeks. How long will the villagers sustain such heavy losses? There is danger of human life also. The Wildlife Department must make arrangements to shift these reptiles to a protected place or allow the villagers to kill them.

* * *

"COMMERCIALISE CROCODILE FARMING" - 'Livestock Adviser' Vol.XIII Issue VI 1988.

Crocodiles, which were an endangered species in early seventies, have proliferated to such an extent in captivity that the breeding centres in Lucknow, Orissa, Madras, Hyderabad, Chambal and the Andamans are facing a problem in maintaining them. If immediate steps are not taken to control and commercialise the breeding of crocodiles and these breeding centres are not converted into commercial farms on the lines adopted in Bangkok and Papua New Guinea, the crocodile population will increase beyond control. The skin of the crocodile is used for making bags and shoes, fat is used in the pharmaceutical industry, bones for fertilizer, meat is eaten in some parts of the world and the upper skin is used for display.

* * * * *

"CROCODILE BETTERS RECORD" 'The Hindu' 3rd July 1988.

A saltwater crocodile has laid the largest cluster of eggs on the sandy bank of Bhitarkanika Creek, about 1 km. from the Crocodile Conservation and Research Centre at Dangmal. All the 68 eggs were fertile. The nest was built on the 'Kharkhari' ferns growing profusely in the midst of the 'sundri' trees. This was the only fern growing in the saline soil of the Bhittarkanika mangrove . The female Crocodylus porosus, prized asset of the Bhitarkanika Sanctuary, earlier had the all-India record by laying a cluster of 67 eggs in June 1987.

* * *

STATUS OF THE FOREST CANE TURTLE (Geoemyda silvatica)

I worked in the original collection area (Kavalai, Kerala) for 5 months in 1983-84, when I captured and notched more than 125 turtles of this species. I was also able to find a female at the southern-most part of Neyyar Sanctuary near Trivandrum, a male at Idukki Sanctuary, north of Kavalai along the Western Ghats and at Agumbe, north of the Palghat Gap, over 200 km. north of Kavalai.

In a letter, Dr. Brian Groombridge said that Dr. Ajith Kumar, who worked in Annamalai Wildlife Sanctuary has seen both the Travancore tortoise (Indotestudo forstenii) and cane turtle (Geoemyda silvatica) in that area. Annamalai Sanctuary is on the leeward side of the Western Ghats, within Tamil Nadu, adjacent to Kavalai.

The cane turtle seems common, and the tribals do not deliberately seek them for food, like they hunt the Travancore tortoise, but will eat them when found. Predators of the cane turtle include wild boars.

These turtles were found in bamboo, deciduous and evergreen forests. In the former two habitats, they were not encountered as easily as in the evergreen forests, where they are common.

I feel that the cane turtle is threatened, as it is dependent on its evergreen forest habitat. Where such forests are disappearing, as in Idukki (where large patches are being turned into cardamom and opium plantations by the tribals) local populations might disappear.

J. Vijaya
(undated)

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The above note was found among the effects of J. Vijaya, a young MCBT naturalist who passed away in 1987.

Moll, Groombridge & Vijaya (1986): J. Bombay Natural History Society 1983 (Suppl.):112-126 brought back the cane turtle to its original genus, Geoemyda.

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TURTLES OF AN ANCIENT PILGRIMAGE TANK IN NORTH INDIA WITH NOTES ON THE DISTRIBUTION OF THE PEACOCK SOFT-SHELL TURTLE (Trionyx hurum)

Misrik in Sitapur District, Uttar Pradesh is the location of a pilgrimage tank of considerable antiquity and sanctity situated close to springs highly venerated by Hindus at Nimsar. The tank some 60 metres square with a water depth of about 5 metres, has masonry steps leading into it on all sides, and lies in the midst of Misrik township. Locally known as the Dadhich Kund, it is said to have been constructed by King Vikramaditya (Century A.D.380)and it is associated with Dadhich Muni whose name appears in the Rig Veda. Repairs to this tank were commissioned by the Maratha princess Ahaliya Bai some 230 years ago (Neville 1905). In November 1987 the district authorities re-commissioned cleaning out and repairs to the tank. In order to clean out the bottom muck which kept the water murky and therefore unattractive, the entire water was pumped out. The fish were auctioned off while we were contacted to translocate its turtles to a suitable alternate home. We engaged a group of people of the Kanjar community to catch the turtles who waded 12 abreast through the muck probing the bottom for turtles with steel spiked bamboo poles.

A total of 32 turtles were caught in this venture over a period of 2 days until the Kanjars declared the tank devoid of turtles, after checking out the bottom repeatedly. Out of these, 22 were Trionyx gangeticus, 8 were Trionyx hurum and one each Hardella thurjii and Geolemys hamiltoni. The

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lengths and weights of the various species that were caught are given in table 1. Based on the maximum size of 70 cms. for Trionyx gangeticus provided by Smith (1933), it would seem that two of the specimens of this species from the tank with shell lengths of 67 cms. and 65 cms. were of very advanced age.

TABLE·1

Species	Shell length (mm) Mean (Range)	Plastron length (mm) Mean (Range)	Shell width (mm) Mean (Range)	Weight in kgs. Mean (Range)
Trionyx gangeticus	449 (240-670)	312 (170-480)	311 (180-460)	8.700 (1.500-24.250)
Trionyx hurum	339 (250-390)	239 (170-280)	250 (200-280)	3.180 (1.800-5.100)
Hardella thurjii	360	340	250	6.350
Geoclemmys hamiltoni	250	220	155	2.300

This report of the occurrence of Trionyx hurum in District Sitapur, Uttar Pradesh supplements the few existing locality records that exist for this species. It is only in recent years that new facts regarding the distribution of T. hurum have come to light. Believed to occur only in the lower reaches of the Ganga by both Smith (1931) and Pritchard (1979), Mertens (1969) cited in Das (1987) recorded the species from lower Sind in Pakistan. Moll and Vijaya (1986) reported the species from locations as far west as north-western Bihar and north-eastern Uttar Pradesh. In fact one of us (D. Basu), not having seen this paper casually challenged the contention of Dr. Moll that T. leithi does not occur in north India, mistaking T. hurum observed in the Kukrail stream near Lucknow to be T. leithi since it was the latter species that was wrongly known to occur in north India. (See Hamadryad 12:2). But this mistake has since been fully realized when skull preparations revealed the distinct differences in the structure of the upper jaw of these two species. Das (1987) reported T. hurum from isolated bodies of north Indian fresh water. Das's report indicates its occurrence in the southern drainage of the Ganga, an aspect of its distribution confirmed by discovery of the species' eggs from the Chambal River.

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But a noteworthy point being raised here is that contrary to the high proportion (40%) of Trionyx hurum in Trionyx shipments examined by Moll and Vijaya at Calcutta, the proportion of eggs of this species among Trionyx eggs from the Chambal was extremely small. Out of a total of 3102 Trionyx hatched at the Varanasi Turtle Rehabilitation Centre only about 40 were of Trionyx hurum, representing a meagre 1.3%, (pers. comm. I.P. Yadava, Research Assistant) and out of a total of 367 hatchlings examined by us at this centre only 2 were of T. hurum (0.55%). Out of 324 Trionyx hatched at Kukrail Centre there were no T. hurum at all. There must be an ecological explanation for the observed variation in the proportion of Trionyx hurum from different parts of its range. One possibility is that fewer eggs of this species were collected because T. hurum has a nesting season discreetly different from that of T. gangeticus, but this is unlikely because the egg collection in the Chambal lasted over a protracted period of mid-August to mid-November and hatchlings of both species emerged together in July the following year. The remaining plausible explanation that comes to our mind, is that both these species being very similar in structure and habits compete for the same niche in the rivers. When it comes to the partitioning of some resource that is rare in the southern drainage of the Ganga the slightly smaller T. hurum (maximum size 600 mm) loses out to the larger T. gangeticus (maximum size 700 mm); the maximum sizes being those given by Smith (1931).

Acknowledgements

We wish to thank Sri Juyal, Project Officer, for letting us examine the turtles at Varanasi and Sri Indra Prakash Yadava, Research Assistant, for his assistance in doing so as well as sharing his observations on turtle hatching with us.

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REPORT ON A VISIT TO HYDERABAD AND CHITOOR DISTRICT, ANDHRA PRADESH (14th to 19th July 1987)

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Introduction

On the advice of Mr. S.R. Sane, Bombay, a visit was paid to Mr. S.A. Khadar, Bangalore, to enquire about the status of star tortoises (*Geochelone elegans*) in the south of India. It was learned that Chittoor District had been a major source of baby star tortoises when the trade was legal. Mr. Khadar kindly provided the name of an animal collector in Chitoor District, Andhra Pradesh, with a note of introduction, and together with Mr. B.C. Choudhury of the Wildlife Institute of India, a brief visit was made to Chitoor District.

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Summary of the trip

Two days were spent driving from Hyderabad to Pungunaru, where contact was made with a nearby village, where people often collect animals. The following day and a half were spent in the field with 7 to 8 animal collectors searching for tortoises; luckily it rained on the evening of the first day of collecting. Because of Mr. Choudhury's tight schedule it was not possible to stay longer, and the next two days were spent driving (and being towed) back to Hyderabad. A day was spent measuring and photographing newly hatched and adult star tortoises in Nehru Park.

Summary of results

A total of 9 wild tortoises (JGF 5465-5473) were found during the day and a half of searching by 9 to 10 people, two of whom are professional herpetologists and the remainder of whom are professional animal collectors. This area is regarded to be prime habitat for the star tortoise, so this gives some idea of the effort needed to find these animals.

It is remarkable that 4 of the 9 tortoises were males of adult size; only one was an adult-sized female, and 4 were unsexed immatures. The preponderance of adult males may be biologically significant; it could be taken as evidence that they are more catchable because they are more active being out in search of mates - one male was found while he was mounted on top of another male. However, the sample size is rather too small to make strong statements about the difference in numbers of males and females.

It is also remarkable that 5 of the 9 animals had a large tick on each of them. In two cases the tick had pierced through the scute nearly at the midplastal suture; other attachment sites were the forearm, base of tail, carapace and hind leg. This level of tick infestation in unknown anywhere else in India for the star tortoise.

All searching was conducted within a radius of 2 hour's drive from Pungunaru, and only to the east and north of this city. This area, as well as most of the area transited during the drives from and to Hyderabad, has been heavily impacted by the removal of woody species and heavy grazing/browsing pressure; intensive agriculture is scattered among the degraded grasslands and open scrublands. A fairly intact scrub forest is at Kandurukanuma West Reserve Forest, and Halsapuram Reserve Forest, although small, has relatively good cover from shrubs.

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Curiously, most tortoises were found in situations of over-grazed/browsed grasslands with erosional gullies, bare basaltic rock outcrops; woody vegetation was infrequent and widely dispersed and rarely over 50 cm high. At Kandurukanúma the woody vegetation was more intact, but there was no sign of tortoises, and the professional animal collectors claimed that tortoises are not found in the dense scrublands. If they do occur, they will certainly be much harder to detect than on open scrubland and grasslands.

The area is arid, and preferred food species were said to be succulents such as Kalanchoe sp. and cactus-like members of the Asclepiadaceae (milkweed family). In many places grasses were not common. Acacia and other woody plants with thorns and spines were not common, so the character of the vegetation is unlike that in typical thorn scrub.

Two sheltering spots for tortoises that were found seemed to be well used, and it is probable that a tortoise has a fixed site to where it retires. Although the heavily browsed/cut shrubs under which the tortoises were found were generally less than 25 cm high (with some twigs 65 cm above the ground), the leafy cover was dense, and the tortoise was invisible unless the branches were moved substantially.

Interviews with the animal catchers were conducted by B.C. Choudhury. Some notable comments were: there were more tortoises and more scrub forests several decades ago; as many as 20 tortoises can be found in an hour during the rain (probably with a team of people searching); the best time of year is October; during the rainy season there is fresh plant growth and an individual can range about a metre from a sheltering place and find sufficient food, but during the dry season the tortoises must move further afield and they will take shelter under various bushes; mating occurs one month before nesting; nesting takes place twice a year, March-April and September-October; hatching occurs from July to October with the most in September and October; ticks are common; star tortoises can be found all round the Chitoor area: north to Mandarapale, east to Somala and Palmaner, south-east to Gudiyattam (Tamil Nadu), south-west to Mulbagal (Kolar District, Karnataka), and west to Srinivaspur (Kolar District).

On returning to Hyderabad, 11 adult tortoises (JGF 5479-5489) in the Nehru Park Zoo were measured and photographed. In addition, 5 newly hatched animals (JGF 5474-5478) were measured and photographed; only one of these was alive, and the other four were the remains left after the hatchlings had been attacked (by rats?). Luckily 8 hatchlings had been

weighed, measured and photographed on 28th June, right after hatching, by B.C. Choudhury. Average weight was 20.6 grams.

Recommendations

The tri-state area of Andhra Pradesh, Tamil Nadu and Karnataka appears to be an area of prime importance to star tortoises, despite the heavily degraded condition of the vegetation and soil. A more thorough survey of this area is warranted, with longer studies of natural history of the star tortoise. It would be possible to hire local people with good knowledge of the fauna to assist.

Acknowledgements

The assistance given by B.C. Choudhury was invaluable. Also, the local villagers who accompanied us were a great help in finding and learning about star tortoises. The visit was done under an Indo-American Fellowship Programme with logistic support from the University Grants Commission and the American Institute of Indian Studies; the U.S. Fish and Wildlife Service, through the Science Office of the U.S. Embassy, New Delhi, provided funds to make the visit possible.

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ON A COLLECTION OF SOME AMPHIBIA AND CHELONIA FROM MEGHALAYA

The State of Meghalaya lies between 25°47' and 25°10' north latitudes and 89°45' and 92°47' east longitudes and comprises an area of 22,549 sq.km. The herpetofauna of the state is rather well known, compared to that of the other north-eastern states of India.

Between June and July 1988, I surveyed the Khasi and Garo Hills of Meghalaya, as part of a bigger project on the distribution and status of land tortoises and freshwater turtles of north-eastern India, supported by the IUCN/WWF (Project 6343). Reported herein are the anurans and chelonians collected during the survey.

Measurements given include: Snout-vent length (SV) of annurans and curved carapace length (CCL) and plastron length (notch to notch) (PL), of chelonians.

I thank the Meghalaya Forest Department for logistical support and IUCN/WWF (Project 6343) for funding to conduct the field work.

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A M P H I B I A

ANURA: PELOBATIDAE

1. Megophrys monticola Kuhl & Van Hasselt 1822.

Material: 2 examples, SV 2.46 and 4.27 cm. from Lailad, Nongkhyllem Reserve Forest, East Khasi Hills District, Meghalaya.

The 2 examples were collected at night, from the edge of forest paths after the rains. The species has been previously reported from Shillong Peak, Khasi Hills by Pillai and Chanda (1979) and Rongrengiri, Garo Hills by Pillai and Chanda (1981), but unlisted in the review by Inger and Dutta (1987).

ANURA: RANIDAE

2. Rana gerbillus Annandale 1912.

Material: 1 example, SV 4.67 cm. from Nokrek National Park, West Garo Hills District, Meghalaya.

The frog was collected during the day from under a boulder near a stream.

Annandale (1912) described the species based on material from the Abor Hills, Siang District, Arunchal Pradesh. Subsequently, Pillai and Chanda (1979) collected it from Nawbland, near Cherrapunji, in the East Khasi Hills of Meghalaya and most recently, Chanda (1986) reported the species from Mirik Darjeeling District, West Bengal.

R E P T I L I A

CHELONIA: TESTUDINIDAE

3. Mancuria emys (Schlegal & Muller 1844).

Material: 2 examples, a carapace, CCL ca.60 cm. and a plastron, PL 35 cm. from Nongkhyllem Reserve Forest, East Khasi Hills, Meghalaya.

Both examples were obtained from forest villages, where the tortoises were consumed by the tribals. Smith (1931) included Cachar in Assam and the Naga Hills, now in Nagaland, in the distribution of the species and therefore the present material constitutes the first record of the species from Meghalaya.

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I assign them to the northern subspecies phayrei since the pectorals are joined and the shell colour is blackish.

CHELONIA: EMYDIDAE

4. Melanochelys trijuga (Schweigger 1814).

Material: 1 example, a broken carapace, CCL 25 cm. from Lailad, Nongkhyllem Reserve Forest, East Khasi Hills District, Meghalaya.

None of the 5 recognised subspecies of Melanochelys trijuga have been so far recorded from north-eastern India. The subspecies indopeninsularis has been recently seen at the Manas Tiger Reserve, Assam (Das 1988) with other reports from northern West Bengal and Bihar, while edeniana occurs throughout Burma. Subspecific allocation of the present material has not been made since the soft parts are unpreserved.

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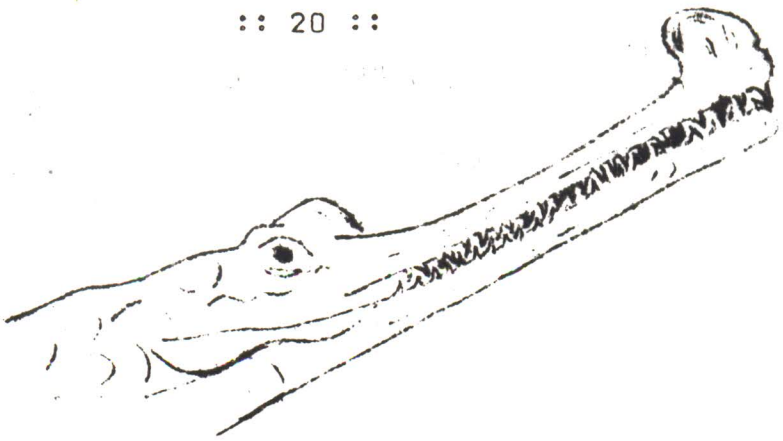

A NOTE ON GHARIAL OVIDUCT EXTRUSION WHILE NESTING AT THE MADRAS CROCODILE BANK

The oldest female gharial at the Madras Crocodile Bank aged 32-36 years (estimated) acquired from the Calcutta Zoo seven years ago, extruded her oviduct in a nesting attempt on 29th March 1988. This was her second nesting attempt, the first one being in 1986. On both occasions she laid soft, uncalcified eggs. Most eggs were thin, long, with the inner membrane joined together.

This year the female dug trial nests in three different locations on a very steep sandy slope. On the 29th of March she selected a shaded location on the slope 5 metres from the pool. Nest excavation started at 19.40 hours and was completed at 12.30 hours. The first egg was deposited at 01.10 hours. After a pause of 30 minutes the female deposited the second egg, after which the cloaca appeared enlarged and reddish in colour. After a 6 minute pause she tried depositing again. Slightly raising her posterior and balancing on her tailbase and hind legs for 2 minutes, she contracted her body and ejected only egg contents mixed with blood. This was repeated eight times, but each attempt to deposit eggs only resulted in an egg/blood mixture being ejected. At this stage the oviduct was noticably extruded. The female, raising herself again on her hind legs, tried egg deposition, but the oviduct started extruding further (about 12 cm) and the cloaca was bulging. Through all this the female appeared normal, with her jaws agape and head raised.

On two occasions during the egg mixture deposition, egg shell membranes were also ejected. On feeling the oviduct (which was in a 'U' shaped position out of the cloaca) an egg could be felt inside. Each time the female attempted to deposit her eggs, they were being compressed, broken and the contents and shells ejected instead.

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At 04.45 hours the oviduct was protruding 17 cm from the cloaca, while the female kept trying to deposit more eggs. At 05.30 hours the female lay still for 18 minutes and started covering her nest. By this time the cloaca contracted a little, but the oviduct remained in the nest. After 10 minutes of covering, the female moved forward, collapsing the sand from the top of the nest into the nest cavity and covering the oviduct. An hour later, a second attempt by the female to move upward, wrenched a portion of the oviduct from her, resulting in profuse bleeding.

Two eggs that looked well developed were collected, candled and found to be infertile. The shells were very thin and porous. The female guarded her nest for almost 75 days. She appears normal and healthy, but it is not known whether the oviduct extrusion was due to the advanced age of the female and whether any permanent injury has resulted.

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STUDY ON GHARIAL BASKING BEHAVIOUR

From January to March 1988, R. Kumar of A.V.C. College, Mannampandal, Tamil Nadu observed the fifteen gharial at the Madras Crocodile Bank. His resultant report, on the basking behaviour of the gharial, was accepted in partial fulfilment of Kumar's Master's Degree in Wildlife Biology.

His report summarizes the current state of knowledge on the gharial's biology and status. It goes on to describe the study area in the Croc Bank and the identification of individual animals (by size, sex and tail clips).

The report then goes into a detailed analysis of the basking of the gharial in relation to sex, size, ambient temperature and feeding. Kumar's summary of his findings follows:

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Summary

Basking was a common behaviour observed both in adults and juveniles. It was found to be related to the ambient temperature. Both adults and juveniles basked during morning and late evening hours. They avoided the high atmospheric temperature of the mid day. Basking was high during January 1988 and low during March 1988. There was a significant difference between the time spent for basking by adults and juveniles. Adults spent more time for basking during the study period. Further, adults were found on land at night but juveniles were found under water at night. It was suggested that gharials generally prefer temperatures below 27°C and their basking pattern mainly depends on the atmospheric temperature as they bask on land during lesser temperature and move into water when the atmospheric temperature becomes warm.

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NESTING ECOLOGY OF THE GHARIAL IN NATIONAL CHAMBAL SANCTUARY

By Dr. R.J. Rao, National Chambal Sanctuary, P.O. Box 11, Deori, Morena 476001

Abstract

The results of a study on the nesting ecology (1985-1988) and population monitoring of gharial in the Chambal River are presented. The data is based on intensive studies conducted at a major communal nesting site, Baroli during 1985-1987 and surveys at other nesting areas during and after nesting. Annual surveys were conducted during 1985-1988 as a follow-up to the surveys conducted earlier to evaluate the success of gharial rehabilitation programme in the National Chambal Sanctuary.

The results indicate a year-by-year increase in the number of nesting sites. From 570 km length of the river during 1978 only 6 places were known where nesting occurred, while in 1988 it was 15 places. In 1988 communal nesting (a place

with more than two nests) occurred at 11 places. Nesting is not found in areas where there is no sand. The banks opposite the sand bank where nesting occurred were, during 1987, muddy or hard soil (53.3% instances) and rocky (40%). Nesting also occurred on the alluvial deposites in between rocks (6.6%).

Nesting of gharial is seasonal and most of the nesting completes during late March and early April. Gharials dig probe pits trial nests before actual nesting. They select a site which is usually 7 M away from water and 1.5M above water level for nesting to avoid any possible flooding of the nests. Mean clutch size is 38.4 with a range of 17-55 (n=51) and the egg dimensions are: length 77.0-94.0 mm ($\bar{x}$ = 86.1 mm; n=120), breadth 59.0-64.0 ($\bar{x}$ = 61.3mm, n=120). Mean egg weight is 185.5 g. Mean incubation period is 62.3 days with a maximum period of 75 days. Female opens her nest at hatching time, to help hatchlings emerge. Hatching success is high (up to 100%) at Chambal due to nest protection by management staff, captive hatching programme and nest guarding phenomena of females. During 1987 nest loss is recorded due to predation (19.5%) mostly at communal nesting sites and mis-handling of eggs by inexperienced management staff (5.1%). The survival value of hatchlings is greater at the communal nesting sites since more than one female is available for hatchling attendance and a larger creche of hatchlings is formed due to congregation of several smaller creches. The male takes part in general attendance at the nesting area.

The recovering status of gharial is evident from a year-by-year increasing nesting activity and per km sighting density. A total number of 33, 37, 45 and 50 nests were located during 1985, 1986, 1987 and 1988 respectively. Annual egg production in 1985, 1986 1987 and 1988 is 1254, 1406, 1710 and 1900, respectively. Sex ratio during 1988 was 1 male vs 4 females. The density of gharial in Chambal was 0.29/km in 1978, 1.6/km in 1985-86 and 1.89/km in 1988. During this decade the gharial population has increased and the number of gharial nests has also increased from 12 in 1978 to 50 in 1988. The results have indicated the conservation status of gharial in the National Chambal Sanctuary.

Although commercial fishing has been banned since 1978, the management will have to increase its vigil over any illegal fishing which can quickly reverse the trend of recovery of the gharial population. Measures to be taken to improve the situation concerning gharial population are suggested.

Review

Dr. R.J. Rao's study on the Chambal gharial is a significant milestone which updates and clarifies what has been achieved by the Government's project to save the gharial. The paper also provides a detailed look at the nesting ecology of the gharial population on the Chambal, offering us the opportunity to see what transpires when a residual wild population is greatly increased by re-introductions.

The introduction is followed by an adequate description of the study area and its environmental parameters. After detailing the methodology, the bulk of the paper is devoted to nesting distribution, nesting activity and the nest parameters. Parental care, nesting success and egg production on the Chambal are summarized.

The conclusion and recommendations emphasize the need to continue monitoring activities and strengthen protection. What is missing however, is a long term view of the programme and an answer to what is ultimately in store for the gharial in the future.

The FAO/UNDP/GOI crocodilian programme that lasted a decade was aimed at both rehabilitation of the species as well as eventually providing an economic incentive for local people to protect crocodilians. So far the protection and rehabilitation seems to be working, but with increasing human pressures on acquatic ecosystems in India, crocodilians will have a harder and harder time surviving unless they can be proved to be "paying their way".

There are two basic ways in which crocodilians can be shown to be of economic importance. The first is to demonstrate the way in which they control the predators of commercially valuable fish, the cleaning of the waterways and the raising of genetic quality of the prey species. The second is the direct use of crocodilians by fishermen and tribals for skins and meat through controlled farming and ranching programmes. India has been in the forefront of wildlife conservation in Asia but has fallen woefully behind in wildlife management, a problem that could be remedied by the dedicated work of the Forest Department and researchers.

Romulus Whitaker
Director
Madras Crocodile Bank

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NEWS FROM IRIAN JAYA, INDONESIA

Rom Whitaker was in Irian Jaya, Indonesia for three months during July-October 1988, to advise the FAO/Government crocodile skin project,which was started two years ago. Specifically he was to assess the rearing potential of young crocodiles in various parts of Irian Jaya (farms and wild stock) and to make recommendations on various aspects of husbandry such as rearing large numbers of hatchlings, transportation and captive breeding potential. The main surveys were on the Mamberamo River and in Bintuni Bay mangrove system.

For the first survey he flew from Jayapura to Pagai with project head, Jack Cox, and visited project villages, then did night survey work on the Mamberamo. The following are extracts from his letters to his wife Zai, on his survey.

Pagai, Edenburg River, 19th August 1988

We were up early to get our Cessna flight. It's over an hour's drive from Awgkhasa above Jayapura to Sentani airfield. We loaded Jack's jeep full of barang (stuff) and got to the strip by 7.30. Our plane is from the Regions Beyond Missionary Union, a Cessna 185 Skywagon. We got everything weighed, loaded the plane, fueled it up and we were off - heading west to the Mamberamo River. We flew for an hour over jungle and swamp forest. The river looked low - it's the dry now. Sometimes I could see flocks of white cockatoos and once a black eagle flew just out of our way (at 5000 feet).

We stopped at Kaiy - a little strip next to the Rouffaer River where Paul, Chadiz and I had stayed a few days on our last trip - they even remembered us. We saw their croc pen, Jack did some extension explaining - i.e. don't spear the little crocs, catch them by hand, and also don't sell to the people without a license (mainly Makassarese, who are always coming up with the military whom they split the profits with). We took off and flew half an hour to Bareri, also along the Rouffaer but quite a ways up a side stream - we hadn't come here last time.

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At Bareri there was a big group of folks from lieele villages in the bush. Nice looking folks with lots of strange things in their earholes and wanting to know about croc supply and making a pen. We didn't see the Bareri pen 'cause it was way down river. We then flew another half hour over the Rouffaer to Faowi on the Van Daalen River where they had recently madd a pen for small crocs. The village is located on a nice cool rushing stream and the strip goes right to the base of a hill - the foothills of the Carstenz mountains which go up to the glacier at 15,000 ft. The croc pen is really neat, built in the bend of the stream so that all they had to do was cut a channel and water runs through continuously. We stayed awhile, talked to the folks and picked up Konstant, one of Jack's counterpart people who's been out here for 2 months helping folks get their pens together and the small croc supply in gear. We took off and flew 40 minutes to Dabra, across small hills and a few villages to the Edenburg River (which along with the Rouffaer becomes the Mamberamo).

Landed at Dabra where we had to get our surat jalans (travel papers) stamped by the chamat, military and police in their tiny outposts. There's a big croc farm there with over 4,000 crocs, quite a surprise out here in the bush and they seem to be doing very well at it - in spite of the hassle of supplying enough fish to feed them all. They also have flowing water. We saw the other two smaller pens in the village and then zipped up and over for 40 minutes to here, Pagai, way up on the Edenburg. We also picked up the inflatable boat and sent it off for my Bintuni survey next week. Several military guys are in the village - the first time here since in the early 80's several were chopped up in this area. Apparently the OPM (the freedom movement) has been active down river and they were sent up here for a few days to check it out (and to try to get the villagers to go out and hunt crocs for them!) The Pagai people had built a nice house to stay at down river on the confluence of the Magri River but the military burned it down for some reason known only to them. The villagers look pretty down over all this but they had 50 small crocs ready when the plane landed and are happy to see Jack. I went down to the little nearby clear stream and had a good mandi (bath) and am now sitting next to the door having a minor mosquito battle and writing by petromax light - very classy! The sunset is spectacular complete with orange clouds, a rainbow and thunder rumbling - several hornbills flew over and we could hear cenderawasih's (birds of paradise) calling in the forest just next to the house.

Discussed local problems with Dimara, a Biak Island man who was educated at Wamena in the highlands by the missionaries and is a pastor, development man now for this area. The villagers had fled the village and lived in the forest for 7 years and have been back only these last 3 years. The whole idea of crocs to bring development is perfect for the circumstances and does exactly what Indonesia wants to bring stability to an area that was once rebel territory. But the greedy local military boys seem determined not to let it happen, 'cause it will eat into their profits.

It's the 21st a.m. early Sunday. A Pagai Sunday is going to be a slow one till noon as we recover from last nite's trip upriver to the "end of the road" for boats on the Idenberg - a series of rapids and a big whirlpool - which has claimed more than one canoe - which we didn't go near. We saw 17 crocs and the two guys with us caught one, a nice 10' belly width freshie they are thrilled with. They'll get 60,000 rupiah for it - nearly 40$ - a monthly salary here for the guards on the wildlife staff - enough to tempt anyone to look the other way!

Now its 6.00 a.m. and the 23rd, Tuesday. The day before yesterday we went down river a few hours in the project dugout with motor and outrigger on it so it's real stable. We went to the confluence of the Magri River where the 9 huts of the Pagai people (for use by the project for croc survey are (were). Sure enough they had all been burnt to a char.

David, Cornelius and Isak were the 3 Pagai people with us as they are the 'owners' of the lakes we were to search at night. Our MAF plane is getting here at 9 or so and we have to make sure all the crocs are packed and ready. Finished taking pictures of packing the crocs in a crate - good fun in the muddy pen, the catchers were the little 10-12 year old boys of the village - good practice - and they are very efficient and unscared croc handlers. Now we're sitting waiting for the plane which just flew over the other way to a village on the Magri and will pick us up on the way back.

Last nite we were snoozing by the river till the moon went down then went on a 2 hour cruise by motor down river, dodging logs and spotted 13 crocs. The notable ones are a nice adult which let the boat touch its head and another, in the shallows, about 1½ metres long that really leapt out of the water several times like a big fish and headed into

the deep. Once when we stopped at the place a stream entered the river (draining an oxbow we wanted to get in to survey), David got in to push the canoe and stepped right on a croc - he squawked (David) and jumped up and said "Buaya besar" - big croc! Our flight back to Jayapura was uneventful - the pilot came around noon and we said goodbye to all the sweet Pagai people - real nice bunch.

Sorong - 24th August 1988

It's exactly a month since I set out from Madras. It is raining crocs and ducks outside and it looks like I have to wait till a ship loads up for a few days before I can get to Bintuni. To continue the Pagai chapter - we landed near an old hunting camp at three little inland lakes owned by David. At 2 a.m. these three guys pulled the smaller canoe through the shore mud, up and over the 30 foot high bank, through the forest a couple of hundred yards and into the first lake - quite a feat! Jack was too comfortable in his spot in the big canoe and so I went ahead with David and Isak, me in front of the wobbly canoe with my trusty torch. Eerie little lakes surrounded by thick pandanus and dotted with little mound islands of vegetation. We hardly went 10 feet and I picked up eyes of 3 crocs. We paddled slowly around and saw 24 crocs, most small but several I assume were big as they didn't allow us to get close. At 4 a.m. we were heading back and Isak started giving a hatchling cry. The response was amazing - from the bushes at least 6 crocs answered in various tones, denoting different sizes of crocs. We got out of the canoe and walked into the tall pitpit grass aways and a small freshie ran underneath my feet, which I caught - he was full of food andit was obvious that this dry period was really good for them to find fish etc.

Got back to the motor perahu and "snuggled" up in the front in my sopping wet jeans and slept soundly for 2 hours or so till the loud bird sounds woke me up at sunrise. We went downriver to the burnt out camp, then headed upriver again for Pagai. Crossing the junction of the dark Magri was fun - big whirlpools made the boat twist and buck - could have been scary in a smaller boat. By noon it was "panas sekali" (damn hot), so we stopped at a big sand bar and spent an hour sporting around in the water and talking about man-eating crocs. We reached Pagai later in the afternoon and just lay around talking. The word for crocodile here is'Yarui' and the cooperative that Pagai is getting going will be the Koperasi Yarui "freshwater crocodile cooperative" with their own little store and all.

25.8.88 Today we fixed up the boat trip to Bintuni - 30 hours of open sea if the weather is okay and leaving day after tomorrow (if rain doesn't hold up the loading of 50 barrels of kerosene). Then we spent a few hours talking with the Catholic mission people about setting up croc collection pens in several villages near Bintuni. Then off to the Government croc farm about 16 kms. out of town. We had a long talk with the workers - so much interest and intelligent, self-motivated questions, very gratifying to see that you aren't wasting your time just talking. The Government farm is okay, there are some ideas, but Jack has convinced them to be a research and training centre instead of a big skin production centre which was the original idea.

After we got picked up at Pagai we went back to Jayapura and I met Scott Frazier who is the monitoring consultant Jack hired for a year and is going to be based down at Merauke, a real hotbed of corruption and skin smuggling - a real wild west type of town. But Scott, seems able to handle it and is a good, solid sort, with plenty field experience in Papua New Guinea on the croc project there.

After we came back from dinner last nite the police chief was waiting for us to ask advice about his proposed croc farm. Already there are farms built with capacities of upwards of 40,000 crocs and most absolutely empty! Today I'm gearing up for my 3 week survey of the salties in Bintuni Bay (one of the biggest mangrove areas of this part of the world). As counterparts I have 4 guys, including Sergius, a very nice Irianese and full of interest in crocs. Should be an interesting trip, but I'm already worried that I won't see much since salties are so easy to clear out of the mangroves and our last trip to Bintuni wasn't very productive. Anyway part of the trip will be to help set up some village collection farms for both freshies and salties and to tell people to leave nests and adults alone.

27.8.88. The ship is now leaving tomorrow morning (Sunday). Found a freshly dead small eyed snake right in town last night and yesterday at one of the croc farms they had a 4M long Papuan python.

(To be continued)

A REPORT ON OUR CURATOR'S VISIT TO JERSEY AND THE U.S.

Harry Andrews, Curator of the Madras Crocodile Bank was away on a study tour from August to October this year. He attended the Summer School Course for one month at the Jersey Wildlife Preservation Trust and later spent two months in the U.S. studying alligator management and farming techniques. His trip was jointly funded by the British Council, Wildlife Preservation Trust International, and Dr. J.W. Lang. A brief summary of his trip is given below:

Arrived Jersey on the 31st July. The Course on "Breeding and Conservation of Endangered Species" at the Jersey Wildlife Preservation Trust commenced on 1st August. Topics included reproductive strategies, captive management of endangered species, genetic diversity, veterinary aspects, reintroduction, exploitation of wildlife resources, and natural history. Courses were directed by Drs. David Waugh, Ian R. Swingland and Pat A. Morris. A study on "Behaviour and Thermoregulation of the Marginated Tortoise (Testudo marginata)" was taken up as my project study.

After the course duration on the 20th, I worked at the Reptile Section for a week under the guidance of Quentin Bloxam (Curator), maintaining the reptiles and learning incubation techniques for turtles, snakes, lizards and frogs.

On the 31st of August I left for Louisiana (U.S.A) where I worked at the Rockefeller Wildlife Refuge for one month, on their alligator and marsh management programme, under the guidance of Dr. Ted Joanen and his team. The Rockefeller Refuge spread over 85,000 acres of marshland, has the best wildlife management program going. 25,000 alligator eggs collected from the wild were successfully incubated and hatchlings distributed free to farmers. After a period of 12 months, 17% of these hatchlings are recovered from the farmers and released back into the wild. The number of eggs collected from the wild is calculated by taking each nesting female as 5% of the population. Eggs and alligators are also harvested from private properties outside the Refuge by the owners depending on the number of nests. Alligators over 4 feet only are harvested. The wild population is maintained on the strategy of 17% being restocked every year, as the survival rate in the wild is only 5%.

The harvest season in Louisiana is from early September till early October. Hunters, trappers, farmers and land owners are issued CITES tags to be attached to the skins of alligators

hunted. The number of tags issued depends on the number of alligators allotted to be harvested in the area.

Alligator farming in Louisiana has evolved into space-age farming technique. Farmers grow hatchlings in styrofoam insulated sheds in 4-6" of water. They are pellet fed, have 24 hours darkness and music (cajan and rock). Alligators grow to harvesting size in 12-16 months. Most of the farming extension work is done by the Refuge people themselves.

I visited the Louisiana State University for 4 days and talked to various research personnel and biologists and attended wildlife management lectures. A trip to the New Orleans Zoo was very interesting. They have a very good herp collection including albino alligators collected from the wild.

I spent a week in early October with Dr. J.W. Lang at the University of North Dakota, sorting mugger and caiman egg shells and embryos for research study, after which Dr. Lang and myself toured Florida for two weeks. We spent two days at Turkey Point with Frank J. Mazzotti who is doing a study on effects of groundwater levels on reproductive success of American crocodiles, and nesting ecology of these crocodiles in the cooling canals of a thermal power plant. During the night we went around in an airboat spotting and catching crocs. We spent a day at the Florida Keys looking at nest types and locations.

We also visited the Everglades National Park. One of the unique features we got to see here was the setting up of drift nets to study herpetofauna and discussed methods and study techniques with field biologists. Some of the other interesting places we visited were Gatorama in Palmdale, Arthur Jones's Farm (who has 20 species of crocodiles and also the largest C.porosus in captivity), Ed Frolich's Alligator Farm in Christman, Florida State University and the Maimi Zoo. This marked the end of my tour of south-eastern U.S.A and I headed back for India on the 21st of October.

On the whole my trip to Jersey and the U.S. has been a very useful, educative and stimulating experience. In particular, my visit to Jersey was an opportunity to meet students of 14 different countries and exchange views and ideas on wildlife management programmes in other parts of the world, besides discussing various social and cultural topics.

Apart from our course activities, we also got to do a bit of touring around the beautiful and historical island of Jersey. One spectacular sight was the German World War II armament remains.

Living in Louisiana was a totally different experience. The friendly caigan farmers with their enjoyable caigan music, spicy food and interesting lifestyle was something to look forward to after a hard day's work in the marshes. Living with this ethnic group of people is something to remember.

Acknowledgements

I wish to thank my sponsors, the British Council Division, Madras, The Wildlife Preservation Trust International and Dr. J.W. Lang, for jointly funding my trip. I also wish to thank the management and staff of the Jersey Wildlife Preservation Trust and the Rockefeller Wildlife Refuge, Louisiana, for all cooperation extended to me and most of all for making my stay a very useful and thrilling experience

Lastly, I am most grateful to Rom & Zai Whitaker and the Trustees of the Madras Crocodile Bank for making my trip possible.

SUMMARY REPORT ON THE BIOLOGICAL RODENT AND TERMITE CONTROL PROJECT SPONSORED BY DEPARTMENT OF SCIENCE AND TECHNOLOGY, GOVERNMENT OF INDIA

27.6.88 to 30.7.88

I.	Rodents caught	No.of Adults	No.of Juveniles	Total No.
	1st week	1982	917	2899
	2nd week	1583	653	2236
	3rd week	877	18	895
	4th week	813	21	834
	5th week	671	-	671
	Total	5,926	1,609	7,535

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II. Materials found in rat burrows

1st week	: 50.0 kgs.	
2nd week	: 40.0 kgs.	
3rd week	: 7.5 kgs.	
4th week	3.0 kgs.	
5th week	Nil	
Total:	100.5 kgs.	(94.5 kgs. of rice and 6 kgs. of groundnuts)

III. Number of Irulas employed

1st week	127
2nd week	96
3rd week	94
4th week	98
5th week	65
Total:	480

IV. Average cost per rat : Rs.1.26

1.8.88 to 27.8.88

I. Rodents caught	No. of Adults	No. of Juveniles	Total No.
1st week	445	9	454
2nd week	711	26	737
3rd week	946	43	989
4th week	870	447	1,317
Total	2,972	525	3,497

II. Materials found in rat burrows

1st week	6.5 kgs.	
2nd week	6.0 kgs.	
3rd week	21.5 kgs.	
4th week	94.5 kgs.	
Total	128.5 kgs.	(116 kgs of rice and 12.5 kgs. of groundnuts)

III. Number of Irulas employed

1st week	75
2nd week	101
3rd week	122
4th week	101
Total	399

IV Average cost per rat : Rs.2.14

29.8.88 to 1.10.88

I. Rodents caught	No. of Adults	No.of Juveniles	Total No.
1st week	807	203	1,010
2nd week	899	431	1,330
3rd week	831	673	1,504
4th week	967	115	1,082
5th week	964	567	1,531
Total	4,468	1,989	6,457

II. Materials found in rat burrows

1st week	52.0 kgs.	
2nd week	96.0 kgs.	
3rd week	108.5 kgs.	
4th week	69.0 kgs.	
Total	335.5 kgs.	(307 kgs. of rice and 28.5 kgs. of ragi)

III. Number of Irulas employed

1st week	: 99
2nd week	: 132
3rd week	: 129
4th week	: 273
5th week	: 134
Total	767

IV. Average cost per rat : Rs. 2.32

3.10.88 to 29.10.88

I. Rodents caught

	No.of Adults	No. of Juveniles	Total No.
1st week	983	588	1,571
2nd week	892	428	1,320
3rd week	904	579	1,483
4th week	741	407	1,148
Total	3,520	2,002	5,522

II. Materials found in rat burrows

1st week	78.0 kgs.	
2nd week	64.0 kgs.	
3rd week	58.0 kgs.	
4th week	49.0 kgs.	
Total	249.0 kgs.	(215 kgs. of rice and 34 kgs. of ragi)

III. Number of Irulas employed

1st week	:	126
2nd week	:	106
3rd week	:	99
4th week	:	99
Total	:	430

IV. Average cost per rat: Rs.1.50

M. Murali
Field Supervisor
Rodent Control Project
Irula Snake Catcher's Co-operative Society
Vadanemmeli Village, Perur Post
Mahabalipuram Road
Madras -603104

HAPPY NEW YEAR

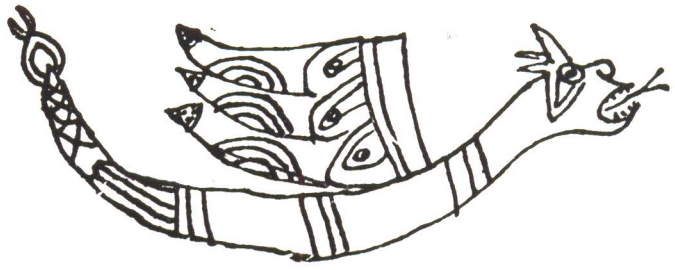
DONATIONS

Local : Rs. 15 annually

Foreign : 5 dollars annually

Cheques should be made to

MADRAS CROCODILE BANK, VADANEMMELI VILLAGE, PERUR P. O.
MAHABALIPURAM ROAD, MADRAS-603 104



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