

SEMINAR ON CROCODILE EGG COLLECTION  
Methodology

Madras Crocodile Bank, Vadanemmeli Village, Perur P.O  
Mahabalipuram Road, Chingleput District, South India.  
14/2/77

- 9 a.m. Introductory Talk at Reception Centre:  
"Crocodiles in Tamil Nadu" A.N.  
Jagannatha Rao - Discussion.
- 10 a.m. Seminar Talk and Demonstration at  
Mugger Breeding Pit.  
"Crocodile Egg Collection" R. Whitaker  
and Allen Vaughan-Discussion.
- 11 a.m. Crocodile Feeding and Coconut Break.
- 11.30a.m. Seminar Talk and Demonstration.  
"Handling of Subadult Crocodiles".
- 12.30a.m. Lunch.
- 1.30p.m. Seminar Talk and Demonstration.  
"Early Care of Hatchling Crocodiles".  
Discussion.
- 2.30p.m. Adjourn.

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16.2.77

## CROCODILES IN TAMIL NADU

1. As in rest of India crocodiles heavily killed for skin in previous years and much habitat lost.
2. *C. porosus* (Saltwater Crocodile) extinct in the state; last report was one caught in Madras Harbour about 1910.
3. MSP workers have identified and collected eggs at the major crocodile nesting sites in the state:
  - a) Amaravathi Dam (b) Moyar (Kedarhalla), (c) Sathanur Dam (d) Chidambaram Waterworks, (e) Kilikudi, (f) Hogenakal.
4. There are only about 160 wild crocodiles in the state and we know of the nesting areas of about 24 adult females. This is an egg collection potential of 600-700 eggs. According to our and our colleagues' survey work in the rest of the country, our state has the largest identified nesting population (and thus egg collection) potential in the country. With a bit of very careful effort, Tamil Nadu could lead the way in crocodile management in India.
5. The various ecological, touristic, aesthetic and resource interests for crocodile conservation are lately getting a lot of publicity. The chances for crocodile survival in the state depends on several main factors:
  1. Successful egg collection, captive rearing and release.
  2. Protection for adequate crocodile preserves;
  3. Public education for this feared, exploited and misunderstood reptile. Co-operation with the Fisheries Department and other Government departments such as Electricity Board is most essential.
6. Reasons for crocodile conservation:
  - a) The crocodile was here at least 100 million years before us.
  - b) The crocodile is evidently an essential component for a healthy fisheries in our lakes and rivers.
  - c) The local and foreign tourist is generally very interested to see these great reptiles, which have dwindled in the rest of the world.
  - d) Crocodiles could eventually be an important revenue earning resource for the state.
  - e) Small scale crocodile farming could eventually become a sort of cottage industry for tribals with a natural aptitude such as the Tribes. *Julas*
7. Tamil Nadu is in the fortunate position of still having a fair remanant crocodile population. It will take considerable effort but with the present interest of the centre in wildlife projects and with the current FAO/UNDP involvement, there is a good chance that this is one form of wildlife  
(J.B)

contd.

that will pay it's own way to survival.

8. Crocodile Preserves:

The following areas have been recommended by MSP workers:

Nesting areas including Amarvathi Dam, Sathanur Dam, Bhavanisagar, Moyar River, (Hogenakal) Cauvery River, Kilikudi Pond, Kedarhalla stream, Chidambaram Waterworks.

Of these areas, Hogenakal, the Moyar River and Kedarhalla stream are the only "original habitats" still in their relatively wild states. The rest are man-made lakes or ponds.

If the full egg collection potential is realized, the Forest Department will have up to 2500 crocodiles to release in five years time. It appears that the implementation and protection of adequate preserves for these should start now.

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## CROCODILE EGG COLLECTION AND INCUBATION

### 1. METHODS:

- a) Nest Location: Locating crocodile nests is learned through experience and most easily with the help of local tribal people. The Marsh Crocodile nest is simply a bent hole about 40-50 cms. deep and 30 cms. in diameter dug in a stream, river, lake or tank embankment, from 2 metres to 200 metres from the water. The sand, gravel or earth nest hole will be covered to ground level rarely with a slight mound. In undisturbed environment the female lies on the nest site most of the time. Mostly it will remain in the water alone by. At this time she will chase predators like monitor lizards, dogs, foxes and other crocodiles.
- b) Egg Collection: It is essential to collect the eggs in the early morning or late evening to avoid temperature shock to the egg. The egg should be handled with extreme delicacy at all times (as if loaded with a high explosive). The nest hole should be dug carefully out and the eggs removed one by one without shaking or turning. Each egg should be marked on its top side with a soft tip marking pen and placed in the incubation box, carefully, right side up. Eggs should be collected the morning after laying.
- c) Incubation Box: Inside dimensions 20x14x14 inches; box made from mango or strong deal planks, with half inch aeration holes around box at 2 inches and 6 inches from bottom. Box should be fitted with hinged lid and lockable latch or suitable lid for tightly tying shut (Note: nails cannot be banged in after eggs are placed in box) or with screw holes for tightening lid.
- d) Packing: Pack eggs in the original, damp nesting soil or sand (provided it is free from stones and mixed with damp, dead leaves). Put three inches of soil dug from the same depth as the nest in the box and place the eggs one by one in rows as in diagram, 2 inches from the sides and one finger width apart. Since a nest usually contains about 30 eggs, a layer of eggs (about 15 eggs) can be covered by 2 inches of soil and a second layer of eggs placed. If the number exceeds 40 a larger box is needed or the clutch can be equally divided between two boxes.
- e) Transport: Smaller boxes may be used if eggs must be brought a long distance by head load and the eggs later carefully transferred to the hatching boxes. When eggs are under 24 hours old they can be transported even several hundred miles by careful driving or train. After 24 hours, however, and up to 20-30 days, the developing embryo cannot stand jarring, so the eggs may be left at a suitable incubation site. After twenty to thirty days,

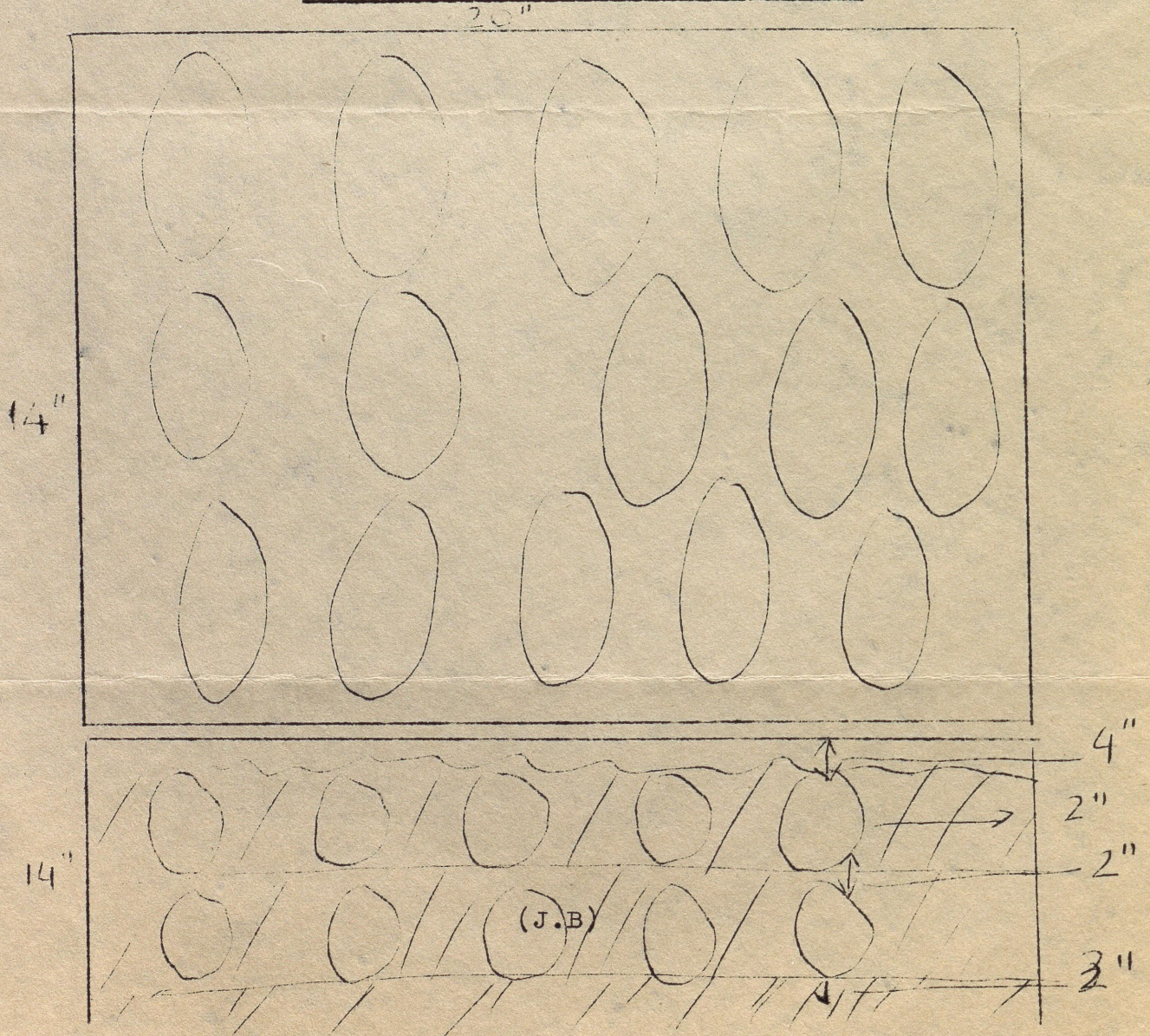
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the eggs can be transported to the main hatchery and rearing station if located away from the collection site. Whenever possible, the hatchery should be adjacent to the egg collection area (easily possible at our reservoings)

- f) Incubation: An average temperature of 85°F to 90°F is optimum for crocodile egg incubation. The nest material (soil, sand) should remain at least slightly humid. The hatching boxes must be kept in a room or chicken mesh cage, secure from predators and ants and need no direct sunlight. Since the incubation period is in summer there may be a need to cool down the eggs; this can be done by piling bricks around the boxes and soaking down the bricks twice daily and by using electric fan etc. Daily temperature checking is important. The eggs must not be subjected to jarring or sudden temperature change. Each mistake in dealing with the eggs will lower the hatching average.

R. Whitaker,  
Member of Crocodile Specialist Group, IUCN.  
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EGG COLLECTION AND INCUBATION BOX



## MADRAS CROCODILE BANK TRUST

### EARLY CARE OF HATCHLING CROCODILES

Based on our experience of rearing crocodiles since 1971 and contact with workers in this field in other parts of the world we have compiled the following notes on the rearing of hatchling crocodiles.

#### A. Hatching

1. Hatching takes place in from 50 to 90 days (depending on the overall incubation temperature average).
2. Scratching or lightly tapping the incubation box will cause ready to hatch or hatched crocodiles to "chirp" (high pitched grunts).
3. If the chirping of several is heard we wait till the cool early morning or evening to carefully remove the earth packed over the eggs.
4. It may take about 24 hours for all to hatch, they should (with very few exceptions) be allowed to free themselves from the egg. Some seem to have trouble getting out but as long as they are able to breathe they should be very carefully helped to hatch only after 24 hours.
5. Some may hatch (more usually the "helped" ones) with distended bellies with a yolk mass visible. Many of these survive if placed on clean wet straw in a warm dark place. The yolk is generally absorbed within 48 hours. Beware of ants.
6. The healthy, active hatchlings can be immediately released in the hatchling enclosure. Weak ones should be kept separate until strong enough to move about.

#### B. HANDLING

1. Hatchling crocodiles cannot bite hard and should be handled with gentle care like any newborn creature.
2. Hatchlings should be handled as little as possible and then only one at a time, using both hands to support it and prevent it from twisting and shaking.

#### C. Hatchling enclosures

1. Only 12 or 15 hatchlings should be kept in each enclosure (see diagram).
2. The enclosure should be about 50% pond area and 50% land area with adequate low grasses and bushes for the young to hide in.
3. Enclosures should be simple and easy to clean; pond of smooth cement for easy scrubbing. Water should be changed at least once in three days.
4. The enclosure must be made escape proof and predator proof. Keep in mind that young crocodiles climb very well as do several predators like mongoose etc. Birds of prey like owls and water birds should be guarded against.
5. The enclosure should receive an equal amount of sun and shade. Temperature should be checked regularly and special care should be taken in mid summer and mid winter to ensure optimum temperatures.

#### D. Feeding

1. Hatchling crocodiles will start feeding within 48 hours of hatching. The best possible foods are those which they would naturally obtain: live small fish, frogs (and tadpoles), and insects. The first two can

- be collected and given, the insects can be attracted at night by placing a light bulb about a foot above the pond surface.
2. Dead foods such as chopped meat and fish should be avoided. If living fish and frogs are impossible to obtain chopped meat and fish can be given for a short period, making sure the food is put in the enclosure in the evening and every left over bit meticulously cleaned out next morning. (including the pond).
  3. There may be one or several hatchlings which are obviously not feeding well. This may be due to not putting enough food or perhaps the animal is weak or sick. It is easy to gently force feed a hatchling crocodile with a small fish or tadpole by inserting it in the croc's mouth and stroking the throat to get it down. If a baby crocodile doesn't eat for a week or its neck looks thin and obviously different from the other, healthy ones, force feeding is indicated.

#### E. Disease

1. Prevention is as usual better than cure. If the hatchlings are kept separated into lots of 12 to 15 per enclosure the danger of losing a number to contagion is lessened.
2. Keep crocodile enclosures meticulously clean and free of feces, dead animals and fish and keep the water changed regularly. If this is observed and the diet is adequate (i.e. as close to a natural diet as possible) the danger of deaths and disease is reduced.
3. The first few weeks is the most critical period and a careful daily check should be made to see that all hatchlings are thriving.
4. Isolation and special care such as force feeding and possibly medication should be the immediate measures if any of the young appear weak, emaciated or otherwise abnormal.
5. If algae grows on young crocodiles, water should be changed more often, sunlight on the pond reduced and the algae on the hatchlings carefully brushed off periodically.
6. Good checks for health and correct diet are:
  - a) Body should be firm and well proportioned, belly round but not distended.
  - b) Tail and neck should appear well rounded; thin necks and/or tail are obvious signs of starvation or sickness.
  - c) Eyes should be clear and wide open when awake. Any fluid from eyes means possible disease.
  - d) Fluid from nostrils and mucous in mouth indicates effects of cold; more access to sun is necessary.
  - e) The jaws and teeth should mesh correctly when closed. A short lower or upper jaw means a deficient diet.

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CROCODILE CENSUS OF TAMIL NADU-1976

Wild (Approx)		Captive	
Amaravathi Dam	25	M.S.P.T.	224
Nearby streams	6	T.N-F.D	29
Kedarhalli stream	8	Amerdhi (F.D.)	2
Moyar R.	20	King of Crocodile	11
Bhavanisagar Dam	10	Madras Acquarium	1
Mettur and Hogenakal	10	Amaravathi Zoo	2
Sathanur Dam	15	V.O. Chidambaram College	2
Pechiparai Dam	5		
Chidambaram Water Works	15	Mettur Dam Acquarium	1
Kilikundu Pond	20	Madras Zoo	1
Cauvery & Coleroon R.	5		
Other areas	20		
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Total	159		273
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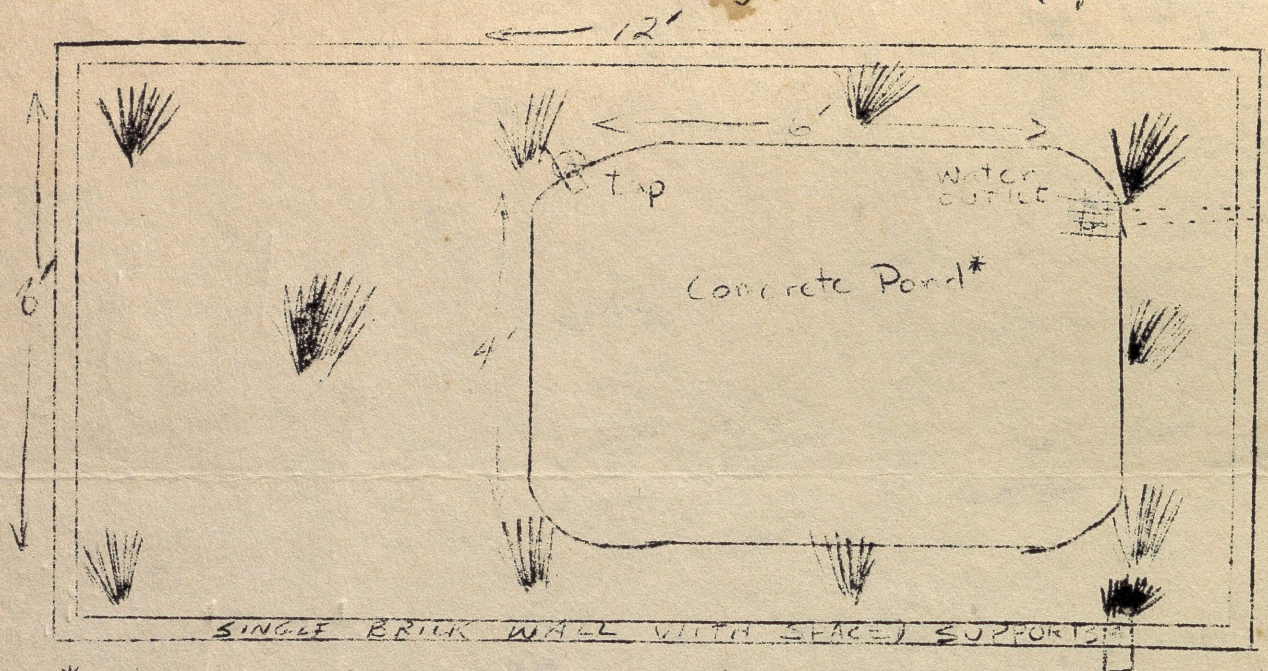
CROCODILES KILLED IN RECENT YEARS IN TAMIL NADU

Pechiparai	1	26.9.73	Killed by local people.
Trichy	1	1974	Local Police killed it in a Cinema Hall.
Sathanur	1	1974	Killed by Fisheries and auctioned.
Moyar R.	1	1974	Killed by E.B. Watchman Arumugam (alleged)
Hope Lake	1	1974	Killed below dam.
Coleroon R.	1	1974	Killed by DSP Tanjore (alleged)
Pechiparai	1	Dec. 1975	Killed by Fisheries Dept. and meat sold (length 170cm)
Trichy	1	1976	Killed on road near Kallanai (Length 140cms)

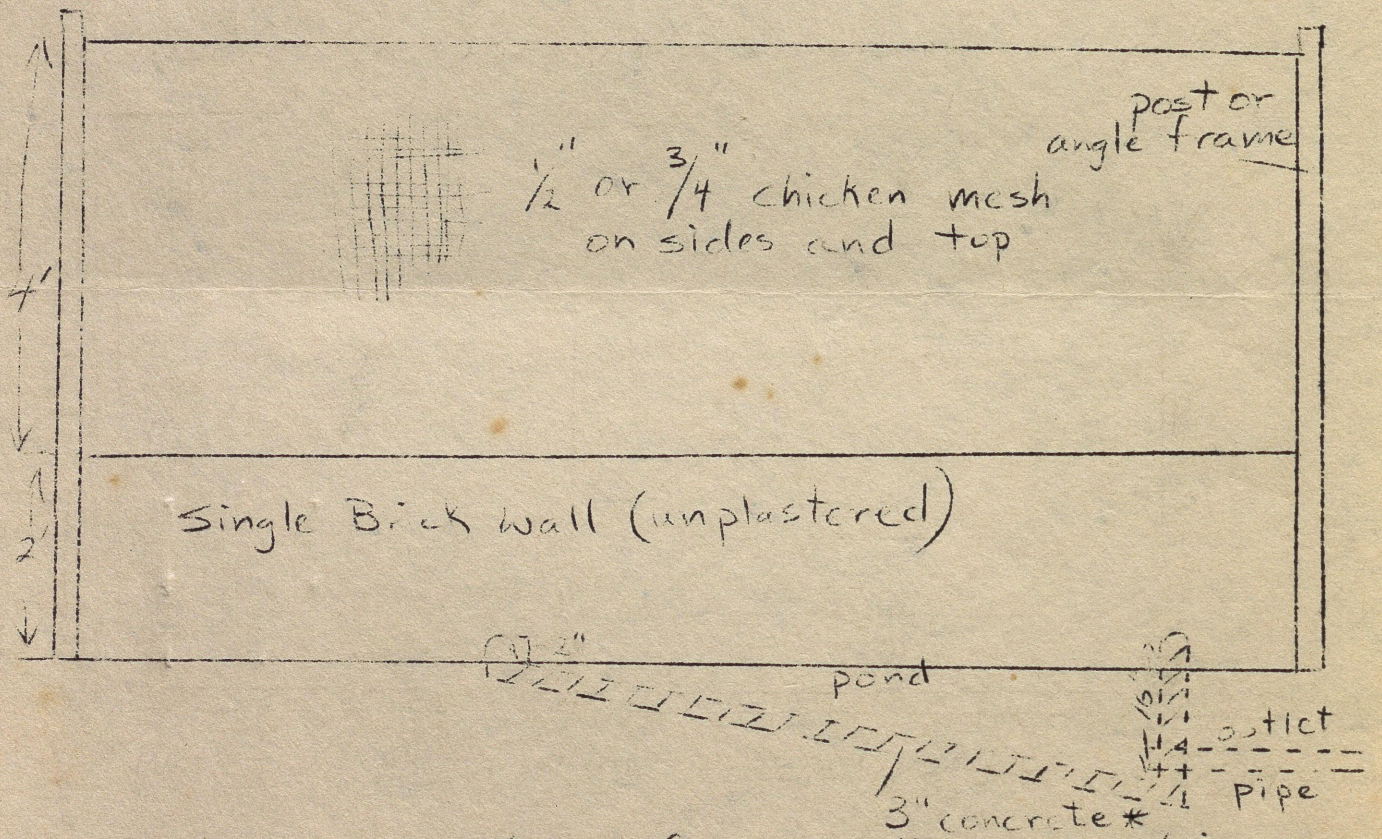
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Enclosure for 12-15 hatchling crocodiles (up to one yr.)



\* When available, a suitable natural pond is much preferable



\* allow to cure ten days before crocodiles are put in