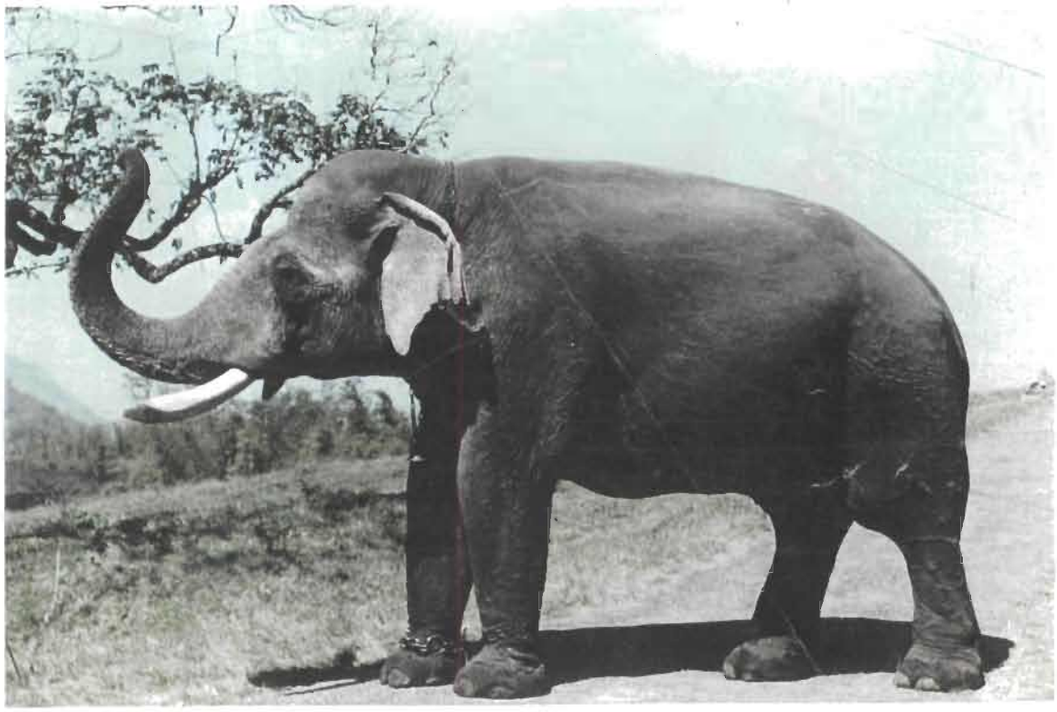
The Krishnamurthy Committee Report On

"THE MANAGEMENT OF DEPARTMENTAL ELEPHANTS OF TAMIL NADU"



DR.V.KRISHNAMURTHY
Chairman
Retd. Forest Veterinary Officer
(Joint Director - Animal Husbandry)

TNV962

R.HEMANTH KUMAR, I.F.S.
Member -
Regional Deputy Director
(Wildlife Preservation)
South Zone,
Government of India
Chennai.

Dr.M.G. JAYATHANGARAJ
Member,
Associate Professor,
Dept. of Wildlife Science,
Madras Veterinary College,
Chennai.

2002

To
Secretary
Dept. of Environment and Forests
Govt. of Tamil Nadu
Chennai-9

Dear Madam,

Sub : A report on the management of departmental elephants in Tamil Nadu

With reference to the GO ID No.355 dated 4-12-2001 the committee headed by Dr. Krishnamurthy, with its members R Hemanth Kumar IFS, Regional Dy.Director(Wildlife), South Zone, Govt. of India & Dr. M.G Jayathangaraj, Associate Professor, Madras Veterinary College, visited all elephant camps at Mudumalai, Anamalai, Arignar Anna Zoo, and Childrens corner, Guindy and studied the various aspects of the management of captive elephants.

The committee is of the opinion that, the elephants are managed on sound management practices and the general conditions of the animals and the camp sites are satisfactory. As a part of our study we even examined the elephants randomly for the serological parameters and found out that the elephants are in healthy condition. We are satisfied even with the preventive vaccination programme that is being implemented around the NP/WLS. Incidentally during our study period one such programme was in force which we observed. Records of the elephants are properly maintained. However, there are some recommendations. We expect that the State Govt. will implement them which we incorporated in our report. The most important one will be better pay and allowances for forest vet. Officer, for the mahouts and cawadies. The vacant posts are to be filled on priority basis; as we sincerely feel that vet. Doctors, mahouts and cawadies are very important as they keep the elephant in orderly and obedient way and with the care taken by them helps elephant to be in good and healthy condition. The mahout and cavady who controlled the makhna should be suitably rewarded, as they helped in the rehabilitations of a known killer elephant, even risking their lives.

As a part of our study we inspected the elephant camps of Karnataka too and the committee feels that the management of elephant is better in Tamil Nadu.

Lastly we express our sincere thanks to the cooperation extended by the Shri J C Kala, IFS, PCCF, Tamil Nadu Dr. Sukhdev Thakur, IFS, Chief Wildlife Warden, Tamil Nadu, Dr. T Sekhar IFS, Conservator of Forests, Coimbatore, Mr. Ashok Upreti IFS, DCF. Mudumalai Wildlife Sanctuary & NP, Mr. Ganeshan IFS, DCF Rajiv Gandhi NP Pollachi and their staff.

Thanking you,

Yours faithfully,

Dr. V Krishnamurthy
Chairman

R. Hemanth Kumar,IFS
Member

Dr. M.G.Jayathangaraj
Member

Chennai
Dated 2nd April 2002

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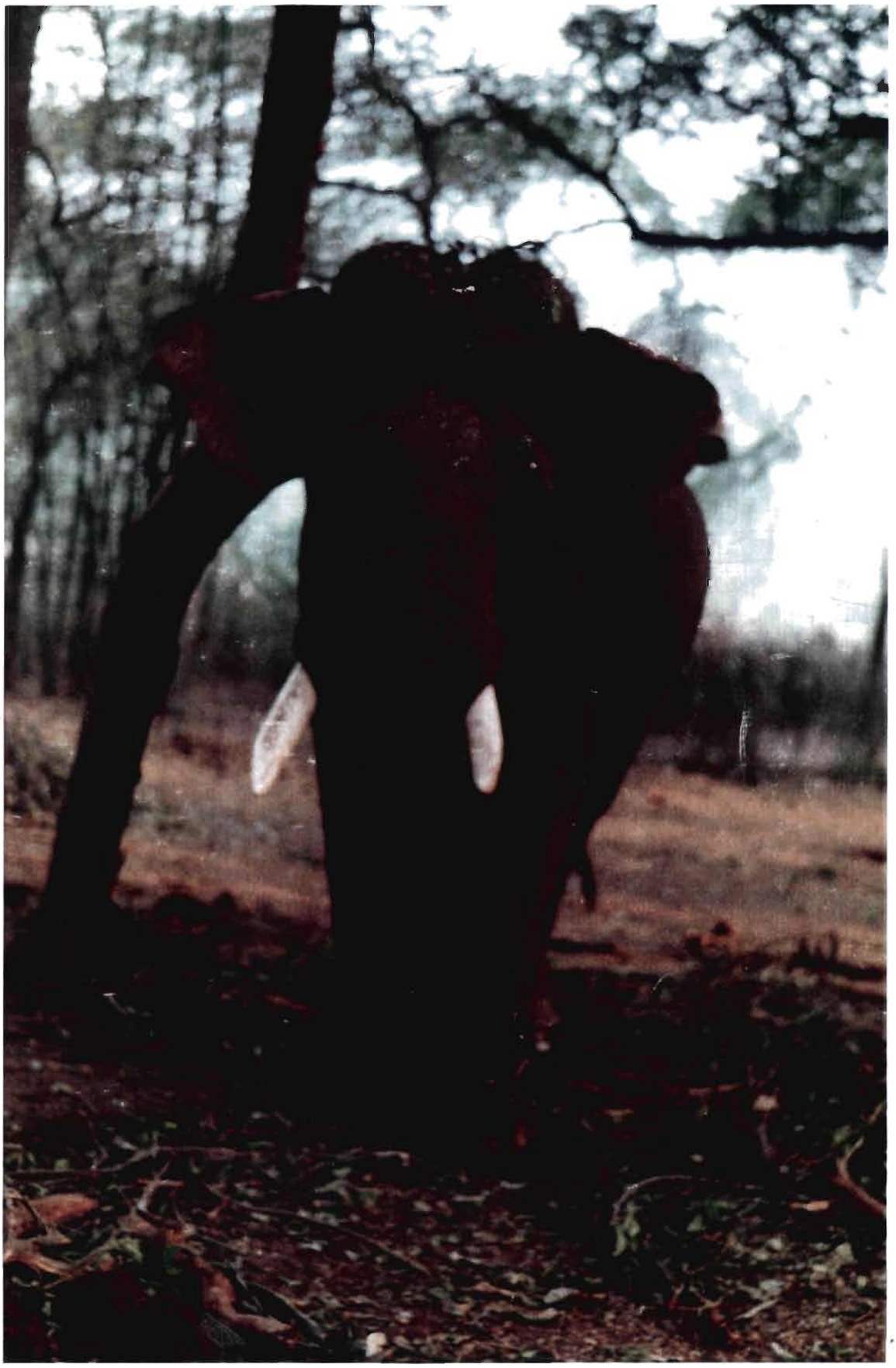


A REPORT ON THE CAPTIVE ELEPHANTS IN THE TAMILNADU FOREST DEPARTMENT- THEIR PRESENT STATUS AND MANAGEMENT.

INTRODUCTION

Elephants have always been an integral part of India's culture. The earliest historical evidence for the domestication of the Asian elephant comes from India. Regionally differing traditions in husbandry capture and training and the use of tools and harnesses seem to have evolved in several regions independently over four thousand years.

Historical Background:

In Tamil Nadu (formerly the Madras Presidency) the Forest-Department had been maintaining elephants for over 140 years. These elephants, which were mainly used for timber extraction work, were kept in various logging camps within the forest area.

Before independence, the limited evidence available indicates that the departmental use of elephant power was formulated between 1850-57 under the British colonial rule when administration of timberlands in the Madras presidency assumed its definitive form under the government.

Elephants need for timber extraction were secured from various sources within India, including transfers from the army Commissariat, as well as from the wild as was done by the Bengal government Khedda establishment which was created in Dacca in the early 1840. Some elephants were even acquired from Burma and from the annual Sonepur Mela of Bihar. But the main source of elephant power was acquired form the local Zamindars and rich landlords particularly in the North Malabar region.

At that time, the Madras Presidency consisted of 26 districts extending from the East Coastal districts and the 5 ceded districts which are now in Andhra Pradesh as well as the North Malabar district and South Canara district in the Western side along the Western ghats. Best of the valuable timber areas were within the North Malabar region, where timber camps were established.

Permanent Camp sites were and still located in all ranges in Tamil Nadu, where elephants are still maintained on a permanent basis. In the Anamallais, the elephant camp was located in Sungam (now in Kerala) till the state reorganization in 1956. Subsequently in 1956 the camp was shifted to Varagaliar in the Ulandy valley and continues there.

The Theppakkadu Elephant Camp was established in 1927 in Mudumalai Range. In turn the Mudhumalai Range became Mudhumalai wildlife sanctuary in 1942.

Elephant capturing by the conventional Pit Method was taken up by the forest department from 1889 onwards in the Madras Presidency, mainly to build up the work force of elephants needed for timber extraction. In the Anamallais where large areas were cleared for planting with teak, elephant capturing operation was taken up in 1889 and until and up to 1972 more than 600 elephants were captured from wild to meet the demand for working elephants. In Mudumalai, elephant capturing was taken up in 1910 and continued till 1953. Thus there was a necessity of building up permanent Camp Sites with necessary infrastructure such as" kraals" to train newly captured elephants. Surplus elephants and elephants considered not fit enough for timber extraction work such as calves were disposed off by conducting auction sales.

The use of local tribal people as elephant handlers clearly pre-dated the establishment of elephant camps. This system was followed mainly because of the tribals' expertise in the jungles, their long traditional association with capture and training elephants. Even today, the local tribals are the backbone of capturing, training and handling of elephant in the forest department. The Kurubas in Mudumalai, the Malasars, the Pulayars and Kadars of Anamallais are some of the tribals who have traditional knowledge in the art of capturing, training and handling elephants.

Record keeping and reportage:

The earliest records that are still available in the former Madras Presidency as early as1907, however systematic records were evidently maintained by private timber firms such as Bombay Burma Timber Corporation and the Provincial Forest departments. From early days of elephant management, data was recorded in the prescribed registers in Madras Presidency, and these were periodically summarized and communicated to superiors.

Veterinary Care:

A long history of traditional medicine is associated with domestication of the Asian elephants. But the elephant husbandry in British India did not begin to benefit from Veterinary Medicine until the late 1800's. It was belated response to an important need because of the growing need for elephant power and the work by elephants was taxing and the conditions were often harsh. The animals were

Exposed to many contagious diseases, injuries, physical exhaustion which compromised their work output. Veterinary care assumed heightening importance with increasing knowledge about the elephants and related veterinary medicine, health care of elephants assumed greater importance. Thus in Madras Presidency the role of the Forest Veterinarians became important and the posts of Veterinarians were established as early as 1906 and even today they continue and the Madras Presidency became the role model for other State governments to follow.

(A note on the Management of Elephants in captivity in Tamilnadu Forest department (Annexure 1) as well as a paper on the Veterinary care of Asian elephants published in "Zoo Biology" (Annexure 2) is enclosed, giving a comprehensive account on the set rules and norms established for managing elephants in the Tamilnadu Forest department)

Anamallais was declared as a Wildlife Sanctuary in 1973 and subsequently became Indira Gandhi Wildlife Sanctuary and National Park from 1985. Part of Mudumalai Sanctuary was declared as a National Park from 1989.

Timber extraction from areas marked for raising teak plantations after clear felling the area in Anamallais (Indira Gandhi Wildlife Sanctuary and National park) till 1979 and the poles extracted from thinning of plantations till 1989 and the elephant power was utilized for dragging timber from these areas.

In Mudumalai, Selection felling system was adopted by extracting timber from over matured trees which were marked for felling and elephants were utilized for dragging timber from these areas. From 1989 onwards Selection felling operations were totally stopped.

In Mudumalai Wildlife Sanctuary apart from timber extraction work, elephants were utilized for providing rides for tourists coming to the sanctuary to view wildlife. Usage of elephants for "Eco-Tourism" continues to be popular. However, in Anamallais tourist influx is not heavy as compared to Mudumalai and using elephants for Eco-Tourism is yet to become popular. Some of the elephants from both the Sanctuaries were transferred to the Arignar Anna Zoological Park from 1981 onwards. Many calves born in captivity were transferred to the Zoos to be exchanged for acquiring other species of animals for the Park. Some of the elephant calves born in captivity have gone abroad to the countries like USA, Yugoslovia, Japan and NewZealand, for getting many other species of animals as exchange.(Barter exchange)

Guindy National Park has a Children's Corner with a Mini Zoo and one or two elephants are always kept as exhibits.

All the Elephants in these Parks are either transferred or exchanged from elephant camps in Theppakadu or Varagaliar. At present ,at Mudhumalai 27 elephants (12 at Theppakadu camp, 15 at Abhayaranyam camp) 16 in Anamallais(9 at Varagaliar camp, 1 at Kozhikamuthi camp and 6 are deputed for "anti elephant depredation work" surrounding tea gardens at Valaparai and at Manomboli) , 5 elephants in Arignar Anna Zoological Park and one at the Childrens' Corner, Guindy. Thus in total there are 49 animals on the roll overall under the management of Govt. of Tamil Nadu.

Methods adopted in studying the management of elephants managed by Tamil Nadu forest department.

The members of the committee visited all elephant camps of Mudhumalai wildlife sanctuary, Ooty, Indira Gandhi National park, Pollachi, Aringar Anna zoological park, Chennai, Childrens corner, Guindy, Chennai and studied the condition of captive elephants. While studying the body condition of elephants it was kept in mind that body condition of an animal is governed by a complex of factors which are inter related. The important of them are:

1. Environmental factors (Moisture and temperature extremities of the camp sites)
2. Ecological factors (food, cover, water etc.
3. Physiological factors (rutting, pregnancy, and lactation)
4. Disease factors (infectious and non infectious)
5. Camp management

All these factors in unison are singularly affect the body condition of elephants. So the group assessed the health of the camp elephants by body condition evaluation (Krishnamurthy et.al.,) and by visiting the surrounding forest areas where the camp elephants, free ranging wild population and the domesticated cattle are sharing the common resources.

The body condition evaluation prepared by Dr.V Krishnamurthy, considers that temporal depression, scapula, ribs, flank area, lumbar shelf, brisket fat, pelvic girdle, tail and auxillary fat as the key body parts for health assessment of elephants. The proforma used for evaluating the body condition index and the various parts of the elephant body for studying the body condition evaluation are annexed at Annexure 3a and 3b.

Apart from it, the committee studied the other factors like

- condition of nails (whether trimmed properly or not)
- condition of foot pad (whether it is intact or broken)
- Searched for ticks in the back of ear (it shows whether the elephant is getting proper bath or not)
- Whether repellents are being used or not
- Response and obedience to the Mahouts

All these show whether Mahouts and Cavady are properly attending the elephants or not.

Based on the study of camp, camp site, its surrounding forests, nature of work given to the elephant, body condition of elephants, staff, feeding schedule, veterinary care, reproduction, maintenance of registers and stores etc. the committee has made some observations which are as follows

1. THE ROLE OF CAPTIVE ELEPHANTS:

The captive elephants in the sanctuaries and national parks are no longer used for timber extraction work, since these areas are managed exclusively as protected areas. Hence the elephants are engaged mainly for the following purposes.

1. Eco tourism
2. Patrolling for anti poaching operations
3. To control Man-Elephant conflict outside the Sanctuaries or other areas (Kumki work)
4. Other miscellaneous works connected with forestry

2.CONDITIONS OF THE ELEPHANTS:

In Mudumalai, except a cow elephant named Senthilvadivu, salvaged from Tiruvannamalai Arunachaleswarar temple, all other animals were observed to be in good condition. The animal Senthilvadivu was with the temple for over 28 years, underfeeding of it resulted in malnutrition and the animal is yet to be conditioned to free ranging system adopted by the Forest department.

The general condition of all the elephants except the tusker Natraj at Varagaliar was good. Natraj, which had a chequered history in the Chidambaram Natraj temple was donated to the Arignar Anna Zoological park in 1985. In 1987, this elephant was transferred to Indira Gandhi National Park

It has been observed that fully grown elephants which are transferred from the temples to the Forest Department do not get conditioned to the free ranging life in the forest and many of them have died (eg. Menaka, Tina, Lakshmi and Vijayalakshmi) and those which have survived are yet to pickup the body condition and have become a liability to the Forest department. This practice of receiving the elephants from the temples should be discouraged.

3.CAMP MANAGEMENT

In both Mudumalai and Indira Gandhi National Park, the Camp Management is under the supervision of a Forester and the day to day management of camp elephants are followed as per camp routine prescribed under camp procedures (please refer to the note on the Captive elephant management appended to this report)

In Mudumalai wildlife sanctuary till 1980, working elephants involved in timber extraction work kept close to the work spot in the temporary camps. Rest of the animals which were used for Eco – tourism, animal under rest such as nursing mothers and weined calves under training and pentioned elephants were kept at Theppakadu camp

At present all the captive elephants are stationed either at Theppakadu or at Abhayaranyam camp. This creates considerable pressure on the existing fodder resources around these camps. The surrounding area appears depleted of fodder. In addition, indiscriminate lopping of fodder trees within 10Kms radius around the camps has resulted in the total absence of many of the

fodder trees particularly many species of Ficus, Grewia, Kydia etc. hence lopping of trees to provide cut fodder should be discouraged.

In Indira Gandhi National Park the situation is far better since the elephants are kept distributed in different camp sites. Further their number is small. The permanent camp sites, both at Theppakadu and Varagaliar have necessary infrastructure such as a spacious cooking cum feeding shed, surrounded by barriered elephant standings, kraals as well as perennial source of running water

such as Moyar in Mudumalai and Varagaliar in the Indira Gandhi National Park. Apart from this in the Anamallais another camp which has been developed almost permanent camp with all facilities is the kozhikamuthy camp which has become popular because of proximity to Topslip, the Range quarters. But the kozhikamuthi river around the camp becomes dry during the summer months. Hence elephants have to be shifted to a different camp during these months.

Every camp has a permanent Stores shed to keep the grain rations as well as various equipments and accoutrements intended for the day today use in the camp.

In the Arignar Anna Zoological Park, similar facilities exist. In addition they have constructed a spacious and well ventilated shed to keep elephants during inclement weather or to keep sick animals or hand reared calves.

4. STAFF:

Every elephant camp has one Forester who is responsible for the day to day management of the camp. He is assisted by a forest guard and sometimes a waterer. The forest range Officer has the administrative control over the supervision of the camp and the staff.

Elephant over two metres in height are handled by two persons, a mahout and a cavady. For the elephants under 2 metres in height such as the calves, only one attendent in the rank of cavady is incharge.

In both Mudumalai and Anamallais several posts of mahouts and cavadies have not been filled after the retirement of mahouts/cavadyes due to a ban on filling up the vacant posts. In the interest of the safety and well being of elephants as well as the people the posts have to be filled up. .Elephant, being a mega herbivore, the handling of this animal needs adequate precautions. Hence it is suggested the Government order may be relaxed and the posts filled up at the earliest.

5. FEEDING:

All the elephants, in addition to natural grazing, are provided with grain rations in cooked form. The standard practice and norms are being followed. The Forest Veterinary Officer is the authority to fix the quantum of grain rations for each animal according to its size, sex, capacity for work etc.

Elephants used for work such as timber dragging, patrolling or any other hard work are given "work rations" as and when they are used for work. Resting animals or animals that are not engaged for work are given the "Rest Diet" which is less than the work rations since these animals spend comparatively more time in grazing.

An elephant being a mega herbivore needs to spend atleast 16-18 hours per day for grazing and the working elephants spend considerably less time. In addition they spend energy for various types of works for which they are engaged. Hence they have to be compensated by providing more grain rations.

Some animals such as pregnant elephants, lactating or nursing mothers and animals which are in run down condition are prescribed special rations by the Forest Veterinary Officer or the Veterinary Assistant Surgeon in the camp.

The Forester In-charge of the camp has to maintain an "Instructions Note" where the Forest Veterinarian or an Inspecting Officer records the instructions. Such instructions have to be carried out by the Forester. This system is being followed in every camp.

The grain rations normally consist of Horse gram and Ragi and sometimes Rice. The prescribed rations are given in cooked form both in the morning and evening at fixed hours. In Mudumalai the evening feeding is witnessed by large number tourists

Standardised Wooden Moulds are used for making cakes of known size and weight to facilitate easy check. If the animals are being fed the proper quantity of rations are prescribed. Each feeding shed prominently displays the ration chart indicating the quatitity of rations prescribed for each elephant. This chart also has the biodata of the animals. This practice had been in vogue for long time and is followed in every camp.

During the day time all the elephants irrespective of age and sex are being sent for grazing. It has been observed that the tuskers (Male elephants) are being tied up within the camp and provided with cut fodder. This system is being followed only recently for fear of safety of the animals against poaching.

It is advisable to revert to old system in the interast of the health of the animals and allow the tuskers also for night grazing with adequate precautions. There are several anti-poaching camps set up in both the protected areas. Such Camps can be set up close to the camp sites also

Periodical changing of Camp sites will conserve fodder around the permanent camp sites. In addition the wild herbivores including elephant herds share the same grazing area and they will also benefit. By changing the camps the forests also gets rejuvenated and the microbes in the dung will die due to non availability of host and due to dessication.

6. WORK:

Both in Anamallais and Mudumalai many elephants are utilised for tourism related activities such as providing rides for tourists for tourists for viewing Wildlife. In addition they are used for patrolling work in anti poaching camps. When necessity arises, they are being commissioned for containing crop raiding by wild herd elephants. At the time of our visit to Anamallais, we found six elephants engaged in such work around the tea gardens in the Monombali and Valparai ranges.

Some times the elephants are being used to clear extensive weed growth which hamper the growth of normal vegetation needed for Wildlife. In Mudumalai we found the elephants engaged in clearing dense growth of Lantana around Ombetta Swamp, a regular Wildlife habitat.

In the Arignar Anna Zoological Park as well as the Childrens Corner, Guindy the elephants are maintained as per the guidelines suggested by the Central Zoo Authority.

Even in the Zoos a regular routine has to be followed for the better comfort of these animals by their attendants. They can be engaged in some form of work. An idle elephant will become uncontrollable when they come to musth or when they are in oestrus.

In the Childrens' Corner the elephant, a sub adult female named "Indira", has not been trained properly. As the animal is over 2 metres in height the Mahout is not able to control the animal single handedly. Hence an Assistant (Cavady) can be provided to handle the animal. As the park attracts large number of visitors, in the interest of safety of the public this has to be attended to immediately. Alternatively if the Zoo is not able to engage a Cavady, this animal can be transferred to Mudumalai from where it has been received. Further an elephant being a social animal, itneeds company to meet its psychological needs. If it is not done the animal may develop a stereo type behaviour which will be difficult to control in later years. Hence it is advised either to keep two elephants or more in the Childrens' Corner on none at all.

7. VETERINARY CARE:

The Tamil Nadu Forest Department always had whole time Veterinarians for the health care of the departmental elephants.

One post of the Forest Veterinary Officer with headquarters at Coimbatore and one (Forest) Veterinary Assistant Surgeon, with headquarters at Theppakkadu are the sanctioned posts. The posts are filled on deputation from the State Animal Husbandry Department.

The Forest Veterinary Officer is responsible for health care of elephants as well as guiding and assisting the Forest Veterinary Assistant Surgeon at Theppakkadu in times of need. He is also responsible for the Office Inspection of the Forest Veterinary Assistant Surgeon (i.e Technical control) who is under the administrative control of the Wildlife Warden, Udhagamandalam.

The posts of the Veterinary Assistant Surgeon at Theppakkadu was lying vacant from the year 2000 and continued to be vacant during the Committees' visit. This had led to adverse comments in the press, as well as the animal-rights activists. Further it added to the work load of the Forest Veterinary Officer (It is learnt that the post of the Veterinary Assistant Surgeon has been filled up recently)

Well equipped field Veterinary Dispensary exists both at Theppakkadu and at Anamallais. In addition to the meeting the day-to-day Veterinary needs of the Camp animals, they are equipped with Dart guns and Immobilizing/Tranquillizing drugs. Regular Deworming schedule is practiced. In both the Wildlife divisions, all the captive elephants in the department are protected against Anthrax by periodical vaccination programme. This has been practiced for more than 50 years. Hence not a single case of death due to Anthrax has been reported in the captive elephants of Tamil Nadu.

Also periodical weighment of the elephants as well as their height and girth measurements are recorded. Laboratory facilities need improvement to help in quick diagnosis.

A full-fledged Veterinary Unit manned by one Veterinary Officer, and two Veterinary Assistant Surgeons available at Arignar Anna Zoological Park. A well equipped Veterinary Hospital, where Veterinary care for all the Zoo animals apart from elephants is available. It is considered to be one of the best Zoo Hospitals in the Country.

Upto 1987, Veterinarians who opted to work in the Forest Department were allowed to continue in the department. Their promotional opportunities were not affected. Many persons who manned the post of the Veterinary Officer continued in the post till their retirement.

At present the system has been discontinued. The Veterinary Officer working both in the zoo as well in the Wildlife wing are frequently changed. Similarly the Veterinary Assistant Surgeons who are on deputation to the Zoo or the Sanctuary are often changed.

To understand the finer points of elephant management and diseases afflicting them, a Veterinary Surgeon needs at least 10 years experience. Similarly even in the Zoo, a Veterinary Surgeon must work at least for 5 years to understand the intricacies of Zoo Medicine.

Frequent change of personnel will affect the quality of service as well as the health care of the animals. The policy of the Central Zoo Authority as well as the Ministry of Environment and Forests of GOI is to have a separate Wildlife and Zoo Veterinary Service with recruiting the Veterinarians with aptitude for this kind of work and also give them adequate training and incentive. This policy should be considered by the State Forest Department for implementation.

8. REPRODUCTION:

In the forest camps, the elephants are maintained as a group consisting of different age class, sex and they are permitted to socialise when are let out for grazing. This has resulted in the captive cow elephants breeding regularly, either being mated by wild bulls or by the captive bulls.

Over the last 10 years, over 260 calves were born to the captive elephants maintained in various forest camps in the Madras State.

From 1956, i.e after State reorganisation only two major elephant camps, one at Mudumalai and the other Anamallais, out of 25 captive cow elephants 97 calves were born. There were 6 cases of still births and one (1) case of Congenital abnormality (Hydrocephalous Condition) and one case of premature birth. 6 other calves died due to natural causes – 4 of them as a result of Herpes virus infected among the captive born calves. Three sets of twins were born in the departmental cow elephants – i.e Tara in 1960, Devaki in 1971 at Theppakkadu, Valli at the Kozhikamuthi camp in 1986. The twins born to Devaki and Valli are retained in the department and they have become adult elephants fit for breeding. (Details of Calves born are enclosed with this report as annexure 4)

Among the captive born calves, 22 nos, mostly female calves were given to various temples in Tamilnadu. Several Calves mostly bulls were sold to private owners in Kerala. Three calves were donated abroad by the GOI, as a goodwill gesture. More than 7 calves were sent abroad through the Arignar Anna Zoological Park for getting as exchange other species of animals.

At present there are only 5 cow elephants fit for breeding. Selvi, Sivakami and Valli in Anamallais, Bhama & Kamakshi in Theppakkadu camp. There is a disproportionate large number of bulls. Hence it is desirable to acquire a few young cow elephants of breedable age, by exchange from the neighboring State of Karnataka.

There are a few young females, such as Aswini, Rajeswari and Indira which are retained in the department at present, they can also be retained in the forest camps as future breeding stock and should not be disposed off.

9. CONDITION OF STORES:

Satisfactory

10. REGISTERS:

All the prescribed registers such as the Feed Register, Stores Register, Livestock Register, we well as the Service Register are maintained and are posted with all the relevant details.

The quality of the food grains fed to the elephant was tested for quality and found to be satisfactory.

CAPTIVE ELEPHANT MANAGEMENT IN KARNATAKA

The members of the Committee visited some elephant camps of Nagarhole National Park in the neighboring state of Karnataka as well as the Chamarjendra Zoological Park in Mysore.

The Nagarhole Park lies partly in Mysore District and partly in Kodagu District. Kodagu District was a Commissioner's Province, before reorganization and the system of managing elephants in captivity was similar to that of Madras Presidency and the elephants in old Mysore State were maintained on the lines of the North Eastern India camps.

Thus two different systems were perceptible even today. Some of the camps we visited, for observing the management practices are the Sunkathakatte and Balle camps, close to Kabini Reservoir and Nagarhole and Mysore camps on the Hunsur road.

The main differences in the management system between the two states, as observed by us are as follows:-

1. All the adult elephants in Karnataka are given a standard grain ration, consisting of 7kg of Horsegram and 7kg of Ragi irrespective of their size, sex or the nature of work performed by them. Unweined calves, even over one year of age are not given cooked ration.

2. Cow elephants having suckling calves are also used for joy rides, which is never done in Tamilnadu.

3. Hooks (Ankush) is used for controlling the elephants in Nagarhole. Whereas in Tamilnadu use of Hooks is totally prohibited. The elephant men use only sticks effectively to control or command their elephants.

4. In Nagarhole, all elephants including tuskers are sent for night grazing, inspite of same poaching pressure as in Tamilnadu.

5. The general condition of al the elephants appeared to be satisfactory.

6. In the Mysore Zoo, unlike Arignar Anna Zoological Park, do not have a regular routine. Some of the animals have not been trained properly. They have a pair of African elephants which have bred in captivity and given birth to a calf.

Like the Arignar Anna Zoological Park, the Mysore Zoo also have regularly breeding elephant.

While studying the management of captive elephants of Tamil Nadu the committee came across a controversial elephants by name Murthy (Makhna) which was captured by Tamil Nadu Forest Dept., even though it killed many people in Kerala and was declared as a rogue by the Kerala Forest Dept. An interim report has already been given to the state govt. A copy of it is annexed with this report as annexure 5.

MUSTH ELEPHANT MANAGEMENT

In a socially evolved group, control of musth is not so difficult unless in case of a solitary elephant; It must be understood that musth occurrence reflects the healthy status of the animal and musth is not a disease. However, because of the aggressive nature of this status, basic precautions are necessary in order to avoid injuries to mahout or other elephants in the group.

Feeding

- Overall, less quantum of diet should be offered when compared to the normal elephant.
- No horse gram shall be given
- Plantain stem, curd, onion, cucumber etc. shall be given additionally to reduce the duration of musth.

Chaining

- Though control is easier by hobbling of the elephant in musth, it is also to be noted that limb injuries are to be taken care of ; In general one hind limb will be chained to the stump of a dried but strong tree.
- Alternate tethering sites should be selected to minimise contamination by excreta
- Specially manufactured chains are available for tethering elephants in musth ands hence, elephant camps should have such chains as precaution , always.
- Adequate lubricant oil shall be applied around the chains encircling the limbs and castor oil is suggested to be the ideal one for this purpose, in the existing situation because it offers not only the lubrication but also it has a fly repellent effects.

Place

- Adequate care needs to be exercised in order to avoid development of conjunctivitis and ocular problems like keratitis (for which the elephants are the more amenable species), adequate care should be undertaken to keep the elephant restrained in a cool and shaddy place.
- Water source should be at a distance but still reachable for drinking purpose for the elephant in musth and this can be accomplished by placing a water drum in level with ground which can be reachable only for drinking purposes.
- The tethering site should be on a slight incline to facilitate the drainage of urine and dung ; Further, always the slop should be from head to tail and this is for two reasons:
    1. ***It facilitates easy getting up by the animal***
    2. ***The drainage of excreta without contaminating the feed is facilitated.***

Restraint

If the musth elephant becomes problematical , the matter should be immediately informed to the forest department veterinarian without delay, to carry out medical management of restraining in elephants.

It should be noted that the elephants in musth get agitated even by the slightest **noise** from traffic or people; If the bull in musth is receptive to a female, mating can be encouraged because some elephants involve in mating only when they are in musth.

Shower this megaherbivore in musth with water atleast once a day to cool the surfaces of the body or if possible , when the animal is controllable, the elephant shall be taken to the water resource esp. river for wallowing purposes , in addition to drinking subsequent to the adaptation of due precautions.

The mahout must be present in **the vicinity**, through out the musth period of the elephant with a constant watch over the animal to avoid any untoward incidence; Since, musth elephants are to be kept chained for long periods (normally, musth persists for 3weeks to 3 months period, occurring mostly in same period of the year), it is the duty of the mahout / cavadi to observe on the development of any **wound in limbs** due to the prolonged chaining and to report it to forest veterinary officer for the immediate remedy.

Fire Heaps shall be created around the tied elephant in musth, leaving about 100 feet around the animal (due precautions should be taken inorder to avoid forest fire) ; This helps to mask the musth-odour emanating from the animal in musth , so that the free-ranging 'tusker in musth' is less likely to charge the tied elephant in musth and it should be remembered that smoke suppresses the musth smell and fire deters the wild elephants with musth.

With regard to musth in elephants, it is a fact that mahout / cavadi in Mudumalai wildlife sanctuary or Anaimalai wildlife sanctuary are capable of handling their elephants even in the musth state; But unfortunately, it is also equally true that because of the **over-confidence**, the elephants in musth state are approached without adapting basic precautions like carrying of the **'restraining - stick'**; This may lead to the situation wherein the mahout or cavadi may get killed or injured by the elephants in musth status; It was known that one mahout was killed by own elephant in 1991 at Mudumalai wildlife sanctuary, probably due to the over – confidence. Hence, it is being emphasized that adequate precautions should always be undertaken by the concerned mahout or cavadi , whenever the elephants esp. those in musth are approached; The moment the first sign of disobedience is noticed like charging at mahout , the animal should be tethered properly and the reason should be found out (pain evoking disorder or musth status

needs to be however ruled out) and the veterinarian should be informed of this.; If the animal is noticed in musth state, the male animal should be isolated from the group and chained properly with provision of adequate fodder and water; If the animal shows temporal gland's discharge and if the animal is amenable to the approach , then cleaning and massaging of the temporal gland needs to be carried out with application of any anti-inflammatory and fly repellent agent; **ALLOW THE MUSTH TO HAVE IT'S OWN COURSE AND IT NEED NOT BE SUPPRESSED BY ARTIFICIAL MEANS UNLESS IT BECOMES PROBLEMMATICAL TO MANAGE THE ANIMAL ON THE ACCOUNT OF MUSTH**; A well experienced mahout will always anticipate the occurrence of musth with suitable precautions because musth is likely to occur every year, regularly. Mostly, musth occurs in November to March in winter seasons in areas like Mudumalai wildlife sanctuary and one reason ascribed to this is that after the south west monsoon, the elephant will be in better nutritional status; But in Anaimalai wildlife sanctuary, it may be seen even in June-July also;

SUGGESTIONS ON BATHING AND GROOMING

Present status

It has been observed that the camp elephants are given bathing twice (one before feeding in morning and one before feeding in the evening)

Improvements suggested

Discouragement of usage of plastic items

Usage of plastic or stone or brick or polythene materials should be avoided during the grooming activities by mahout / cavadi.

Encouragement of, use of materials which are available easily a ecofriendly

Coir brush or coconut husk or fruits of Pandanus (Called as Thalangai in Tamil) are the ideal ones for scrubbing purposes and adequate time (atleast 90minutes) shall be utilized for the bathing activity.

Wallowing

Animals should not be bathed and watered in the same place.

Allowing the elephant to wallow esp. in summer months should be encouraged.

Bathing site preference and avoidance of contaminants

The bathing place should be free from muddy areas or rocky areas. Moyar river at Theppakadu is being used for both bathing and drinking purposes and is contaminated by drainage water from tribal settlements, residential / or tourism accommodations and this is to be avoided at any cost. The bathing site should be free from excreta of wild animals. Additionally,

the evidences of insects like finding of egg pockets of these should be removed around the eyes during bathing activities esp. at the bases of tusk or tush.

The moths if any around eyes should be removed; Similarly at the back sides of ear, lice infestation may be noticed if the animal has not been bathed regularly; Hence, the sign of absence of external parasite shall also be taken as a sign of efficient bathing activity maintained in this megaherbivore.

ENRICHMENT OF BONDING

It should be remembered that though the process of grooming is exhausting for the mahouts , the grooming activities need to be encouraged because the scrub-bath can also be considered as an opportunity for the mahout and cavadi to develop personal bond in an effective manner between elephant and man ; In this regard, it is to be noted that the bathing activity helps this mega-herbivore in following ways:

- There are lesser chances of skin and foot inspection due to the monitoring activities during grooming or scrub- bathing.
- Cleans the body from mud, urine stains and dung stains
- Helps to lower the body temperature
- Helps in relaxation of the body system because it was observed that the elephants spend lots of time in water while in the wild
- Helps to avoid the external parasites.
- Both the mahout and cavadi must work together during the bathing and grooming activity in camp elephants.
- Improves cutaneous circulation

NOTE

Subsequent to the exhausting marches as well as heavy works , the elephant should be given adequate rest and then only bathed or watered.

WEANING OF ELEPHANT CALVES AND MANAGEMENT

Present status :

Currently calves are weaned from their mothers at the age of 15-18 months and earlier they were weaned when they were 2 years old only and the weaned calf is put into krall at both Mudumalai and Anaimalai wildlife sanctuary and trained for 15-20 days normally. Usually at age of 3 years and over only in north – east regions, the calves are taken away and tethered in a separate site and then, trained unlike the krall method of weaning management as practiced in

South India including Mudumalai and Anaimalai wildlife sanctuaries; Once the animal is enkralled , basic commands are being taught and the calf is dewormed and vaccinated for anthrax and the diet is changed from rice to ragi along with few vitamins mixed in the food. Care is being to avoid any rubbish materials inside the krall like paper, rubber, plastic, polythene materials etc. and the calves are being sent out for grazing with mother in day time and tied with chain at night period.

IMPROVEMENTS

Strengthening of protection from extremes of climate(winter including rainy seasons / summer):

During winter months,warming resources shall be provided only in case of hand – reared elephant calves ; In calves with mother, natural warmthness given by mother elephant is adequate. Similarly all extremes of weather, calf should be taken of including the rainy days.

Removal of dung

The dung materials need to be removed immediately to avoid build up of vector population and thereby to avoid chances of disease transmission and recycling of the gastro-intestinal parasitism. Suitable number of dung pits shall be maintained in every elephant camp and the accumulated dung should be periodically burnt.

Coprophagy

It is normally a vice which can be discouraged . However, new born calves tend to eat the mother's dung to facilitate the bacterial culture and thus to enable cellulose digestion. Some mahouts or others use to drive the calves feeding on dung material of others esp. their mother's fresh dung; Since this encourages growth of bacterial flora in intestines which can help in proper digestion, this need not be discouraged. Even the practice of collection of fresh dung from apparently healthy cow elephants from the camp site, dilution in water, with subsequent filtration and administration to the calf esp. the hand reared calves shall be carried out and this may be beneficial to the calf; However, prior to the collection , veterinary health care measures shall be undertaken to deworm the mother elephant few days earlier, in order to avoid helminth – contamination in them; Arignar Anna Zoological Park many times encounter orphan calves and hence these guidelines are necessary for hand – rearing of calf.

Encouragement of usage of places with shades in hot summer periods esp. in middle of the day:

The mahout should be encouraged to graze or take the elephant calf under shades during summer periods esp.in middle of the day i.e. time with more hotness felt.

In addition to the encouragement, the mahout/cavadi shall be inspected surprisingly on whether calves are not tethered or placed in hot places during such periods by the camp in – charge.

Specific suggestion on management of rejected calf by mother

If the mother is alive but rejecting it's own calf, followings are to be checked up:

- ❖ Inflammation of mammary gland of the mother
- ❖ Too much interference by calf during the feeding time of mother
- ❖ Injuries around the nipples or mammary gland
- ❖ Emotional reasons

In such calves, attempts shall be encouraged by mahout to draw milk out of mother that has rejected the calf and administer this milk using enema can to the calf; But before dealing with this incidence, the rejected calf should be accustomed to feeding of milk by using enema can , so that the administration of elephant's drawn out milk may not be a problem in the rejected calf.

To prevent or minimizing of 'going in for starvation' due to incompatibilities in height, following step shall be attempted:

The reaching of calf at mammary gland of mother shall be assisted either by digging the pit in front , so that forelegs of the mother elephant rest on the pit and hence, the calf is able to reach the mammary gland easily or the forelimbs of mother elephant should be hobbled , so that the calf could reach the mammary gland easily by placing the legs on
the hobbles.

Repeated attempts shall be made to introduce the calf to mother that has rejected and for this mild sedation may be necessary for mother inorder to permit the drinking of milk by calf or attempts shall be made by sprinkling of salt over the head of the calf , so that there may be strengthening of maternal instincts.

Discouragement of mud eating

Though mud eating is one of the behavioural activity observed in elephants esp.in wild, this should be discouraged atleast until 3 to 4 months of age since the animal might not have an immunity-compromised status, in such age period; If the calf is with its mother or surrogate mother, normally calf may not go for mud eating . However, worm burdon and pica condition need to be examined in such cases.

Strengthening of strict vigilance on provision of feeds to calves by outsiders or visitors

Often digestive upsets occur due to provision of unaccustomed feeds or overfeeding and may cause the colicky pain to digestive upsets , even death. Hence, the practice of feeding with

new or unaccustomed feeds by visitors should be totally prohibited; In this regard, vigilance should be strengthened by range officers and the veterinarian whenever calves are being maintained in the elephant calves.

ENCOURAGEMENT OF CALF REARING AT ARIGNAR ANNA ZOOLOGICAL PARK

Since the calves need adequate and intermittent intensive care, the orphan or rejected calves shall be shifted to Arignar Anna Zoological Park for hand rearing purposes and specific animal keepers available in the zoological park shall be utilized for hand – rearing of these calves in the park; In this regard, Arignar Anna Zoological Park has achieved significant success in hand rearing of such calves. Hence, the shifting of elephant calves from either Mudumalai or Anaimalai wildlife sanctuary to Arignar Anna Zoological Park may be encouraged by following reasons:

1. The expertise among animal keepers in the park in hand – rearing of elephant calves shall be effectively utilized
2. At calfhood stage, elephants are vulnerable to various ailments due to many health related reasons; Hence, it needs intensive care.
3. Round the clock health care is readily available at the park
4. Hand – rearing of multiple simple stomached captive wild animals is already undertaken at this zoological park with significant success.
5. The sustainable economic workup shall be strengthened at Arignar Anna Zoological Park by selling such calves on exchange basis to other zoos etc. following the existing guidelines from Central Zoo Authority of India and Wildlife Protection Act.

Stimulation of feeding on fodder or cereal:

Salt shall be sprinkled at the beginning over the feed materials and the animal will get attracted to that and slowly it gets accustomed to these feed materials

Weaning as a management tool

Since weaning is considered as a management tool , one has to scientifically manage the weaning aspects , so as to minimize stress not only for the calf but also to the mother.

Age of weaning

The calf to be weaned should not be less than 140 cms in height or not less than 15 months of age and the calf should not be weaned without the presence of veterinarian.

Post weaning

After weaning , training should be considered for 1-2 hours daily and should be made to accustom the forest area. Unless the calf is adapted by a foster mother, it should not be sent for grazing; If not, upto 5 years, it should not be sent for grazing in nights and this is for the purpose of eliminating the chances of predation by panther, tiger etc.

Adaptation of factor that can reduce the stress factors in calves to be weaned

The preliminary conditioning of the calf is to be weaned needs to be carried out , prior to the start of the actual weaning process in the krall system of weaning management ; This shall be carried out by luring the calf to feeds placed inside the krall; The palatable feeds shall be offered as a lure inorder to have the preliminary conditioning of the elephant calf for the 'krall-life' and thereby to minimise the chances of stress , inaddition to the injuries.

Adaptation of factor that can reduce the stress factors in mother elephant from whom the calf is to be weaned

Medical management of the mother elephant (from which the calf is to be weaned) shall be carried out in the following ways:

- Sedating of the mother elephant using modern immobilization drugs.
- Frequent stripping out of milk from mother by using mahout and cavadi

ORPHAN CALF FEEDING OR FEEDING OF REJECTED CALF

First few days:

Very diluted milk (diluted twice with water along with turmeric powder) along with coconut water shall be given

First 45 days

Only milk is fed ; Baby food in market shall be used instead of milk; In comparison, the goat milk is better than cow milk because of the fact that cow milk contains large fat globules and may cause diarrhoea ; Using a rubber tube, milk can be fed using enema can and usage of plastic tubes shall be avoided totally; Oral calcium supplements shall be given.

Normally upto 2 months

Calves generally suckle their mother every 60-90 minutes and during each feed, they consume atleast 1.5 litres of milk; Same pattern need to be maintained in hand rearing of orphan or rejected calves also.

Between 5 am and 10 pm , the hand reared calves shall be fed regularly and it is to be noted that crying out by calf is a sign of appetite in general and going to sleep immediately after feeding is also a sign of contentment.

At 6 months

Calves are introduced to solid food

At 8 months to 9 months of age

Calves consume 30-40 Kg of fodder per day

At 6 months to 12 months of age in general:

Cooked rice shall be given in a gradual manner.

NOTE:

The height of hand reared calf should show an increase of atleast 1 inch per month and 20-30 Kg per month.

WORK MANAGEMENT IN CALF

Till the calf is of six months old, no work should be extracted and until the weaning.

FEEDING OF CALF SENT FROM A NEARBY PLACE SUBSEQUENT TO CAPTURE

If the strayed or rejected wild calf is brought to elephant camp from nearby villages, most of the times the calf might have been offered more bananas or other feeds to the calf and hence, the newly brought calf shall be underfed in the first few days in such situations and however, veterinarian's help need to be sought on this before the feeding activity during such occasions.The signs of dehydration needs to be monitored.

FEEDING ACTIVITIES IN ADULT ELEPHANTS

Present status:

Camp elephants are fed twice per day both in Mudumalai and Anaimalai wildlife sanctuaries with cooked grain ration as prescribed by the forest veterinary officer.

In general

Rest diet contained:

- Horse gram :1-3 Kg
- Ragi flour :10-14 Kg
- Salt : 75-100 Gm
- Jaggery : 100 Gm
- Green fodder : 150-250 Kg (5% body weight)

  (When cut fodder is offered)

Work diet contained:

- Horse gram : 4-5 Kg
- Ragi flour :12-18 Kg
- Salt : 75-150 Gm

- Jaggery : 100 Gm
- Green fodder : 150-250 Kg (5% body weight)

(When cut fodder is offered)

In case of male animals, upper range shall be chosen for each ingredient quoted as above.

Animals over 8'6" and bulls need to be given with feeds quoted in upper range in above data; It should be remembered that most of the times, female elephants may be invariably 7.75 to 8.25

IMPROVEMENTS SUGGESTED WITH REGARD TO FEEDING

- **Periodical shifting of elephant camps and feeding**

Unlike the case with Anaimalai wildlife sanctuary (wherein the terrain was bestowed with plenty of water resources that lead to avoidance of pinch periods in dry summer months), in case of Mudumalai wildlife sanctuary , the pinch period i.e. the period of scarcity of feed resources is likely to be felt by camp elephants and this may deteriorate the body condition of these elephants; Hence, the camp sites must be judiciously selected taking care of the following factors:

1. Proximity to the work site
2. Availability of land with fodder
3. Availability of sufficient water resources
4. Accessibility of terrain
5. Plus points of well drained soil with less marshes and swamps to avoid foot problems
6. Availability of shade

Hence, it can be summerised that , the periodical shifting of the elephants in camp has following merits:

- Conservation of fodder resources
- Facilitates regeneration of fodder
- Reduces incidence of parasitism

HENCE, IN THE INTEREST OF FACILITATING THE NATUREAL REGENERATION AND TO MINIMISE THE CHANCES OF RECYCLING OF GASTRO-INTESTINAL PARASITES , THE CAMP SITES SHOULD BE CHANGED FROM THEPPAKADU AND ABHAYARANYAM.

BAMBOO PROPAGATION FOR CAMP ELEPHANTS

Since the bamboo comprises the major fodder component consumed by elephants at Anaimalai wildlife sanctuary esp. during the south west monsoon, suitable measures for propagation need be carried out in both Anaimalai and Mudumalai wildlife sanctuaries , wherein gregarious flowering of bamboo is occurring by nature; Hence, artificial propagation of bamboo becomes all the more necessary and is to be attempted on war footing.

Follwing areas need to be considered for immediate propagation of bamboo species.

MUDUMALAI WILDLIFE SANCTUARY

- Bidirhalla
- Abayaranyam
- Theppakadu

ANAIMALAI WILDLIFE SANCTUARY

- Around Varagaliyar

It should be remembered that the bamboo not only helps in feeding of captive elephants but also is the major food resource for free ranging elephants.

EXAMINATION OF SOIL AND FODDERS OF ELEPHANTS

In the field of feeding ecology of elephants, Indian Institute of Science, and Bombay Natural History Society have done some meaningful researches; However, nutritional component related studies need to be carried out in an intensive manner, systematically in free ranging captive elephants of forest department. The soil in the grazing regions of elephants shall be examined for specific micronutrients along with the frequently consumed fodder plants and the mineral status shall be studied; so that, the mineral requirement of the camp elephants shall be scientifically computed, if needed.

REVIEW OF DIET SCHEDULE IN CAPTIVE ELEPHANTS

The diet schedule should be reviewed and refixed when necessary in consultation with expertise available at Madras Veterinary College and may be reviewed periodically and this may help in followings:

- **Framing of new strategies in formulation of feed schedules**
- **Helping part of the diagnostic workup for medical problems in elephants**
- **Finding of alternate cheaper feed resources, so as to bring down the cost of maintenance**

GRAZING ELEPHANT MANAGEMENT IN ELEPHANT CAMPS

During day time

- All the able bodied elephants irrespective of sex and age must be sent for grazing, since they have their own seasonal preferences and it is the duty of the mahout to find out good grazing areas and to find out the animal in the evening.
- The elephant needs to be left with hobbles i.e. hobbling of forelimbs (The purpose of hobbling is to prevent straying away with wild group or animals in heat in particular) with chains and trailing chain in one fore limb (trailing is to identify the elephant) at places where plenty of fodder is available. When the elephant is kept at camp site, no hobbling should be done but trailing chain shall be there with the animal.
- The mahout and cavadi will accompany the grazing elephant that goes into the forest area .
- Bell should be tied around the neck of the elephant while being taken for grazing which helps for easy identification of camp elephant at a distance.

During night time grazing

Bell is to be tied around neck during the night time grazing also and has been observed that at present elephants are sent for night grazing in forest areas to meet the seasonal fodder preferences of the animal and in addition, elephants tend to consume more during night time than during day time. Hobbling and chaining is a must in night time also..

TUSKERS AND NIGHT TIME GRAZING

It was observed that the tuskers are not being sent for grazing purposes in the night but instead , they are given cut fodder, which on examination by the team was found inadequate with poor quality and further, in the name of provision of cut fodder, indiscriminate lopping of fodder trees occur in an extended area, thus the very purpose of conservation may be defeated. This was evident around Theppakadu region. Inspite of poaching pressure the tuskers in Karnataka are sent fro night grazing.

Hence, in this context, bulls also shall be allowed with adequate precautions to graze in nights and allowing the bulls for grazing during night times helps the followings:

- **It facilitates the exchange of germ plasm with wild**
- **It facilitates regeneration of fodder**
- **Lopping of fodder trees can be avoided**
- **It enables socializing of cow elephants.**

IMPROVEMENTS IN MANAGEMENT OF PREGNANT ELEPHANTS

The mahouts should report any history of mating as evidenced from following signs to forest officers esp.veterinarian:

1. Signs like scars or marks of the bull elephant's feet or tusks on the rear side of the cow elephant.
2. Presence of remnants of seminal fluid, along with the insides of thighs and at the vulva regions
3. Accidental observations of the actual mating

Though from 1st month , physical signs of pregnancy start to appear, only during the 13th month, it is possible to feel the fetal movements inside the womb from outside(quickening) and this can be checked when the elephant is being bathed.

Pregnancy assessment

Assessment of progesterone at weekly intervals shall be carried out upto 12 to 13 weeks of mating.

Parturition

Watch for the signs of impending parturition like relaxation of sacro-sciatic ligament with pronounced depression at the base of tail and sometimes , milk oozing out may be there, while standing and occasionally, mucoid or blood tinged discharge will be noticed from genitalia. Nearing parturition, elephant should never be disturbed .

Work management in pregnant elephant

From 13th month to 15th month of pregnancy, the elephant should be given no other duty except carry its' own fodder. Till delivery, the elephant should be given full rest and also a special nutritious diet.

Feeding of pregnant elephants

- Coconuts shall be included in the diet schedule to pregnant elephants since it contains more essential vitamins , minerals and short chain fatty acids which may be of helpful in lactation and is an approved practice in Southern India.

- ❖ The quality of ration shall be improved without increasing the bulk at the periods nearing the parturition.
- ❖ In general, the quantity of ration or concentrates is raised and special diet shall consists of vitamins, minerals, soaked green grams and coconuts.

MANAGEMENT OF ELEPHANT IN PARTURITION

On signs of impending delivery, the cow shall be tethered in one cool and shady place nearer to the camp site and one or two non-lactating cow elephant that act as a better surrogate mother (**regularly calving cow elephant will act as a better surrogate mother**) shall be kept as 'company animal' tied near the elephant that is about to deliver the calf; This helps in followings:

- ❑ To avoid panic status due to new release of calf esp. in first time calvers.
- ❑ To create a sense of confidence in the female elephant .

It should be remembered that most of the times (>90%), calving occurred only in night time only.

SUGGESTIONS ON IMPORVEMENT IN SEX RATIO IN CAPTIVE ELEPHATNS

Most of the cow elephants in both these sanctuaries in Tamilnadu state are not fertile as evidenced by findings and hence, either by exchange or by purchase , the females can be procured and also the existing female calves should never be disposed off.

SUGGESTIONS ON MAN POWER MANAGEMENT IN ELEPHANT CAMPS

MAHOUT / CAVADI EMPLOYMENT

The system of employment of tribal people (as practiced now) shall be followed for mahout and cavadi posts;

Though this is the existing status, followings are suggested considering the welfare of the camp elephants:

1. Since the understanding capacity of totally uneducated mahout or cavadi is poor, **emphasis shall be paid to fix up their basic educational qualification** like completion of atleast elementary school studies; This will not only help for the upkeeping of health status in captive elephants maintained at both Anaimalai and Mudumalai elephant camps but also it will also help the management.

2. No post of cavadi or mahout should be left vacant ; It has been observed that many **posts of cavadi and mahout are vacant** in the elephant camps of both Mudumalai and Anaimalai wildlife sanctuaries, without being filled up due to various administrative reasons. In the interest of the safety of elephant and in the interest of safety of tourists and visitors to the elephant camps, the posts should be immediately filled up at the earliest. This seems to be an immediate task to be accomplished at these elephant camp sites of Tamilnadu state. If the posts are not filled up immediately, the existing practice of inadequate filling up of mahouts and cavadis will be definitely detrimental to the management pattern which will affect the well being of these animals.
3. **Training component**

   Since disease related features are to be understood in substantial manner, there is a need of training programme at elephant camps for mahouts, cavadis, foresters as well as rangers involved in elephant camps.
4. **Service as a forest department veterinarian shall be the specific basis for consideration to the post of Forest Veterinary Officer;** Provision of risk allowances and non-practising allowance shall be positively considered to veterinarian at these elephant camps, considering the risks involved in execution of works related with wild animals which normally a field veterinarian is never exposed.

WORK MANAGEMENT IN LACTATING ELEPHANT

Lactating elephant should not be used for riding because the breast band is liable to injure the mammae and also adversely affect the growth of the calf.

HEALTH CHECK UP OF CAMP ELEPHANT

- **The coprological, haematological , biochemical and serological** examination should be carried out in collaboration with TANUVAS periodically and the data shall be kept at both places because the recordings are useful both for enrichment of health care of these elephants and for veterinary education and this will also helps to arrive at suitable therapeutic strategies and this will enable exchange of technical ideas; The details on treatment should be made available and maintained by veterinary officer.

- The adjoining areas of sanctuary shall be **monitored for any outbreak of diseases** and if so, the chances of acquiring of infection by the camp elephants should be probed effectively.
- The existing practice of carrying out of **anthrax vaccination** should be followed and this enables to keep away anthrax infection in camp elephants. The veterinary institution shall be approached for **monitoring of vaccine effects**; Depending on requirement and needs , FMD and HS vaccination shall be carried out. However, vaccination related studies should be strengthened in collaboration with veterinary institutions.
- Due encouragement shall be given to **application of advanced technologies** like ultrasonography, pulse oximetry, ECG etc. in captive elephants, in addition to the assessment of direct and indirect health related parameters like finding out of microbial evidences in local infections/swellings.
- **The hospital shall be enriched with following infra-structures:**

1. Infra-red, non-contact thermometer
2. Portable ECG
3. Spectrophotometer
4. Microscope
5. Laboratory with due man – power
6. Pulse oximeter
7. Deep freezer
8. Refrigerator
9. Transport and dispatch containers for storage and transport of specimen
10. Respiratory stimulant drugs like doxapram hydrochloride and non-steroidal anti-inflammatory drugs like flunixin meglumine
11. Transport vehicle for veterinarian with fixed medical and immobilization kits and necessary infra-structures for dealing health and disease related matters.
12. Generator
13. Emergency battery operated lamps

Skin care and daily inspection

Though the elephants are fairly resistant to infections and diseases, wounds are the common ones ; **Since the skin is very thick, the healing process is slow**; Despite the thickness of skin, it is highly sensitive and requires frequent bathing with scrubbing to keep it free from parasites and diseases; Chiangalls and injuries can be avoided if proper care of chains is taken.

- Cases of **hyperkeratinization** should be dealt accordingly and similarly, **cutaneous filariasis, warts** and **fungal infections** should be ruled out; These conditions indirectly reflect the camp hygiene.

HERPES VIRUS EXAMINATION

There is a world wide threat in Asian elephants on account of Herpes virus infection **and periodical screening** of all the elephants is important.

FEED ANALYSIS

Periodical investigation of feed samples shall be carried out by sending the material to competent authorities to avoid large scale food-contamination by **fungal** and **toxic** factors; This will help to assure the quality of the feeds maintained in captive elephants in camp sites.

HEALTH CARE IN CALVES

The different body regions should be inspected thoroughly esp. the **naval flap** region because calves below one month of age retain their umbilical cared and this might be infested with maggots and this condition needs immediate treatment by veterinarian and this is immensely essential inorder to prevent the neonatal diseases which may be septicaemic in nature; All new born calves esp.hand reared calves should be examined periodically for **salmonellosis**.

Veterinary care undertaken in visited areas of Karnataka state was equally good & this is being supported by research institutions of Karnataka Agricultural University at Hebbal, Bangalore; Similar collaborative measures are to be strengthened in Tamilnadu state.

IMPROVEMENTS SUGGESTED IN INTERACTIONS AMONG MAHOUTS/CAVADIS AND OTHER STAFF OF ELEPHANT CAMPS

The role of mahout as defined in the note enclosed with this report on duties and responsibilities of mahout, cavadis and other staff including the veterinarians shall be followed as such; However, followings have been emphasized based on the observations carried out at elephant camps of both Mudumalai and Anaimalai wildlife sanctuaries:

HYGIENE & HEALTH CARE & DISEASE DIAGNOSIS are related with the role of veterinarian in elephant camps and similarly, overall administrative supervision of the elephant camp is related with range officers and ultimately, it is the wildlife warden who interacts with all these personnel ; Hence, it shall be stressed that it is a collective responsibility and shall be considered as a 'team –work' , rather than any individual cadre work. A working harmony among all cadres of forest department shall no doubt will help the enrichment of health status in the camp elephants. The love and care shown by a superior officers towards his elephants will be reflected in the lower cadre of men involved in the management positively.

IMPROVEMENTS SUGGESTED WITH REGARD TO THE SHIFTING OF ELEPHANTS FROM TEMPLE

The practice of shifting the temple elephants to protected wildlife regions like both Mudumalai or Anaimalai wildlife sanctuary should be discouraged and following reasons justify this decision:

1. Lesser chances of conception- even when the female elephant at the elephant camp is mated by wild or captive males, as evidenced in most of the shifted elephants.
2. Conditioning of the elephant to the varied eco-systems existing in these wildlife sanctuaries is not satisfactory as evidenced from the health status examination of such elephants (Eg. Senthilvadivu in Mudumalai wildlife sanctuary at Theppakadu and Nataraj in Anaimalai wildlife sanctuary)
3. Having been in the nutritionally different status in temples, these immunologically compromised elephants shall become highly liable to get affected by disease / disorders.
4. Restraining of such elephants in middle or later years of age in the newly exposed camp atmosphere in the protected wildlife regions is difficult.
5. Additionally, the temple elephants transferred may become health hazards not only to the existing camp elephants of the sanctuaries but also to the free ranging wild stock and diseases like Tuberculosis, leptospirosis etc. may become significant in this regard.

FOOT CARE IN ELEPHANTS

Both at Mudumalai and Anaimalai wildlife sanctuaries, the nails were observed coated with following recipe and as per the versions from cavadis and mahouts , the recipe works well for the purpose aimed at for these camp elephants:

Recipe:

- Resin of Gardenia species(Woody climber)-**100 gms**
- Camphor **-100 gms**
- Garlic **-100 gms**
- Neem oil **-1L**

Note:

Crush the garlics after peeling and mix it with Gardenia resin; Boil it in Neem oil on slow fire for about half – an – hour ; At the hot condition itself, keep the contents out of fire and add

camphor and use this as a stock solution; One litre per animal per month will be adequate for meeting the needs (applications on and around the nail regions and at the insertion points of tushes or tusks)

Since **neem oil** has not only lubricant and antiseptic actions but also has a good fly repellent actions, the committee found that there is no need of changing the recipe. However, mahout should be advised that any cracks in nails or wound in foot-pad region should be brought to the notice of veterinary doctor and this will greatly help in avoiding the development of septicaemic condition involving the foot region; It needs to be emphasized that the foot care measures need to be carried out, more intensively in case of captive elephants at zoological parks, since they often lack adequate exercise.

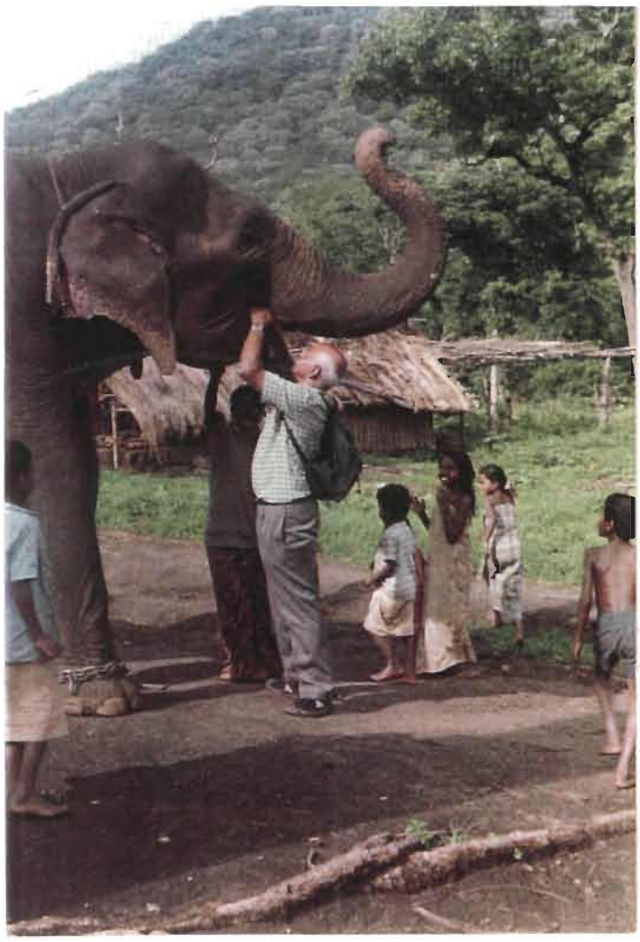
In order **to facilitate formalin-based foot bath**, use 1 Kg of nicely powdered husk or saw dust placed in a gunny bag and soak it in steaming hot water (80^0 C) and pour about 50ml of formaldehyde and now, this can be applied not only for fomentation purposes but also applied under foot pad by tying around leg inorder to facilitate the hardening of foot pad structures in elephants.

CONCLUSION

- The management practices in neighbouring state esp. Nagarahole national park and Sri Chamarajendra zoological gardens in Mysore were observed; In these places, the management pattern differed as the case with Sungathkatte and Balle of Nagarahole national park region in which case suckling calf accompanies the mother utilized for riding ; In Morekal of Kodagu district, the management lines are similar to Tamilnadu state.
- Indiscriminately, in both Mysore and Nagarahole regions , hooks (ankush) are being used towards exercising of better restraint measures in captive elephants, whereas in Tamilnadu state, usage of hooks (ankush) is prohibited.
- The elephant camps at both Mudumalai and Anaimalai wildlife sanctuaries are considered both at national and international levels as **model camps** for captive elephant management; We hope that this tradition is to be continuously maintained.

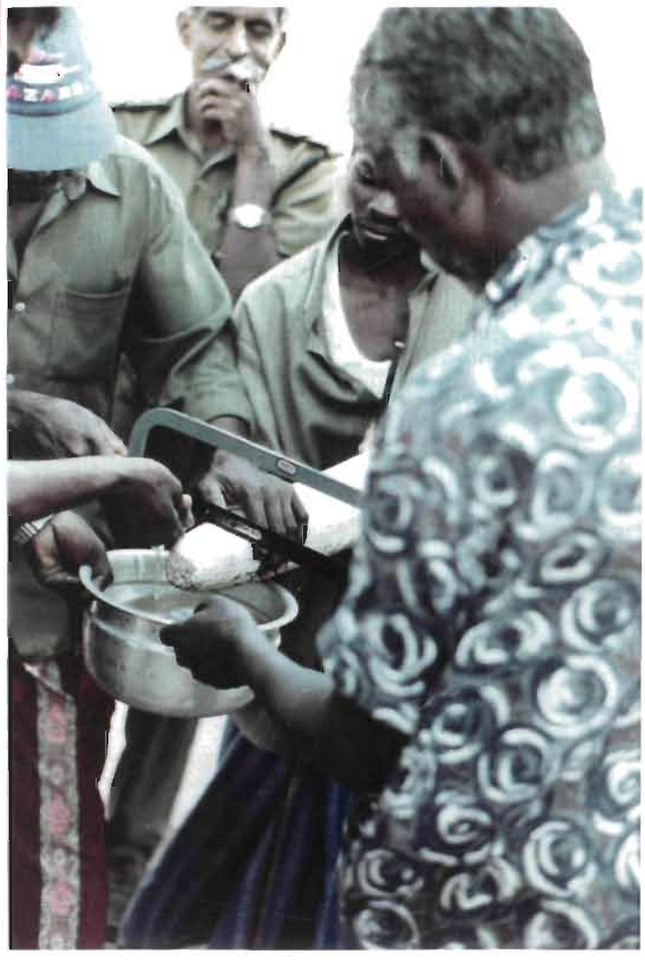
MEMBERS OF THE COMMITTEE EXAMINING THE ELEPHANT

KUMKI OPERATION



CRAL EXAMINATION

TRIMMING OF TUSK



ANNUAL WEIGHMENT OF ELEPHANT & CALF

KROLL METHOD OF ELEPHANT CALF

B.V.Sc.,N.D.A.H.
roject Officer
alim Ali Centre for
rnithology & Natural History

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Dated: 29/05/93

ANNEXURE I

Sri V.R. Chitrapu, I.F.S.
Chief Conservator of Forests (Wildlife)
and Chief Wildlife Warden
Tamilnadu
Childrens Corner
Guindy National Park
Madras-600 022

Dear Sir,

I am herewith enclosing, as desired by you, a Note on the Captive Management of elephants, based on the old circulars and guidelines.

The object of this note is for issue of guidelines to the elephant managers and the Forest Vets, in the form of circulars and to update the existing management practices.

The Note may not be exhaustive and hence I request you to indicate shortcomings or any serious omissions.

In this connection I wish to stress on the importance of Record keeping and this point may please be stressed in all the circulars.

With kind Regards,

Yours Sincerely,

(V. KRISHNAMURTHY)

cc to:
Conservator of Forests (Wildlife)
Western Circle
Coimbatore

A NOTE ON THE MANAGEMENT OF ELEPHANTS IN CAPTIVITY IN TAMIL NADU FOREST DEPARTMENT

ntroduction:

Though Elephant Management in Captivity and associated culture ias a long history in India, the British Colonial presence wrought .ndelible changes in all aspects of the relations between Man and lephants. Elephants are still managed in captivity, thoughout outh Asia; but the present day practices are a reflection of a ixed legacy of Indian tradition and Colonial influence.

British civil servants recorded some of the practices (Sanderson 875) Evans (1910) Milroy(1922) Pfaff(1940) Ferier (1947) Williams 1950)) and subsequently Indians added to the records (Chandrasekarar illai (1954) Stracey (1963)

The Tamilnadu Forest Department (Madras Forest Department) has een acknowledged as one where, over a long period of time elephants ad been managed in captivity very efficiently. Elephant management y the provincial Forest Department was responsive to the welfare f the animals above and beyond feeding, working and treatment of llness. This was promoted by a rigorous system of record keeping, eporting, and input and feed-back at various levels of the epartmental administration. Elephant management continues to volve, but many of the practices of the past have been lost through nattention. Many of the guidelines have become obsolete on account f better understanding of the animal. Some of the circulars ave been lost due to efflux of time.

The object of this note is to update the management practices s well as to issue proper guidelines for continued efficiency in anaging the valuable asset. For this purpose, the following uggestions are made for issue of necessary directions to the fficers concerned for implementation.

dministrative Set up

The Asian elephant is considered an endangered species and s per the provisions under the Wildlife (Protection) Act 1972, ll matters concerning Elephants Management come under the purview f the Chief Wildlife Warden.

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The available captive elephant resource is distributed according to the needs, to various forest divisions or the Wildlife Sanctuaries, and the officer incharge of respectice division (DFO or Wildlife Warden) shall be responsible for the proper upkeep and maintenance of the elephants, and utilise them for various works for which they are needed.

The captive elephants should be located in a range which has optimum facilities, such as perennial source of running water for drinking and bath; adequate grazing area etc. A permanant camp site should be selected for the elephants and necessary infrastructure, such as cooking-shed, provisions shed, a field Veterinary Dispensary, kraals and quarters for the staff should be provided.

The elephant camp should be under the charge of a forester who in turn shall be under the administrative control of his immediate superior viz. the Forest Ranger.

The basic permanant unit for a working elephant consists of a mahout and an assistant designated as cavady, who will take proper care of the animal.

For elephants less than 2 metres in height, only one attendant will suffice preferably in the rank of a cavady. All elephants over 2 metres in height are fit for work and hence need both a mahout and a cavady each, for efficient and safe handling.

Elephants which have been retired from work, i.e. pensioned off can be managed by a mahout alone and the services of a cavady dispensed with, or diverted to another animal.

The recruitment of mahouts and cavadies may be restricted to the scheduled tribes, who are traditionally elephant men. A mahout is selected from among the seniormost cavadies, who are capable of independently handling the animals under their control, have adequate knowledge in the use of command words in practice, capable of training a new captive and above all have good health and fearless disposition. Frequent changing

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of mahouts should be avoided as it tends to spoil an elephant. Normally a mahout should be retained on the same animal he is handling and except on grounds of inefficiency or indiscipline, mahout should not be replaced.

The Veterinary care of the animals will be looked after by the Forest Veterinary Officer and Forest Veterinary Asst. Surgeon.

The post of the Forest Veterinary Officer had been in existence in the department since 1906, and the post of the Forest Veterinary Asst Surgeon was sanctioned in 1971, with Headquarters at Theppakkadu in Mudumalai Wildlife Sanctuary.

The Forest Veterinary Asst Surgeon is under the administrative control of the Wildlife Warden, Udhagamandalam. He is under the technical control of the Forest Veterinary Officer. It is suggested that the Forest Veterinary Asst Surgeon may be placed under the direct control of the Forest Veterinary Officer, ie. with administrative and technical control to improve efficiency.

CAMP MANAGEMENT:

It is desirable to locate permanent camp sites where elephants need to be maintained on a permanent basis. The Theppakkadu elephant camp was established in 1927, and the Varagaliyar elephant camp in 1956.

Camp sites are located on a well drained soil. The components of permanent camp are an open sided cooking shed on level ground surrounded by elephant stands. The stands consist of timber railings with assigned places for each elephant. The object of this provision is to facilitate feeding the elephants and for inspection.

The shed houses tables for food preparation, a fire place (smoke free) for cooking food, the cooking vessels and moulds for forming the cooked rations into cakes. A ration chart, listing the animals bio-data, prescribed food, work load etc., is also displayed in the shed.

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Food stores are kept preferably in a dry rat proof shed, where raw food grains are stocked and accounted for. This shed should have a platform, scale, and separate facilities for storing gear and tack.

A kraal (2 compartmental) should be a component of a permanent camp to facilitate training of newly captured wild elephants, as well as for weaning and training of captive born calves. These kraals can be used for treating sick elephants, particularly during the rainy seasons, where continued observation and prolonged treatment is necessary.

Residences for the forester and the elephantmen and their families are to be located in the vicinity of the camp. A Veterinary Dispensary to attend to the day-to-day treatment of sick or injured elephants will be a valuable addition. The residential quarters are to be constructed away from the camp and upstream to prevent the contamination of drinking water by elephants and vice versa.

Temporary camp sites are to be selected as and when necessary, mainly when the elephants are sent for timber hauling. The camp sites are to be located close to the work site. Similarly during the hottest part of the year, when the fodder quality is minimal, animals are rotated to a fresh camping ground to minimise reinfection by parasites, and allow for regeneration of fodder resources around the permanent camp site. <u>This is obsolutely essential and need to be implemented every year</u>.

2. <u>DUTIES OF THE STAFF</u>

The forester incharge of the elephant camp and the elephantmen are directly involved in the day to day management of the elephants in the camp.

When elephants are distributed in more than one camp, it is desirable to have a forest guard and/or a forest watcher to assist the forester.

The forester in charge of the elephant camp is directly responsible for the care and management of the elephants under his control. His duties are as detailed below:-

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1) He should be made to be wholly incharge of the livestock, their accoutrements, food grains and other miscelleneous stores entrusted in the camp and accountable for the same.

2) He is responsible for the day to day management of the camp by following the Daily Routine and Seasonal work schedule which is in vogue.

3) He should maintain discipline among the elephant men.

4) The issue of Daily grain rations, supervising the proper cooking and feeding of the elephants according to the diet schedule prescribed by competent authorities are his responsibility. He should physically be present in the camp at the time of feeding of the elephants both in the morning and evening.

5) He is responsible for the proper training of the newly captured elephants and weaned calves and should be conversant with the command words used and the nature of work expected of the animals.

6) He should take adequate health care of the elephants. As and when elephants fall sick, he must arrange to get proper veterinary care promptly. He must also be conversant with giving first aid both for elephants and elephant men.

7) Maintenance of proper hygienic conditions in and around camp site - proper disposal of dung and litter etc., cleaning of the stream banks.

8) Proper care and maintenance of elephant Accoutrements and make arrangements for adequate supply of these accountrements.

9) Check periodically the fodder resources available around the camp for their quality and abundance.

10) Provision of adequate supply of cut fodder to the animals which need to be tied up for various reasons, such as riding elephants, elephants in advanced stage of pregnancy (where delivery is imminent) or with new born calves, elephants in musth and sick elephants which cannot be let out for grazing.

11) He should maintain all the records and registers intended to be maintained in an elephant camp and record relevant informations.

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12) It is desirable that he should maintain a separate register for logging day to day happenings, interesting events, such as matings, calvings, birth/height/weight of calves, monthly growth rate of calves and annual record of height, girth and weight measurements of all the elephants. Incidence of musth - onset, duration and behaviour, sickness and other relevant matters; as this will be a source of valuable, scientific information.

13) He shall carry out the instructions given by his superiors and Veterinary personnel (FVO and FVAS) Get all instructions recorded in the "Instructions Note Book" particularly by the Veterinary Surgeons and Wildlife Wardens, and should invariably send copies of such instructions given, to his Range Officer.

A Forester is the most important person with regard to the day-to-day management of elephants, it is desirable that great care and attention is bestowed in selecting a suitable person for this job. The person to be selected should be a willing worker, should have love for the animals and capable of maintaining discipline among men and animals and for taking quick decisions in time of emergency. Frequent change of such persons should be avoided.

DUTIES OF THE ELEPHANT MEN:

Each working elephant should have a mahout and a cavady.

Both the mahout and cavady are responsible for the proper upkeep of the animal and they shall be under the control of the official incharge of the camp.

1) The mahout is responsible for the proper training of the animal. He must be conversant with all the words of command in vogue and make the animal obey all the words.

2) He shall impart training to his animal not only for dragging timber, but also for carrying fodder or rations (Baggage carrying) taking tourists for viewing wildlife, escorting new captures and weaned calves etc., He must be able to make the animals obey his command readily.

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3) Take proper care of the accoutrements provided for his elephant.

4) It is his responsibility for taking the animal for work, giving bath and assist the official incharge of the camp in all the activities connected with the elephant camp.

5) He is also responsible for the health of the animal and report promptly as and when his elephant falls sick, or gets injured for proper veterinary care. He must be able to detect signs of oestrus or matings, indication of pregnancy (if it is a cow elephant) and if the elephant shows signs of musth.

6) The mahout shall be assisted by his cavady. The cavady should learn to the words of command and assist the mahout in the training of the animal and in the absence of the mahout, must be able to handle his elephant independently. He is responsible for taking the animal for graging, collecting fodder, if the animal is tied and given cut fodder.

7) He should assist in cooking rations in the camp.

8) He should assist the mahout in giving bath to the animal and feed the animal with cooked rations, both morning and evening.

9) He should assist the mahout in the proper care of the accoutrements provided and also in all other activities in managing his ward.

10) He should assist in maintaining the camp hygiene, by proper disposal of dung and litter collected around the camp, providing water for cooking, collection of fuel for cooking etc.,

DUTIES OF VETERINARY STAFF

At present one post of Forest Veterinary Officer in the cadre f Asst Director of Animal Husbandry and one post of Veterinary sst Surgeon has been provided for the Veterinary care of the epartmental elephants.

The Forest Veterinary Officer conducts his business from the ffice of the Conservator of Forests (Wildlife) Western Circle t Coimbatore

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The day-to-day care of elephants in Mudumalai Wildlife Sanctuary is being attended by the Forest Veterinary Asst Surgeon at Theppakkadu. The Forest Veterinary Officer is responsible for the health care of elephants in Anamallais and other camps.

His duties are as detailed below:-

1) He is responsible for the Veterinary care of all the departmental elephants.

2) He shall annually fix/revise the Book value of the departmental elephants (including those in Vandalur Zoological Park)

3) He shall prescribe rations for the departmental elephants as well as the work load/dragging capacity.

4) He must supervise the work of the Veterinary Asst Surgeon/ Veterinary staff under his control. For this purpose he will carry out periodical inspections of the office and dispensary of the Forest Veterinary Asst Surgeon and communicate the inspection notes to Conservator of Forests, Chief Wildlife Warden, and Wildlife Warden in the prescribed format (approved by the Chief Wildlife Warden)

5) He shall assess the professional capabilities of the Veterinary staff and record his remarks in the confidential dossier maintained and send his reports to concerned officers.

6) As and when he visits the elephant camps, he must draw up inspection notes on the elephant management, viz. condition of elephants, condition of accoutrements, camp hygiene, adequate availability of fodder resources, progress of work etc., and communicate to the concerned officials for rectifying of defects.

7) He must assess the elephant power required for various divisions, in consultation with the concerned Divisional Officers and report to the Chief Wildlife Warden for deployment of elephants.

8) He is responsible for disease prevention work in and around Mudumalai and Anamallais Wildlife Sanctuaries.

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9) As and when requisitioned, he shall conduct the Postmortem examination of wild elephants as well as other wildlife and communicate the reports of the postmortem examination.

10) Organise timely preventive vaccination of departmental elephants against Anthrax and other communicable diseases.

11) He will assist the Conservator of Forests (Wildlife) and Chief Wildlife Warden on all professional matters and carry out their instructions. [Any advice or directions given by FVO, with respect to care and management of elephants, should be implemented by concerned officials]

12) He shall bestow special attention to the proper maintenance of various records, such as the service register, livestock register, clinical register and other professional records as they are valuable documents which are to be preserved permanently.

13) He shall periodically record the body measurements of all the departmental elephants, such as height, girth and body weight, and send the reports to the officers concerned.

14) He shall arrange and supervise the timely weaning of the calves born in captivity.

The post of the Forest Veterinary Asst Surgeon exists from January 1971. It is filled up by deputations from Animal Husbandary Department.

The duties of the Forest Veterinary Asst Surgeon apart from proper veterinary care of the departmental elephants, includes the following:-

1) A book should be maintained at each elephant camp, and the Veterinary Asst Surgeon after inspection should note instructions or his remarks for the guidence of the subordinate incharge of the elephants.

2) He should check the food materials for their quality as well as adequacy (according to the diet prescribed) and must be present at the time of feeding as and when he is present or atleast twice a week in Work camps.

3) He should inspect and consult territorial Ranger regarding the progress of work and field conditions.

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4) He should see that no elephant is over workdd and at first signs of fatigue or loss of condition should be given rest or light duty.

5) The working capacity of each elephant should be checked and if necessary revised.

6) He should periodically check the fodder resources available around the camp site and include in his field inspection notes which should be submitted atleast onee in every 15 days.

7) He is responsible for submitting periodical indents for the medical stores required by him, and is responsible for the stores entrusted to him. He should maintain proper accounts of the stores entrusted to him.

8) He is responsible for maintaining clinical records, of Livestock Register, Service Register of the elephants in his division and post them with up-to-date particulars.

9) He should record the measurements of the departmental elephants, periodically (height/girth/body weight etc)

10) He will perform the Postmortem examination of all the elephants and other wildlife in the Nilgiris district, as and when requisitioned and submit the reports to the concerned officers promptly.

DAILY ROUTINE

An elephant camp should have a fixed routine prescribed by the competent authority, viz. Divisional Forest Officer.

It is the responsibility of the camp incharge to follow the daily routine. The normal working day commences at 6.00 AM. The cavadies and mahouts go into the forest to collect their respective elephants left out previous evening for night grazing.

They are led back to the camp where they are dusted to remove debris, and paraded for inspection by the forester. Ace animals fit for work are next taken for their morning bath, which lasts as long as an hour to 90 minutes. Next they are

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assembled around the camp in their standings, where they receive their morning feed of cooked rations and by 8.00 AM they are marched to the work area. As the camping sites are chosen close to work area, little time is lost in commuting to the work area. The animals work for 6 hours a day, in two three hour sessions, with a break during the mid day. Hobbled, the animals are permitted to graze within the work area during the mid day heat.

After a day's work is completed, the animals are marched back to the camp, where they receive their rations of cooked grains following the evening bath. At dusk, the mahout or cavadies lead their animals to the forest where they are released to graze during the night. As a precaution to prevent straying long distances, animals are hobbled and carry a trailing chain of 15-20 metres (weighing 80-100 kgs) This helps in retrieving the animals next morning in time for their work.

FEEDING:

Elephants are bulk feeders. Since they are simple stomached, they have to spend atleast 18-20 hours in a day to feed. Since elephants in captivity are maintained for various forestry works, the animals have to spend energy performing various types of hard work. In addition, about 7-8 hours in a day are spent for work, bath, commuting etc., Hence to compensate the loss of time for grazing and replenish the energy spent, the animals are to be fed with grains ration, according to the diet schedule prescribed by the Forest Veterinary Officer.

The Forest Veterinary Officer will use his discretion in prescribing special diet, as and when necessity arises, such as for those animals which are rundown in condition; pregnant and lactating new elephants, growing calves, orphaned calves etc.,

Rice is included in the diet of young calves and lactating mothers. Sugarcane is prescribed for calves and animals under training. Inclusion of jaggary in the diet is to fecilitate

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administration of oral medication to the elephants, as they are conditioned to the taste of jaggary. Salt is absolutely essential for all herbivores.

The criteria for selecting food grains depends upon their nutritive value, palatability, and easy availability through out the year, and cost factor. Hence Ragi and Horsegram have been prescribed. Compared to other food grains, ragi and horsegram are high in nutritive value, cheaper in cost. It is easy to cook them and the elephants like these grains.

The quantity of each of the grains for different classes/ size of animals has been decided, after much care and thought and experimentation. The main intention being to give a balanced diet for the animals, avoid wastage, keep the animals in good condition and at the same time taking into consideration the cost factor (Tamilnadu is one of the very few states, which works out the economics of elephant maintenance, and cost of timber dragging)

The diet is prescribed for the wholeday and the elephants are fed with cooked rations both in the morning and evening, i.e. half the prescribed quantity in the morning and remaining half in the evening. Standard sized moulds are used for making cakes of the cooked food. This facilitates easy distribution for individual elephants, and easy verification by inspecting officers.

Elephants in our forest camps are sent out for grazing. This is a desirable practice, as they have seasonal preferences and choose their own required fodder. This also encourages socialising, resulting in mating and other activities. But under special circumstances, when the elephants are used for providing rides to the tourists, visiting the Sanctuary, elephants in musth, and newly weaned calves and sick or incapacitated animals.

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It has been observed that elephants which are continuously tied and subsist on cut fodder tend to lose their body condition. Hence it is desirable that elephants used for joy rides are used by rotation. Avoid exposing the elephants to the monotony of monoculture fodder. Their seasonal preferences must be taken into consideration in choosing the fodder species. Riding elephants are normally tied and given cut fodder during nights and these elephants when sent out for grazing, actively graze more during the night hours. Hence the quantity of cut fodder to be provided should be atleast 3% of the bodyweight, taking into consideration the wastage.

When the elephants are let out for grazing, adequate precautions must be taken to hobble them, and use a trailing chain. Even a hobbled animal can move ouer a distance of about 1-2 km. The elephantmen should take care to leave the animals, where adequate fodder is available. They must also check for the presence of wild tuskers which tend to be aggressive towards captive elephants. Only those bulls, which are new to the territory or those in musth tend to be aggressive.

Bulls in musth, and other animals such as those which are incapacitated or very young calves should be tethered and given cut fodder.

WORK:

Elephant is a versatile animal. A well trained elephant and well managed elephant can be utilised for various types of works. In the forest department, elephants had been utilised for timber hauling, fodder and baggage carrying, carrying tourists for joy rides. They had been used for clearing jungle for preparation of camp sites, clearing obstructions on the roads, laying temporary bridges across streams, patrolling and in some places even for consolidation roads by hauling the heavy stone-rollers.

They had been hired-out for processions, film shooting and hauling timber by contracters or private forest owners.

Some of the elephants had been outstanding kumkies - i.e for capturing wild elephants.

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Elephants by nature of their size are capable of hauling heavy loads. If the elephant had been looked after properly, it can be used for well over a period of 40 years. Some of the elephants had been with the department doing work for over a period of 50 years (Godavari:60 years- Caesar:58 years- Tara:54 years- Inspector General:53 years- Saroja, Meena & Tipoo: over 51 years) This is mainly because of proper management.

Calves till they reach the age of 6 years are never used for work. They are trained to learn the jobs expected of them. Between 6 and 15 years, the elephants are given light work; from 15-25 years moderate work and between 25-45 years put to heavy work. For animals over45 years, the work load is gradually reduced over the years, and after they attain the age of 55 years they are normally retired. A few animals which maintain good health, and their teeth have not worn out, continued to be used for a few more years.

The body conformation of an elephant is not suited for carrying heavy loads. An elephant can haul heavy loads, but they cannot carry even a load more than 400 kgs. This fact has to be taken into consideration, when we use the animal for baggage carrying.

TIMBER DRAGGING:

Elephants had been utilised for several millenia for hauling timber and other heavy loads.

We had been using the "Vakkai method" for timber hauling. Use of harness method which is the widely prevalent method in many parts of our country,& South East Asia had been given up since 1932 in our state, as we found by experience the Vakkai method of dragging has more advantageous over the harness method. We cannot overload an elephant in Vakkai method.

Judicious selection of Depot sites within the forest coupe will minimise the lead, and lesser the lead, more out-turn by the elephant, and greater progress can be achieved.

Updragging of timber by the elephant should be minimised, if it cannot be avoided. Such conditions, drag paths must be maintained along the contours and not vertically over steep

slopes. Elephants must be trained to work inpairs, as this will help in dragging loads which are over the prescribed limit. Elephants should not be used to carry heavy logs on their tusks. Tusks can be permitted to be used for pushing loads or turning the logs.

SEASONAL WORK SCHEDULE:

Work hours are adjusted according to season. Work sessions in South India during monsoon and winter are from 08.00 to 11.00 hrs and 14.00 to 17.00 hrs during dry seasons. From January to March the working hours are from 07.00 to 10.00 hrs and 15.00 to 18.00 hrs. This should be strictly adhered to.

Adequate quantity of Vakkai fibre (Sterculia villosa sp) must be collected well in advance and stored for use in dragging. Similarly the drag chains must also maintained in good shape.

RIDING:

In our Sanctuaries, providing elephants to tourists for viewing wildlife is becoming increasingly popular and hence there is greater demand now. Hence more number of elephants are now being utilised.

It had been our experience that elephants which are put for riding work continuously over long periods, tend to lose condition, develop sore back and galls and suffer frequent ailments. Hence there is absolute necessity of training more number of elephants, so that they can be used by rotation.

Some elephants are temperamentally unsuitable for this work Similarly other animals having slopy backs are not good for this work. Animals with level and well padded backs are the most suited. Hence such animals are used frequently resulting in their loss of condition.

Further, elephants used for rides have to be necessarily tied and given cut fodder which has to be collected by lopping trees. Over the years, continuous lopping of fodder trees has very much depleted the fodder resources around Theppakkadu and Abhayaranyam elephant camps in Mudumalai.

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Hence there is an urgent necessity of taking suitable alternate steps. The following are some of the measures suggested:-

In the morning hours, instead of using the elephants for joy rides from 6.30 AM to 8.00 AM, the time of rides can be shifted to between 7.30 AM to 9.00 AM. Then there will be no necessity of tying them up overnight and giving cut-fodder. Having two sets of elephants, one for the morning session and the other for evening session, will minimise stress for the elephants.

Distribution of riding facility to other part of the tourism zone, like game hut, upper Kargudi and Thorapalli may also be considered. This will minimise the stress on the fodder resources around the old established camps, such as Theppakkadu and Abhayaranyam. This needs immediate action as the bamboo which is one of the main fodder for the elephants has flowered over a vast stretch, extending from Theppakkadu to Bidirhalla and beyond.

MISCELLANEOUS:

Apart from timber dragging and rides, the elephants can be used for fodder carrying, baggage carrying, for patrolling duty, clearing of abnoxious weeds like lantana etc., Hence it is necessary that all the elephants are suitably trained for this purpose.

(Elephants which are less than 15 years of age should not be used for providing rides, as they are growing animals and using them frequently for rides will affect their growth. They can be trained for this purpose by using them for fodder carrying and taking children for short rides. Cow elephants in advanced stage of pregnancy and nursing mothers should not be used for rides or baggage carrying)

ELEPHANT ACCOUTREMENTS:

Each elephant must be provided with one set of hobbles, a trailing chain and a brass bell. The bell is fixed with a thin chain around the neck. The bell chain should have a leather around the area extending over the top of neck.

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In addition each elephant should have properly fitting Gaddi and numdah. The Gaddi should be well padded to fit over the spinal arch, with sufficient number of ropes and leather covers for these ropes when used for fixing the Gaddi.

Proper storage and care of the elephant accoutrements is essential. The Divisional ForestOfficer and the Forest Veterinary Officer must periodically check the accoutrements for adequacy and proper care.

The chains and hobbles must be checked for weak links and promptly repaired. When not in use, the chains and hobbles must be stored in a dry place and kept on special stands and oiled to prevent from rust.

Leather covers must be kept soft and pliable by applying wax and kneading and keeping them in a dry place. The moisture collected on account of sweat and exposure to rain must be wiped and the leather covers kept dry and soft. Continuous use will keep the leather covers smooth and pliable.

Ill fittings of chains, rough leather covers and friction of ropes by direct contact over the skin may lead to formation of rope burns, galls and abscesses.

MAINTENANCE OF RECORDS:

The earliest records that are still available in the former presidency (now Tamilnadu) date back to 1907. But systematic records were evidently maintained from the early days of elephant management under British rule.

The Livestock Register was an inventory which indicated the number of elephants by name, sex, age at the time of acquisition, method of acquisition, girth and height measurements book value (the intrinsic value of the animal, as opposed to market value) diet, and work load prescribed, cost of maintenance, work performance and the nature of disposal, if any.

The Livestock Register should be maintained in the offices of the Forest Ranger, Divisional Forest Officer, Conservator, and Forest Veterinary Officer and the Forest Veterinary Asst Surgeon.

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A Service Register should be maintained for each individual animal from the time of its acquisition to the time of disposal. The document is a complete record of important details about each animal, including means of acquisition, training method, temperament, breeding performance, work-load, work performed, cost of maintenance, veterinary record, mahouts and assistants who are manning the animal, body measurements and other important occurances.

This register should be kept in each of the elephant camps, and periodically posted by the Veterinary personnel, and they may be made responsible for the upkeep of record.

Apart from this, it is important that the Veterinary Officer and the Veterinary Asst Surgeon to maintain Clinical records for each animal.

All the above-mentioned records may be treated as permanent records and retained for safekeeping for future references. These records provide valuable scientific data on captive elephants (Proforma for these records are enclosed for reference)

The Forest Veterinary Officer and his assistant should submit Inspection notes, periodically for the guidance of forest staff.

The Forest Veterinary Officer should take up the Bi-annual inspection of the office and dispensary of the Veterinary Asst Surgeon and communicate the results of inspection.

Annual Reports on the Forest Livestock should be part of the Administration report and the details should be furnished by the Forest Veterinary Officer.

GENERAL:

1. Care of Elephants in Musth

,Bulls maintained in captivity, particularly in forest department come to musth periodically. Musth is a sign of health as only Bulls in normal health will come to musth. During musth, the serum male hormone level will be on the increase and the animal tends to be aggressive.

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The mahout and the cavady will run the risk of injury, if they do not take adequate precautions.

On the onset of musth, the first signs noted will be that the animal will not obey its mahout and try to show aggression towards the other bulls in the camp. There may be swelling of the temporal glands followed by discharge from both the glands.

Musth may last for a period of three weeks to three months. The normal season for occurance of musth is either between November to March or from May to September. During this period other Bulls including may also come into musth.

Conflict among the bulls may result in serious injuries to one or both the animals involved. Whenever a wild bull in musth attacks a captive bull, it invariably results in serious or leading to death of animal. There had been several occasions when we have lost some good animals on account of conflict with wild bulls in musth.

The following precautions must be taken. As soon as a bull comes to musth, it should be tied up close to the camp. Special musth fetters must be used to tether the animal. If the animal responds to the mahout, the animal can be taken for watering. With-hold horsegram from the diet and give a reduced quantity of cooked rations.

Taking suitable precautions, the temporal glands of the animal must be examined and cleaned and dressed with fly repellant oil. Sometimes, the gland may get infected and hence should be attended regularly.

The temporal gland discharge and the urine has breakdown products of Testosteron and hence emits a pungent odour. It can attract a wild bull in musth. This has to be prevented. An elephant in musth will show inclination to mate with a cow elephant in oestrus. Hence if the bull does not exhibit aggression, can be permitted to mate with a

...20/-

receptive cow elephant. Consorting with a cow elephant may reduce the aggression of the elephant in musth and also if mated reduce the duration of musth.

Never allow the animal for grazing nor allow any other bulls to come in close proximity of the animal in musth. The bull shall never be disturbed by presence of other people, vehicles or other animals.

Care of Pregnant or Lactating Cow Elephants

The cow elephants in the forest camps breed regularly, as they have access to bulls both captive and wild. Experienced mahouts can detect the signs of oestrus and mating. The forester incharge of the camp must record such instances of mating.

If the animal has conceived, the signs of pregnancy will be observed from 10-12 months of pregnancy. The gestation period varies from 20 - 22 months. The gait of the animal slows down, the breasts start filling with the outward tilting of the teats. There may be viscous discharge from the mammae.

From 12-13 months of pregnancy, the foetelmovements can be observed.

Once the foetal movements are observed, the animal should be taken off from work and given complete rest. The animals should be given special diet prescribed by the FVO.

At the time of delivery, the animal may or may not show discharge from the genital opening. Most of the occasions, the delivery takes place during the night (out of 72 births recorded over a period of 27 years, the delivery has taken place during day time only on 6 occasions) the remaining taking place during night time only.

At the time of delivery one of the non-lactating cow elephant will keep company with the animal and ofter delivery acts as the allomother.

As soon as the calving takes place, the animal must be brought to the camp and observe whether the mother allows

....21/-

the calf to suckle and the calf is active. Fly repellant oil must be applied around the umbelical card. Veterinary care of the mother should be available.

It is the duty of the Veterinary surgeon to record the height/weight at the birth of the calf and also observe the growth rate by recording the body measurements atleast once a month.

He must also check whether placenta has been expelled by the mother elephant, whether the milk is adequate for the calf and must also observe the feeding frequency.

The nursing mother must be given complete rest till the calf attains the age of six months. Then from six months to till the weaning of the calf, the mother elephant can be given light work. She should never be used for riding nor for baggage carrying.

Weaning of Calves

The calves born in captivity are to be weaned when they attain the age of about one year and has a minimum height of 125 cms.

Kraal method is the most humane method of weaning. Acclematising the calf to enter into the kraal prior to weaning will reduces stress at the time of weaning.

From the time of weaning an attendant must be posted to give training to the calf. Once the calf settles down, it can be taken out of the kraal and given for training.

The training must be gradual and the animal conditioned to free living and in the company of other calves.

Till the calf reaches the height of 2 metres, it cannot be given any work. But it should be trained to obey all words of command and make it fit enough to be a working elephant at a future date. ~~They~~ It must be given training to get onto trucks, when transported.

GENERAL

1) Hiring of elephants:

When the animals do not have work, can be hired. There is demand for elephants for templs processions, for dragging timber and for Movie films.

The animals must not be made to do any work, other than [illegible] have been trained to. They should not be put to work for more than six hours a day. They must be assured of regular bath and adequate fodder. Feeding of grain rations is the responsibility of the department.

The hire charges must be revised according to the cost of maintenance.

Many circulars have been issued on this subject of hiring the elephants.

Death of Captive Elephants:

Death of Departmental elephants can happen due to illness, accidents or due to other causes. Many times, the elephants may die in the grazing area or within the camp.

In all such cases arrangements must be made for conducting the postmortem examination expeditiously, preferably by the Forest Veterinary Officer or the Veterinary Asst Surgeon, to ascertain the cause of death.

Salvageable materials, such as Ivory, Molars etc., may be arranged to be collected and the carcase disposed off in a hygienic manner, preferably by burning.

A detailed Postmortem report should be sent along with the proposals for write off of the Book value of the animal by the competent authority.

Trimming of Tusks:

The tusk tips of captive bulls become sharp by constant use. The tips have to be trimmed by the Veterinary Surgeon, periodically

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to avoid breakage while working and to prevent injury to other animals. The trimming is only a management practice and not for show purposes. Hence the Veterinary Surgeon should take proper precautions in trimming the tusk tips, particularly in young stock to avoid injuring the core.

The tusk pieces collected should be accounted for, by handing over to the forest Ranger for custody, under proper acknowledgement.

Fixing of Fair Price:

The fixing of fair price for the elephants intended to be disposed off by negotiated sale, should be done in consultation with the Forest Veterinary Officer, as he is the competent authority for the annual valuation of the Departmental elephants. The book value is only the intrinsic value of the animal, and is for write off purposes in the event of death of the animal or transfer to other departments.

The market value is not constant. It depends upon the current demand. Since most of the elephants are sold to temples or to other countries or for exchange for other animals, I wish to suggest the following guideline for fixing the fair price.

In our department, we had been acquiring many animals by capture from wild. Of late most of our animals are captive born.

For an adult elephant, which has been acquired by capture from wild, the animal has to be maintained atleast for three years, before its full potential is realised as a working animal. Hence I wishto suggest that to arrive at fair price, the cost of maintenance for a period of three years added to the Book value may be taken as a guide line.

....24/-

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In case of calves upto 5 years of age, the animals cannot be put to work till they reach the age of six years. Then they start earning their maintenance partly by work. In such cases, the cost of maintenance for a period of six years may be added to the book value to arrive at the fair price.

For elephants in the age group of 6-15 years, the cost of maintenance for a minimum period of six years added to the book value, may be used as a guide line. As these animals have a long productive period, interms of work, as well as breeding, the valuation may be arrived at by confidential enquiry, in Kerala and Sri Lanka about the present market rate (The present rate for Tuskers of this age group varies from Rs 100,000 to Rs 120,000/- and for females the price varies from Rs 50,000/- to Rs 75,000/-)

ANNEXURE R.

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Veterinary Care of Asian Timber Elephants in India: Historical Accounts and Current Observations

V. Krishnamurthy and Chris Wemmer

Salim Ali Centre for Ornithology and Natural History (SACONH), Coimbatore, India (V.K.); Conservation & Research Center, National Zoological Park, Front Royal, Virginia (C.W.)

We discuss herein some of the historical factors that have influenced present day veterinary treatment and husbandry of Asian elephants used for timber extraction by Indian state forest departments. The British incorporated both indigenous and European practices into the veterinary management of timber elephants, and invested considerable time and energy to improve care and humane standards. The paper examines selected aspects of preventive and clinical treatment based on records from the Madras Presidency and present day Tamilnadu state.

Key words: veterinary medicine, traditional medicine, timber extraction, husbandry, animal welfare

INTRODUCTION

A long history of traditional medicine is associated with the domestication of the Asian elephant, but elephant husbandry in British India did not begin to benefit from veterinary medicine until the late 1800s. It was a belated response to an important need, since the army had employed elephants to haul heavy arms and baggage since the late 1700s [Clarke, 1879a,b]. While the creatures evidently received some medical care from army personnel and mahouts, military expedience often seems to have dictated that they be treated as dispensable equipment, especially during military campaigns. Since the Government Khedda Establishment in Dacca was dedicated exclusively to supplying elephants to the Commissariat, a continuous supply of replacements was more or less guaranteed [Sanderson, 1879]. Military animals spent most of their time on inactive duty, but experienced intensive workloads when employed in military campaigns.

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Address reprint requests to Chris Wemmer, Conservation & Research Center, Front Royal, VA 22630.

In response to growing needs for timber by the British Navy, scientific forestry was introduced to India in the 1850s, and thus an additional demand for elephant power was created [Stebbing, 1922]. The work by elephants was taxing and conditions were often harsh. Because physical exhaustion, injuries, and contagious disease compromised work output, veterinary care assumed heightened importance. Between the turn of the century and World War II a number of monographs and books were published by veterinarians and civilians associated with elephant camps and forestry [Evans, 1910; Forsyth, 1919; Milroy, 1922; Pfaff, 1940; Ferrier, 1947; Williams, 1950, 1954, 1957; Stracey, 1963]. Elsewhere we have described the management of timber camps and elephants by the Forest Department during and since the colonial period [Krishnamurthy and Wemmer, in press; Wemmer, in press], and in this paper we record some little known aspects of veterinary care and husbandry. It must be remembered that so-called "forest veterinarians" worked under conditions of considerable privation compared to those prevailing in even the most modest clinics of affluent nations. Many diagnostic aids and tests were unavailable and, consequently, diagnoses had to be made on less than ideal evidence. This paper therefore does not pretend to be a technical analysis of clinical medicine, as much of the archival information is anecdotal. Our objective is to give a picture of veterinary issues of the period and an idea of the attitudes toward welfare of those responsible for elephant management.

METHODS

This paper is based on the knowledge and experiences of the senior author acquired during 22 years of service as a Forest Veterinary Officer with the Tamilnadu Forest Department, commencing in 1958. Miscellaneous files at the Forest Dispensary at Topslip, Indiragandhi National Park (formerly Annaimalais Wildlife Sanctuary) provided valuable documentation, as did records in the India Office Library examined by the junior author, and interviews conducted with retired Indian forest personnel between 1985 and 1989. We have relied on a number of different geographical sources of information, but most of our examples emanate from South India, and from Tamilnadu state, an area that was geographically included within the Madras Presidency prior to independence in 1947.

Data on veterinary treatments were extracted from annual and semi-annual reports of the Veterinary Assistant (Tamilnadu Forest Department). After compilation with microcomputer spreadsheet software, treatment categories were combined to eliminate duplication due to inconsistencies in terminology employed by different officials.

Use of several Anglo-Indian terms has been unavoidable: *ayurveda* is the traditional medicine of India which relies primarily on indigenous plants; *coir* is coconut fiber used to make ropes and mats; *jaggery* is a coarse brown sugar made from palm sap; *khedda* refers to elephant capture by driving the animals into a wooden corral; *masala* is a mixture, often of spices; *numdah* is a rope; *ragi* is a leguminous grain indigenous to southern India; *vakkai* is a Dravidian term for dragging a log, using a plant fiber mouth piece to which the drag chain is attached.

HISTORICAL ACCOUNTS

Colonial Perspectives of Indigenous Medicine

While the colonial British did not dismiss the traditional remedies resorted to by mahouts and native doctors, they questioned the rationale and efficacy of many treatments [Gilchrist, 1841; Evans, 1910; Pfaff, 1940]. Captain H. Wilberforce Clarke [1879a] of the Royal Engineers (Calcutta) observed that in "the treatment of elephants, the subject seems to be chaotic and empirical . . . no scientific attention seems to have been paid to the subject. There seems to be room for great improvement in this branch of knowledge . . . A cursory glance will show that the most contradictory opinions are held about matters which should be beyond doubt. From an economic point of view, ignorance regarding such a costly animal is very costly, as from it arise—(a) invaliding of the animals for long periods of time, and (b) high mortality" (p. 1). A less tempered view was offered by Captain J. Forsyth [1919], who declared that "mahouts, or native keepers, than whom a more ignorant or careless class does not exist, are commonly allowed to do with them what they chose very often to their [the elephant's] serious detriment, and sometimes complete disablement" (p. 365).

The British contribution to elephant management was greatest in the area of veterinary care, and drew heavily on experience with horses. All evidence available to us at this time indicates that veterinary officers became attached to the forest department sometime after the turn of the century. The Annual Report of Forest Administration of Assam for the year 1912–1913 reports, "A proposal was submitted during the year, and subsequently sanctioned, for the employment of a qualified Veterinary Assistant on a salary of Rs. 75 rising to Rs. 150 per mensem to specialize in elephant treatment and save the department from the heavy loss which results from the frequent illness of Government elephants and their premature death" (p. 32). Most of these officers were British subjects, but Indians also served in increasing numbers before independence. The "Doctor Babu" mentioned in Stracey's [1963] excellent book was in all probability Babu Pasupati Mukherji who, during the first half of the century, rendered long and honorable service to A.J.W. Milroy during khedda operations in Assam.

Elephant stables for timber extraction were organized throughout India under the provincial Forest Administrations along more or less military lines, which probably reflect the influence of German foresters contracted by the British Raj more than the use of elephants by the Commissariat. A small cadre of German foresters, led by Dietrich Brandis, systematically drafted blueprints that attended to many of the finest details [Stebbing, 1922], including rank and file process, record keeping, and reportage [Krishnamurthy and Wemmer, in press].

The Blend of Traditional and European Treatments

The use of ayurvedic treatments still persists in the care of elephants throughout India, and the literature on elephant culture in Asia often alludes to medicinal plants. Deraniyagala [1955] and Gale [1974] list traditional medicaments for various ailments. The efficacy of many medicinal plants used in elephant medicine has not been established. The shrub *Calotropis gigantea* yields a corrosive latex which was used externally as a blistering agent for chronic abscesses. In the south of India, dikkamali

preparation is still in use. Oil extracted from the seed of the neem tree (*Azadirachta indica*) is used with equal parts garlic and gardenia resin as an effective fly repellent; the leaves are an effective antiseptic. Gale [1974] records similar effective use of this plant. Sanderson [1879] credited neem oil as a more effective insect deterrent than the "lime, tobacco, and the juice of certain plants" (p. 116) that was used by the Mysore mahouts, and also reported camphorated turpentine as a valuable maggot remedy.

Ganja or Indian hemp (*Cannabis sativa*) is still a traditional medicine used in Asia for sedation, particularly for the control of recalcitrant musth elephants, and to reduce the pain of acute colic. In many elephant camps this drug was a standard prescription, but it invariably led to abuse by mahouts. Pfaff [1940] noted that "this drug accounts for the presence of many inmates in the mental asylums of India and Burma" (p. 21), and concluded that "unless it has proved beneficial to elephants, its use should be discontinued" (p. 21).

Antiquated veterinary methods included the use of mercury chloride and red iodide of mercury for blistering the skin as a treatment for contusions and inflammations. Arsenic and antimony preparations were liberally used as restorative agents. The use of mercury diuretics continued until the early 1960s; this was a common treatment for edema or dropsy, but being a cumulative poison, prolonged use of mercury caused eventual renal failure. A variety of less toxic diuretics are now being used. Similarly, epsom salts was widely used as a purgative until the late 1970s, but purgation is no longer practiced as a treatment for impaction.

Elephant Treatments at Topslip—1930–1961

Between 1930 and 1961, 4,288 veterinary treatments designated in 68 categories were administered to Forest Department elephants. The size of the stable varied during that period from nine to 32 elephants, and the average case load per year was 153 ($n = 28$) (Fig. 1). Digestive ailments, primarily indigestion and diarrhea, accounted for nearly half of the treatments. A quarter of the treatments were for work-related injuries including abscesses, boils and galls, eye and foot injuries (including mudsores caused by fungus), and broken tusks and tusk amputations. One death was recorded as a result of snake bite to the trunk. Another quarter of the cases accounted for all other treatments. Vaccinations were not registered as treatments, so only 1% of the treatments were for contagious disease.

Injuries were not infrequently inflicted by wild bulls, as working elephants were and still are permitted to browse at night in the forest. However, the fetters and drag chains which restrict nocturnal ranging activity handicap the working bulls, particularly when encountering wild bulls. "Eleven of our elephants were attacked by the wild solitary tuskers, but fortunately all of the wounds were of a minor nature. One tusker which was proclaimed as rogue elephant was shot dead by Mr. W.C. Hart, District Forest Officer, South Coimbatore on 23-9-35 near Seechali elephant camp" [Pillai, 1935–36, p. 3]. Wild tusker attacks however have been responsible for serious injuries and deaths. In the following year the Livestock Assistant reported "Twelve of our elephants were attacked by wild solitary tuskers and many of them sustained serious wounds and necessary treatment were promptly given, and fortunately all of them were cured and discharged for works after a short interval." During the period from 1952 to 1957, when threat of attack was continuous, working elephants were tethered overnight in camp, and there were no fatalities. During the subsequent 30 years (1957–87) only one tusker had to be euthanized as a result of

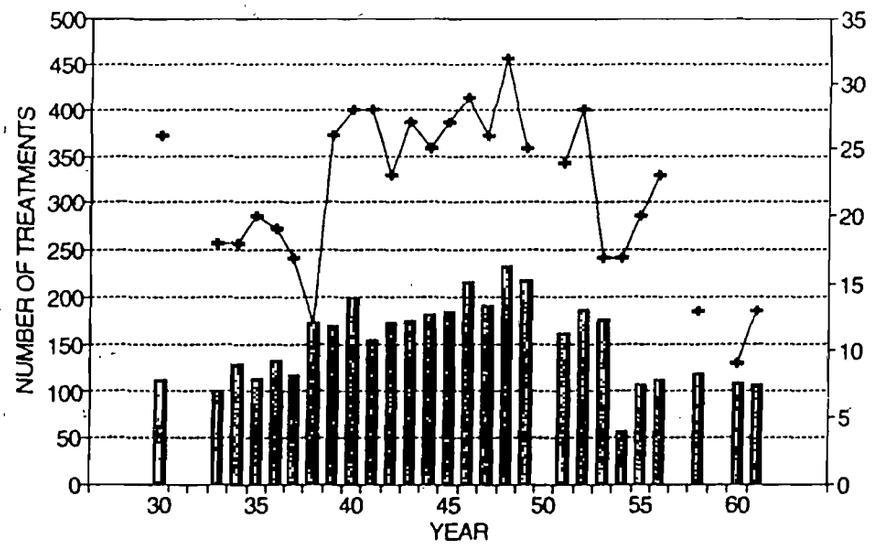

Fig. 1. Annual statistics on the domestic elephant population and number of veterinary cases treated at Topslip Headquarters, South Coimbatore Division, Annamalais (now Indira Gandhi National Park), Tamilnadu between 1930 and 1961. Bars = number of treatments lines = number of elephants

injuries inflicted by wild tuskers, but another bull, Inspector General, was killed by a wild tusker while grazing. Fights also occasionally broke out among domestic bulls. During the same period one domestic tusker, for example, killed two fellow tuskers while grazing in the forest at night.

Wounds from fights include contusions on the body and upper legs, punctures of the body and hindquarters, and bitten tails. Cold compresses of water and gunny padding (10–15 min) are the standard treatment for contusions, while iodine ointment and white lotion are standard dressings. The former is made of 1:2 parts 15% iodine and potassium iodide mixed with glycerine into a smooth paste, and diluted with 40 parts vaseline. White lotion (3:4 parts zinc sulfate and lead acetate) is similarly prepared and applied as a compress or a bandaged dressing (to leg wounds). Puncture wounds are cleaned with an antiseptic (e.g., permanganate, disinfectant, chloroxylenol, or tincture of iodine), while suppurating wounds are drenched with hydrogen peroxide or 5% copper sulfate. The wounds are then dressed with a dusting of antifungal/biotic powder. In former times a dressing of equal parts calomine, boric acid, and zinc oxide was used. Wounds are regularly drenched to keep maggots away.

Now and then working elephants disturb bee and wasp nests while browsing in the forest, and receive severe stings. In addition to antihistamine injections, the swellings are dressed with a smooth paste of acetic acid and calcium carbonate. Another hazard to young elephants are nettle stings to the mouth, which have been treated with a paste of borax and glycerin.

Elephant capture in South India relied upon the traditional pit method [see Stracey, 1963]. This sometimes caused serious injuries, such as rupture of internal organs and hemorrhage, fracture of the spinal column, shock and death of the fetus and mother in the case of cows in advanced pregnancy, multiple injuries to young

calves due to severe falls, and heart affliction leading to dropsy and congestive heart failure. These disasters were attributed to inadequent maintenance of padding in the pits which, when properly administered, could effectively break the fall of captured animals. The use of fire crackers to drive elephants also caused unnecessary injuries and deaths due to headlong falls. A miscellaneous note in the files (dated 20 March 1953) states: "The loss by death and the cost of drugs and labour involved in treating the injuries and maimed animals will be far greater compared to a few hundred rupees spent in padding the pits." Regular maintenance of the vegetation used to cushion the capture pits greatly reduced injuries until 1961, when wild elephant capture was no longer permitted.

Contagious Disease

Anthrax was formerly the cause of large scale mortality of elephants in forest based elephant camps throughout Asia [Williams, 1950]. Vaccination for anthrax was instituted as early as 1926 in the Madras Presidency, when many domestic elephants died as a result of this disease. Anthrax was then misdiagnosed as surra (trypanosomiasis), but subsequent analyses of skin and blood swabs using the Ascoli precipitin test at the Madras Veterinary College verified the presence of the disease. Ferrier [1947] states that anthrax vaccination has been practiced in Burma since 1935. Anti-anthrax serum, which was unsuccessfully used earlier as a treatment for infected elephants, was replaced with an effective spore vaccine. Regarding the disposal of animals dying from anthrax, Evans [1910] remarked on ". . . the great importance of not cutting into the carcass of an animal suspected to have died of anthrax, and of carefully disinfecting the bloody discharges which generally exude in such a case from the natural orifices" (p. 322).

Prior to World War II, Indian veterinarians recognized domestic livestock as reservoirs of diseases contagious to elephants, and a livestock vaccination policy was therefore instituted in villages situated near forest elephant camps. Normally, cattle are inoculated against anthrax only when there is an outbreak. Other diseases have occurred sporadically. Hemorrhagic septicemia, which produces pneumonia-like symptoms, has not been recorded from present Tamilnadu state, but its occurrence elsewhere has been preceded by infection of livestock which graze in the elephant area. Only three cases of tuberculosis have been recorded in Tamilnadu forest elephants during the last 80 years. Tetanus bacilli are normally part of the intestinal flora, so self-infection is possible from injury to the intestinal tract. However, tetanus is rarely contracted, and elephants are not vaccinated against it. The risk of rabies infection is always present because mahout settlements are part of the elephant camps and invariably have domestic dogs. Post-exposure treatment is the rule. Still, the only confirmed death from rabies was in 1949. The victim was a tusker named Sardar which achieved notoriety in Wynaad (Karnataka) for tippling with its mahout and then delivering the drunken man safely to his hut. One case of an unidentified pox (*Vaccinia* virus) [see Chandrasekharan, 1979] was recorded in the region in the late 1950s, but not verified by a diagnostic laboratory. It caused lesions inside the mouth and trunk, and later sinusitis, but the elephant recovered. Vesicular stomatitis is also rare, and nonfatal, and shows the usual symptoms seen in cattle with consequent loss of appetite and condition. Antibiotics are ineffective, and recovery occurs once the disease runs its course. More recently, viral encephalitis has been suspected in several elephants which have experienced convulsions, followed by coma and death.

Among parasitic diseases, filarial infection (*Indofilaria pattabiramani*) is common in south India where it forms subcutaneous nodules which often bleed spontaneously in hot weather, and sometimes ulcerate. Filariasis does not cause serious problems, and was controlled in the past by regular de-worming with toxic preparations such as an anthelminthic specific for ascarid worms with mercuric chloride, or oil of *Chenopodium*. While highly effective, these preparations are strongly unpalatable and difficult to administer. Broad-spectrum anthelminthics are now equally effective and easier to administer by disguising in food such as cooked balls of ragi. Trypanosomiasis is widespread in south Indian elephants, and causes chronic anemia, hypoglycemia, jaundice and loss of condition. Animals which recover can be carriers, and chemotherapy with the chloroquinone group is now the main treatment.

Necropsy Procedures

There are no records to show that necropsies were performed before the British colonial period. With the passage of the Madras Elephant Preservation Act of 1887, post mortem examination of all elephants became compulsory, with responsibility residing in the Forest Department [Forest Department Manual, 1952]. Pfaff [1940] describes the method, but procedures were not described until the appearance of Pfaff's manual.

Improvements in Husbandry

Concern for the general health and welfare of elephants is clearly demonstrated in miscellaneous communiques of the Madras Forest Department from the 1940s and 1950s. The records are incomplete, but evince a sense of the times and the methodical efforts that were made to improve the living conditions of the charges. We have selected several themes as examples of specific issues in husbandry and veterinary care.

Conversion from harness to mouth dragging. Two methods of timber dragging by elephants are used in Asia. Mouth dragging of timber or vakkai was the traditional practice in the Malabar region and Ceylon, while harness dragging was the standard method in the rest of Madras Presidency until 1933. In the latter method, which was practiced throughout British India and Burma, the elephant is fitted with a dragging harness and chains, and the force of the log is born by the chest and shoulders. Since this commonly led to chaffing and galling [Ferrier, 1947; Evans, 1910], the Forest Department introduced two experimental improvements in the early 1930s to reduce these injuries. The old dragging equipment (gunny and coir numdahs) were replaced with flexible wire-rope breast bands and canvas and leather numdahs, but in addition three elephants "were put for mouth dragging" [Pillai, 1932–33]. In mouth dragging the elephant is trained to seize a soft coir or plant-fiber ring in its teeth: the bite piece is in turn attached to the dragging chain and log.

At their commencement, the new numdahs caused slight abrasion or galling, but this was corrected, and additional elephants were trained to mouth dragging. By the beginning of 1936, it was noted that "since mouth dragging is increasing with advantage only very few flexible wire-rope breast bands were in use." Finally, harness dragging was abandoned in 1938, but mouth dragging (or vakkai) was not a total solution to the problem of abrading the shoulder and elbow region. Ramaswamy [1953] reported, "To prevent vakkai galls on the shoulders, the vakkai rope was passed through a long tight fitting leather tube and this provides extra comfort to the

elephants while dragging timber and the results are satisfactory" (p. 2). Since then, vakkai dragging has been standard practice in Tamilnadu.

Body condition and diet. The indigenous elephant owning families of Malabar had generations of experience and were regarded by Forest Department officials as sources of considerable wisdom in the area of husbandry. Two native elephant treatments from Malabar—goat masala and the chewing of cutch (*Acacia catechu*)—were experimentally tried by the Forest Department at the recommendation of the Conservator of Forests. During the drought years of the mid-1930s when many elephants suffered loss of body condition from heavy work loads and marginal fodder, goat masala was successfully used as a conditioner tonic. A departmental circular (no longer available) specified the recipe, which called for a goat weighing 25 kilos and devoid of white markings. After bleeding, the viscera were removed and the meat was cut with the bone into small pieces, which was cooked over a slow fire with a decoction of indigenous herbal ingredients for 6–8 hr. The meat was then separated from the bones, the marrow recovered, and all ingredients mixed and pounded with palm sugar (or caramelized cane sugar) and oil preparations (including oil of coconut, groundnut, and sesame, and clarified butter). This was again boiled until the mixture was thick. The masala was then divided into 14 parts, and fed to the elephant once daily with 14 kilos of cooked white rice for a fortnight. During the treatment the elephant was tethered, with frequent access to water and cut fodder, but was not allowed to bathe. Elephants had to be conditioned to accept masala through deception and rewards such as jaggery and ghee (clarified butter). A few elephant men still make this preparation for sale in the state of Kerala.

After 1966, the practice was abandoned and was replaced with daily IM injections of B complex vitamins and liver extract (20–30 ml). Elephants are rested after a week of treatment, and if needed the treatment is repeated.

Cutch is a wood extract from the khair tree which with betel nut and pan leaf has been chewed in South Asia as a mouth refresher, much as tobacco is chewed in the west. The chew was made of equal parts (approximately 4 oz.) of khair powder and wood shavings of *Acacia chundra* placed into the eyes of a de-husked and drained coconut which was heated until it cracked. Two cooled coconuts were given daily for a week to treat gums which were injured from mouth dragging. The chewing of cutch however was not successfully introduced to the Forest Department elephants. "Goat masala has improved the condition of one to whom it was given, but the elephants have not yet taken to cutch chewing, so its efficiency can not now be gauged" (Nayar, 1939–40, p. 4).

Eye problems and the use of "the whippy stick." In the mid-1930s a spate of eye problems, including corneal opacity and conjunctivitis, among the Topslip elephants came to the attention of J.A. Masters, Chief Conservator of Forests. The issue is an illuminating example of the role of advice and consent among departmental rank and file. On behalf of his supervisor, Conservator of Forests G.C. Robinson took up the matter with the Inspector of Livestock. We quote from his memorandum:

> The Chief Conservator is inclined to the opinion that most of the eye trouble among the department's tame elephants is traceable to the long whippy stick, carried by the mahouts, and used, not with intentional cruelty, but thoughtlessly; that is, the Chief Conservator believes, the Conservator's own theory, and he agrees that it is more than likely to be correct. The Chief Conservator

thinks that he is right in saying that similar eye trouble is not common among the Mysore elephants, whose mahouts carry ankus instead of a long stick. The Chief Conservator would suggest that the use of long whippy sticks be forbidden and short stouter ones, or even ankuses be employed instead [Robinson, 1939, p. 1].

Evidently the Chief Conservator's theory and suggestions were "exhaustively discussed" by rank and file, and three and a half months later the Inspector of Livestock commended Conservator J.A. Master's Memorandum (below) to the Assistant Veterinary Inspectors:

In connection with eye troubles occurring among elephants, I think the only precautionary measures we have to take are:—

1. Strict and clear orders to attendants not to hit the elephants anywhere on the head and the foresters in charge of the elephants should keep a watch on the attendants.
2. Always to use the eye shades.
3. Not to use a whippy stick and the stick should not be longer than three feet.
4. Not to use ankusam or driving hook even with blunt tip unless an elephant is uncontrollable.
5. The eyes should be cleaned very gently at the bathing time.

The Inspector of Livestock is requested to offer his remarks on the above suggestions and to make further suggestions, if any.

I beg to state that I have no further suggestions to make.

The precautionary measures detailed in the reference will be strictly carried out. [Master, 1939, p. 1].

Corneal opacity came to be attributed also to the effects of direct sunlight [Ferrier, 1947], and the department instituted the use of thick leather sun shades or visors on elephants required to work in direct sunlight. The practice was considered successful, as noted in the 1946 annual report of the Assistant Veterinary Inspector: "Eyeshades were in use . . . and were successfully serving in preventing the sun's rays falling directly on the eyes and in preventing the injuries that were likely to be caused by the sticks . . . and the cases of eye trouble are very much less" (p. 3). Unfortunately, no photographs of elephants wearing sun shades are known to survive, and the practice is no longer in use.

Pensioning. Pensioning older elephants by the Forest Department was practiced only for exceptional animals [Rama Gowda, 1953]. The correspondence concerning the pensioning of Phyllis, wild caught as a youngster in 1904, captures the departmental sentiments for an exceptional animal. In March, 1953, Inspector of Livestock S. Ghopalan, described the animal's endearing qualities to Conservator of Forests as follows:

Elephant Phyllis . . . is reckoned to have completed 56 years of age. Now she is declining in health and is found unfit for dragging timber. She is very fond of elephant calves. Whenever there had been births of elephant calves in captivity, she was attaching herself to the calves and allowing the latter to suckle

> in her breast. In the nights while grazing in the forests, she used to be following the elephant calves and their mothers, and specially looking after the young calves, as though they were her own. Even newly captured calves were and are being let out for grazing along with her, lest the young ones may be mauled by tigers. She has been watching them like a guardian and foster-mother. In view of the services rendered by her during the last forty-nine years, it will be better that now in her old age, she is pensioned off, just as Eva, Ranger and Peri were previously pensioned off, allowed maintenance ration and looked after by only one attendant till their end. Or as a measure of economy, she may be transferred to Nilgiris Division, and tried solely for the joy riding for visitors in Madumalai Wildlife Sanctuary of Nilgiris Division [Gopolan, 1953, p. 1].

The DFO responded at the end of April.

> In accordance with the latest suggestions of the Inspector of Livestock and in view of the long services rendered to the department by 'Phyllis' she may be pensioned off and allowed to remain undisturbed for the rest of her life. She may be allowed to enjoy complete rest and the services of only one attendant be utilized till her end. Here transfer to Mudumalai range for being used solely for Joyrides stands cancelled [Rama Gowda, 1953].

Unhappily, the story ends with the footnote hidden in the annual report of 1955: Phyllis was sold in Nillambur for Rs. 1100.

CONCLUSIONS

1. While British colonial officers questioned the efficacy of indigenous treatments of elephants, they incorporated a number of traditional treatments into veterinary medicine.

2. Digestive tract ailments, indigestion and diarrhea in particular, accounted for nearly half of the treatments recorded between 1930 and 1961 in the Forest Department veterinary records from Topslip (Tamilnadu). Work-related injuries accounted for a quarter of the cases, and the remaining treatments were of a miscellaneous nature.

3. Elephant management by the provincial Forest Departments was responsive to the welfare of the animals above and beyond the treatment of illness. This was promoted by a rigorous system of record keeping, reporting, and input and feedback at various levels of the administrative chain.

ACKNOWLEDGMENTS

We kindly thank J.C. Daniel of the Bombay Natural History Society for his interest and support of all aspects of this study, and the Tamilnadu Forest Department for access to historical records and files. We also thank Lyndsay Philips, Mitchell Bush, and two anonymous reviewers for suggestions on the manuscript. This work was partially funded by a Smithsonian Visiting Researcher Award to V.K., a Smithsonian Research Opportunities Grant to C.W., and USAID PSTC grant DHR-5600-G-00-0062-00.

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ANNEXURE - III A

ASIAN ELEPHANT BODY CONDITION INDEX

Elephant's Name/ID_____

Sex_____ ***Age***_____ ***(Estimate***_____ ***Known***_____***)*** ***Date***_____

Location_____

NOTE: **Body condition is most easily assessed in direct overhead sunlight**

Use parameters 1-6 to assess wild elephants, and all parameters (1-9) to assess domestic elephants where palpation of body parts is possible.

1. HEAD: TEMPORAL DEPRESSION *(view from several angles)*

____ full and convex in outline when viewed from behind, frontal ridge vaguely outlined at best (2 points)

____ slightly to moderately concave, frontal ridge defined (1 point)

____ deeply concave, frontal ridge forms a crater-like rim around the temporal depression (0 points)

____ *Number of points*

2. SCAPULA (SHOULDER BLADE) *(view from side)*

____ spinous process not visible, or slightly visible when the leg is in certain positions (2 points)

____ spinous process visible as a vertical ridge with a concavity between the ridge and the posterior edge of the scapula (1 point)

____ spinous process pronounced and bladeline with the acromial process pronounced as a knot (0 points)

____ *Number of points*

3. THORACIC REGION *(view from side)*

____ ribs not visible, barrel smooth (2 points)

____ some ribs visible, but the extent and demarcation not pronounced (1 point)

____ many ribs strongly demarcated (even behind the scapula) with pronounced intercostal depression (0 points)

____ *Number of points*

4. FLANK AREA (IMMEDIATELY IN FRONT OF PELVIS) *(view from side and behind)*

____ no depression visible, flank bulges outwards in front of the pelvis (1 point)

____ depression visible as a sunken area immediately in front of the pelvis (0 point)

____ *Number of points*

5. LUMBAR VERTEBRAE (BEHIND RIBS AND IN FRONT OF PELVIS) *(view from behind; an elevated vantage point may be necessary)*

____ not visible, lower back smooth and rounded (2 points)

____ visible as a ridge; skin slopes away from the top of the ridge; height of the vertebrae does not exceed width (1 point)

____ visible as a knife like blade; sides of the spinal ridge are parallel, and the height exceeds the width (0 point)

____ *Number of points*

6. PELVIC BONE (EXTERNAL ANGLE OF THE ILIUM) AND RUMP *(view from several angles)*

_____ not visible (or slightly visible); rump region between ilium and caudal vertebrae filled with tissue (and not forming a depressed zone) (2 points)

_____ visible but not pronounced; the rump is a slightly depressed zone between the ilium and the caudal vertebrae (1 point)

_____ visible as a jutting bone; rump is a pronounced sunken zone between the ilium and the caudal vertebrae (0 point)

_____ *Number of points*

Conduct the next three tactile assessments only when the elephant is under the direct control of the mahout

7. AXILLARY FAT (IMMEDIATELY BEHIND JOINT OF HUMORUS AND SCAPULA)

_____ skin contains a thick handful of fat, can be easily seized (2 points)

_____ skin contains some fat (1 point)

_____ skin thin, little tissue palpable underneath (0 point)

_____ *Number of points*

---

8. BRISKET FAT (BETWEEN FORELEGS AT BASE OF NECK)

_____ sternum well padded with muscle and fat, bone neither visible nor palpable (2 points)

_____ sternum not visible but palpable (1 point)

_____ sternum both visible and palpable (0 point)

_____ *Number of points*

---

9. TAIL

_____ fat and muscular, not boney feeling (1 point)

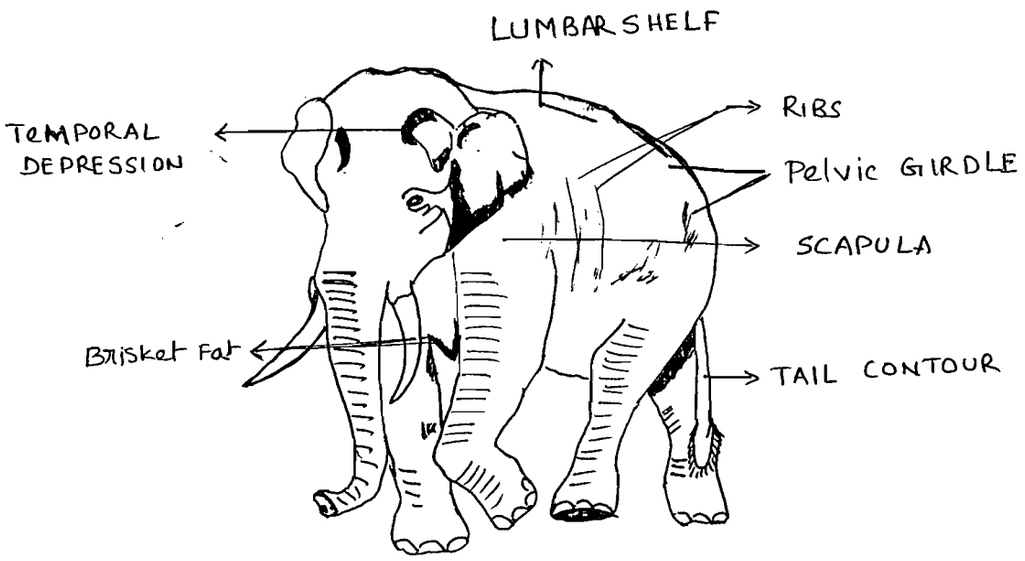
_____ thin and boney, feels stringy, and individual joints palpable (0 point)

_____ *Number of points*

_____ **Total number of points**

(0 - 5 = emaciated condition; 6 - 10 = average condition; 11 + = fat or very good condition)

ANNEXURE - III B



BODY PARTS OF AN ELEPHANT - FOR BODY CONDITION EVALUATION

Reproductive History of the catptive cow elephants - Tamil Nadu forest department
Mudumalai Wildlife Sanctuary & National Park - 1956-2002

Sno.	Name of elephant		Date of Birth(B) or Captive(c)	Age at captive	Date of first calving in captivity	Age	No. of calves born male	female	total	Mean calving interval years	Active reproductive phase in years	Remarks
1	Meenakshi	(B)	9-3-1889	Born	17-7-1902	13 y 4 m	5	6	11	4.11	41	Nil
2	Tara	(c)	15-4-1935	25(?)	12-5-1935	25	6	6	12	3.62	41	Died 27-5-89 one set of twins born 20-5-60
3	Godavari	(c)	2-3-1931	16	20-7-1953	38	0	3	3	5.22	10	Died 13-1-92
4	Devaki	(c)	11-2-1942	12	7-5-1948	18	8	2	10	4.83	39	Died June 1998 one set of twins born 20-5-71
5	Rathi	(c)	11-4-1942	9	1-10-1950	17	7	3	10	4.11	37	Pensioner
6	Gowri	(c)	5-2-1966	25	7-12-1967	26	2	5	7	4.97	still active	Nil
7	Cauvery	(c)	3-4-1974 gifted by BBTC	24	21-4-1977		0	5	5	6.42	,,	Previous calving history not known
8	Bhama	(c)	1-8-1963	15	19-2-1974	26	2	2	4	5.75	,,	Nil
9	Kamakshi	(c)	20-101960	3	7-3-1986	29	3	2	5	2.81	,,	,,
10	Bommi	(c)	16-12-1974	18	16-10-1975	19	2	1	3	6.81	-	Died on (34 yrs) 18-6-1990
11	Alamelu	(c)	23-11-1972	16	19-1-1981	25	1	3	4	4.59	-	Died in 1996(40 yrs)
12	Suguna	(c)	2-1-1939	18	21-3-1950	29	3	3	6	5.92	24	Died 26-10-1990(70 yrs)

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Annexure - IV A

Reproductive History of the catptive cow elephants - Tamil Nadu forest department
Indira Gandhi Wildlife Sanctuary & National Park 1956-2002

Sno.	Name of elephant		Date of Birth(B) or Captive(c)	Age at captive	Date of first calving in captivity	Age	No. of calves born male	female	total	Mean calving interval years	Active reproductive phase	Remarks
1	Saroja	(c)	2-7-1937	10	24-9-1951	24	1	2	3	7.64	15	Died 1989(66 yrs)
2	Mina	(c)	27-6-1942	6	20-1-1955	19	1	3	4	10.81	32	Died in 1998(62 yts)
3	Valli	(c)	27-1-1967	22	27-11-1975	30	3	3	6	3.54	active	Had a calf
4	Vijayalakshmi	(c)	29-12-1972	18	23-7-1977	23	4		4	3.37	?	
5	Sivakami	(c)	16-11-1973	22	31-12-1980	29	5		5	3.78	active	now pregnant
6	Vani	(c)	18-10-1973	20	16-12-1974	25	1	3	4	4.95		Died on 23-10-89
7	Selvi	(c)	4-6-1970	10	8-12-1978	18	4	2	6	3.12	active	now pregnant
8	Kaveri	(B)	30-12-1960	born	1-12-1978	17 y 11 m	0	1	1	the animal had two still birth and two abortions		Died on 30-5-98(38 yrs)
9	Swamavathi	(c)	15-10-1972	18	26-10-1973	19	0	1	1			sold away in auction
10	Deepa	(c)	6-1-1973	20	19-10-1974	21	0	1	1			euthanised due to paralysis
11	Vasanthi	(c)	16-10-1964	6 months	28-2-1979	14+	0	2	2	4.25		Now in Nanadankanan Zoo, Orissa

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Annexure 10 B

ANNEXURE- V

A Report on Murthy a Tuskless Male elephant(Makhna) at the Theppakkadu Elephant Camp. Mudumalai Wildlife Sanctuary and National Park

During the course of our visit to the Theppakkadu elephant camp from 3-01-2002 to 5-01-2002, we examined the Tuskless male elephant named "Murthy" and assessed his health condition, behaviour as well as the control exercised by its mahout. This report is based on our observations of the makhna, clinical examination of the blood sample, available records with the elephant camp, photos taken at different times etc.

Back Ground Information of Makhna(This information is based on available records)

This tuskless male elephant, a habitual crop raider was reported to have killed over 22 people in the adjacent Kerala state as well as in the Gudalur Forest Division in Tamil Nadu. In Kerala state, this animal was declared a rogue and was ordered to be shot.

During the 2nd week of July 1998, since some people were reported to have been killed by this elephant, in Gudalur division of Tamil Nadu, the local people demanded for immediate action.

On request from DFO Gudalur, a team of experienced people assisted by sufficient number of trained elephants, managed to capture the animal by Drug Immobilisation Technique on 12-07-1998 and was brought to Theppakkadu elephant camp escorted by the trained elephants (kumkies) under mild sedation and was put in the existing kraal on 15-7-1998.

As the kraal was found damaged and unsafe for keeping this killer elephant a temporary kraal was constructed and the Makhna was shifted to the new kraal on 20-7-1998.

At the time of capture the animal was found to have suffered from more than 12 gunshot wounds, some of which have suppurated. The animal has developed deep lacerated wounds on the all four legs at the fetlock regions during its incarciration in the kraal.

The animal was kept in the kraal for over 6 ½ months to enable it to recover completely from the injuries. While in the kraal the animal was provided with required quantity of cooked rations prescribed by the forest veterinarian and adequate quantity of cut fodder. Because of the treatment the injuries of Makhna got healed up and the animal was taken out of the kraal on 6-2-1999. At the time of treatment an expert opinion from Dr. Jacob B Cheran, Dr. N S Manoharan and Dr. V Krishnamurthy was taken and the department has spent over Rs.2,44,000/- towards the cost of the medicine for treating this Makhna. After a few days of observations the animal was let out for grazing, in addition to provision of routine diet.

Observations of the Committee

The committee thoroughly examined Murthy and individually assessed the condition of Makhna, its behaviour, the status of wounds, took blood samples for clinical examinations and went through the ultrasonography report.

1. Condition of Makhna

The condition of Makhna was individually assessed by the members of the committee by using the standard score card in the form of **"The Asian Elephant body condition index forms"** and found out that the Makhna is in very good condition. Dr. Krishnamurthy's assessment gave 12 point, Mr. Hemanth Kumar assessment gave 11 points and Dr. Jayathangaraj assessment gave 11 points. Copies of assessment forms are annexed.

The Makhna was found to have normal feeding activity and activities of urination and defaecation are apparently normal. From the records we observed that Makhna has put on 500 Kgs. in body weight since its release from kraal.

2. Behaviour and Temparament

Makhna at present is very cool in its temparament and obeying the commands of Mahout readily. It even cooperated the team while taking blood samples from the ear vein lying on the ground. It shows that this Makhna has acclamatised itself to the captive conditions and shed its aggressiveness. We observed the Makhna's gait also. The gait is quite normal and did not show any signs of physical infirmity and nervousness.

3. Clinical Examination

The Makhna is in very good condition except for some low level of serum glucose(23.07 mg/dl). So it is prescribed that high energy ration enriched with mineral mixture shall be provided. The laboratory test report is annexed.

4. Ultrasonography test

In the month of Feb.2001 Dr.Hilde Brandt, Germany and Dr.Dennis Schmidt of USA did ultrasonagraphy of all camp elephants which include Makhna also at Theppakkadu and found out that the Makhna is in excellent condition, (copy of the report is annexed).

5. Present status of wounds

The team compared the present status of wound with that of earlier wounds. The photographs taken way back in 1998-99 shows that the Makhna has got wounds in all the four legs extensively. But now, all the wounds got healed up except - a partly healed sinus wound on its right upper forearm and almost healed wound on the left front leg. All the nails are intact (photos are annexed)

The committee is satisfied with the progress of healing process as it normally takes a very long time for the external injuries to heal up in elephants and in Rhinos as they have very thick skins.

Controversy on Makhna

While going through the records the committee found copies of e-mails and the papers related to the Court case. The committee went through the records and tried to know the about the case fully and observed the following observations which are in brief.

1. Ms. Deanna Kraants, who is managing an animal farm in the outskirts of Mudumalai sanctuary initially offered imported medicines for treating Makhna and the department accepted the medicines in good faith.
2. After that she started demanding the department to send the Makhna to her animal farm for treatment saying that the Makhna is not getting proper treatment and feed. She started a website showing the photographs of Makhna which she named it as Loki and started asking for help from the animal lovers. She kept on criticizing the treatment given to the Makhna by the departmental vets., and even questioned competency of Indian vets.
3. Dr.Mahoney, a professor of Newyork School of Clinical Medicine, visited Theppakkadu on the invitation of Dr.Deanna Kraants in the month of December 98, at that time the Makhna was still in kraal.
4. Subsequently two years after, a court case was filed in the High Court at Chennai pleading the court to allow Ms.Deanna Kraants and her American doctors to treat Makhna.

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The committee after speaking to the local people and thoroughly going through the records came to the following conclusions.

Dr.Mahoney basically a primate expert who doesn't have any exposure to elephants observed Makhna while it was in kraal. At that time the injuries were in healing process. The court case was filed after a gap of two years. Meanwhile through the website on Loki (Makhna) people attempted to downgrade the competence of eminent Indian Vets. All these shows that some dubious motives are behind this entire episode.

As it was already been explained, Makhna got a very good veterinary care and at present is in excellent condition. Credit should go to the staff of elephant camp at Theppakkadu, to the experts who gave their valuable opinion at the time of treatment and most importantly to the Mahout and his helper who dared their lives even though they know that temperamentally the animal was aggressive and killed about 22 people, and trained this Makhna.

The credit should go to the Chief Wildlife Warden of Tamil Nadu and other officials of forest department of Tamil Nadu who saved the life of an endangered animal like an elephant rather than redeclaring this once killer elephant as a rogue by capturing and rehabilitating it.

Dr. V Krishnamurthy
Chariman

R. Hemanth Kumar,IFS
Regl.Dy.Director(WLP)
Govt. of India
Member

Dr. M G Jayathangaraj
Associate Professor &
Head incharge
Dept.of Wildlife Science
Madras Vety.College
Member

Date: 4-01-2002 (76)

ASIAN ELEPHANT BODY CONDITION INDEX

Elephant's Name/ID Muthu (Mathna)

Sex Male *Age* 40yrs *(Estimated* ✓ *- Known* — *)* *Date* 4/1/02

Location

↳ Mudumalai Wildlife Sanctuary

NOTE: Body condition is most easily assessed in direct overhead sunlight

Use parameters 1-6 to assess wild elephants, and all parameters (1-9) to assess domestic elephants where palpation of body parts is possible.

1. HEAD: TEMPORAL DEPRESSION *(view from several angles)*

___ full and convex in outline when viewed from behind, frontal ridge vaguely outlined at best (2 points)

✓ slightly to moderately concave, frontal ridge defined (1 point)

___ deeply concave, frontal ridge forms a crater-like rim around the temporal depression (0 points)

___ *Number of points*

2. SCAPULA (SHOULDER BLADE) *(view from side)*

✓ spinous process not visible, or slightly visible when the leg is in certain positions (2 points)

___ spinous process visible as a vertical ridge with a concavity between the ridge and the posterior edge of the scapula (1 point)

___ spinous process pronounced and bladeline with the acromial process pronounced as a knot (0 points)

___ *Number of points*

3. THORACIC REGION *(view from side)*

✓ ribs not visible, barrel smooth (2 points)

___ some ribs visible, but the extent and demarcation not pronounced (1 point)

___ many ribs strongly demarcated (even behind the scapula) with pronounced intercostal depressions (0 points)

___ *Number of points*

4. FLANK AREA (IMMEDIATELY IN FRONT OF PELVIS) *(view from side and behind)*

✓ no depression visible, flank bulges outwards in front of the pelvis (1 point)

___ depression visible as a sunken area immediately in front of the pelvis (0 point)

___ *Number of points*

5. LUMBAR VERTEBRAE (BEHIND RIBS AND IN FRONT OF PELVIS) *(view from behind; an elevated vantage point may be necessary)*

✓ not visible, lower back smooth and rounded (2 points)

___ visible as a ridge; skin slopes away from the top of the ridge; height of the vertebrae does not exceed width (1 point)

___ visible as a knife like blade; sides of the spinal ridge are parallel, and the height exceeds the width (0 point)

___ *Number of points*

6. PELVIC BONE (EXTERNAL ANGLE OF THE ILIUM) AND RUMP *(view from several angles)*

____ not visible (or slightly visible); rump region between ilium and caudal vertebrae filled with tissue (and not forming a depressed zone) (2 points)

✓ visible but not pronounced; the rump is a slightly depressed zone between the ilium and the caudal vertebrae (1 point)

____ visible as a jutting bone; rump is a pronounced sunken zone between the ilium and the caudal vertebra (0 point)

____ *Number of points*

Conduct the next three tactile assessments only when the elephant is under the direct control of the mahout

7. AXILLARY FAT (IMMEDIATELY BEHIND JOINT OF HUMORUS AND SCAPULA)

____ skin contains a thick handful of fat, can be easily seized (2 points)

✓ skin contains some fat (1 point)

____ skin thin, little tissue palpable underneath (0 point)

____ *Number of points*

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8. BRISKET FAT (BETWEEN FORELEGS AT BASE OF NECK)

____ sternum well padded with muscle and fat, bone neither visible nor palpable (2 points)

✓ sternum not visible but palpable (1 point)

____ sternum both visible and palpable (0 point)

____ *Number of points*

---

9. TAIL

____ fat and muscular, not boney feeling (1 point)

✓ thin and boney, feels stringy, and individual joints palpable (0 point)

____ *Number of points*

---

11 **Total number of points**

(0 - 5 = emaciated condition; 6 - 10 = average condition; 11 + = fat or very good condition)

Dr. M. G. Jayathangaraj
M.V.Sc., Ph.D.
Associate Professor & Head I/C,
Dept of Wildlife Science,
Madras Veterinary College,
Chennai - PIN: 600007.

(48)

ASIAN ELEPHANT BODY CONDITION INDEX

Elephant's Name/ID Murthy

Sex ♂ *Age* 40 *(Estimate* ✓ *Known* ___*)* *Date* 4th

Location Theppakkadu Elephant Camp
Mudumalai WLS and National Park TN

NOTE: **Body condition is most easily assessed in direct overhead sunlight**

Use parameters 1-6 to assess wild elephants, and all parameters (1-9) to assess domestic elephants where palpation of body parts is possible.

1. HEAD: TEMPORAL DEPRESSION *(view from several angles)*

___ full and convex in outline when viewed from behind, frontal ridge vaguely outlined at best (2 points)

✓ slightly to moderately concave, frontal ridge defined (1 point)

___ deeply concave, frontal ridge forms a crater-like rim around the temporal depression (0 points)

___ *Number of points*

SCAPULA (SHOULDER BLADE) *(view from side)*

✓ spinous process not visible, or slightly visible when the leg is in certain positions (2 points)

___ spinous process visible as a vertical ridge with a concavity between the ridge and the posterior edge of the scapula (1 point)

___ spinous process pronounced and bladeline with the acromial process pronounced as a knot (0 points)

___ *Number of points*

THORACIC REGION *(view from side)*

✓ ribs not visible, barrel smooth (2 points)

___ some ribs visible, but the extent and demarcation not pronounced (1 point)

___ many ribs strongly demarcated (even behind the scapula) with pronounced intercostal depressions (0 points)

___ *Number of points*

FLANK AREA (IMMEDIATELY IN FRONT OF PELVIS) *(view from side and behind)*

✓ no depression visible, flank bulges outwards in front of the pelvis (1 point)

___ depression visible as a sunken area immediately in front of the pelvis (0 point)

___ *Number of points*

LUMBAR VERTEBRAE (BEHIND RIBS AND IN FRONT OF PELVIS) *(view from behind; an elevated ridge point may be necessary)*

✓ not visible, lower back smooth and rounded (2 points)

___ visible as a ridge; skin slopes away from the top of the ridge; height of the vertebrae does not exceed width (1 point)

___ visible as a knife like blade; sides of the spinal ridge are parallel, and the height exceeds the width (0 point)

___ *Number of points*

6. PELVIC BONE (EXTERNAL ANGLE OF THE ILIUM) AND RUMP *(view from several angles)*

✓ not visible (or slightly visible); rump region between ilium and caudal vertebrae filled with tissue (and not forming a depressed zone) (2 points)

____ visible but not pronounced; the rump is a slightly depressed zone between the ilium and the caudal vertebrae (1 point)

____ visible as a jutting bone; rump is a pronounced sunken zone between the ilium and the caudal vertebrae (0 point)

____ *Number of points*

Conduct the next three tactile assessments only when the elephant is under the direct control of the mahout

7. AXILLARY FAT (IMMEDIATELY BEHIND JOINT OF HUMORUS AND SCAPULA)

____ skin contains a thick handful of fat, can be easily seized (2 points)

✓ skin contains some fat (1 point)

____ skin thin, little tissue palpable underneath (0 point)

____ *Number of points*

---

8. BRISKET FAT (BETWEEN FORELEGS AT BASE OF NECK)

✓ sternum well padded with muscle and fat, bone neither visible nor palpable (2 points)

____ sternum not visible but palpable (1 point)

____ sternum both visible and palpable (0 point)

____ *Number of points*

---

9. TAIL

✓ fat and muscular, not boney feeling (1 point)

____ thin and boney, feels stringy, and individual joints palpable (0 point)

____ *Number of points*

---

12 **Total number of points**

(0 - 5 = emaciated condition; 6 - 10 = average condition; 11 + = fat or very good condition)

V. Leimbrandt

(80)

ASIAN ELEPHANT BODY CONDITION INDEX

Elephant's Name/ID MURTHY (MAKHNA)

Sex M *Age* ____ *(Estimate* 45Y *Known* 40 *)* *Date* 03-05-2002

Location Theppakadu Elephant Camp

NOTE: Body condition is most easily assessed in direct overhead sunlight

Use parameters 1-6 to assess wild elephants, and all parameters (1-9) to assess domestic elephants where palpation of body parts is possible.

1. HEAD: TEMPORAL DEPRESSION *(view from several angles)*

___ full and convex in outline when viewed from behind, frontal ridge vaguely outlined at best (2 points)

✓ slightly to moderately concave, frontal ridge defined (1 point)

___ deeply concave, frontal ridge forms a crater-like rim around the temporal depression (0 points)

___ *Number of points*

2. SCAPULA (SHOULDER BLADE) *(view from side)*

✓ spinous process not visible, or slightly visible when the leg is in certain positions (2 points)

___ spinous process visible as a vertical ridge with a concavity between the ridge and the posterior edge of the scapula (1 point)

___ spinous process pronounced and bladeline with the acromial process pronounced as a knot (0 points)

___ *Number of points*

3. THORACIC REGION *(view from side)*

✓ ribs not visible, barrel smooth (2 points)

___ some ribs visible, but the extent and demarcation not pronounced (1 point)

___ many ribs strongly demarcated (even behind the scapula) with pronounced intercostal depressions (0 points)

___ *Number of points*

4. FLANK AREA (IMMEDIATELY IN FRONT OF PELVIS) *(view from side and behind)*

___ no depression visible, flank bulges outwards in front of the pelvis (1 point)

✓ depression visible as a sunken area immediately in front of the pelvis (0 point)

___ *Number of points*

5. LUMBAR VERTEBRAE (BEHIND RIBS AND IN FRONT OF PELVIS) *(view from behind; an elevated vantage point may be necessary)*

___ not visible, lower back smooth and rounded (2 points)

✓ visible as a ridge; skin slopes away from the top of the ridge; height of the vertebrae does not exceed width (1 point)

___ visible as a knife like blade; sides of the spinal ridge are parallel, and the height exceeds the width (0 point)

___ *Number of points*

6. PELVIC BONE (EXTERNAL ANGLE OF THE ILIUM) AND RUMP *(view from several angles)*

____ not visible (or slightly visible); rump region between ilium and caudal vertebrae filled with tissue (and not forming a depressed zone) (2 points)

✓ visible but not pronounced; the rump is a slightly depressed zone between the ilium and the caudal vertebrae (1 point)

____ visible as a jutting bone; rump is a pronounced sunken zone between the ilium and the caudal vertebrae (0 point)

____ *Number of points*

Conduct the next three tactile assessments only when the elephant is under the direct control of the mahout

7. AXILLARY FAT (IMMEDIATELY BEHIND JOINT OF HUMORUS AND SCAPULA)

____ skin contains a thick handful of fat, can be easily seized (2 points)

✓ skin contains some fat (1 point)

____ skin thin, little tissue palpable underneath (0 point)

____ *Number of points*

---

8. BRISKET FAT (BETWEEN FORELEGS AT BASE OF NECK)

✓ sternum well padded with muscle and fat, bone neither visible nor palpable (2 points)

____ sternum not visible but palpable (1 point)

____ sternum both visible and palpable (0 point)

____ *Number of points*

---

9. TAIL

✓ fat and muscular, not boney feeling (1 point)

____ thin and boney, feels stringy, and individual joints palpable (0 point)

____ *Number of points*

---

11 **Total number of points**

(0 - 5 = emaciated condition; 6 - 10 = average condition; 11 + = fat or very good condition)

(R. Hemanth Kumar)
Regl. Dy. Director (In L.D)

Summary of Ultrasound Assessments
Mudumalai Asian Elephant Research and Conservation Center
February 13-15, 2001

INTRODUCTION

We were impressed by the quality of care of the camp elephants and the extensive records of each elephant in the camp. All personnel were extremely helpful in accommodating the requests to facilitate the ultrasonographic examinations and workshop. Supplementation of the natural forage available to the elephants is obviously an advantage both to the caretakers and the elephants. We were pleased at the strong interest demonstrated by the workshop attendees in the application of ultrasonography to elephant biology. Especially encouraging was the attendance of both well-established and younger biologists and veterinarians.

APPLICATION OF ULTRASONOGRAPHY IN ELEPHANTS

Ultrasonography is an alternative approach to non-invasive exploration of anatomical structures and relations and biological processes in elephants. This imaging technique is still under-utilized in reproduction science. Ultrasonography provides reproducible real time images, cross-sectional imaging of tissues, organ structures and motions, morphometric measurements, documentation and preservation of data. The advantages of this technique favour its more widespread use. Ultrasound imaging in veterinary and biological sciences offers new information regarding embryonic development, uterine and ovarian function, muscle development, digestive process, etc. where classical experimental techniques are limited. The use of ultrasonography in elephants is combined with characteristic features for applying this imaging technique due to the individual anatomical structures. Miniaturised transducer technology has allowed for the development of microprobes with compact, contoured shapes for access to unexplored anatomical regions in elephants. Many of the new probes offer colour flow imaging which is an ideal option for investigating fluid trends inside a body like blood or ingesta flow. Improvements in ultrasound technology as well as the development of new types of application techniques will certainly advance the progress of this imaging modality in elephant research.

EXAMINATIONS

Murthy – 40 year old tuskless bull. Ultrasonography performed and semen collection was attempted twice, but we unable to proceed because of movement of the bull away from the palpation. A lymph node examination of a lymph node dorsal to the salivary gland revealed several white echogenic spots, a lymph node biopsy was obtained. In addtion a biopsy below the archus zygomaticus was obtained. The lesion was characterized by a fistula discharging yellow purulent material with slight swelling and edematized skin. 150 mg of xylazine was used to sedate the bull for exam and antisedan used to reverse the effects (1.5 ml IV and 1.5 ml IM). There was a small cavity

associated with the fistula about 2 cm dorsal to the fistula. The center of the abcess contained a dense echogenic material consistent with a piece of wood or shotgun pellet. Handheld 2-4 MHz convex transducer was used transcutaneously over the bulburethral glands, located under tail, they were size of a child's fist located bilateral of the penis. Image quality was not high because of connective tissue located between the transducer and the tissue of interest. Transrectal examination the urethra appeared healthy with typical size. The prostate contained three lobes on each side, which were slightly small. Ampullae glands were highly folded and thick walled each contained approximately 5 ml indicating previous breeding activity. The ductus deferns were of normal size with a central echogenic focus indicating no current sperm production. Seminal vesicles were highly folded and contained several compartments. The glands were about 2/3 capacity containing about 200 ml each. Bladder was thin walled with no abnormalities noted. In general there were no signs of ascites abdominally, indicating adequate nutrition. Examination with the transducer extender – first attempt failed to visualize testicles because of extensive internal fat pads surrounding the testicles. Second examination both testicles were visualized with a diameter between 11-12 cm. Parenchyma appears highly echogenic with well marked rete testis. The tunica albigenia was distinquishable from the parenchyma. There were no pathological findings in either testicle. The kidneys were easily visible and did not contain any indication of pathology. Despite continuing treatment of chronic superficial wounds the elephant was in good general condition, but is not currently in breeding condition. However, he has a high chance to return to breeding condition in the future.

Anna – 48 year old bull. Ultrasonography performed and semen collected. Bulbourethral glands were not visible due to the thick skin. The external penis size was quite small for his age. The urethra appeared normal, the three lobes on each side of the prostate were well visualized and well developed. The ampullae appeared round and were filled with approximately 3-4 ml on each side. The ductus deferns was detectable with no abnormalities noted. The center appeared moderately echogenic indicating on-going sperm production. Seminal vesicles were cigar shaped without folds and compartments and each contained about 80 ml. The testicles were easily visible due to absence of fat pads. The use of the extended transducer both testicles were visible with a diameter of about 16 cm. Parenchyma appeared moderately echogenic indicating endocrinological and spermatogenic activity. Both kidneys appeared normal. Semen evaluation revealed excellent motility and concentration, but with a small volume of 3-4 ml. In summary the bull was in excellent health, but the status of the accessory glands indicate he was never an active breeder. Social interaction may the cause for this phenomenon. This bull could still have the potential for breeding with a change in social status.

Sujay – captive born 30 year old bull. Ultrasonography performed following semen collection. Therefore the initial status of the accessory glands were difficult to characterize. The urethra and bladder appeared normal. Prostate was typical structure but was not as large as in an actively breeding bull. Ampullae were completely empty and not well visualized, but the bull had been cooperative for semen collection. Seminal vesicles contained 20 ml each and were flat and unfolded. The ductus deferns were

undetectable due to semen collection immediately previous to the examination. Exam with the extended transducer revealed easily visualized testicles with a diameter of 11 cm. No abnormalities of the testes except the small size. The average breeding bull has a testis diameter of 16-20 cm. Semen collection consisted of three fractions of 4 ml, 45 ml and 27 ml. The first two fractions were combined for motility and concentration. Gross motility was moderate with slow wave formation. The third fraction contained several sperm with head to head agglutination. Concentration will be determined at a later date. This bull would make ideal candidate for semen collection. He is not a prime candidate for becoming an active breeding bull.

Cauvery – 51 years old female, last calf stillborn in 1995. Ultrasonography revealed small areas of calcification in the urethra and the bladder is normal. The vagina was well developed and contains large amount of echogenic irregularly shaped mucus however, the cervix is normally developed. The kidneys contain a few white spots in the parenchyma indicating a very mild chronic degeneration. There was not much body fat present in the abdominal cavity making the exam quite clear. Upon ultrasonography exam of the right ovary there were no active structures observed. The left ovary contained 7 mm old copus albicans and a small follicle. There were no abnormalities noted on either ovary. The uterus has normal size with no pathological alterations with an inactive endometrium about 12 mm thick. In summary this cow is currently in a sexually dormant stage and is not currently cycling. However, she has a good chance of breeding in the future. The mild lesions found are not very remarkable.

Kamakshi – 44 year old female, bred December 2nd. Physical exam includes a small rectal diverticulum. Urethra and bladder were normal. Vestibule contained slightly swollen mucosa, the vagina was highly folded containing a small amount of mucus. Endometrium was enlarged which indicates the cow is near the end of the luteal phase. Each ovary contained corpus luteum the size of 12 and 16 mm. The kidney appeared normal. Examination for pregnancy was unsuccessful. Based on the endometrium and size of the corpus luteums present, the chances for pregnancy are low. The next mating should have high probability of success for pregnancy.

Bhama – 53 year old female, bred four months ago, she has four calves the last calf born in 1991. Ultrasonography of the right ovary contains a follicle of 14 mm, the left ovary contains several old copra albicans with no other abnormalities. The kidney was not visualized and the urethra and bladder was normal. The well developed vagina contained a small amount of anechoic mucus and the cervix was normal. The 15mm thick endometrium contained at least two placental scars and appeared less echogenic. There were no cysts or tumors visualized. In summary Bhama is cycling and in the early follicular phase, so she should ovulate in the next few weeks. The reproductive tract indicates a high potential for breeding,success with no abnormalities.

Senthil Vadium – 30 year old female, brought here to the conservation center from a temple three years ago. Molars are malocculuded and impact her ability to digest food properly. She was sedated with 100 mg xylazine which was reversed with 1ml IV and 1 ml IM. A lymph node biopsy was performed dorsal to the salivary gland. Urethra and

urinary bladder were normal. Unfolded vagina contained large amount of mucus, cervix was normal. The myometrium was enlarged, and contained several distinguishable leoimyomas. The endometrium contained several cystic regions with diameters ranging from 2 to 10 mm located in the body and caudal portion of the uterine horns. In addition there was a small amount of detectable uterine mucous contained in the uterine lumen. Ovaries were of normal size and were characterized by absence of functional structures. The kidney was normal with no abnormalities noted. Remarkable was the presence of ascites found between the uterine horns and the intestinal loops indicating a lack of protein absorption. The breeding potential of this individual would be characterized as very low. There was no indication of swollen lymph nodes in the abdominal cavity or of the superficial lymph node which was biopsied.

Gowri –60 year old female , partially blind, has produced seven calves the last born in 1995. The urethra and bladder appeared normal with no abnormaiities noted. The vagina was unfolded and appeared inactive, the mucosa was undetectable the cervix was promenint with folds undetectable. The diameter of the entire uterus was reduced and the endometrium was 8-10 mm in diameter. There were no pathological in the endometrium or myometrium except for several placental scars which appeared as highly echogenic spots. Right ovary was normal sized except for 3.7 cm perpherially located cysts. The cyst contained clear fluid and was bordered by detectable wall about 1mm thick. There was in addition one old corpus albicans of 8 mm. The left ovary appeared inactive with out any functional structures. There was no evidence of ascites, however the parenchyma of the kidneys was not distinguishable and the capsule was irregularly shaped and slightly notched. These findings indicate ongoing mild chronic kidney degeneration. As an incidental finding the mouth contained all teeth. There is a low change this female will become pregnant again, however the urogenital tract is quite normal.

RECOMMENDATIONS

1. The continued testing of elephants in the camp for tuberculosis is highly recommended. With the potential movement of elephants from temples in the region into this group in the future, it is in the best interest of the camp and free-ranging elephants to maintain a vigilant watch for this chronic disease.

2. The collaboration with researchers using this valuable resource of well trained elephants and competent staff can provide valuable information for the management of captive and free-ranging elephants. An example is the possibility of herpesvirus in the native elephants. Until now no indication that this virus existed in native elephants was present. However, the clinical symptoms described for the recent deaths of three young elephants may change this hypothesis and submission of samples from any suspicious deaths should be fully investigated for the presence of herpesvirus.

3. The development of the museum into an attractive supplement to the elephant activities would add to the income potential of the camp. The additional income

from camp activities could be used to increase the training activities of camp personnel and cooperate with potential research activities.

4. If the reproductive viability of the males is to be increased for captive breeding potential, the best candidate for selection as the primary breeding bull would be Anna.

Respectfully Submitted:

Dr. Dennis Schmitt, Southwest Missouri State University, Springfield, MO USA
Dr. Thomas Hildebrandt, Institute for Zoo Biology & Wildlife Research, Berlin, DE
Heidi Riddle, Riddles Elephant Sanctuary, Quitman, AR USA
4.

ANNEXURE -

RANDOM ASSESSEMNT OF HEALTH STATUS IN ELEPHANTS AT WILDLIFE SANCTUARIES OF TAMILNADU STATE

S.No.	Parameter	No. of elephants examined	Mean value	Range
1	PCV	12	36%	12-40
2	Hb	12	8.27g/dl	6-11
3	RBC	12	3.55m/cmm	2.56-5.38
4	WBC	12	8538/cmm	6200-15150
5	Total protein	12	7.75g/dl	6-9.62
6	Albumin	12	2.03g/dl	0.8-4.05
7	Globulin	12	5.72g/dl	3.82-7.13
8	Cholesterol	12	108.97g/dl	16.66-300
9	Glucose	12	72.13mg/dl	50-105
10	Total Bilirubin	6	0.85mg/dl	0.2-2.6
11	Direct Bilirubin	6	0.23mg/dl	0-0.9
12	AST	6	36.17IU/L	22.9-47.5
13	ALT	6	11.2IG/L	1.8-40.7
14	BUN	6	19.02mg/dl	12.2-28.7
15	Creatinine	6	1.17mg/dl	0.8-1.5

Note : Elephants examined were apperently helahty in general.

Annexe VII A

Departmental Elephants in Mudumalai Wildlife Sanctuary and National Park as in January 2002

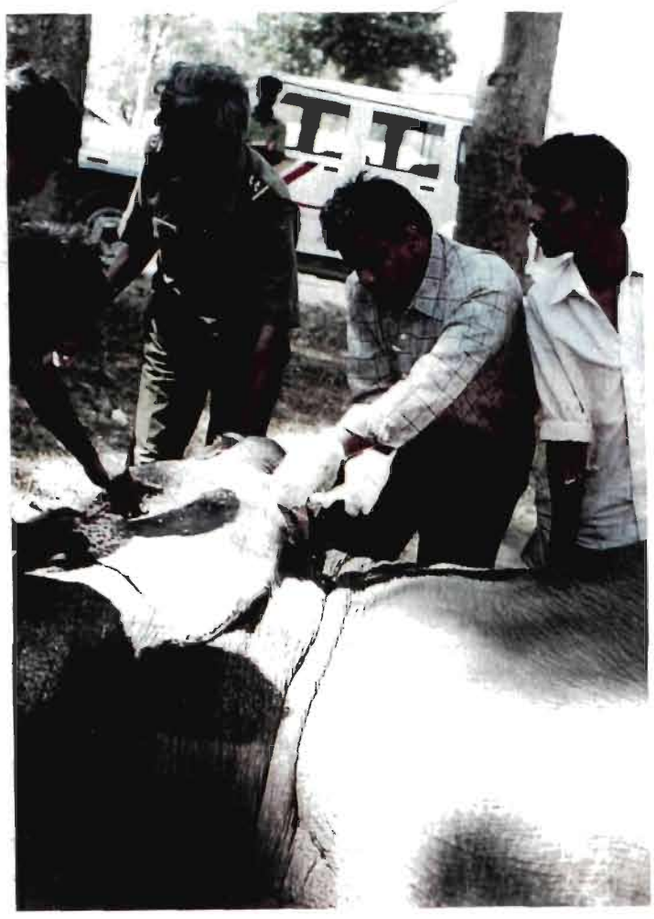
S.No.	Name of elephant	Sex		Date of captive(B) or birth(c)	Present Age years	Remarks
1	Rathi	cow	(c)	11-4-42	65	
2	Gowri	cow	(c)	5-2-66	61	
3	Indhar	bull	(c)	13-10-60	54	
4	Bhama	cow	(c)	1-8-63	53	
5	Cauvery	cow	gift	3-4-74	51	Gift from BBTC
6	Subramanian	bull	(c)	7-9-58	50	
7	anna	bull	(c)	July 1971	46	
8	Kamakshi	cow	(c)	20-10-60	44	
9	Mudumalai	bull	(c)	9-7-67	37	
10	Sankar	bull	(c)	3-5-75	29	
11	Ganesh	bull	(c)	1972	32	
12	Senthilvadivu	bull	(c)	July 1970	36	Transferred from tiruvannamalai temple
13	Sujay	bull	(B)	20-5-71	30	Twins born to Devaki
14	Vijay	bull	(B)	20-5-71	30	,,
15	Santosh	bull	(B)	15-8-71	30	Born to Rukmini
16	Wasim	bull	(B)	30-1-78	23	Born to Bhama
17	Cheran	bull	(B)	10-7-86	16	Born to Bommi
18	Jambu	bull	(c)	27-8-86	16	Orphaned calf
19	Wilson	male SA	(B)	16-4-88	13	Born to Gowri
20	Rajeswari	female SA	(B)	13-10-91	10	Born to Gowri
21	John	male SA		1991	10	Orphaned calf from wild
22	Satyan	male SA	(J)	1997	4	Orphaned calf from wild
23	Palni	male SA		17-7-95	6	Born to Gowri
24	Murthy	bull makhna		c.12-2-98	40	Captured from Gudalur Dn.
25	Udayan	M.calf		24-11-98	3	calf of Mina
26	sumangala	female SA	(c)	July 1988	13	Orphaned calf
27	Swaminathan	SA Bull	?	Nov 2001		Recd. From Swamimalai temple in exchange for durga claf of Alamelu

* SA = SUB ADULT, J=Juvinile

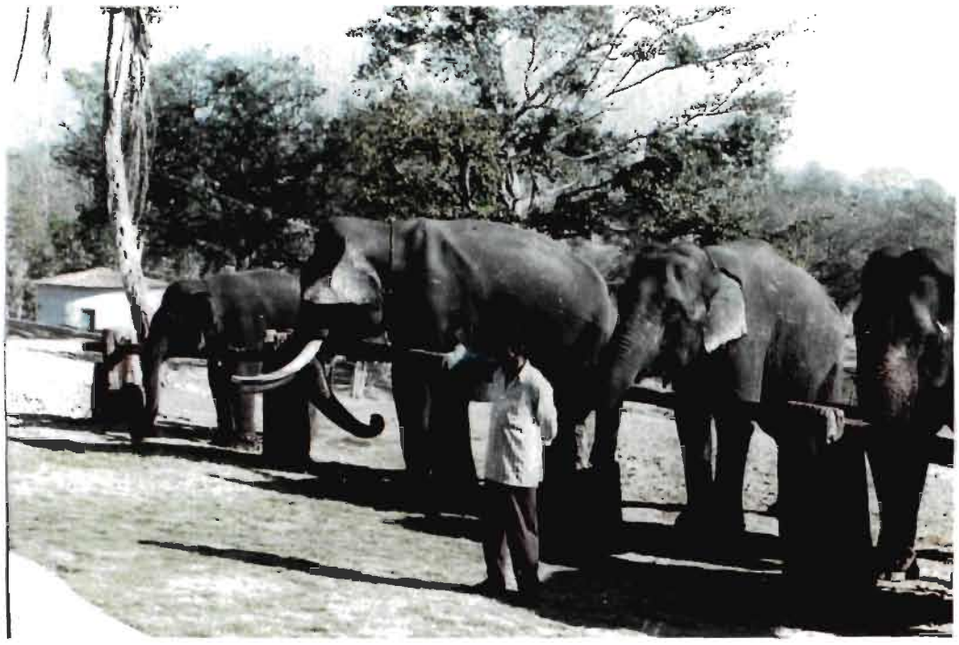
Annexure VII B

Departmental Elephants in Indira Gandhi Wildlife Sanctuary and National Park as on 15-2-2002

S.No.	Name of elephant	Sex		Date of captive(B) or birth(c)	Present Age years	Remarks
1	Dev	Bull	(C)	6-9-60	57	
2	Saradha	Cow	(C)	1-7-61	43	
3	Lakshman	Bull		?-7-63	47	
4	Valli	Cow	(C)	27-1-67	54	
5	Pallavan	Bull	(C)	Nov 1968	47	
6	Badsha	Bull	(C)	1969	35	
7	Nataraj	Bull		Gift Aug 85	36	
8	Selvi	Cow	(C)	4-6-70	41	
9	Sivakami	Cow	(C)	16-11-73	50	
10	Vijayalakshmi	Cow	(C)	27-11-72	47	
11	Nanjan	Bull	(C)	12-2-72	38	
12	Khaleem	Bull	(C)	16-11-72	32	
13	Ram	Bull	(C)	March 77	32	
14	Karthik	Bull	(B)	13-10-84	17	Born to Alamelu at Guindy park
15	Pari	Bull	(C)	11-7-88	19	
16	Surya	Bull	(C)	10-12-99	20	
		Childrens Corner, Guindy				
1	Indira	F.calf	(B)			Born to Kamakshi in Mudumalai
		Arignar Anna Zoological Park				
1	Kapildev		(B)	5-5-83		
2	Venkatesh		(B)	6-4-87		
3	Aswini		(B)	20-1-86		
4	Bharani		(B)	20-1-86		
5	Vikram	M.calf	(B)	Apr-00		orphaned calf received from Dharmapuri Dn.,



BLOOD COLLECTION



PRE-FEEDING ASSEMBLANCE OF CAMP ELEPHANT OF MUDUMALAI

INSPECTION AT MUDUMALAI WILD LIFE SANCTUARY

FEED PREPARATORY SHED AT MUDUMALAI SANCTUA

GOVERNMENT OF TAMILNADU

ABSTRACT

Forests--Wildlife-Constitution of an expert Committee to study the condition and status of elephants in Tamil Nadu both departmental and private owned elephant--Constitution of " The Krishnamurthy Committee" --Orders--Issued.

Environment & Forests (FRV) Department

G.O. MD NO. 355 Dt:4.12.2001

From the Principal Chief Conservator of Forests
Lr.NO.WL1/32077/2001 dt:26.11.2001

ORDER:

In order to study and examine the status of elephant management in Tamil Nadu both in departmental and privately owned elephant including temple elephant and suggest measures to improve the same, a meeting under the Chairmanship of the Hon'ble Chief Minister was conducted on 20.11.2001, it was decided to constitute an Expert Committee to go into the details of elephant management in Tamilnadu. Based on the suggestion, the Principal Chief Conservator of Forests was asked to send suitable proposals indicating Terms of Reference norms and guidelines etc.

2. The Principal Chief Conservator of Forests has now suggested that the Expert Committee may be called as " The Krishnamoorthy Committee" and that the Constitution of the Committee will be:

i) Dr.V.Krishnamuorthy, Retired Joint Director of Animal Husbandry and Member Elephant Task Force IUCN,

ii) Dr.M.G.Jayathangaraj, M.V.Sc.,Ph.D. Associate Professor, Head in charge.

iii) Mr.Hemanth Kumar,Regional Deputy Director (WL) Ministry of Environment and Forests, Govt.of India, Besant Nagar,Chennai.

3. The Principal Chief Conservator of Forests has also stated that the Committee will cover the following areas and submitits report to the Government;

a) To go into the details of management of departmental elephants and suggest improvements if any;

ii) To examine the allegations of ill-treatment meted out to the Makhna elephant and identify the source of extensively as possible.

pto

Madras
No. 3288
Date 4/12/01

c) To study the present status of departmental and privately owned elephants including temple elephants and suggest norms for management of these elephants.

The Principal Chief Conservator of Forests has also stated that the Committee will undertake tours to the neighbouring States in order to fulfill the above mentioned tasks and that for this purpose the Committee shall be treated as First Class Committee and shall be eligible to the facilities and entitlements available to the First Class Committee. He has further stated that the Committee shall submit its report on departmental elephants and the report on ill-treatment of Makhna elephant within a period of one month of its constitution and that the report on the temple and private elephants shall be submitted within 3 months.

4. The Government have examined the proposal carefully and accordingly pass the following order:

i) In order to study and examine the status of elephant management in Tamilnadu both departmental and private owned elephant including temple elephant, the Government shall constitute an Expert Committee which will be called as "The Krishnamurthy Committee".

b) The Constitution of the Committee shall be with the following members:

1. Dr.V.Krishnamurthy,
Retired Joint Director of Animal Husbandry and
Member Elephant Task Force, IUCN ... Chairman.

2. Dr.M.G.Jayathangaraj, M.V.Sc., Ph.D.,
Associate Professor and Head In charge. ... Member.

3. Mr.Hemanth Kumar,
Regional Deputy Director
(Wildlife) Ministry of Environment and ... Member
Forests, Govt.of India, Besant Nagar,
Chennai.

Terms of Reference.

c) The Committee will cover the following 3 areas and submit its report to the Government.

i) to go into the details of Management of departmental elephants and suggest improvements if any.

ii) to examine the allegation of ill-treatment meted out to the Makhna Elephant and identify the sources as extensively as possible.

iii) to study the present status of departmental and privately owned elephants and suggest norms for management of these elephants.

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5. The Committee shall undertake tours to the neighbouring States in order to fulfill the above mentioned tasks.

6. The Committee shall be a first class Committee for purpose of journey, Travelling Allowance and Dearness Allowance to the members.

7. The Committee shall submit its report on departmental elephant and report on Makhna elephant within a period of one month of its constitution. The Committee also shall submit its report on the temple and private elephant within a period of three months of its constitution.

8. The Chief Wildlife Warden shall countersign the Travelling Allowance and Dearness Allowance bills of the members of the Committee.

9. The expenditure in respect of the Committee members shall be debited to the office contingencies of the Principal Chief Conservator of Forests.

10. This order issues with the concurrence of Finance Department vide its U.O.NO.196/JS(SF)/01 dt:29.11.2001.

(BY ORDER OF THE GOVERNOR)

V.PALANICHAMY
SECRETARY TO GOVERNMENT.

To

The Principal Chief Conservator of Forests, Chennai.15

Chief Wildlife Warden, Chennai.15.
The Secretary to Govt.of India,
Ministry of Environment & Forests, Paryavaran Bhavan,
CGO Complex, Lody Road, New Delhi.

All members of the Committee.

copy to: The Pay & Accounts Officer, Chennai.9
The Accountant General, Chennai.18/35 (BN)
The Finance Department, Chennai.9

Sr.Personal Assistant to Minister (Information, Tourism, Forests and Environment) Chennai.9

Secretary to Chief Minister, Chennai.9

SF/SC.

-Forwarded by order-

4/12/01
Section Officer.