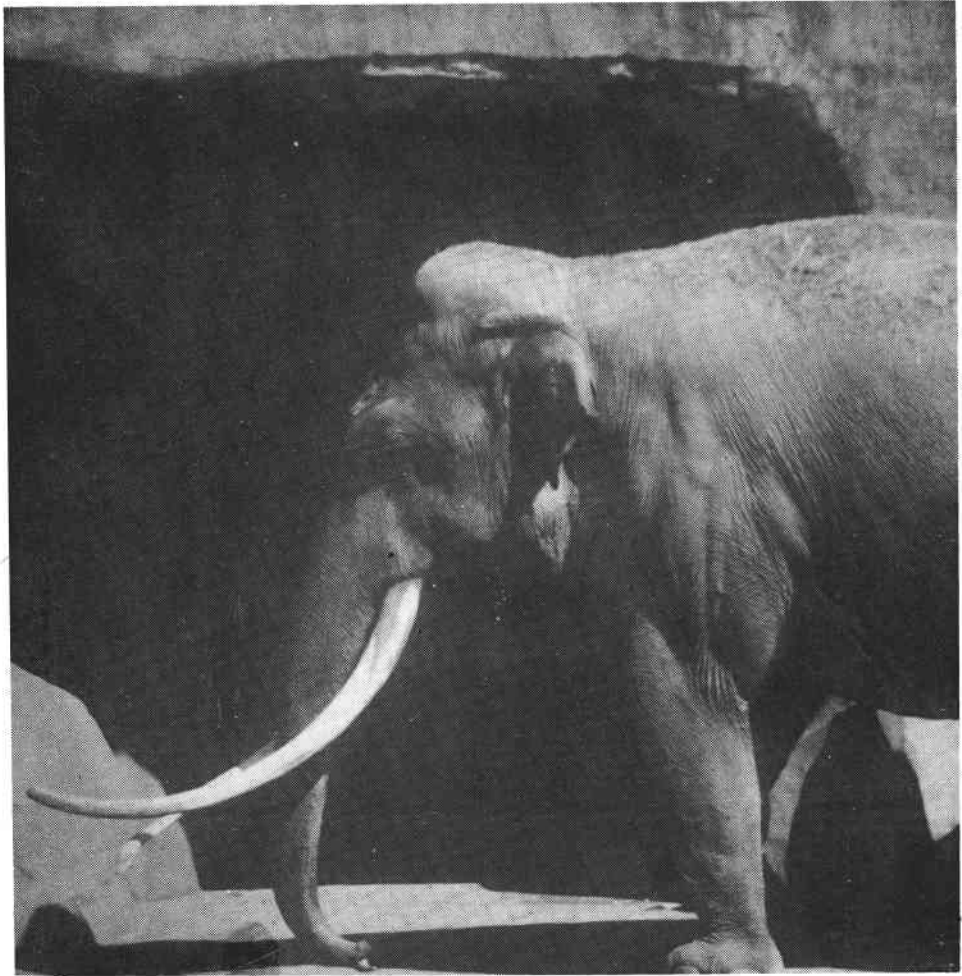


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1. To highlight the plight of the Asian Elephant.
2. To promote the conservation of the Asian Elephant, and
3. To provide a forum for communication amongst the members of the Asian Elephant Specialist Group.

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COMMENTS ON ELEPHANTS IN BURMA*

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ABSTRACT

This draft is a set of notes rather than a formal report, offering a few suggestions on the population dynamics of wild elephants and timber elephants. The major problem is that the timber elephants do not constitute a self-perpetuating population, that they must be augmented continuously by capture of wild elephants, but that these appear to be declining such that their capacity to provide enough animals is progressively eroded. Demographic analysis suggests that the reason for the timber elephants' inability to maintain numbers has nothing to do with their death rate. This is not high. Burmese veterinary treatment of elephants is of a very high standard. The reason lies instead with the low birth rate. If this could be raised above 8 births per year, per 100 females of breeding age, the population of timber elephants would be self sustaining. Suggestions are offered for how this might be done, but it is best left to the knowledge and experience of the Veterinary Officers. The current capture rate of about 120 elephants per year from the wild population is probably above the maximum sustainable yield. The wild population seems to be declining at about 5% per year. Suggestions are made for determining current numbers, trend, and sustained yield, and for halting the decline of wild elephants.

INTRODUCTION

This draft is more a set of notes than a formal report. The writer is keenly aware of the Burmese expertise on elephants and would not presume to advise men who know much more than he does about this subject. The purpose of these notes is therefore only to give an outline of potential problems as he sees them. Sometimes the perspective of an outsider, however poorly informed, can reveal problems not immediately obvious to men closer to the subject. These notes are offered in that spirit of humility. They will contain mistakes reflecting the writer's lack of detailed knowledge, and for these he asks forgiveness, but they may also contain one or two ideas that can be used.

[* This paper refers to the situation of elephants in Burma in 1980].

PROBLEMS

Burma contains two populations of elephants. The first comprises the timber elephants, a population of known size and demographic characteristics, under intense and skilful veterinary care, which would decline progressively unless captured recruits were added each year. The second comprises the wild elephants, a population whose demographic characteristics are unknown, whose size is not known precisely but is probably in the region of 3,000, and whose rate of increase or decrease is unknown. From this population about 120 elephants are captured each year to add to the timber elephant population.

These questions immediately arise: 1. Why cannot the population of timber elephants maintain itself without artificial recruitment from the wild population? 2. Can the wild population sustain, without declining, an offtake of 120 elephants per year?

DEMOGRAPHY OF TIMBER ELEPHANTS

This section investigates the population dynamics of the timber elephants in an attempt to locate the reason for their inability to hold numbers stable. The data used are not exhaustive and hence the conclusions are only approximations.

Mortality

On p. 78 of his excellent book "*Burmese Timber Elephant*", U Toke Gale (1979) gives the incidence of death by age-class for 714 timber elephants. These data are used here to investigate the mortality pattern. Table 1. gives U Toke Gale's figures in the second column and rate of mortality per year in the third. The rate of mortality is the percentage of elephants within a stated age-class at the beginning of the year that will die before the end of the year. It is a different statistic from the percentages given by U Toke Gale, which are the deaths in an age-class as a percentage of total deaths recorded.

Table 1. % Mortality Rate in Timber Elephants.

Age-class (years)	Deaths recorded	% mortality rate per year
0 - 9	78	1.2
10 - 17	27	0.5
18 - 35	185	2.0
36 - 54	222	3.8
55 - 70	201	25.0
Total	714	

These figures cast doubt on the commonly expressed opinion that the mortality of timber elephants is excessively high. The mortality pattern revealed above is not much different from that of wild African elephants. The veterinary treatment of elephants is of such a high standard in Burma that little more could be done by chemotherapy to reduce the already low rate of mortality. At present there is one veterinary assistant to about 40 Timber Corporation elephants and one veterinary officer to about every 15 veterinary assistants. Veterinary treatment and training in Burma is modern, highly developed, and backed by an elaborate recording system. Detailed records are kept on the health and treatment of each timber elephant. Burma could teach other countries a lot about veterinary care of elephants but there is little or nothing on this subject that other countries could teach Burma.

Table 2. Life table for timber elephants as approximated from U Toke Gale's data

x	l_x	d_x	q_x
0	1.000	0.109	0.109
1	0.891	0.083	0.093
2	0.808	0.147	0.182
3	0.661	0.160	0.242
4	0.501	0.162	0.323
5	0.339	0.287	0.847
6	0.052	0.051	0.981
7	0.001	0.000	1.000

Notation:

x = Age in decades; l_x = Probability at birth of surviving to age x ; d_x = Probability at birth of dying in the decade x of age; q_x = Probability at age x of dying in the next decade of age.

Assumptions: Population has a stationary age distribution and zero rate of increase.

Birth rate

U Toke Gale stated (p. 71) that a healthy female can produce three to five calves in her lifetime at a spacing of five to seven years between births. That approaches the rate of breeding in the wild and represents a maximum that could be hoped for from a captive population. If a female bred at intervals of seven years, and her chances of dying at any age were those given in the previous section, on average she would produce 3.88 calves in her lifetime (Table 3).

The birth rate of timber elephants might reach this level for some females but the average is much lower. The timber elephants in the Prome area produced only 15 calves in 1979 from 283 females of breeding age. That is a birth rate of 5.3 per 100 breeding

females and implies an average calving interval of 18.9 years. Applying again the mortality rates of the previous section we arrive at a figure of 1.44 calves produced in the lifetime of an average female.

Rate of Increase

A rate of increase or decrease can be calculated from the mortality and birth data presented previously. If the timber elephants each bred at intervals of seven years, but the rate of mortality was the same as now, the population of timber elephants would increase at 2.3% per year (Table 3). However, with current mortality rates and the birth rate implied by the 1979 data from the Prome area, the captive population would decrease at 1% per year (Table 4).

This analysis highlights two facts, one obvious, the other less so: (a) the population of timber elephants cannot sustain itself and must be augmented continuously by capture of wild elephants and, (b) the reason seems to lie exclusively in a low birth rate rather than an excessive death rate.

Reasons for the Low Birth Rate

The writer does not have the information necessary to determine precisely why the birth rate of timber elephants is below the replacement rate. The veterinary officers would have a much better idea. However, from the little information available to him he offers the following suggestions:

Although mating is not actively discouraged it is also not greatly encouraged. The attitude is to "let nature take its course". Unfortunately the course of nature is deflected by some of the management practices designed to increase efficiency at elephant camps. The effect of these will now be examined. U Toke Gale's data on p. 67 of his book shows that the commonest period of birth is October-March (average is December-January) which accounts for 68% of total births. Taking the period of pregnancy as 21 months the corresponding peak period of mating is January to June, the average being March-April. That period coincides both with the peak of *musth* and with the annual rest period. Leaving aside the question of whether *musth* is related physiologically to reproduction, we note that the rest period is not conducive to mating. The elephants are widely scattered among rest camps, these camps often contain elephants of only one sex, and males in *musth* are restrained from friendly encounters with females. These practices are designed to increase the peace and efficiency of the elephant camps, but their incidental effect may be to reduce the birth rate. *It is no coincidence that the highest birth rates among timber elephants are in areas where wild elephants are also present.*