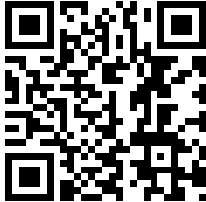

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DESTRUCTION OF LIFE BY WILD ANIMALS AND VENOMOUS SNAKES IN INDIA.

A Paper read before the Indian Section of the Society of Arts, Friday, February 1, 1878,

By Sir J. FAYRER, K.C.S.I., M.D., F.R.S.

It has been suggested to me that some information on the destruction of life in India by wild animals and venomous snakes would be acceptable to the members of this Society; I have, therefore, put together a few notes on the subject, which will serve to show that, among the many preventive checks to population in that country, such as epidemics, famines, storm-waves, and cyclones, nature has yet another and very potent one, in the predaceous animals with which the forests, hills, plains, and waters still abound. I propose, then, to give you some account of the mortality caused by these creatures among our Indian fellow-subjects, to tell you something of the circumstances under which the deaths occur, and to add a brief description of the animals that destroy 20,000 human beings, and 50,000 head of cattle annually. This yearly loss of human life and cattle is startling, and suggests the question whether some more effective measures than any now in operation might not diminish it. The subject has long been under consideration by the Indian Government, and the object of legislative interference, but, as I shall presently show you, with no very satisfactory results; and, that, notwithstanding the measures taken, the destruction of life still goes on at what has been described as really "an appalling rate."

It appears from the returns furnished to Government, that, in the year 1875, 20,805* persons and 46,805 head of cattle perished from this cause, and that the deaths were due to the following animals:—Elephants killed 61 human beings and six head of cattle; tigers, 828 persons and 12,423 cattle; leopards, 187 persons and 16,157 cattle; bears, 84 persons and 529 cattle; wolves have a bad pre-eminence, for they destroyed 1,016 persons and 9,407 cattle; hyænas are responsible for the death of 68 persons and 2,116 cattle; whilst jackals, alligators, buffaloes, boars, and other animals, are charged with the destruction of 1,446

persons and 3,001 cattle, whilst snakes killed 17,070 persons and 3,166 cattle.

In 1875, Bengal lost 10,914 persons; the North-West Provinces, 3,933; Oude, 1,736; Madras, 1,536; Bombay, 1,072; Punjab, 723; Central Provinces, 617; Assam, 420; Burma, Hyderabad, Ajmeer, and Mairwarra contributing the balance; and there is reason to suppose that even these returns fall short of the real mortality in respect of some of the localities, whilst from others, such as some of the independent States, no returns at all have been obtained, and all this notwithstanding the destruction of a large number of wild animals and snakes. For in the same year, 1875, it appears that 22,357 wild animals, and 270,185 snakes were destroyed, at a cost to Government of 120,016 Rs.

In 1876, it appears, from the *Gazette* supplement, of November 24th, 1877, that there was some diminution in the loss of human life, but an increase in that of cattle; 19,273 persons, and 54,830 head of cattle were killed. But as the returns were not complete, those from Mysore and Coorg not having been sent in, the comparison with the previous year is not complete. The resolution by Government on the report says, "In Madras, Bengal, North-West Provinces, and Oude the numbers of persons killed by wild animals and by snakes are less in 1876 than in 1875. In the other provinces the figures do not exhibit any great variation, except in the Central Provinces, where deaths rose from 617 in 1875, to 1,098 in 1876."

No explanation is offered of the greater mortality. As regards the loss of cattle, the figures of the year are unsatisfactory; while Madras and Bombay show fewer cattle killed, Bengal, the North-West Provinces, Oude, Punjab, Central

* The totals given in the Government returns for 1875, are:—Men, 21,391; cattle, 48,234; but there seems to be some error in the addition, which should be—men, 20,805; cattle, 46,805. A similar error occurs in the addition of the returns of 1876—men, 19,273; cattle, 51,830; should be—men, 18,273; cattle, 54,430.

Provinces, and British Burma show materially large numbers; and it is probable that the figures are only approximative, as the agency for reporting is still imperfect. The unfavourable figures, it may be, testify to better reporting.

During this year 124,574-4-6 Rs. were paid for the destruction of wild animals and snakes, as against 120,016 Rs., of 1875.

The following summary of the Madras and Bombay reports, gives the results of 1876:—

WILD BEASTS AND SNAKES IN MADRAS.—The Board of Revenue have submitted to Government their report on the results of the measures taken for the destruction of wild beasts and snakes during the year 1876. The number of elephants killed was 2, tigers 236, leopards 844, cheetahs 177, bears 133. The number of tigers killed in 1876 was about the same as that in 1875. Most of them were killed in the Northern Circars, Malabar, and Coimbatore. Leopards and cheetahs.—The total number killed in 1876 was 1,021, against 918 in 1875. Of the 133 bears killed, 107 belong to the Northern Circars. The number killed in 1875 was 154. The number of wolves killed was 39, exactly the number killed in 1875. The total number of hyenas destroyed was 164, against 139 in 1875. The total number of other animals killed was 4,741, against 5,302 in 1875. No reward is granted for the destruction of snakes, and as a consequence the number killed is probably not correctly reported. The number reported, however, is 532, against 3,075 in 1875. The total loss of human life by wild animals and snake-bites was, if the reports are to be trusted, considerably less in 1876 than in 1875. The returns show only 162 deaths in 1876, against 268 in 1875, by wild animals; and 819 against 1,268 by snake bite; but the Board apprehend that the number reported is not trustworthy. The loss of cattle was 10,322, against 11,934 in the preceding year; that caused by tigers, leopards, and wolves, being respectively 3,231, 2,235, and 3,681.*

DEATHS FROM ANIMALS IN INDIA.—A statement has been published in the *Bombay Gazette*, showing the results of the measures adopted in British India with the view of exterminating wild animals and venomous snakes, during the year 1876. As will be perceived, snake-bites are far in excess of all other causes of death. The number of persons killed by elephants was 52; by tigers, 917; leopards, 156; bears, 123; wolves, 887; hyenas, 49; other animals, 143; snakes, 15,946; total killed, 19,273. Number of cattle killed by elephants, 3; tigers, 13,116; leopards, 15,373; bears, 410; wolves, 12,448; hyenas, 2,039; other animals, 4,673; snakes, 6,468; total killed, 54,830. Number of animals and snakes destroyed and amount of reward paid for their destruction: Elephants, 4, Rs. 50; tigers, 1,693, Rs. 43,598-12; leopards, 3,786, Rs. 33,972-12; bears, 1,362, Rs. 4,915-6; wolves, 5,976, Rs. 18,633-12; hyenas, 1,585, Rs. 3,650-12; other animals, 8,053, Rs. 3,985-2; snakes, 212,271, Rs. 15,757-12-6; total number, excluding snakes, destroyed, 23,459; total amount of reward, including snakes, Rs. 1,24,574-4-6†

Now, it seems obvious that more effectual measures are needed to mitigate, if not prevent, this evil. There is reason to believe that the supreme Government has the matter under its anxious consideration, with a view of devising plans by which, with the most efficiency and at the least cost, the evil may be remedied. But I fear the expenditure of more money is needed to make any arrangement competent to grapple with the evil. I shall presently tell you briefly what measures are in force, and offer a few suggestions as to how a scheme for dealing with it might be worked out.

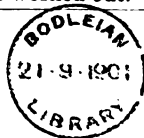
* *Madras Times*, October 4, 1877.

† *Allan's Indian Mail*, 29 Dec., 1877.

The question that it concerns us to ask is, how may this mortality be diminished, and what measures might be resorted to for mitigating what should be, to some extent certainly, a preventable evil. It is one by no means easily dealt with, and though, no doubt, Government aid is needed—in- deed, is essential in a country like India, where Government is expected to do almost everything—yet it is necessary that the people should bestir themselves, trust to their own resources, and be more self-reliant in this as in other matters concerning their social welfare, before the evil can be removed, or stayed. Nor can it ever be so entirely whilst predaceous animals continue to abound. As Shakespeare says, "Tigers must prey!" and, so long as these *feræ natura* are numerous, cattle or men will be their victims. The Government may give rewards for the destruction of noxious animals, but the people must learn to protect themselves, and to bring the resources of improved knowledge and civilisation to bear on this and other matters that concern their well-being. As education makes them more self-reliant, and clears away prejudices and superstition—as civilisation produces increase of cultivation, and a more general diffusion of humanising influences—wild beasts will recede, and men will no longer worship, or reverence with superstitious awe, the creatures that destroy them. Meanwhile, one cannot help thinking that something more should be done to prevent such destruction of life.

The death-rate from disease has been reduced to less than one-third of its former figure (69 to 18) by the scientific application of sanitary laws. Let the same enlightened attention be given to this death cause, and depend on it, equally good results would, in time, ensue. In a few years, it would no longer be the duty of the registrar to chronicle such figures of mortality as those I have given you. Without concerning ourselves with what obtained previous to 1868, I will tell you chiefly what has been done since then. I have selected from the *Indian Gazette* a small portion of what is recorded, but sufficient to show the extent of the evil and that it is appreciated both in India and England.

Towards the close of the year 1868, a scheme submitted by the late Captain Rogers, of the Bengal Staff Corps, for the destruction of wild animals, and a suggestion by the Foreign Department for the revision of the existing system of rewards for such destruction, led to a review of the losses occasioned from year to year, both of life and property, by tigers, panthers, wild elephants, snakes, and other noxious animals, all over the country, with a view to the determination of the best means that could be adopted for their extirpation. No single report, however, was extant, which would give sufficient, if not complete, information on the subject; accounts of the depredations committed in the several provinces by beasts of prey being scattered over a variety of documents, such as survey reports, general administration reports, applications for sanction to the offer of rewards, special reports of missionaries residing in the interior, &c., &c. But the few papers that could be collected at the moment were enough to convince the Government that the annual losses of human life, and of cattle, and the injury to crops caused



by these scourges, were exceedingly great. Whole villages were at times completely depopulated, public roads and thoroughfares rendered literally unapproachable by human beings, even in broad daylight, and thousands of acres of once cultivated land were, in consequence, entirely deserted, and confined to the growth of brushwood and rank vegetation, to offer, in their turn, safe coverts to these various animals, and enable them to do more havoc in the surrounding country.

It appeared from the Central Provinces Revenue Survey Report for 1867-68, that great obstruction was caused to the operations of the survey party by the depredations of tigers which infested the district where it was employed. A tigress was represented to have killed 127 people, and stopped the traffic for many weeks on the road between Moolb and Chunda, until she was shot by an officer. In the Topographical Survey Report of the Bengal Presidency for 1867-68, it was stated that "in the Central Provinces the surveyor came across a track which had been utterly devastated by a single tigress, which was estimated to have killed upwards of 50 people, and was known to have driven the inhabitants away from 13 villages." Certain proceedings of the Madras Government that were laid before the Governor-General in Council, also contained terrible accounts of the ravages committed by tigers, leopards, and other wild animals. A report by the collector of South Canara, dated the 16th February, 1868, stated:—"The depredations caused by tigers and cheetahs have of late been somewhat serious in the district, and even the town of Mangalore itself is not free from their incursions. In the month of June, 1865, it was reported that during the previous twelve months no less than sixteen human beings had been carried off in the Udipi and Candapore Talooks, and in the rest of the district, the loss of life by this cause only was gradually on the increase. In addition to this, the losses by the villagers of their cattle, goats, and pigs were in some localities very considerable." The collector of Kurnool, under date the 9th October, 1867, reported that, up to the end of September preceding, a man-eating tiger had carried off no less than 64 human beings, and had caused such a terror that the post-runners and beat constables would not traverse the ghat until large numbers of persons collected together, and procured numerous tom-tom beaters to accompany them, and that the coolies of the Public Works Department had stopped work through fear of attack by this tiger.

The proceedings of the Government of the North-Western Provinces were also not wanting in horrible accounts of ravages committed by wild beasts. A report by the local Board of Revenue, dated 7th December, 1867, contained the following mournful narrative of the destruction of life caused by a single bear in a northern village bordering the forest:—"About midnight, whilst most of the cultivators were out watching their rubbee crops, and there were only some fourteen or fifteen people in the village, a bear, in the short space of two hours, killed two men, three women, and one child, also wounding two men. He first entered the house of one Ahmed Yar Khan, Pathan, and killed two women. He next destroyed Sobratee Dhobee, who had come to the assistance of the women. He then entered the house of Elahi Bukhs,

butcher, and killed his wife and child. The husband attacked him with a knife, but the bear appears (from investigation) with one blow to have torn away his head and face. On retiring from the village he attacked six head of cattle, three of which died before morning. The cries from the village attracted the attention of two of the cultivators, who, proceeding from their fields to ascertain the cause, met the bear a short distance outside the village. He immediately attacked them, wounding them both, but the wounds were not serious. The following night the animal entered the adjoining village of Pertabpore. He there entered the house of a 'Rais,' and wounded his wife; he then attacked the man, and had succeeded in wounding him badly on the arm, when he was shot by a man named Waly Mahomed."

The police reports of some of the provinces showed that the local governments and administrations were quite alive to the necessity of driving away these wild beasts from the vicinity of the habitations of men, and rewards were most liberally dealt out for their destruction. But enormous numbers of men, women, and children still continued to fall victims to their ravages year after year.

So early as March, 1864, the Secretary of State had noticed serious devastations caused by tigers, wolves, and other wild animals, and thought it not improbable that the failure of the handsome rewards offered for their destruction in producing the desired effect might be partly owing to the villagers having been deprived of their arms through the operation of the General Disarming Act. He, therefore, commended the subject to the consideration of the Government of India, and desired that, if deemed necessary, the inhabitants of those villages which suffered most from the ravages of wild beasts might be allowed to retain such arms as were absolutely necessary for the protection of themselves and their property. This despatch being circulated through the government of Bengal to the several Divisional Commissioners in the Lower Provinces, a discussion took place as to the adequacy or otherwise of the authorised rewards, resulting in some cases to an enhancement of them. The Bengal Government also suggested to the Commissioners that strychnine might be used with advantage, and without risk, by being introduced into the body of a cow or other animal after it had been killed by a tiger. But nothing was said in the correspondence that ensued to lead to the conclusion that the operations of the Arms Act had in any way contributed to aggravate the evils complained of.

A separate correspondence was at this time going on with the local governments and administrations on the subject of the Arms Act, from which it became abundantly manifest that the loss arising from the destruction of crops by wild elephants, pigs, &c., was very considerable.

Captain Rogers' scheme consisted of a contrivance devised by him, a sort of spring gun already in use in many parts of the country. The main details of the invention are contained in his letter.

With regard to the weapon, he proposes the use of the old muskets, that have merely a nominal value as iron, and are constantly being taken up and sold as such.

Captain Rogers depicted in strong and vivid colours the immense and irreparable injury caused by wild animals in remote parts of the country, as will be seen from the following extract from his letter:—"By killing as they do these cattle, not only are the villagers losers, but also the Government in an indirect way." It is by these people, and these people, again, assisted by their live agricultural stock, that the vast jungles are becoming tracts of cultivated country; but the wild beasts greatly retard the same, and act as a considerable check on the energies of those unfortunates, who are now, to a great extent, at the mercy of any tiger or other beast of prey that may take up its quarters in their district.

No thefts or murders in India can exceed the horrors and misery caused by the wild animals, and no picture or language can give even a faint idea of the sufferings of their victims. Those poor creatures, living as they do, for the most part, in districts seldom or ever visited by any European except an occasional sportsman, are obliged to bear their losses or sufferings with little or no chance of the same being brought to the notice of the Government whose subjects they are. I now look upon it in the light of a question involving the lives of hundreds of persons yearly, and, in a second and less serious light, as affecting the loss of cattle to the value of many lakhs of rupees for the same period, and the same being almost entirely the only worldly property of thousands of half-starved creatures of a much more honest and truthful disposition than the inhabitants of the towns and villages in the immediate vicinity of our stations.

Captain Rogers would organise the shikarees of every district into regular bands, with jemadars over them, and supply them with guns and ammunition, exempting these selected shikarees from the usual payment for licenses for their guns. He said that, where bows and arrows were used by the natives, the same contrivance as that suggested by him would operate with fatal results in the destruction of wild animals. He would fix the reward at 8 Rs. only, "but never more, except under special circumstances, having no reference to the damage the tiger is doing, but to any extra trouble or injury the shikaree has sustained in killing it."

The total reported loss of human life in the three years of 1866-67, 1867-68, and 1868-69, from wild beasts and venomous snakes, was no less than 33,218,* or 12,736 per annum; and that the expenditure incurred by Government in rewards for the destruction of noxious animals amounted to 455,755 Rs., or 151,918 Rs. per annum. Bengal appears to have suffered most, upwards of 21,000 lives having been lost during the period; that is, nearly 5,000 more than the number lost throughout the rest of India. This certainly throws serious doubts on the accuracy of the returns from the other provinces. Next to Bengal, are the North-Western Provinces; Oudh, the Central Provinces, and Madras stand third, fourth, and fifth, respectively; British Burmah showing the least loss of all. As regards expenditure, the Central Provinces stand first in the list, having spent a lakh and 65,000 rupees; that is, nearly three times as much

as Bengal. Next to the Central Provinces stands Madras, where the expenditure amounts to 80,000 rupees. Bengal stands third in this respect, having spent only 62,000 rupees; Punjab is fourth, and British Burmah has been the least expensive of all.

The excessive expenditure in the Central Provinces may be in some measure owing to the extremely high scale of rewards prevailing in these provinces. One hundred rupees for a "man-eating" tiger, and fifty rupees for a "full-grown" tiger, are not paid anywhere else. It may not be possible to secure uniformity in regard to the scale of rewards. But, presumably, the Government of India can, with great advantage, lay down a maximum limit for each species, on a consideration of the rates prevailing in the different parts of the country, leaving it to the local governments to propose higher rewards in the case of any specially destructive and dangerous animals.

None of the local governments suggest any specific measures for adoption beyond the system of rewards now in force; and almost all subordinate officers whom they have consulted agree in condemning Captain Roger's mechanism as unsuited to the territory under their jurisdiction, or as dangerous and full of risk to human beings and domestic animals. For a brief analysis of the opinions given by the local governments, the reports may be divided into three heads:—

1. The destruction of wild animals, and Captain Rogers' plan.
2. Destruction of poisonous snakes; and
3. Disposal of the skins of wild animals killed.

As regards the destruction of wild animals and Captain Rogers' plan, local officers in the Lower Provinces consider the system of offering rewards to be practically the best, and recommend no change in this respect. The Lieutenant-Governor thinks that much good might be done by encouraging local officers in districts in which the loss of life and cattle is great, "to organise at suitable seasons, and at a small expense to Government, large hunting parties, to destroy the particular class of beasts found to be destructive," as such a course would give the people courage, and incite them to organise similar hunts themselves, and also teach them to make a stand against a danger that is now destroying their substance and themselves. His Honour would also encourage the police to destroy noxious wild animals by allowing them the usual rewards.

The Madras Board of Revenue considers it "the bounden duty of Government to do something for the destruction of wild animals and the protection of life and property from their ravages," but does not think it necessary to depart from the present system of rewards.

The Government of the North-Western Provinces, writes:—"Upon the whole, the Lieutenant-Governor is of opinion, that the existing system answers well, and no material alteration need be recommended. Wherever there is any unusual prevalence of destructive animals, his Honour considers that the Government should have authority, as within budget limits it already possesses, to increase the rates of reward for their destruction. And where individual animals become notorious as occasioning loss of life, such as man-eating tigers and rogue elephants, liberal rewards should

* Wild beasts, 12,564; snakes, 25,664. Total, 38,218

be offered on special parties organised for killing them." His Honour does not approve the adoption of Captain Rogers' plan. The use of poison is recommended by some officers, but it does not appear to have been anywhere adopted. His Honour considers that there is obvious danger in a resort to this practice, and is, therefore, unable to recommend its indiscriminate adoption. But he does not explain what that danger is. The Superintendent of Dehra Doon strongly advocates the plan of putting strychnine in the carcasses of animals killed and left by tigers before they come back to eat them.

The Lieutenant-Governor of the Punjab agrees with the conclusion arrived at by a majority of local officers, that the existing system of rewards is sufficient, and no change is desirable.

Capt. Rogers' plan is generally pronounced to be unsuitable to the Punjab. The Lieutenant-Governor remarks that it is a known and undisputable fact that the number of wild animals is rapidly decreasing in the Punjab, and that if their destruction proceeds at the same rate as at present, the more dangerous animals will at no distant date be altogether exterminated. The chief cause of this diminution, he thinks, is the rapid increase of the population, and the immense extension of cultivation in the province, which has reclaimed vast tracts formerly covered with jungle, and affording shelter to wild beasts.

In the Central Provinces also, the destruction of animals dangerous to crops is left to the people themselves, the measures of Government being confined to those that are dangerous to human life.

The Oude and British Burmah authorities also support the existing system of offering rewards, and do not consider any other measures requisite.

The Resident at Hyderabad approves the existing system of offering rewards, and does not consider any change necessary. The Deputy-Commissioner of Booldannah says that, in the last few years, the wild animals are becoming much fewer in number, and that such an animal as a tiger will, before long, not be heard of in that district; he thinks Captain Rogers' plan to be a "dangerous one, and more likely to lead to the death of cattle and human beings than of tigers." The officers consulted by the Chief Commissioner of Coorg are of opinion that the continued payment of rewards, at an increased scale, will effect the gradual extirpation of the most dangerous and destructive class of wild beasts. The Chief Commissioner concurs in this view, but says that "in certain localities, so as to effect the destruction of particular animals, some of Captain Rogers' suggestions might be adopted with advantage." He, however, does not specify the suggestions.

The following extract from the proceedings of the Bombay Government* connected with a recent case of fraud, will show to what extent funds assigned by Government for the destruction of noxious animals are capable of being misappropriated under the new system:—

"A most impudent fraud has been practised. It appears that the average annual payments for the destruction of wolves in the Seerpore Talook of Khandeish was 390 Rs.;

whereas from the 31st March to the 21st May, 1859, no less a sum than 3,381 Rs. was paid on this account. Of this sum 581 Rs. was disbursed by order of the Mamlutdar between the 31st March and 23rd April. On the latter date the Mamlutdar went on leave, and the Head Karcoon took charge. Between then and 21st May he managed to pay away 2,800 Rs. The fraud was then discovered."

The following extract from the report of the collector and magistrate shows the bare-faced manner in which this system of robbery was carried on:—"There is reason to believe that no trouble was taken to procure even a few wolf skins to give colour to the fraud; for of the 45 skins which were seized when the fraud was discovered, and for which an order had actually been written on the treasury to pay the rewards, there is not a single wolf skin. They consist of village cat skins, fox skins, jackal skins; and it is probable that the whole of the rewards were paid on this lot of skins brought up over and over again, some of them having been torn across and sewn up again."

The rules for payment of rewards require that the skins should be accompanied by a report from the village officers, stating that the bearer had killed the animals in question and was entitled to the reward. An examination of the skins has also to be made by a "punchayet," or jury. These rules were duly observed, but false reports were received from the villages, and any person who happened to be present in the kutchery was made to go through the form of signing the report of the jury.

The following resolution was recorded:—The papers now before the Government of India conclusively establish the fact that the evil under consideration is a very serious one. The loss of life, though probably not quite accurately reported, is certainly enormous. Nowhere is the destruction of life by wild beasts so great as in the lower provinces of Bengal. In other provinces, as cultivation and civilisation have advanced, wild beasts have diminished in number. In the Punjab, and in most parts of the Bombay Presidency, the presence of the more dangerous species is now stated to have become exceedingly rare.

In the opinion of the Governor-General in Council, this serious mortality could be very largely reduced by the extirpation of those animals in the neighbourhood of human habitations. This should be first attempted, and every reasonable means taken to secure their destruction whenever they make their appearance near towns or villages. The system of rewards hitherto in force in all provinces seems to be the most effective means by which the Government can accelerate the work, and local governments and administrations are empowered to increase, within the limits of their respective budget allotments, the rate of the authorised rewards whenever such a measure is considered desirable; but rewards should only be given for killing destructive, and not merely wild, animals.

As regards snakes, it seems to be overlooked by many officers that there is a deep-rooted prejudice among most natives against killing a snake—a prejudice which nothing but the offer of a reward will overcome. And, as deaths from

* Revenue proceedings for October, 1870.

snake-bite are extremely numerous, the Governor-General in Council has no doubt that the recent prohibition against the grant of rewards for killing snakes should be partially withdrawn, and that rewards not exceeding two annas a head, as a general rule, should, at the discretion of the local governments and administrations, be offered for snakes known to be deadly, that is, the cobra and some other species to be expressly named. But such rewards should not be offered throughout a whole province or for an unlimited period, but in selected districts, where the mortality from snake-bite is greatest, and for a period not exceeding two years. At the end of this period the result of the experiment should be reported to the Government of India in order that, if successful, the propriety of extending it may be considered; and it is clear, from the correspondence, that care should be taken that no reward be given without the snake, when killed, being seen by the officer who grants the reward, and that the head of every such snake be cut off and destroyed as soon as the reward is given.

In 1871-2 the Government of India, at my request, caused me to be furnished with the returns of death by snake-bite in the following provinces for 1869. It appears that there were in Bengal 6,219 deaths; Orissa, 350; Assam, 76; North-West Provinces, 1,995; Punjab, 755; Oude, 1,505; Central Provinces, 606; Central India, 90; total, 11,290.

This portion of India is not much more than half the whole area, and the returns are but very imperfect, as up to that time no very reliable records were available. Thus it is probable that if Bengal had a mortality of 6,219, Orissa and Assam together, both regions prolific in poisonous snakes, would probably give a larger return, if accurate records were kept, than a total of 420 deaths from snake-bite. The most obvious mode of dealing with this national evil is prevention, and the adoption of a rational mode of treatment, and though comparatively little may be expected from the latter, much may be anticipated from the former, and it is to be effected by making the nature and appearance of the known venomous as distinguished from the innocent snakes, and by offering rewards for their destruction, to be judiciously distributed. Such was the object of the work that I wrote and presented as a parting gift to the country, when I left it in 1872, and when I stated that the real mortality from the snake-bite for the whole of India was probably in excess of 20,000 annually. I think you will allow there were good grounds for the assertion.

The snakes that are so destructive to life in India are the cobra, the bungarus or krait, the echis, and the daboia, or Russell's viper, all most conspicuous snakes, and easily identified. There are others, but they are comparatively rare, and seldom bite men. In the book referred to there is a picture from nature of each venomous snake known in India, so that there can be no possible difficulty in recognising them.

This book is, or should be, distributed over India for the purpose I have described, and it is about to be supplemented by a smaller edition by Dr. Ewart, which will place full information within the reach of everyone, so that no excuse can exist for difficulty in distinguishing venomous

from harmless snakes. Rewards should be offered for venomous snakes only. This, if steadily carried out, and the money paid by some responsible official on identification, would soon diminish the number of snakes and deaths from snake bites. And I must earnestly protest against the validity of an opinion expressed by some authorities in India that such rewards are useless;—useless they may have been when distributed without discretion for snakes not poisonous. If this method of dealing with the subject, and who can deny its importance, be adopted—but it must be done willingly, and not with a foregone conclusion that it will fail—I am certain that, as part of a comprehensive scheme for the destruction of noxious animals generally, it will succeed.

The Bombay Government, in a resolution of the 17th June, 1872, for example says:—"The experience of the last 15 years on the subject of rewards for killing snakes, shows that at present no effectual antidote to the poison of the snake is known.

"That in districts where the work of snake killing has been actively carried on, the death-rate from snake bites has been gradually reduced. That in Rutuaghery, where more has been done in the matter than in any other part of the Presidency, the death-rate has been reduced from 257 in 1856, to 37 in 1869; while in Kaira, where the reward offered has not as yet been enough to overcome the dislike of the people to kill snakes, the death-rate has risen from 46 in 1856, to 72 in 1869."

The Government of India, addressing the Secretary of State on this subject, on 27th November, 1874, says:—"The reports furnished by the local governments and administrations, show the measures that have been taken under resolution of 11th September, 1871, and the result of them. There is no doubt that a great deal has already been done towards the extermination of wild beasts, and as the subject is engaging the earnest attention of the local authorities throughout India, it is hoped that future results will be more satisfactory as regards snakes, but Government is of opinion that the experimental offer of a reward for their destruction has been a failure. As the arrangements for the destruction of wild animals now in force seem likely to prove sufficient for the purpose in view, Government is not disposed to sanction Captain Rogers' proposals, which do not commend themselves to its judgment."

To recur to the feline animals, I have taken the following from the Madras Reports.

The destruction of wild beasts was vigorously prosecuted, and with greater success in 1873 than in 1872.

In the northern and western ranges it appears that in those two years 391 tigers were killed, whereas in the years 1866 to 1869, an average of 186 tigers was killed in those districts.

Special rewards were given in Kurnool and other districts—58½ Rs. in 1871-72, and 49 Rs. in 1872-73, for each tiger.

Cheetahs (Leopards).—In 1871-72, in certain districts in the Madras Presidency, 678 were killed; in 1872-73, 788. In the three years from 1866 to 1869, 898 leopards (or panthers) were killed yearly on the average. The average reward was

13 and 14 Rs., but in Canara, a special reward of 40 to 44 Rs. was given.

Bears.—In 1871-72, 102; in 1872-73, 115 were killed, more than half of them being killed in Ganjan; 5 Rs. 11 annas was the average reward paid.

Hyenas.—In the two years 1871-72, 1872-73, 203 were killed in Ganjam, Vizagapatam, Kishai and Kurruck, and 17 other districts; 3½ Rs. was the annual reward paid for them. Wolves are not numerous in Madras; 14 were killed in 71-72; 20 in 72-73; 5 Rs. were paid for each.

In Malabar in 1873, 9,300 rupees were paid for alligators. The grant of rewards for these Saurians has been discontinued, excepting in rare cases, where a large one proves dangerous.

"On the whole," says the proceedings, "the grant of rewards, amounting to 24,000 rupees yearly, represent the destruction of nearly 1,200 dangerous animals, a result which the Board regards as satisfactory. The Board now recommends that the maximum reward for a full grown tiger be 50 rupees, for a leopard 25 rupees, and it appears that the Madras Government sanctioned 100 rupees for every tiger killed in the district of Ganjam, Jeypore, Godavery, Kurnool, South Canara, and Coimbatore.

In August, 1873, the Madras Government appointed Captain Caulfield to the temporary duty of destroying tigers in the Coimbatore district, until 31st December, 1873. Inspector Mackenzie, of the police, was appointed to act under Captain Caulfield, and the collector of Coimbatore was directed to ensure every assistance to Captain Caulfield. Elephants were also placed at his disposal; he was to report to the Inspector-General of Police, who was also to collect materials from all the districts in the Presidency, so as to enable the Government to form an opinion of the requirements of other parts of the country in this matter, and into the extent and direction in which the police may be more especially employed in shooting and poisoning tigers.

The magistrate of Coimbatore, in a letter regarding a plan proposed by Dr. Shortt for poisoning tigers by strychnine, says:—"It appears to me that the offer of rewards has been singularly futile. For two years the 100 rupees for every tiger in the Saltiamunganum hills, and the 300 rupees, and finally 500 rupees, for a known man-eater were offered; and though several attempts were made, the man-eater was not shot, but finally poisoned. I beg leave, therefore, to withdraw the rewards, and to substitute a special report in each case where an extra reward seems to be called for." He suggests that the magistrate of a district should be authorised to expend a certain amount, say 500 Rs. annually, in destroying noxious animals. Dr. Shortt's suggestions were to be tried; but no very definite results were obtained.

It appears that, among other measures, Capt. Caulfield tried traps for the destruction of tigers and leopards, and they were found, to a certain extent, successful. The Inspector-General of Police, on the 17th Nov., 1873, says, in a letter to Government, *inter alia*:—"I enclose reports for the magistrate of Vizagapatam, showing that there has been fearful loss of life on the Narayanapatam pass into Jeypore. There is every

reason to believe that the destruction of cattle by tigers throughout the Presidency is enormous."

Capt. Caulfield's bag up to that date was as follows:—Seven tigers, of which three were man-eaters. Two panthers, of which one was supposed to be a man-eater. Only one tiger was shot, three were poisoned, five trapped. Strychnine was placed in the carcases of nine bullocks killed by tigers. In two cases the tigers did not return, and only in one instance have the bodies of two tigers poisoned been found.

The people are everywhere encouraged to shoot wild beasts. Under recent orders village heads can be supplied with poison, and with a further general introduction of these traps where needed, I have little doubt of a satisfactory result ultimately.

In another letter, 16th January, 1874, the magistrate says:—"Traps do not seem to have been so successful, as only two tigers were destroyed, and one escaped. They are generally too wary to be caught in traps to any extent. The loss of life has diminished since 1872, when 29 lives were debitable to one tiger."

The means sanctioned by Government, and now in full operation, seem likely to check the career of cattle-killing tigers, and prevent their further mischief. Capt. Caulfield's operations extended to Vizagapatam and other districts, and with considerable success. The Government, in their orders in the Inspector-General of Police's letter, of 6th April, says, *inter alia*:—"The Government concur with the Inspector-General, that the most effective way of dealing with the evil is to offer handsome rewards for the destruction of these animals. The ordinary reward, by the standing order, is 35 Rs.; but, as far back as 1865, magistrates were authorised to offer, without reference to Government, such rewards, for any tiger which has destroyed a human being, as they may deem sufficient, not exceeding 100 Rs. Subsequently, in the same year, 100 Rs. were sanctioned for every tiger killed in the Vizagapatam Agency. The Government now resolve to extend this last-mentioned order to the five districts now shown to be so notorious for tigers, and to Coimbatore. His Excellency in Council will be prepared to enhance the reward on due cause shown, as was done for a period of five years in a portion of the Kurnool district with such excellent results, no less than 67 tigers having been destroyed under the stimulus of the offer of 300 Rs. a head." And it is added "that the basis of the recommendation for a permanent reward of 100 Rs. was, that the superstitions of the people led to a considerable outlay in the slaughter of a tiger. They reverence it as they reverence every other object of fear, and he who kills a tiger incurs great expenditure in cleansing himself from the crime!" The Government further says, "Every opportunity should be taken of teaching superintendents of police how to construct and set Capt. Caulfield's trap, and the Inspector-General should procure and distribute doses of strychnine to the infected districts."

Captain Caulfield's diary in July, 1874, gave some interesting but shocking details of the ravages of tigers in Naryanapatam. "This place lies in a valley surrounded on all sides by high hills covered with jungle. As near as possible 40 deaths (human) have occurred here during the past

12 months. I am of opinion that two tigers are at work. In three cases the villagers turned out at once, in each case the tiger killed several men within 12 hours. There appear to be very few cattle killed. I am, therefore, led to believe that the tiger or tigers live habitually on human flesh.

Seventeen deaths have been reported since the 1st of November of last year; probably double this number would be nearer the correct thing. I have made out four deaths since our arrival here, which had not been reported."

Captain Caulfield says, "tigers which take to killing people, are notoriously cunning, and generally range over a beat of some 30 square miles. They have, in most cases, certain places which may be called their head-quarters.

With two or three Europeans systematically at work during the next cold season, I think the district might be cleared of man-eating tigers."

The Government again approve of Captain Caulfield's proceedings, sanction his requests, and empower the Medical Department to meet demands for drugs required in the fever districts in which the operations are carried on.

The system of poisoning by strychnine, though to a certain extent successful, was not altogether satisfactory, and aconite was suggested by the Surgeon-General, it being said to have succeeded in the Himalayas.

Captain Caulfield's appointment does not seem to have terminated on the 31st of December, 1873, as I find several reports from him in 1874, but I do not know exactly what he is doing now. It is not necessary to multiply details, the above is quite sufficient to show how the Indian Government have dealt with this great evil, and that they have evinced no want of appreciation of its magnitude and importance.

I have selected these details from the Madras reports because they forcibly illustrate what has been suffered, and what has been done in one part of India. But I find that in Bombay, Bengal, the North-West and Central Provinces, and Native States, the Government and political agents have all shown themselves alive to, and interested in, the subject, and all or nearly all have expressed their opinions, concurring that the evil is great, and needs remedy. A variety of rewards are offered in different localities, full price for adult animals, half or less for cubs. Some think that rewards should be continued; some that they should be given up, or only given in special cases; some, again, think the rewards too high, others too low. A variety of opinions as to the measures for their destruction exists, but all alike recognise the evil. This much is certain that the subject has attracted attention all over India, even in independent native States, and that the chiefs, notably those of Jeypore and the Nizam, have proclaimed rewards for the destruction of noxious animals. It cannot be said, therefore, that Government is indifferent or misinformed, or that it has omitted to consider the existence of the evil. What is wanted, in my opinion, is a system to be laid down on general principles for the entire country, and worked out in detail according to the needs or peculiarities of each district. There should, in short, be a department, or a branch of a department, with a responsible chief and subordinate agents, for whom

certain rules should be laid down, to be carried out steadily and without hindrance throughout the country, leaving much as to detail to the discretion of local authorities. I would insist on the importance of carrying it out on broad principles everywhere. When such orders are made imperative, and when a department is got into working order, then, I believe, noxious animals will decrease and prosperity will increase.

It is not necessary here to go into details, ample means exist, if sought, for such a scheme in India, and if the matter were entrusted to an officer, such as he who controls the Thuggie and Dacoitee departments, we may feel certain that the result would be as good (in a few years) in the case of noxious animals as it has been in that of noxious men, Thugs and Dacoits.

The *Gazette of India*, of 31st March, 1877, in alluding to the net results of the measures now in force in the different provinces towards exterminating wild animals and venomous snakes in the year 1875, tells us that upwards of 21,000 persons and 48,000 head of cattle were destroyed by wild animals and venomous snakes during the year, that 22,357 wild animals and 270,185 venomous snakes have been killed, and that 1,20,016 Rs. have been expended in rewards, and remarks that these figures deserve the careful consideration of local governments and administrations, in view to such measures being adopted in each province as seems best calculated to diminish this loss of life and property.

Endeavour to estimate the value of life and property destroyed, a very rough calculation will give some idea how great it is.

The value of 48,000 head of cattle, however, is not the money worth alone, but represents that of food lost and tillage prevented, and who can estimate the money value—albeit life has never been set very high in India—of 21,000 human beings so lost? But one may imagine the desolation and horror of the survivors, the depressing and deteriorating effect it must have on cultivation and development of industrial energies of the villages and communities exposed to such losses, and how it must paralyse all efforts towards progress, comfort, and prosperity. Such results, indeed, are graphically illustrated in some of the reports I have read to you. And can nothing more be done to mitigate this evil?

From what I have already said, you see that a scale of rewards has, at various times, been offered for the destruction of wild animals, differing in different localities, and varying according to the urgency of particular cases, that the people have been encouraged also to rid themselves of their enemies, and that special arrangements, in some cases, have been made for assisting them to do so.

The following is a scale of the rewards offered in different parts of India, at different times, for wild beasts and snakes:—

| Tigers. | Rupees. | |
|-------------------------|---------|-------|
| | 12½ | to 50 |
| Bengal | 10 | — 20 |
| Berar | 6 | — 60 |
| Bombay | 5 | — 20 |
| Burmah | 10 | — 100 |
| Central Provinces | 20 | |
| Hyderabad | 50 | — 500 |
| Madras | | |

| | Rupees. |
|---------------------------|---------|
| Mysore..... | 35 |
| North-West Provinces..... | 10 |
| Oude..... | none |
| Punjab..... | none |
| Rajpootana..... | 10 — 15 |

Lions.—The only record of which I find official mention is 25 rupees in Kotah.

Panthers, Leopards, Cheetahs.

| | Rupees. |
|---------------------------|----------|
| Bengal..... | 2½ to 10 |
| Bombay..... | 3 — 12 |
| Burmah..... | 5 — 10 |
| Hyderabad..... | 10 |
| Madras..... | 25 |
| Mysore..... | 15 |
| North-West Provinces..... | 5 |
| Rajpootana..... | 8 — 10 |
| Central Provinces..... | 5 — 12 |

Wolves.

| | Rupees. |
|---------------------------|---------|
| Bengal..... | 5 to 20 |
| Berar..... | 3 — 5 |
| Bombay..... | 4 |
| Central Provinces..... | 2 — 5 |
| Madras..... | 5 |
| North-West Provinces..... | 5 |
| Oude..... | 1 — 6 |
| Rajpootana..... | 5 |

Hyenas.

| | Rupees. |
|------------------------|---------|
| Bengal..... | 1 to 2 |
| Berar..... | 5 |
| Central Provinces..... | ½ — 2 |
| Madras..... | 3½ |

Bears.

| | Rupees. |
|---------------------------|----------|
| Bengal..... | 1½ to 2½ |
| Berar..... | 5 |
| Bombay..... | 3 — 12 |
| Burmah..... | 5 — 12 |
| Hyderabad..... | 5 |
| Madras..... | 5 |
| Central Provinces..... | 2 — 5 |
| North-West Provinces..... | 3 |
| Rajpootana..... | 5 |

Snakes.—(Species not reported).

| | |
|---------------------------|----------------------|
| Bengal..... | 4 annas. |
| Berar..... | |
| Bombay..... | 6 pie to 4 annas. |
| Burmah..... | |
| Central Provinces..... | 1 rupee. |
| Hyderabad..... | 2 rupees to 8 annas. |
| Madras..... | 1 anna. |
| Mysore..... | 8 annas. |
| North-West Provinces..... | 2 rupees. |
| Oude..... | |
| Punjab..... | 2 annas. |
| Rajpootana..... | 1 to 8 annas. |

No reward appears officially proclaimed for elephants, buffaloes, or bisons. In cases of notorious rogues, rewards have been specially given. In Burmah, 5 to 20 rupees offered for alligators; in special cases, more have been given in Bengal and Madras.

The difference in the amount of the rewards appear to indicate that the higher sums were offered in special cases, probably where the creature was a notorious man or cattle-slayer.

Now, I cannot help thinking that if local governments made it part of the duty of district officers,

not merely to proclaim these rewards, but to encourage the destruction of wild animals and snakes, by the operation of an organised establishment, with which they should be supplied in these districts, much benefit would result. The money rewards already offered would probably suffice for wild animals, but those for venomous snakes should be increased; and if the people were encouraged to work for them, and were aided by persons acting under properly selected superiors, the result would soon be a diminution of the wild animals and snakes. But I repeat that until some organised establishment is formed, to be worked steadily throughout the whole country—not dependent on the will or subject to the caprice of individuals, but under local officers subject to one head—no real or continuously progressive amelioration of the evil can be anticipated. Such a department working under a selected officer would, as in the case of Thugs and Dacoits, soon make an impression on what, so long as it continues in its present condition, must be regarded as a defect in our administration.

Supplement to the Paper on Destruction of Life by Wild Animals and Snakes in India.

As most important, because most destructive, I shall begin with the feline race, taking them rather in order of destructiveness than of zoological classification. First in size, strength, and ferocity is the tiger (*Felis tigris*). I will describe briefly a few points in his structure that fit him for his predatory life, and that apply to the *Felidæ* generally. The *Felidæ* are distinguished by a rounded head, short but powerful jaws, formidable fangs, and cutting teeth. They have vigorous limbs, digitigrade feet armed with sharp retractile claws, and cushioned with soft pads, which give the noiseless, stealthy tread, and vigorous spring. Active by night and day, and vision is adapted for either; the pupil dilates widely in a feeble, while it contracts to a slit or point in bright, light. Hearing is acute; speed, strength, and agility great. The tongue is covered with sharp papillæ, which give it a rasp-like appearance, and by which the remaining flesh, that has escaped the teeth, is licked from the bones of its prey.

The *Felidæ* are distributed widely over the globe except in Australia; but the tiger is limited entirely to Asia. The general appearance of this animal is so familiar that it seems superfluous to describe it. Its figure denotes a combination of great strength and agility, the elongated compressed body, the vigorous limbs, with elastic cushioned digitigrade feet, sharp retractile claws, powerful muscles of jaw, neck, forearm, and shoulder, and formidable fangs, proclaim a creature armed and fitted to wage war against all other animals.

The skull of a tiger is adapted for the insertion and action of powerful muscles and teeth. The tentorium, or septum, that separates the cerebrum from the cerebellum, and which in man and many other creatures is membranous, is bony in the *Felidæ*, probably for the purpose of increasing the strength of the skull, and not, as has been suggested, for that of diminishing the shock of cerebrum against cerebellum in their leaps and bounds, for which purpose, indeed, the elastic membranous tentorium would answer better. The lower jaw is short and strong, articulated to the

skull by a hinge-like joint, which restricts its movements nearly in a vertical plane. The coronoid process, which gives insertion to the temporal muscles, is proportionately large. The muscles are very powerful, and arise from large and deep fossæ, which have well-marked ridges of bone. The zygomas form expanded arches, and give attachment to certain bundles of muscular fibres. The masseter muscles, which move the lower jaw, are large. The teeth are firmly implanted in deep sockets, and have special forms entirely adapted for flesh eating. In each jaw there are six incisors, the outermost resembling small canine teeth, and two long and powerful canine teeth, or laniaries; these are the formidable fangs, and are pointed, recurved, convex, grooved in front and sharp-edged behind. The lower canines are rather smaller than, and pass in front of, the upper when the mouth is closed. The molars are eight in the upper jaw, the first being only rudimentary, and has no corresponding tooth in the lower jaw. There are six in the lower jaw. The second tooth in both upper and lower jaw has a conical crown and two roots. The third upper tooth has a cutting crown, with three pointed lobes, and a flat inner side against which the cutting teeth in the lower jaw work obliquely. There is a small tubercular tooth behind and on the inner side of the upper tooth. These tuberculated cutting teeth are called sectorial, "dents carnassières" of Cuvier. The formula is, incisors, $\frac{3,3}{3,3}$; canines, $\frac{1,1}{1,1}$; premolars, $\frac{3,3}{2,2}$; molars, $\frac{1,1}{1,1} = 30$. The small incisors are used to gnaw the soft ends of bones and to scrape off fibrous and tendinous structures. The long fang-like canines seize, pierce, and hold the prey. The sectorial, or scissor-like teeth, cut and divide the flesh or crush the bones. The special senses of hearing and vision are acute, whilst scent seems to be defective. The pupils are round, in which respect they differ from some other cats, which have them vertical; the tapetum lucidum is of a greenish hue, which gives the eye a peculiar and characteristic glare when the pupil is dilated, and is often well seen in the wounded tiger when crouching preparatory to a charge. The tactile sensibility is acute, especially in the so-called whiskers upon the chin, lips, cheeks, and eyebrows. Each hair has extreme sensibility at its root, and is movable by muscular fibres which surround the hair bulb, which is connected with a bed of glands and with the nerves of the lips. They are of use as feelers in their stealthy movements by night and day. It is not only in the jaws that the muscular development is so remarkable, but also in the neck, shoulder, and forearm, in the anterior as contrasted with the hinder extremities. The tiger can not only strike down a cow or even a buffalo with his forearm and paw, and hold it with the long fangs, but can raise it from the ground through the action of the powerful muscles of the neck, and carry or drag it to his lair, where it is devoured at leisure. The claws are remarkable; there are five in each fore and four in each hind foot. The mechanism by which they are made retractile is interesting; the claw and the phalanx into which it is fitted are kept in the retracted position by an elastic ligament which connects the two phalanges. It is unsheathed by the action of a flexor muscle (*flexor profundus*) which opposes the action of the ligament. The

claw phalanx, when retracted by the ligament, is drawn to the outer side of the second phalanx, not on to it; the joint that connects them being so formed as to admit of this oblique action. By this arrangement the claws, during ordinary progression, are kept out of the way, and are consequently not liable to wear or be blunted by contact with the ground.

There is only one species of tiger, though there are several varieties in colour, and even shape. The colour is exceedingly beautiful. The ground is of a rufous, or tawny yellow, shaded into white on the vertical surface; this is varied by vertical black stripes, ovals, or brindlings. On the face and back of the ears the white markings are very conspicuous. The depth of colour varies according to the age and condition of the animal; the young are more dusky in the ground colouring than the old. It is also affected by locality and climate; forest tigers are of a deeper shade than those of more open localities. It is remarkable how well the colour harmonises with the cover among which the tiger prowls.

The tigress is smaller than the tiger. The head, neck, and body are finer and lighter. There is no crest. She is more active, and, when with her young, more savage and aggressive than the male.

The tiger has many native synonyms, according to his *habitat*. In Bengal he is Bagh, F. Baghni, Sita-bagh, Go-bagh. In the north, Sher; female, Sherni. In Central India, Nahar. By the Santhals, Tut, Puhug. In Goruckpore, Nungyachor. In Tamil and Telagoo he is Puli, Peddappuli. In Malabar, Parampuli. In Canarese, Huli. In Tibet, Tagh, Lepcha, Sahtong. In Bhootan, Tukh. In Chinese, Lau-chu, or Lau-hu.

The tiger was known to the ancients. He is the *tygris* of Greek, the *tigris* of Latin, authors. He figured in the Colosseum, and other amphitheatres. Pliny says:—"The tiger is produced in Hyrcania and India." Augustus was the first who showed a tigress in Rome. At the dedication of the theatre of Marcellus, the Emperor Claudius exhibited four tigers; and Suetonius speaks of tigers exhibited by Augustus. It was said by Dion, that the tigers first seen by the Romans and Greeks were sent by the Indians when they were suing for peace from Augustus. The Emperor Philip on one occasion exhibited ten tigers, along with lions, elephants, and other wild beasts. Gordian, Antoninus, Eligabalus, and Aurelian also exhibited tigers in the circus and in triumphal processions. Greek and Latin authors make frequent allusions to the tiger.

Mosaics found in Rome show the tiger devouring his prey. Those exhibited by the Romans were probably brought from the Elburz mountains, south of the Caspian—the ancient Hyrcania—and from India. In these countries they still exist, though seldom seen west of the Indus.

The geographical distribution of the tiger is very wide. Buffon said it was found in South Africa as well as Asia, but he was wrong; it is confined entirely to Asia, though over a wide area—from Ararat and Caucasus west, to the frozen island of Saghalien east (but not on the high tableland of Thibet); from Cape Comorin to the Himalayas, to the height of 6,000 to 8,000 feet. One was killed in 1874 at Dalhousie, 8,000 feet above the sea. It is found in Georgia, north of

the Hindoo Kush, Bokhara, Persia, south of the Caspian (Hyrcania), on the shores of the Aral Blyth says it troubled the Russian surveyors, during mid-winter! as far north as the shores of the Obi; and in the deserts which separate China from Siberia; on the Irtisch, and in the Altai regions. In Amur land it is said to be very destructive to cattle. In China, Siam, Burma, and the Malayan peninsula, Singapore, Java, Sumatra, and perhaps other islands, but not in Borneo or Ceylon. It is a mistake to call the tiger only a tropical animal, though, no doubt, the finest specimens are tropical, being those of Bengal.

The tiger is found in many of the tree and grass jungles throughout India: those remote from population and cultivation are most frequented; but, when compelled by hunger, he visits the cleared and cultivated localities, and becomes the dread and pest of the villagers, who are in constant dread for their own or their cattle's lives, though certainly the cattle are most endangered. During the cold and wet season he is restless, and wanders about from place to place, and has no fixed abode, though he keeps within a certain range of country. When the cover is thick, he roams in search of food, and during these seasons is safer from his human foes than in the months of March, April, and May, which, in many parts of India, is the tiger-hunting season. The grass and jungle of the cover at this time having been burnt, the shelter become less extensive. The heat is intense, and the tiger seeks the patches of rank grass and swamps, which are cool and moist, where, as also in the margins of the forest, he lies at rest during the heat of the day, sheltered from the sun's rays. Such retreats are often near villages and cattle grazing stations, and here tigers live, and feed on the cattle; taking a cow perhaps every second or third day. In some cases they take to man-eating, and, when they do, soon depopulate a village by killing some and frightening away the others. In some parts of India it would appear that the man-eater is the rule rather than the exception. Jerdon says that in Central India, in the Mundlah district, near Jubulpore, in 1858 and previous years, an average of between 200 and 300 villagers were killed yearly by tigers. It is said that when a tiger has once killed a man, and tasted human flesh, he prefers it to other food. Whether this be true I cannot say, but there is no doubt that when he has overcome the natural dread of the human form, the man-eating tiger becomes the dread of a whole district. But it is remarkable with what indifference at other times they are regarded by the villagers, who carry on their usual avocations as herdsmen and wood and grass-cutters close to the cover in which the tiger is known to be concealed. This may arise from an apathetic and fatalistic disposition, or from the experience which teaches that, as a general rule, the tiger will not molest man when he is well supplied with other food. But it is certain that over many roads, and along many paths through the forest or grass, men will not pass day or night without tomtoms or torches to scare away the lurking enemy. It sometimes happens that a road is closed for weeks by a single tiger, and is not passable until he has been shot. Not only post-runners and herdsmen, but even those travelling in bullock carts are attacked and carried off; and yet it is strange to see the in-

difference with which his presence is often treated; the beaters will follow readily on foot, and beat him out of the jungle, though, should he pass near one of them, he is pretty certain to strike him down and inflict a dangerous, perhaps a mortal wound, though he is much less likely to do this if he is unwounded.

The natives of India, especially the Hindoos, hold the tiger, as they do the cobra, in superstitious reverence; many would not kill him, even if they could, for they fear that he would haunt or do them mischief after death. Some they regard as the abode of a spirit which possesses unlimited powers of mischief. In many districts the peasants are loth to pronounce his proper name, calling him the Gidhur (jackal), Janwar (the beast), or they refuse to name him at all; they do the same in the case of the wolf. But though they will not always do so themselves, they are willing that others should take his life, and they will not only point out his abode, but rejoice over his death, as it relieves them from destruction of property, and fear of their own lives. The remarks of these villagers round a fallen tiger are often very amusing and quaint.

All sorts of powers are ascribed to portions of the tiger after death. The fangs, the claws, the whiskers, are potent charms, medicine, love philtres, or prophylactics against the evil eye, disease, death, magic. The fat is in great demand, having many potent virtues in relieving rheumatism and other ailments. The heart and flesh are eaten as tonic and invigorating remedies giving strength and courage. The whiskers, among other wonderful powers, possess those, it is said, of being a slow poison when given with food. This belief one may try in vain to oppose. The rudimentary clavicles are also much valued.

It is almost impossible to preserve the skin of a tiger with its whiskers and claws intact. They are so valuable that one cannot keep them. I have known them to be carried off, aye, even the fangs extracted from the skull at night, when the dead tiger was placed under the charge of a sentry.

There is a common delusion among natives that the tiger gets an extra lobe to his liver every year of his life.

There is a popular belief, not confined to the ignorant, that the wounds of the claws or fangs of a tiger are dangerous, from being of a poisonous nature. This is an error. It is certainly possible that the teeth and claws may occasionally be contaminated with septic matters from decomposing food, but this is probably rare, as he is very particular in keeping them clean. The real fact is, the wounds are dangerous because they are deep, punctured, and lacerated; otherwise they have no peculiarity, and not unfrequently heal rapidly, though they often suppurate, and may then induce blood poisoning. I have seen the severest injuries recovered from rapidly, others, again, have caused much suppuration and destruction of tissue and loss of life.

It is remarkable how many persons escape from the clutches of a tiger. It seldom kills outright, and rarely carries the human victim far from the spot where he was struck down, except, of course, in the case of confirmed man-eaters. There is a blow, a bite, generally in the shoulder, a shake or two; the victim is dropped or dragged for a short

distance and then left. Such injuries are frequently fatal, but by no means always so. I know several persons who have been thus seized, and have escaped with life, seldom though without a crippled limb. When a man is seized simply for food, he is carried off and eaten just as a deer would be.

It seems to be the impression that tigers have not diminished since 1857—*i.e.*, since the disarming act after the mutiny. In some places, no doubt, cultivation and population have pushed them back, but in others they are as numerous as ever. Many tigers are destroyed yearly, but the destruction of life and property caused by them goes on, though perhaps not to so great an extent as sometimes represented, when it is remembered that the population of India exceeds 250,000,000, the proportions of deaths is not relatively so very large, and would not contrast so very unfavourably with mortality from preventible causes at home.

Mr. J. Hogg, for example, says, on an average three persons are killed daily in this country by railway accidents, and eight are daily injured. The year 1874 was memorable on this account, 1,421 persons were killed and 5,041 were injured. One in every 35 of the railway servants is killed outright yearly and many are injured.

There are several ways of compassing the tiger's death. They are secured in pitfalls and traps, shot by spring guns and arrows; poisoned by strychnine, and sometimes, it is said, taken by birdlime, which is spread on leaves; these adhere to the tiger's face, cover his eyes and blind him, when he is destroyed by spears; numbers are also shot by sportsmen or professional shikarries, either on foot, from elephants, or from machauns, but still the numbers keep much as they were, and probably will do so, until some better organised plans are devised for their destruction.

The late Captain B. Rogers, of the Bengal Army, in a paper read before the Social Science Association a few years ago, gave some curious information regarding the destruction caused by tigers in India. He devised a scheme for their destruction by traps and spring guns, but it was not accepted. He was an enthusiast, but there is no doubt that much of what he said was literally true, for example:—

Speaking of the destruction of life by wild animals, Captain Rogers says, in Lower Bengal alone, in a period of six years ending in 1866, 13,400 human beings were killed by wild animals, whilst 18,196 wild animals were killed in the same period at a cost of 65,000 Rs.; and it appears, moreover, that the Government reports show that in these six years ending in 1866, 4,218 persons were killed by tigers, 1,407 by leopards, 4,287 by wolves, and the remainder by other animals; the tiger and wolf thus claiming nearly equal shares. The worst district in Bengal Proper is that of Rungpore, in the Rajshahye Division, the yearly loss of life being between 55 and 60 persons. In Bengal Proper alone about 1,200 tigers are killed annually; of these 4 per cent. are cubs. Next to Bengal come the Central Provinces, and then certain parts of Madras.

The Chief Commissioner's reports of the Central Provinces show that in 1866-67, 372; in 1867-68, 289; in 1868-69, 285 persons were killed by tigers.

The District magistrate from Dhera Dhoon writes:—"Man-eating tigers are quite an exception in Oude and Rohilkund; one is heard of in every six years, but he is invariably killed after a short lapse of time." Captain Rogers says, however, that tigers are man-eaters by nature and instinct, not by education; "men, therefore, are liable to be eaten where tigers exist."

One gentleman, writing from Nayadunka in July, 1869, says:—"Cattle killed in my district are numberless. As regards human beings, one tiger in 1867-68-69 killed respectively 27, 34, 47 people. I have known it attack a party, and kill four or five at a time. Once it killed a father, mother, and three children; and the week before it was shot it killed seven people. It wandered over a tract of twenty miles, never remaining in the same spot two consecutive days, and at last was destroyed by a bullet from a spring gun when returning to feed at the body of one of its victims—a woman.

"At Nynce Tal in Kumaon, 1856-57-58, there was a tiger that prowled about within a circle say of twenty miles, and it killed on an average about eighty men per annum. The haunts were well known at all seasons. * * * * This tiger was afterwards shot while devouring the body of an aged person it had killed."

Captain R. relates an incident which illustrates the superstition of the native in regard to tigers:—"A tiger in Chota Nagpore destroyed a great number of lives. * * * * I had a weapon set across its known path, and it was only a matter of hours before his career was stopped. But what was the result? Numbers of the natives in the vicinity, including those I had employed to set the trap, ran off when they heard of the animal's death, and did not return for days, as they felt sure that when dead it would be revenged on them, and take the form of a human corpse so as to get them hanged for murder. The remains were not, on that account, shown to me until decomposed." Further, he remarks:—"When a Ghond or Kurkoo (the people inhabiting certain wild tracts) is killed by a tiger, the wife, children, and parents are thrown out of caste—all intercourse between them and other inhabitants being interdicted, on the ground that they are labouring under the displeasure of the Deity. In fact, the man-eating tiger is the deity to whom those wild and ignorant aborigines offer prescribed sacrifices on the occasion of their having suffered from its ravages; thus the injury they have incurred is increased, and the previously scanty means of these helpless creatures are doubly taxed."

Again, quoting a Government report:—"In one instance, in the Central Provinces, a single tigress caused the desertion of thirteen villages, and two hundred and fifty square miles of country were thrown out of cultivation. This state of things would undoubtedly have continued, but for the timely arrival of a gentleman who happily was fortunate enough, with the aid of his gun, to put an end to her eventful career."

In 1868, the magistrate of Godavery reported "that part of the country was overrun with tigers, every village having suffered from the ravages of man-eaters. No road was safe, and a few days before his arrival at Kondola, a tiger charged a large body of villagers within a few hundred yards of the civil station."

Again, it is reported that one tigress, in 1869, killed 127 people, and stopped a public road for many weeks, until she was finally killed by the opportune arrival of an English sportsman.

Other instances will be added, though the above are sufficient to prove how fierce and destructive tigers can be, not only to cattle and other lower animals, but to human beings.

The Lion (*Felis leo*), known to natives of India as Bhubber Shér; Singha; Untiah Bagh, has a much more limited range in India than the tiger. It seems to belong now more to the African than the Asiatic fauna, and probably attains a greater size in Africa. It is of various tints of colour; in India it is of a pale tawny hue, wanting the dark rufous tinge, and has a comparatively scanty mane, which is not so dark in colour as that of the African variety, and has the median line of hair on the abdomen less developed. The physiognomy is also somewhat different; it is, however, merely a variety. Even in Asia three varieties have been described, the Bengal, the Guzerat, and the Babylonian. It is smaller and less powerful than the tiger, though its large head and voluminous mane give it a more imposing appearance. The lion is from 8 to 9 feet in length, from the nose to the end of the tail, which is tufted, and has a small terminal spine. Its dentition and general structure are like those of the tiger. It is comparatively small, and weak in the hinder extremities. Some of the male Indian lions are nearly devoid of mane; the female is always maneless. It differs in its habits from the tiger; is generally said to be bolder and of a nobler character, but this wants confirmation. Its range in India is now very limited, and it would appear to be gradually becoming extinct; for it is no longer found in localities where, 50 years ago, it was not uncommon. It has entirely disappeared from Bengal, the North-West Provinces, and some other parts of India, is still found in Cutch, Guzerat, Hurriana, Gwalior, Saugur, and Persia; but is not known in Afghanistan, and is only at all common in the two first-named districts. It is no longer a denizen of Southern Europe, though within historic times it was found in Greece. But, indeed, it is becoming rare everywhere out of Africa; it is destructive to life, like other *felide*, but seems to prefer donkeys to all other cattle, and occasionally kills human beings; its comparative rarity prevents it from occupying a high figure among the destroyers of life in India. It does not inhabit swamps and deep forests like the tiger; but keeps more in the open, in the scrubby jungle, in ravines, sandy desert places, and among low grassy or thorny jungle covers. It is hunted from elephants, and it will fight and charge like the tiger. The lion and the tiger occasionally meet, and have, it is said, fought over a stricken deer. The tiger would probably prove the victor in such a contest.

I have not been able to ascertain the number of men or animals destroyed by lions in India, nor of the number of lions themselves that have been killed in any year; but, no doubt it is comparatively small.

I find that in Kotah, Rajpootana, the sum of 25 Rs. has been offered for lions, but the returns do not give the results of this offer.

I have been told by officers of the Central India

Horse, who used to kill a certain number of lions yearly, that they are becoming rarer every year. All seems to show that the animal is disappearing from India, as he has done from Greece.

The Leopard, or Pard (Felis-pardus).—It is considered by some naturalists, and by a great many sportsmen, that there are two varieties, the larger or panther, the smaller or leopard. Others assert that they are identical, and that any difference is due to individual peculiarity, age, food, or habitat. Blyth, for example, considers them identical.

The leopard is known in India as Tenduah, Honiga, Cheeta, Cheeta-bagh, Gool-bagha, and other local names. It is of a more or less rufous fawn colour of different shades, with beautiful black spots arranged in rosettes. The tail is marked with black rings; it varies from six to eight feet in length. Jerdon also describes two varieties, the larger or panther, the smaller or leopard; but the probability is that they are accidental or local varieties of the same species. A degree of modification of form, colour, and size seems to exist in all animals under differences of climate, food, place of abode, &c.

Temminck considered the panther and leopard quite distinct from each other, and he assigned to the leopard a longer tail, with 28 caudal vertebrae, whilst to the panther—the larger—he gave a shorter tail and only 22 caudal vertebrae.

The leopard is widely distributed over India, but does not extend into Asia so far north as the tiger. It is found all over India, the hills and plains, and also in Ceylon; it is also an inhabitant of Africa. The larger variety is most frequent in the plains, among low hills and ravines; it is very fierce and active, and has been known to kill a full-grown bull. The smaller kind frequents forests and higher hilly districts, where it is very destructive. There is also a black variety, and its spots can be seen in the bright light blacker than the dark groundwork of the skin. It is comparatively rare, but occurs occasionally from the Himalayas to Ceylon and Assam, and the Malay peninsula. Hodgson regards it as a distinct species. The leopard extends through Western Asia as far as the Caucasus, Afghanistan, and Malayan peninsula, and also in Africa. It is very dangerous and destructive to human beings and other creatures, and is especially fond of dogs, which it carries off whenever it can get the opportunity. In some of the hill stations it is difficult to keep a dog, and it is necessary to protect them by putting a spiked collar round the neck. It is very active, and readily climbs trees, and when wounded is very dangerous. The Government returns for 1875 show that during that year 182 persons, and 16,187 cattle were killed by leopards. It appears from the same returns that 3,572 leopards were destroyed at a cost of 35,757 Rs., an average of 10 Rs. for each leopard, whilst for 1,789 tigers killed, 41,312 Rs. were disbursed, or about 23 Rs. per head. There are other species of leopard, but they are not found in the parts referred to as the seat of loss of life.

The cheetah, or hunting leopard (*Felis jubata*), is a very different creature; it is taller, slighter, has longer and more delicate limbs, with only partially retractile claws. It is of a lighter colour, and is spotted, but the spots are not arranged in the rosette-like form of the leopard.

It is found in the plains of India, chiefly in the southern parts, and is caught and trained for hunting antelopes, and is a great favourite with the native princes. There is no reason, I believe, to think that it is destructive to human life, or even to cattle; its habits probably lead it to prey on deer and antelopes.

Felis uncia, or the snow leopard, found in the Himalayah and Tibet, is smaller than the common leopard, has longer hair, and is also marked with spots. It feeds chiefly on burhal, the wild sheep, and goats, but has never been known to attack men.

Felis macrocelis, diardi, the clouded leopard or tiger, found in the Nepal Terai, and in Sikhim up to 5,000 to 10,000 feet high in the Himalayahs. Its limbs are very bulky, and its paws and claws large (*undenomen*), length of body, 3½ ft.; tail, 3 ft. It is of an olive or dark clay brown colour, and has large clouded spots or patches over its body, some black hair on the head and neck; the claws and feet are very powerful. It is a forest leopard, and is destructive to hogs, sheep, goats, deer, and pigs, but does not appear to destroy men or large cattle. *Felis onca* (jaguar) is a very large and fierce leopard, but it is confined to South America. *Leopardus japonensis* (Gray), *Leopardus brachyurus* (Swinhoe), are other species found, according to Jerdon, in Formosa and Japan.

Canide (Canis pallipes).—The Indian wolf differs somewhat from the European species; it is of a hoary, grizzled, dirty reddish colour, some of the hairs being tipped with black; ears rather smaller than in the European species. It is known to natives of India as Bherya, Nekra, Hundar, and by other local names. It is very common in some parts of India, as in the North-West Provinces, Oude, Rohilkund, Rajpootana, and is very destructive to life. It takes children, frequently carrying them off at night from their huts, and it has been known to take them out of their mothers' arms. Wolves generally hunt in packs, and have been seen in the Southern Mahratta country to chase antelopes in this fashion. They are very wary, and pursue their prey with great stealth; some lying in wait, whilst others drive the animal in their direction. They are seldom seen in the daylight, hunting chiefly at night. Smaller than the European wolf, they are just as cruel and bloodthirsty. Living in holes and ravines, and of nocturnal habits, they are seldom met in the fields. Surprised by day, they strike off at a long loping gallop, in which it is almost impossible to overtake them; they are generally silent, but sometimes bark like a dog. The formidable teeth are arranged in this formula—

| | | | | |
|-----------|----------|------------|-----------|---------|
| Incisors. | Canines. | Premolars. | F Molars. | Molars. |
| 6 | .. 1 1 | .. 4 4 | .. 2 2 | .. 3 3 |
| 6 | .. 1 1 | .. 4 4 | .. 3 3 | .. 4 4 |

Very destructive to deer, sheep, goats, and other horned cattle, they seldom attack the larger ones unless feeble, as they often are in India, or adult human beings, but they do so sometimes, and then it is in concert. They bite the throat, and I have seen children who, having been rescued from their grip, were found to be mortally wounded in this way. There are other species, but they are comparatively rare and, are not found in the plains of India.

In 1875, 1,061 human beings, 9,407 cattle, sheep, and goats, were destroyed by wolves; whilst 5,683 wolves were killed at a cost of 15,186 Rs., or a little less than 3 Rs. a head.

The *Times*, of June, 21st, 1877, gives the following information about wolves in Europe:—European Russia, according to the official report, contains 200,000 wolves, and in 1875 they killed 161 persons; whereas in 1849, 1850-51, the average deaths were 125; 108,000 cattle and other live stock are annually destroyed, besides poultry and dogs; the former being the usual diet of young wolves. The total loss is estimated at 15,000,000 Rs. per annum, and the loss in Siberia must be very considerable, especially reindeer.

I find in *Allen's Indian Mail*, of 21st July, 1877:—

WOLVES AT LUCKNOW.—Wolves, it appears, are re-frequenting the neighbourhood of Wingfield-park. At dusk, on Tuesday evening, as a woman and a little boy were returning through a ravine from their field to their village they were attacked by two of these ferocious animals and literally torn to pieces. The Government reward offered for the destruction of these wolves is not sufficiently high to induce native shikarees to undertake the task.—*Lucknow Times*.

The natives of many parts of India have a most superstitious dread of the wolf; they will not only not destroy them, but they will not even mention their names, fearing that they will thereby bring down misfortune on themselves or their children, and it is consequently difficult to compass their destruction.

Canis aureus (the jackal), Gidhur in Hindostanec, is not generally destructive to human life, but I have known young children to be carried off by them, and also young or feeble animals, but they are essentially feeders on carrion. They are not named in the return of 1875 as among the destroyers of life, but no doubt they form an item in the heading "other animals," though it is not probable that they have sinned to any great extent.

Hyenine.—H. striata (the striped hyæna), Jhirak, Lakhar-bagh, Rera, and other local names.—This animal is of a grey colour with transverse tawny stripes. It has a mane on the neck and back. It is a treacherous, cowardly brute, common all over India, inhabiting holes and caverns, often prowls into villages, and is generally met with at night. Its jaws are very powerful, and the teeth most formidable; it can crush a large bone with ease. It destroys a certain number of animals, generally the young and weak, but it lives also on carrion. It takes dogs, sheep, poultry, or any animal it thinks itself bold enough or strong enough to overcome, but it will seldom attack a man or large animal unless it can do so quite unawares. It has an unearthly, disagreeable cry.

The hyæna has a most formidable set of teeth, the formula of which is:—

| | | | |
|-----------|----------|------------|---------|
| Incisors. | Canines. | Premolars. | Molars. |
| 6 | .. 1 1 | .. 4 4 | .. 1 1 |
| 6 | .. 1 1 | .. 4 4 | .. 1 1 |

In 1875, 68 persons and 2,116 animals fell victims to hyænas, whilst 1,386 hyænas were killed, at a cost of 3,602 rupees, or less than an average of three rupees each.

Bears (*Ursidæ*).—The bears are mostly fru-

giverous, or root-eating animals, but at times some, perhaps all, are carnivorous. They are nocturnal in their habits, and some are very aggressive and fierce. I have related a well-authenticated case in which a bear entered a village, got into a house, and killed several people before it was destroyed. Many lives are lost by bears, but it is more probably from ferocity and an aggressive nature than from any desire to eat that which they have killed. They live in caverns, holes under rocks, hollow trees; climb trees for honey and fruit. Moreover, they are very fond of the flowers of the *Bassia latifolia* (mhowa-tree), and it is said they get much excited by eating them. Where the bear is common, especially the Himalayan bear, the villagers often suffer considerably; some are killed, others are severely mutilated, and are generally injured in the face.

There are several species:—*Ursus isabellinus*, the brown or cinnamon bear; a fine, large, and powerful bear of a yellowish brown colour, found in the north-west Himalayas and Kashmir; it does not appear to contribute much to the mortality, but *Ursus tibetinus*, the Himalayan black bear, found in the Himalayas and Assam, is often very fierce and aggressive. *Ursus lubiatus*, or sloth bear, is found throughout India, from Cape Cormorin to the Himalayas; it is found chiefly in hilly and jungly districts; these are the bears that destroy most life.

The teeth and claws are formidable, and capable of inflicting severe wounds. The formula of dentition is:—

| Incisors. | Canine. | Premolar. | Molar. |
|-----------|---------|-----------|--------|
| 6 .. | 1 1 .. | 4 4 .. | 2 2 |
| 6 .. | 1 1 .. | 4 4 .. | 3 3 |

The claws are long and trenchant, but not retractile, and the wounds inflicted by them, especially on the face, are most ghastly. The native names for the bear are Reech, Bhaloo.

It appears that in 1875, 84 persons and 529 cattle were killed by bears, whilst 1,181 bears were destroyed, at a cost of 4,453 Rs.

The Elephant.—*Elephas indicus* (Hathi).—Male, without tusks, Mukhna.—Found in most of the large forests of India, from the Terai to the extreme south, and in Ceylon. As a general rule harmless to man or other animals, but occasionally the old males become vicious and dangerous. Separated from the rest of the herd, they lead solitary lives, and vent their spleen on men or animals. In this state they are described as rogues, are very dangerous, and not only destroy life but property, injuring crops, plantations, and houses. For such individuals a reward is sometimes offered, and often the creature is not destroyed until it has done much damage. It is said that male tuskers that have once been in confinement, and have broken loose, are apt to become the most dangerous of rogue elephants, and a very terrible and dangerous brute a *must* wild elephant is. There are certainly two (according to some naturalists, three) species; the Indian, the Sumatran, and the African.

The Indian differs from the African considerably in the shape of the head, the ears, the formation of the teeth, and the number of nails or hoofs in the hind feet. The head of the African is narrower, and more receding; the ears are much

larger. The bone and enamel in the African elephant's teeth are arranged in lozenges; the Indian, in parallel lines. The African has only three nails, whilst the Indian has four, on the hind feet. The tail of the African elephant is shorter than the Indian. The *rugæ* on the trunk are much more pronounced, and the sound of its trumpeting is quite different to that of the Indian. The African male and female both have tusks; the Indian male alone has them and in some cases it has only a small tusk like the female, when it is called "mukhna."

I believe that the African attains maturity earlier than the Indian elephant. The African male in the Regent's-park Gardens is now nearly 11 ft. high, though under 20 years of age, and has for some years had the appearance of an adult; he has been *must* on more than one occasion. The Indian male, so far as I know, never attains the same condition so early in life; seldom before 25 to 30 years of age.

There are other anatomical differences. The Indian elephant has 19, the African has 21, the Sumatran 20 pairs of ribs; the Indian has 33, the African only 26 caudal vertebræ.

The Sumatran seems to resemble the Indian species very closely, and it is thought, I believe, by some authorities, that the Ceylon elephant is the Sumatran variety. More information on this subject is needed. It is curious that the Ceylon male is very frequently devoid of tusks.

It appears that in 1875, 61 persons and six head of cattle were killed by wild elephants, but that only 5 Rs. were paid as reward; five wild elephants were killed.

The elephant destroys his victim by seizing him with his trunk, raising him up and dashing him on the ground, and then crushing him with the tusks, and kicking the body backwards and forwards between the fore and the hind feet. Under native Governments, in former days, the elephant was trained to be executioner, and was taught to destroy the culprit by plucking him limb from limb, by pressure with his feet on the chest, and by breaking his bones. Stories have been told of the very savage wild elephant having not only deliberately plucked off the limbs of the victim but of his having also eaten the flesh. This, I think, is very doubtful.

Rhinoceros indicus, the great Indian rhinoceros, ga'ndha, found in the Terai, Bhotan, Nepal, Purneah, Assam, in dense jungle and swamps. This animal may cause the death of a few human beings in chance encounters, but it does not appear on the roll of death-dealing animals, and therefore I pass it by with this simple reference. There are other species which are rare, and also not destructive to life.

The Buffalo—*Dubalus*.—*B. arna* (Arna Bains).—Common in Assam, Bengal, the swamps of the Eastern Terai, in Central India, and in Ceylon. A very powerful animal, with long sharp scimitar-like horns. The solitary males are very dangerous and vicious, and often make sad havoc among the fields, and occasionally kill men. The same may be said of the bison, or gaur, *Bos gaurus* (bun-parra, gauri-gai), and other local names. It is a powerful animal, sometimes standing six feet high, with massive horns. Found in the forests of India, from Cape Comorin to the

foot of the Himalayas, but not in the Oude, Nepal, or Rohilkund Terai. It is common in Assam, in Southern and Central India, but is now extinct in Ceylon. It is a timid and wary animal, but bulls are occasionally dangerous, and cause the death of men, though not to any extent.

Reptilia.—The crocodile, or as it is often, though erroneously called, alligator, is destructive to life, both of men and cattle, and in some places, such as the Sunderbunds, very numerous and dangerous, often seizing human beings who come down to the river to bathe or enter the water for other purposes. Cattle are seized when drinking or swimming across the nullahs. I remember to have seen a man, directly after he had been seized by one of these creatures in swimming across a nullah, holding on to a cow's tail. The crocodile seized him by the leg, and with such force and determination that the limb was severed at the knee joint, the man, notwithstanding, was dragged on shore on the opposite bank, still holding on, though faint and exhausted. He was brought to the station hospital at Dacca, and amputated, but he died of the shock. With their large peg-like teeth they inflict frightful wounds, tearing the flesh and crushing the bones. They seldom relinquish their hold, the creature is dragged down and drowned, and devoured at leisure. To enable the crocodile to hold its prey under water and drown it without swallowing the water or itself being suffocated, it has an apparatus of flood-gates at the back of its mouth, comprised of cartilaginous flaps above and below, which meet and completely close the entrance, so that water cannot get down through the opened mouth. The nostrils are on the surface of the snout, and they also close like valves; the nose can be kept above water whilst the mouth is immersed. The air passages of the nostrils open behind the septum, so that the creature can remain a long time under water, quite long enough to drown any animal. There are, at least, two species, probably three, of crocodile found in Indian waters—*C. biporcatus* or *porosus*, *C. palustris*, and *C. pondicerianus*. They are known as Muggurs; whilst the Gavia or Gharial (*Gharialis gangeticus*), is known as Nakir, Gharial, Goh, and other names. This Saurian, though generally a fish eater, is not innocent of homicide, and has been known to seize and kill men, though rarely; the remains of human beings, ornaments of women and children, have been found in the stomach. I once saw a man who had been seized by a gharial, when I was travelling in India with H.R.H. the Duke of Edinburgh in 1870. The following is an extract from my diary:—

“Before leaving camp this morning a camel-man of the Maharajah's (Jung Bahadur) was brought in with rather a severe wound in the left thigh, just above the knee. He was wading across the Mohan—which there was not up to his knees—when he was suddenly seized by a large gharial, and dragged down. Some sepoy, who were close at hand, rushed to the rescue, and one of them so severely wounded the great lizard that it let go, and tried to make its escape; he followed, thrusting his bayonet into it, and, having fired all his (six) cartridges, he clubbed his musket, and belaboured it until the stock was broken. The

brute by this time was so far *hors de combat* that it turned over, as though dead, and was dragged on shore, and was brought into camp with the man it had bitten. Fortunately, the grip had not been firm, and a portion of integument only, about 5 in. in circumference, had been torn away, leaving a painful, though not a dangerous wound. The gharial was an enormous brute, over 16 ft. in length. He was opened, and his stomach found quite empty, with the exception of about 20 or 30 pebbles, from the size of peas, or marbles, to a hen's egg. These are useful for purposes of digestion, and are, probably, always found in the stomachs of these Saurians. The incident quite settles the question as to whether the gharial does take other food than fish, although, from the conformation of his jaws, he is not able to seize so large a morsel, or inflict so great a wound, as the alligator.”

The gharial sometimes devours children, and occasionally seizes the legs of men who venture into the shallow waters in which these creatures abound. About two years ago, Mr. Carleyle, curator of the Riddell Museum, Agra, wrote to the *Delhi Gazette* that the following had been found in the stomach of a large gharial taken near that city:—“About a dozen large bunches, pellets of hair (probably human), 68 stones (rounded pebbles), averaging in size from nearly three inches to one inch in diameter, one large ankle bangle ring of mixed metal, 24 fragments of various sizes, of vitreous armlet rings called ‘churis,’ five bronze finger rings, one small silver neck-charm (a small defaced coin with a metal loop for suspension attached to it), one gold bead, about one-third of an inch square, one largish bead of black stone, veined with white, called ‘Sulimani-manka’ (*onyx*), thirty small red necklace beads.” All these things (barring the stones) says the reporter, must have been on the body of some young woman or girl (if not more than one), who had been devoured by this monster, which shows that the brute must have had an unfortunate predilection for the weaker sex. And these facts prove the fallacy of the generally received idea that the gharial never preys upon living human beings.

There is no great difference between the alligator which is peculiar to American rivers, and the crocodile of Egypt, Africa, and India. The origin of the name is *Lagarto*, given by the Portuguese and Spaniards to the huge reptiles that frequented the rivers and estuaries. The difference between them is chiefly this—the head of the alligator is broader, the snout shorter, and the *quasi*-canine teeth of the under jaw fit into furrows in the upper jaw, instead of into foramina or deep grooves, as they do in the crocodile. The legs, too, of the alligator are not denticulated, and the feet are only semi-palmate. The anterior teeth in crocodiles fit into two holes in the upper jaw and perforate it. In both, the size of the jaw is tremendous; they open and close it with a powerful snap. I have seen a mortally wounded crocodile close its teeth so firmly on a log of wood that they were not easily withdrawn. These teeth are deciduous and renewable, therefore the mouth of this formidable creature is always armed. They attain a great size, up to 15, 18, even 20 ft. in length, and are found in many Indian rivers, estuaries, lakes, and tanks, or marshes.

All are bloodthirsty creatures; but they are said to be fonder of carrion than of fresh food. The larger species (*C. biporcatus*), is found near the sea, and in the large rivers and Sunderbund. *Palustris*, which is smaller, occurs in the swamps and pools. The gharial is more of a fish eater, has a very different head and mouth, the jaws are long and narrow, and has rows of closely-set teeth. As I have said, it is not innocent entirely of homicide. It is found in the rivers high up, near the foot of the hills, or in the rapids, and it is generally found to have a number of pebbles in the stomach to assist in the digestion of food.

The shark (*Carcharias gangeticus*). This fierce and bold fish ascends the Hooghly, and probably other rivers, doubtless as far as the tidal water flows, and especially during the seasons when the freshes from the hills fill the rivers fuller than usual. They are occasionally mischievous, seizing people when bathing in the muddy river at the bathing ghâts. They do not often succeed in carrying off the victim, who is generally rescued by other bathers, but inflict dangerous, often mortal, wounds. It is usually in the months of April or May that these accidents occur near the ghâts where formerly the dead were thrown into the water, and where the sharks were wont to seek their food in the bodies that were thrown into the river, imperfectly burned. Since municipal arrangements have provided for complete cremation of all the bodies brought to the ghâts, the supply of food for the sharks has failed, and they have turned their attention to the living at the neighbouring bathing ghâts. I wrote the following some years ago in Calcutta in reference to some cases of shark bite that came under my observation in that city.

Shark-bites, I regret to say, occur annually, and they will continue to do so until measures, such as might easily be taken, are resorted to for their prevention. The particular shark (*Carcharias gangeticus*) is a fierce and bold creature; he dashes in among the crowds bathing at the ghâts, and though he seldom, if ever, under these circumstances succeeds in carrying off his prey, yet he inflicts a dangerous, often a mortal wound. These accidents appear to have become more common of late years, since the practice of throwing bodies into the river has been discontinued, and those of the poorer classes have been entirely burned at the municipal expense. Near the great burning-ghâts, where the sharks, no doubt, used formerly to find their prey in abundance in the half, or only very partially, burned bodies then thrown into the river, but where they no longer find them, as they are now completely burned, these accidents most frequently occur; and one or two bathing ghâts near that spot have furnished more victims than others. It is chiefly in the months of April and May, when the river contains much salt water, that the accidents occur, for being then unusually muddy from the freshes, the sharks are not seen as they glide in among the legs of the bathers, and it is only when the shrieks and sudden immersion of one of their fellow bathers give the alarm that the others are aware that the enemy is among them. The noise, the splashing, the shouting, as well as other aid given to the sufferer, save him from being carried off, but not from a severe, perhaps mortal, wound. Up to 1872, when I left Calcutta, no precautions

had been taken to prevent this annual loss of life. The mere staking off a portion of the ghât, as is done in the Sunderbunds, against alligators, would be sufficient; but, simple as the expedient is, it had not been resorted to. The people go on bathing at the same places perfectly unconcerned. Indeed, shortly after a person has been bitten, the ghât is again fully occupied by bathers. Every year during these months cases occur, and they are generally taken to the Medical College Hospital.

Ophidia.—The venomous snakes of India are colubrine and viperine. The colubrine are—1. *Naja-tripudians* (cobra); 2. *Ophiophagus elaps* (hamadryas); 3. *Bungarus fasciatus* (yellow-banded snake); 4. *Bungarus cœruleus* (krait); 5. *Xenurelaps bungaroides*; 6. *Callophis* (several species); and then 7. *Hydrophida* (sea snakes), all very poisonous. The viperine are—8. *Daboia russellii* or chain viper, *Tic-polonga* (Russel's viper); 9. *Eohis carinata*. Crotaline are—10. *Trimeresurus, peltopelor, Habys, Hypnale*. They are all poisonous. Nos. 1, 4, 8, and 9, are the most deadly, or, at all events, they are the chief man-slayers. The others, 2, 3, 5, and 7, are very poisonous, but seldom encountered; 6 and 10 are comparatively harmless.

A full description of all these will be found in the "Thanatophidia of India," and also an account of the physiological action of their poison, and the extent to which they contribute to the death-rate in India.

LOSS OF LIFE IN INDIA BY WILD ANIMALS AND SNAKES.

| ANIMALS. | KILLED IN 1875. | | KILLED IN 1876. | |
|---------------------|-----------------|---------|-----------------|---------|
| | Persons. | Cattle. | Persons. | Cattle. |
| Elephants | 61 | 6 | 52 | 3 |
| Tigers | 828 | 12,423 | 917 | 13,116 |
| Leopards | 187 | 16,157 | 156 | 15,373 |
| Bears | 84 | 522 | 123 | 410 |
| Wolves | 1,061 | 9,407 | 887 | 12,448 |
| Hyænas | 68 | 2,116 | 49 | 2,039 |
| Other animals | 1,446 | 3,901 | 143 | 4,573 |
| Snakes | 17,979 | 3,166 | 15,946 | 6,468 |
| Totals..... | 20,805 | 46,805 | 18,273 | 54,430 |

WILD ANIMALS AND SNAKES DESTROYED AND REWARDS GIVEN.

| ANIMALS. | IN 1875. | | | IN 1876. | | |
|----------------------|-----------|----------|-------|-----------|----------|-------|
| | Destroyed | Rewards. | | Destroyed | Rewards. | |
| | | R. | A. P. | | R. | A. P. |
| Elephants | 5 | 5 | 0 | 4 | 50 | 0 |
| Tigers | 1,789 | 41,212 | 8 | 1,693 | 43,698 | 12 |
| Leopards | 3,512 | 35,756 | 14 | 3,788 | 33,972 | 12 |
| Bears | 1,181 | 4,463 | 0 | 1,362 | 4,915 | 0 |
| Wolves | 5,683 | 15,156 | 12 | 5,976 | 18,633 | 12 |
| Hyænas | 1,388 | 3,602 | 4 | 1,585 | 3,650 | 12 |
| Other anim. is | 8,801 | 3,251 | 6 | 8,053 | 3,985 | 2 |
| Snakes | 270,185 | 16,548 | 11 | 212,371 | 15,757 | 12 |
| Totals..... | 292,542 | 120,015 | 8 | 234,830 | 124,564 | 4 |

WILD ANIMALS DESTRUCTIVE TO LIFE IN INDIA.

CARNIVORA.

PELIDÆ.

- Felis*—*F. leo*Lion.
- F. tigris*Tiger.

- F. pardus* Leopard.
F. jubata Hunting leopard.
- HYENINÆ.
Hyæna—H. striata Striped hyæna.
- CANIDÆ.
Canis—C. pallipes Wolf.
C. aureus Jackal.
- URSIDÆ.
Ursus—U. isabellinus Brown bear.
U. tibetanus Black bear.
U. labiatus Sloth bear.
- UNGULATA.
- ELEPHANTIDÆ.
Elephas—E. indicus Elephant.
Rhinoceros—R. indicus Rhinoceros.
- SUIDÆ.
Sus—S. indicus Wild boar.
- BOVINÆ.
Gævus—G. gauri Bison, gaur.
Bubalus—B. arni Buffalo, arna.
- SAURIA.
- CROCODILIDÆ.
Crocodilus—C. palustris Crocodile.
C. biporcatus "
C. poncierianus .. "
Gharialis—G. gangeticus Gharial.
- FISCS.
- CARCHARIDÆ.
Carcharias—C. gangeticus Ground shark of Ganges.

POISONOUS SNAKES OF INDIA.
 Those marked with an * are most deadly; those marked with a † are most common among the most deadly.

- POISONOUS COLUBRINE SNAKES.**
- ELAPIDÆ.
- Naja* *N. tripudians*†, cobra, several varieties.
 - Ophiophagus* *O. elaps**, hamadryas.
 - Bungarus* *B. ceruleus*†, krait.
 " *B. fasciatus*, sankni.
 - Xenuroslaps* *X. bungaroides*.
 - Callophis* *C. intestinalis*, and several other species.

- HYDROPHIDÆ, OR SEA-SNAKES (ALL DEADLY).**
- Platurus* *P. scutatus*, *P. Fischeri*.
 - Hydrophis* *H. cyanocincta*, and several other species.
 - Enhyarina* *E. bengalensis*.
 - Pelamis* *P. bicolor*.

- VIPERINE SNAKES.**
- CROTALIDÆ, OR PIT VIPERS.
- Trimeresurus* *T. gramineus*, and several other species.
 - Peltopelor* *P. macrolepis*.
 - Halye* *H. himalayanus*.
 - Hypnale* *H. nepa*.

- VIPERIDÆ, OR TRUE VIPERS.**
- Daboia* *D. russellii*† chain viper, Tic-po'longa.
 - Rohis* *R. carinata*† Phooras snake, Afaâ, Kuppur.

SCALE OF REWARDS IN INDIA FOR THE DESTRUCTION OF SNAKES AND WILD ANIMALS IN 1876.

| | Snakes. | Alligators. | Bears. | Buffaloes. | Cheetahs. | Elephants. | Hyenas. | Leopards. | Lions. | Panthers. | Rhinoceri. | Tigers. | Wolves. |
|------------------------------|-----------------|--------------|-------------|-------------|-------------|--------------|--------------|-------------|-------------|-------------|--------------|--------------|-------------|
| Bengal | 4 Ans. | Rs. 1½ to 2½ | Rs. 5 | Rs. 1 to 2 | Rs. 5 | Rs. 2½ to 10 | Rs. 2½ to 10 | Rs. 3 to 12 | Rs. 3 to 12 | Rs. 5 to 10 | Rs. 10 to 20 | Rs. 10 to 20 | Rs. 3 to 5 |
| Berar | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Bombay | 6 Ps. to 4 Ans. | Rs. 3 to 12 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 |
| British Burmah | 1 B. | Rs. 2 to 5 | Rs. 5 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 |
| Central Provinces | 8 Ans. to 2 Rs. | Rs. 5 | Rs. 5 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 |
| Hyderabad, Nizam's Territory | 1 An. | Rs. 5 | Rs. 5 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 |
| Madras | 1 An. | Rs. 5 | Rs. 5 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 |
| Mysore | 8 Ans. | Rs. 5 | Rs. 5 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 |
| North-West Provinces | 2 Rs. | Rs. 3 | Rs. 3 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 |
| Oude | 2 Ans. | Rs. 3 | Rs. 3 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 |
| Punjab | 2 Ans. | Rs. 3 | Rs. 3 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 | Rs. 3 to 5 |
| Rajpootana | 1 to 8 Ans. | Rs. 5 | Rs. 5 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 | Rs. 5 to 10 |

GRAND TOTAL OF DEATHS FROM SNAKE-BITES IN 1869.

Population, excluding that of Central India, 120,972,283.

| PROVINCES. | Males over 12. | Females over 12. | Males under 12. | Females under 12. | NAMES OF SNAKES. | | | | Total Deaths. |
|----------------------|----------------|------------------|-----------------|-------------------|------------------|--------|---------------|-----------|---------------|
| | | | | | Cobra. | Krait. | Other Snakes. | Un-known. | |
| Bengal | 2,374 | 2,576 | 683 | 606 | 959 | 160 | 348 | 4,752 | 6,219 |
| Orissa | 137 | 138 | 44 | 31 | 128 | 2 | 52 | 168 | 353 |
| Assam | 60 | 14 | 9 | 3 | ... | ... | 12 | 64 | 76 |
| North-West Provinces | 664 | 252 | 199 | 90 | 854 | 92 | 63 | 986 | 1,995 |
| Punjab | 434 | 184 | 77 | 32 | 76 | ... | 242 | 437 | 765 |
| Oude | 364 | 58 | 137 | 146 | 607 | 105 | 20 | 473 | 1,205 |
| Central Provinces | ... | ... | ... | ... | ... | ... | ... | ... | 606 |
| Central India | 38 | 36 | 8 | 8 | 21 | ... | 37 | 32 | 90 |
| Burmah | 95 | 22 | 3 | ... | 45 | ... | 65 | 10 | 120 |
| Grand Totals | 4,416† | 4,480† | 1,140† | 1,016† | 2,690; | 359‡ | 839‡ | 6,922‡ | 11,416 |

The addition of 28 (fr. m Umritsur) to the totals marked * will give the grand total 755. The addition of 606 to the totals marked † will give the grand total 11,416. The addition of 634 (i.e., 806 + 28) to the totals marked ‡ will give 11,416. About 1 death in every 10,000 persons. These abstracts are made from Government returns, which are, however, imperfect in details.

