Eaton RL. Fastest of the world's land animals is racing towards extinction. African Wild Life:132-128.

Keywords: 1Afr/45Asia/Acinonyx jubatus/behavior/breeding/captivity/cheetah/ history/protection/sex ratio

Abstract: A comprehensive article about the cheetahs history, hunting strategy, social behaviour, sex ratio who is about one male to two females in the Serengeti, prey preferences, territorial behavior, breeding behaviour, about breeding programs in captivity and their mating behaviour that is quite elaborate. In Asia, Cheetah are already endangered. And for South Africa it would be a good thing if the commercial market in live cheetahs were regulated and if the animal could receive more protection.

FASTEST OF THE WORLD'S LAND ANIMALS IS RACING TOWARDS EXTINCTION.....

by

Randall L. Eaton

THE TITLE OF Joy Adamson's book about Pippa could not have been more appropriate. Indeed, the "Spotted Sphinx" has been a biological mystery for very long – too long. With the exception of the dog and domestic livestock the cheetah has shared a long, unique and glamorous relationship with mankind. Thousands of years before Christ, Egyptians entertained themselves by coursing gazelles with cheetahs they caught in the wild. The first time I followed a wild cheetah on foot, it soon became apparent that I was something to be ignored by this regal animal. The Egyptians had little trouble in taming wild cheetahs to hunt for them. This is itself as much a mystery as why the cheetah, unlike other wild animals, shows little fear of man. Equally obscure, is the fact that through countless ages of living close to man the hunting leopard has virtually not bred in captivity.

Six years ago, I became intensely interested in learning about the cheetah and had hopes that the efforts of myself and others would ensure its survival. In 1965, the East Africa Wild Life Society published its report of the cheetah survey conducted by Graham and Parker. The questionaire study clearly indicated that the cheetah was declining in East Africa due to several factors, all of which stemmed from human activities and industry. Shortly, afterwards I went to East Africa where I conducted field research on cheetah ecology and behaviour primarily in Nairobi National Park and in Masai Amboseli Game Reserve. For the past 5 years, (and at this time), I have been involved in various studies aimed at a greater understanding of all aspects of cheetah biology, without which conservation efforts might be futile.

The cheetah is a true cat and not a dog-cat hybrid or ancestor as much of the earlier African literature implies. *Acinonyx jubatus* is the only living member of its genus. The cheetah is the fastest land animal having been accurately clocked at a top speed of 70 m.p.h. Its specializations for speed include an exaggerated anatomy quite dog-like in appearance. The skull and jaws are small, the legs and tail long, the rib cage deep, and the feet specialized for quick turns. The claws are only partially retractable and are blunted due to their use in running. The tail acts as an important rudder when sharply changing directions while chasing prey. Cheetahs are well known for the tear line which runs from the eye down to the mouth. I believe that this black strip of hair serves one or both of the following functions: to cut down glare – the cheetah is a day time hunter and like several diurnal hunting animals has a need to decrease and eliminate glare; to act as a form of camouflage which breaks up the silhouette of the hunting cheetah's head against the horizon – throughout the animal kingdom there are many instances in which prey respond to and or mimic the head and eyes of predators.

Many estimates of the distance which a cheetah chases prey at top speed are erroneous. It can maintain a near top speed for no more than 300 yards and usually begins to slow down after 200 yards. Following a full speed chase the cheetah is so taxed that it cannot make another effective chase for about 30 minutes.

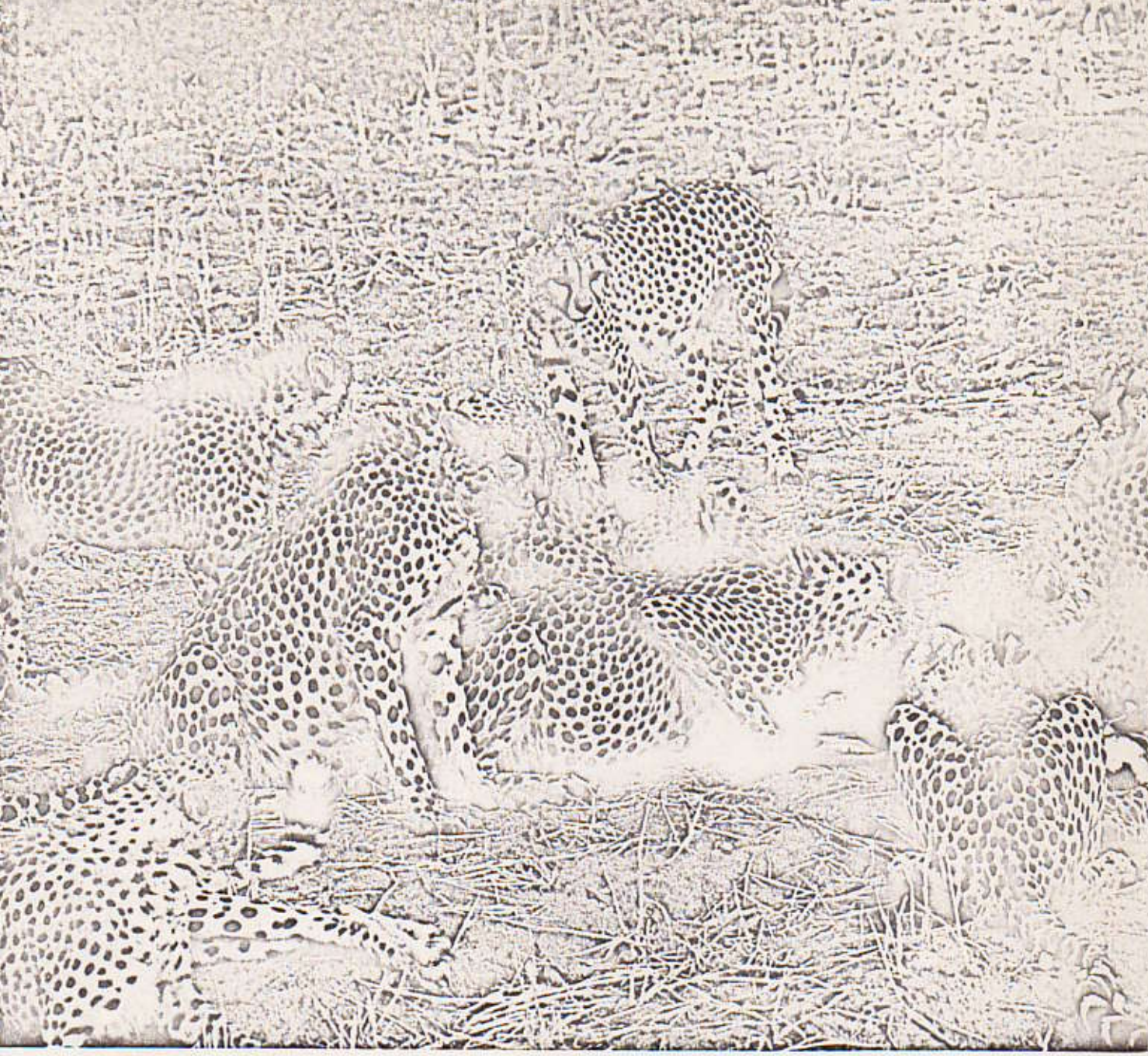
Except for the white tip of the tail, the tear line and the black ear spots the cheetah is spotted all over the body. These spots serve to camouflage the animal. However, there was a population, now believed extinct, which lived in Rhodesia and which exhibited a different pellage. The Sex or King Cheetah as it was known had a pattern of dark stripes against the lighter typical background. This unusual pattern was most likely due to a single mutation which arose and disappeared in a short time. As far as can be told, the cheetah does not warrant sub-species or race classification throughout its range in Africa and Asia.

Though the cheetah is taller and longer than the leopard it is lighter in weight. The average adult weight is about 100 lbs. Males are usually slightly larger than females but there is no other distinguishing difference in the sexes. Some cheetahs have gone as high as 140 lbs. but this is highly exceptional.

The many specializations described all adapt the cheetah for a unique niche amongst the larger carnivores – that of employing speed to overcome swift prey. These extreme adaptations are counterbalanced by a seeming inability of the cheetah to kill its prey, and more important perhaps to defend its kill and itself from the other predators with which it competes. The cheetah's jaws and teeth are quite reduced in size, consequently it has great difficulty in killing. Unlike many cats, the cheetah predominantly suffocates the prey with a strangle bite directed to the ventral neck. Actually it is common for the leopard, lion and tiger to kill very large prey with the strangle bite and to kill smaller prey with a bite to the dorsal neck which damages the lower skull or spinal cord. I have observed cheetahs kill small and

THE AUTHOR

R. L. Eaton received his B.A. in Biology from Western Illinois University. He did graduate study in Zoology at the University of Washington, the University of East Africa and the University of Missouri. He received the M.Sc from Purdue University in animal behaviour (ethology) and wildlife ecology. His PhD dissertation at Purdue is aggressive behaviour in the African lion. Mr. Eaton at 28 is the author of more than 30 scientific and popular articles and the editor of a two volume work derived from the recently held international symposium on ecology behaviour and conservation of the world's cats, presently in press. Eaton is the author of a forthcoming book on the ecology and behaviour of the cheetah. He is presently a member of the faculty in Forest Resources at the University of Georgia.



(above) Feeding on whole carcases is valuable for proper nutrition.

(below) In areas such as Nairobi National nearly full grown cubs, as many as 4 or 5, are with their mother.

young antelope many times and none of the victims died in less than 5 minutes, some of them taking as long as 20 minutes. This rather inefficient technique is a disadvantage in that the struggling prey can get free and even escape, or it can vocalize and thus attract other predators and scavengers such as lion, leopard and hyena, all of which frequently drive the cheetah from its kill. The cheetah is ill-equipped to defend a kill against these predators, which are also responsible for preying on cheetah cubs and even adults. About half the cheetahs born die before they reach six months of age due to predation by lion, leopard and hyena. The cheetah has evolved a highly specialized complex of threatening responses which are elicited only towards other species and potential competitors including man. These gestures which include sounds, facial expressions, foot stamping and charging are not seen in their own fights. These inter-specific threats are used when competing predators approach the cheetah's kill. When only one hyena approaches, the cheetah may be able to bluff and drive the hyena away. The threats are never followed by physical attack, and if the competitor is not bluffed, the cheetah submits and abandons the kill.

For a long time it has been falsely assumed that cheetahs are solitary animals, much like the leopard or the common house cat. This is not the case. The cheetah is a social animal in many respects. Basically the cheetah is found

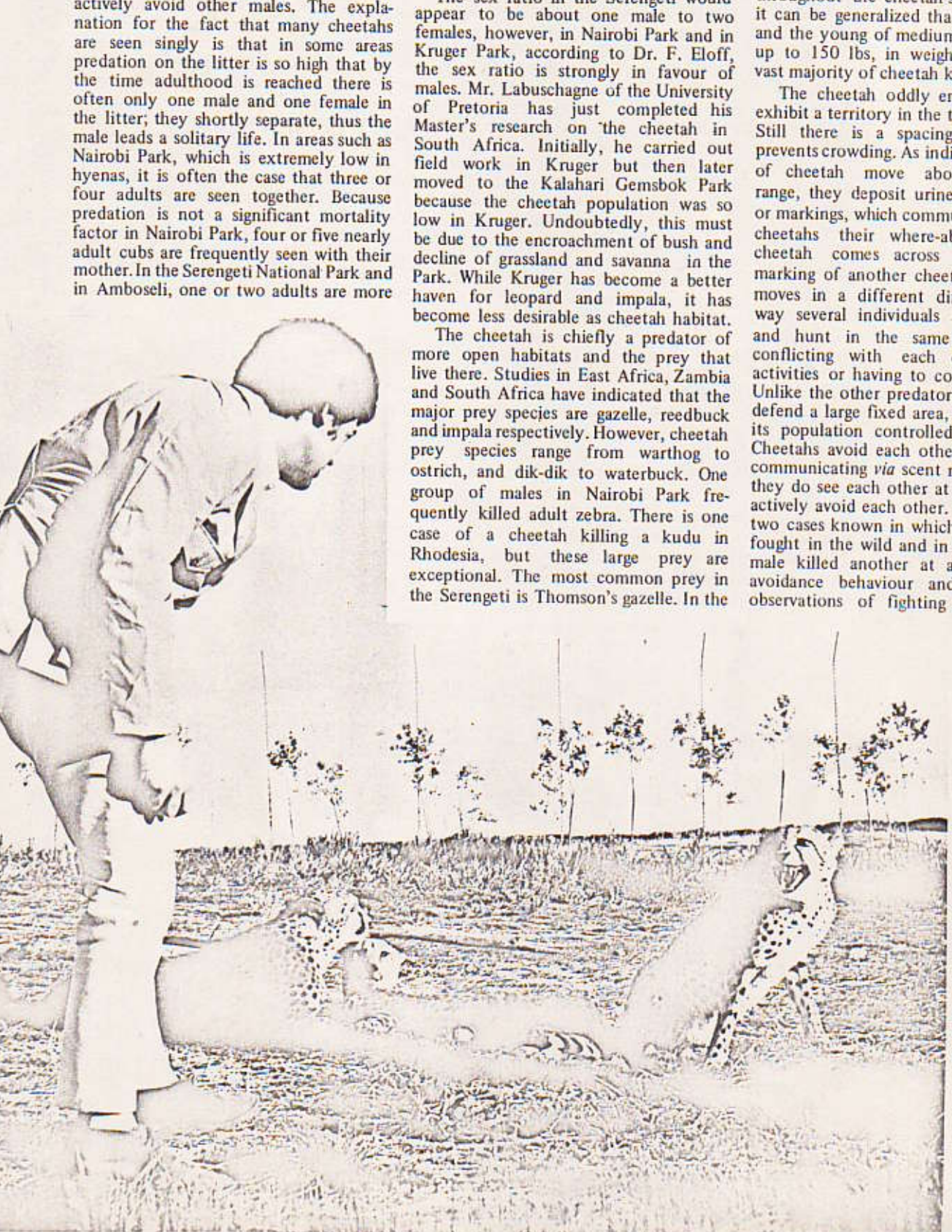
(right) The cheetah has evolved a highly specialized complex of threatening responses.

as a single adult, a mother with cubs or groups of adult males. When the female gives birth to a litter, usually 5 cubs, she stays with them until they are 14–18 months of age, at which time she seeks solitude and gives birth again. The litter stays together but the females gradually leave to mate and reproduce, never again associating with other adults except for mating. The rest of her life is spent in mating and rearing cubs. Her brothers stay together as an adult group which is very cohesive and does not mix with other groups of males – in fact they actively avoid other males. The explanation for the fact that many cheetahs are seen singly is that in some areas predation on the litter is so high that by the time adulthood is reached there is often only one male and one female in the litter; they shortly separate, thus the male leads a solitary life. In areas such as Nairobi Park, which is extremely low in hyenas, it is often the case that three or four adults are seen together. Because predation is not a significant mortality factor in Nairobi Park, four or five nearly adult cubs are frequently seen with their mother. In the Serengeti National Park and in Amboseli, one or two adults are more commonly sighted. My research indicated that hyenas killed many cheetah cubs in Amboseli. Similar findings in the Serengeti indicate that its high density of other predators are responsible for a very low density and survival rate of cheetahs. George Schaller has indicated that the cheetah population may be declining in the Serengeti area where one cheetah per 100 square miles is the average density. On the other hand, in Nairobi Park we find a density of one cheetah per two square miles, a striking contrast.

The sex ratio in the Serengeti would appear to be about one male to two females, however, in Nairobi Park and in Kruger Park, according to Dr. F. Eloff, the sex ratio is strongly in favour of males. Mr. Labuschagne of the University of Pretoria has just completed his Master's research on the cheetah in South Africa. Initially, he carried out field work in Kruger but then later moved to the Kalahari Gemsbok Park because the cheetah population was so low in Kruger. Undoubtedly, this must be due to the encroachment of bush and decline of grassland and savanna in the Park. While Kruger has become a better haven for leopard and impala, it has become less desirable as cheetah habitat.

The cheetah is chiefly a predator of more open habitats and the prey that live there. Studies in East Africa, Zambia and South Africa have indicated that the major prey species are gazelle, reedbuck and impala respectively. However, cheetah prey species range from warthog to ostrich, and dik-dik to waterbuck. One group of males in Nairobi Park frequently killed adult zebra. There is one case of a cheetah killing a kudu in Rhodesia, but these large prey are exceptional. The most common prey in the Serengeti is Thomson's gazelle. In the Kruger National Park, Pienaar fou impala to be most important, thou reedbuck was the preferred prey. Kafue National Park, reedbuck were more abundant than in Kruger but w not an important prey species. different areas the preferred prey spec vary regardless of their abundance. Nairobi Park, every group of cheet specialized on a different prey speci This is not to be unexpected since ma carnivores acquire specialized techniqu in their hunting experience. Overal throughout the cheetah's existing ran it can be generalized that small antelo and the young of medium sized antelo up to 150 lbs, in weight, make up t vast majority of cheetah kills.

The cheetah oddly enough, does n exhibit a territory in the traditional sen Still there is a spacing system whi prevents crowding. As individual or grou of cheetah move about their hor range, they deposit urine – scent pos or markings, which communicate to oth cheetahs their where-abouts. When cheetah comes across a fresh sce marking of another cheetah or group, moves in a different direction. In th way several individuals and groups u and hunt in the same area, witho conflicting with each others hunti activities or having to compete directl Unlike the other predators which usual defend a large fixed area, the cheetah h its population controlled by predatio Cheetahs avoid each other by indirect communicating *via* scent markings. Wh they do see each other at a distance the actively avoid each other. There are on two cases known in which cheetahs ha fought in the wild and in both cases or male killed another at a kill site. Th avoidance behaviour and the isolate observations of fighting to the deat



Randall Eaton is threatened b a cheetah at Lion Country Safari, Californ nia. Even cheetahs in the wilds can be approached closely on foo

indicates that cheetahs socialize in the wild only with members of their own group. This excludes the female's mating behaviour, during which she will permit males to approach and mate. They follow her scent trail when she comes on heat until they find her. Several males or male groups may mate with a female during heat which lasts from two to six weeks. In East Africa, the majority of litters are born in April, May and June, while in the Transvaal and in South West Africa there is a preponderance of births in November and December. These seasonal differences are related to climatic conditions and how they affect concentrations of game during the "education" period of cubs.

Cheetah cubs begin to take part in active hunting at about six months of age. Until then, they follow their mother through her hunting circuit staying behind each time she goes on a hunt. When the female kills, she either drags the prey to the cubs or calls the cubs to the kill with a high pitched 'chirp'. The cubs respond to the chirp by immediately running to her. If there is cover available, the kill is dragged into seclusion and eaten there. The mother opens the carcass on the rear flanks and then allows the cubs to feed while she stands watch, quite nervously for dangerous predators. It is usually said that cheetahs are slipshod and wasteful killers which eat their fill and then abandon the carcass. This is not altogether true. A female with cubs will cover the carcass and return to feed again. The reason that cheetahs often abandon their kills is that it is usually a short time before potentially dangerous competitors arrive. It is in the cheetah's best interest to eat as much as it can in a short time and then leave the carcass. Many cheetah kills are picked clean before they are left. Everything except the stomach contents, skin and the larger and longer bones are consumed. An adult cheetah weighing 100 lbs. can consume 25 to 30 lbs. at one time. Certainly the cheetah is not a wasteful animal.

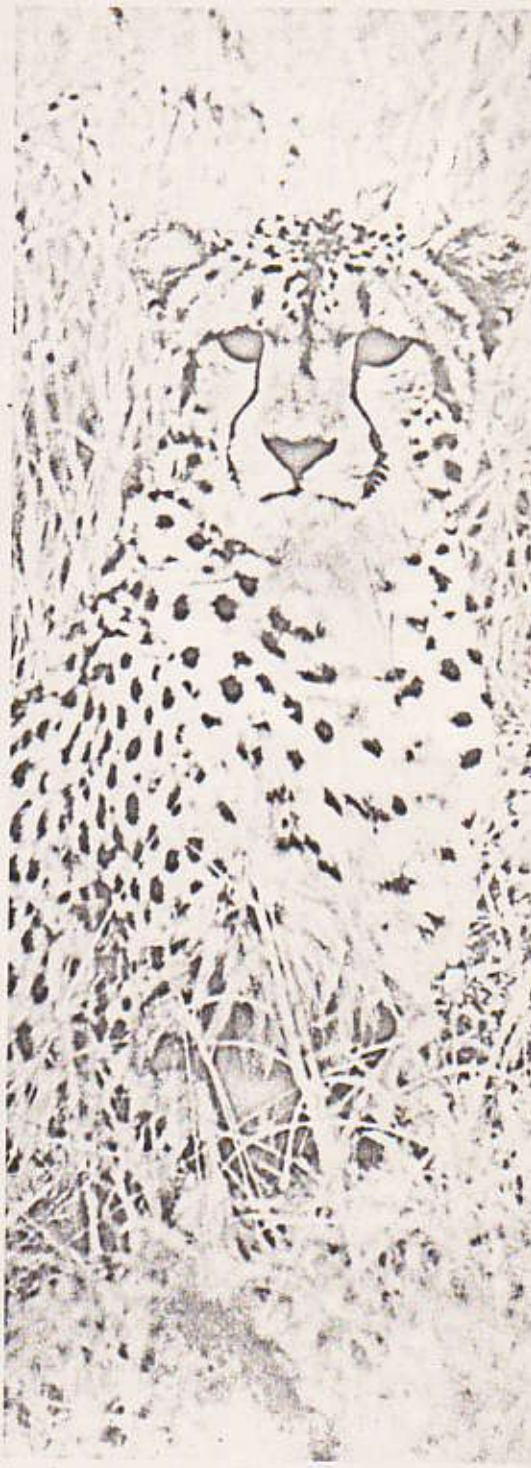
The cubs require four months of extensive practice before they are able to kill on their own some of the time. This period in which the young are educated is demanding process which requires that the mother feed the young, protect them and train them to kill. The cubs scare away many prey that the mother might have caught on her own. The female suddenly undergoes a drastic change in behaviour, she captures prey but does not kill it. Indeed, she takes it to her cubs alive or calls them to the disabled prey and allows them to paw and bite it while it is still alive. In fact they may feed on it without having killed it. These experiences along with joining the mother in stalks and chases enable the cubs in time to hunt and kill on their own. The mother may go so far as to actively herd prey such as young warthogs towards her young while at the same time charging and keeping the young warthog's mother away from her own cubs. It is an interesting fact that in some areas young warthogs are important prey to the cheetah but that adult warthogs are avoided. Of course, a fully grown warthog is a formidable prey and has been known to kill lions, just as wild boar have killed tiger in India. The hunting lessons are important not only for acquiring confidence, but also in learning what prey animals to attack. A faulty experiment with the wrong prey could be fatal.

Along these same lines, Fritz Walter has clearly demonstrated that hunting cheetahs make fine discriminations and select the more vulnerable prey in a herd. For example, in seven out of eight cases in which there was only one female in a male herd of gazelles, she was killed. Both sexes have horns implying that the cheetah can make fine discriminations of size difference.

There are presently a number of organizations throughout the world that are endeavouring to breed cheetahs for a number of reasons. There are at least two cheetah breeding programs under way in the Transvaal sponsored by different groups. In Natal, there is an attempt to reintroduce the cheetah to the game reserves: apparently there is controversy over this scheme. In the United States, there are several zoos and wildlife parks also attempting to breed cheetahs on a large scale. I have been involved for sometime now in these projects and I believe that we have acquired the information necessary to not only breed cheetahs but to reintroduce them in the wild. The foregoing information on cheetah ecology and behaviour must be employed along with the results of semi-captive studies to properly guide reintroduction and breeding efforts in South Africa and elsewhere. Under the semi-natural conditions of Lion Country Safari, a drive-through African Wildlife Park in Southern California, I was able to closely observe 24 cheetahs brought from South West Africa. Previous field studies including my own revealed very little about the reproductive behaviour and requirements of cheetahs. Since cheetahs have only rarely mated with success in captivity there has been virtually no information on this subject.

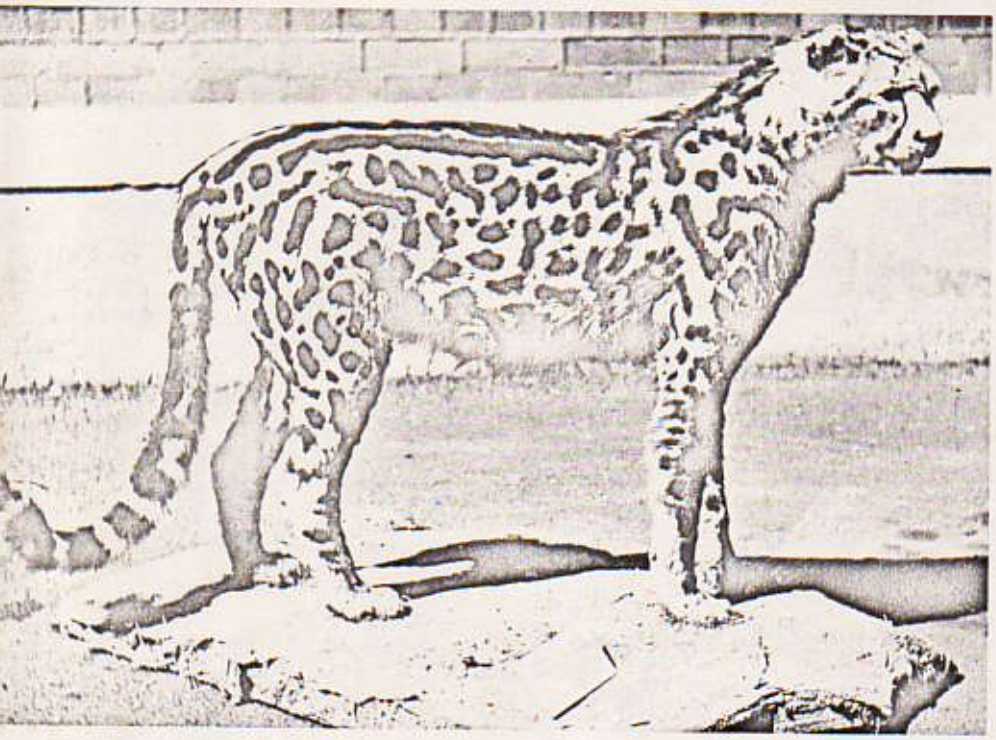
It soon became apparent that cheetah courtship and mating behaviour was quite elaborate, involving complicated signals and gestures as well as extensive courtship chases of females by males. The cheetahs showed a mating season during July, August and September in Southern California. They had been in the United States only a short while and there is every reason to believe that they would have mated during these same months in South Africa. This belief is supported by the fact that reported births in South West are in November and December primarily. The San Diego Zoo received 10 cheetahs also from South West Africa and they too showed a preponderance of mating activities during these months. Most copulations followed intensive courtship fights between the competing

South West Africa is one of the last strongholds of the cheetah – but it is also the source of recent live cheetah exports.



Correction: The photograph in "Library in the Wilds" by A. Prinsloo in the September issue, entitled Harry Wolhuter as a young man, should in fact have read: F.C. Selous.

THE KING CHEETAH....



The extinct King Cheetah from the Siki Reserve in Rhodesia – a mounted specimen in the Natal Museum.

males and play fighting between female and male. Perhaps most important, is the fact that extensive chases over several hundred yards took place.

I am convinced that the presence of several competing males and adequate space for courtship chases is optimal for breeding success. These have been lacking in previous zoo attempts to breed cheetahs. The few isolated successes, for example at Whipsnade Zoo are best explained as the rare case in which a pair is more tolerant of an unnatural setting. We cannot count on the exceptions, rather we must find formulas which are effective for most cheetahs. Towards this end. I have mentioned several males and adequate space – no less than 5 acres in area. Further, there is reason to believe that females are behaviourally and physiologically more receptive to males when they have been isolated away from the males until they come on heat. For this reason, and the additional fact that this is the case in the wild, males should be kept away from the female until she is in season.

In some species there are indications that hunting behaviour is conducive to overall condition as well as to the production of reproductive hormones which may affect breeding success, therefore, and in keeping with the general principal of duplicating natural conditions, I should recommend that feeding live prey be carried out regularly as one aspect of any breeding programme. Unless the keepers of cheetahs are highly skilled in nutrition, it is desirable in any event to feed whole fresh carcasses since this provides proper nutrition and enhances health in captivity.

The breeding programmes should naturally be a part of restocking efforts; however, assuming that the restocked habitat is suitable, cheetahs born in captivity must be allowed to acquire the education from their mothers that they would have received in the wild. Even if cheetah cubs are removed from the wild to later be restocked, or for some reason the cubs are removed from their mother, they will in time acquire a normal predatory sequence, as Stevenson – Hamilton discovered years ago in South Africa. Under any circumstances a restocking programme should implement live feeding, preferably with the prey species that are abundant in the area to be restocked.

Humane and preservation groups would prevent this practice in the United States and certainly there would be some opposition in South Africa. My personal belief is that we must place the conservation status of the cheetah and whatever is necessary to achieve it above our displeasure of otherwise inhumane practices in our system of priorities.

Now it may be obvious why it is so important that South Africa should make a contribution to the conservation of the cheetah. The picture for the cheetah around the world is dismal at present in spite of all that we have learned in the last few years and all that many organisations and people in many nations are striving to do. The reasons for the cheetah's decline and fast approach to endangered status are numerous.

Historically there has been a constant drain put on wild populations for their use as sporting animals. Marco Polo said that the Great Khan had hundreds in his courts. This fashion remained in vogue through the centuries in Asia and Europe. In fact to the present day, cheetahs are still smuggled into India where they have become extinct. The loss of the cheetah's major prey, blackbuck, in India combined with excessive hunting and loss of habitat were responsible for its extermination there. Cheetahs are found in Asia today in remnant, declining populations in Pakistan and Afghanistan. The I.U.C.N. ranks the Asian cheetah as endangered; however, I have just learned that cheetahs are increasing in Iran, a tribute to their outstanding Fish and Game Department. The cheetah in Africa is considered rare and in danger of becoming endangered. It has all but disappeared from West and North Africa. It has declined to a dangerously low level in Ethiopia and Somalia. Its numbers are declining in all the rest of its remaining range in eastern, central and Southern Africa.

I believe that there are no more than 2,000 cheetahs remaining in Africa and most of these are protected areas. Although South West Africa is prime cheetah habitat, there is a heavy drain on the population there by removal of live animals for the pet, zoo and wildlife industries. There are some objections to the high number of cheetahs removed from South West, which is usually done on the basis of actual or more likely potential threat to livestock, particularly sheep. One can argue that were the animals not removed alive they would be killed by farmers or hide collectors.

Considering the situation in South West, perhaps the export of cheetahs is warranted as they are used for research. However, I cannot condone the removal of live cheetahs for the pet industry or for display animals in zoos not qualified or properly able to keep and breed cheetahs, It would be a good thing if the commercial market in live cheetahs were regulated in South West and if the animal could receive more protection there.

The greatest immediate danger to the cheetah and, moreover, the leopard, is the hide industry. I should like to report on this in a following issue.