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Abstract: Prehistoric ancestors of our modern feline forms survived at least two cold stadial phases in Europe. As temperatures continued to fall, gradual changes to the diet were made so as to raise the proportions of concentrate and fats. No signs of physical discomfort were observed. The cooler temperatures appeared to stimulate the animal's activity. The ability to adjust to climatic changes is apparently still present in the modern forms of *Acinonyx*.

A note on keeping cheetahs

Acinonyx jubatus

under winter conditions

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In the quest for improvements in maintaining felids in captivity, we should not overlook the prehistoric ancestors of our modern feline forms. In a previous paper (VanEysinga, 1969), I was able to report that 'African lions *Panthera leo*,

tigers *P. tigris* and jaguars *P. onca* can be safely maintained without artificial heat during the cold weather period'. This ability to adapt to a cold weather environment is not restricted to the abovementioned species. We have continued our

investigations into this phenomenon with cheetahs *Acinonyx jubatus*. Their prehistoric records date from the early Villafranchian to Middle Pleistocene in Europe and to late Pleistocene in Eastern Asia. They survived at least two cold stadial phases in Europe (Kurten, 1968).

A pair of cheetahs were obtained from two African sources. The female arrived in our collection during the last week of May while the male arrived from Kenya in early July. Both animals were housed in a large enclosure about 60 × 60 m (200 × 200 ft) in extent surrounded by a 2.3 m (7 ft) high, 11 gauge, chainlink fence. A scattered growth of pine, spruce and cedar dots the enclosure, while the southern boundary is formed by a slightly elevated ridge overlooking a lake. We made this provision in order to provide the cheetahs with a panoramic view. According to an earlier report, such an arrangement would alleviate the boredom frequently encountered in captive cheetahs (Florio & Spinelli, 1967). Adjacent to the outdoor enclosure a single-wall wooden building was constructed measuring 8 × 2.5 × 2.25 m (26 × 8 × 7.5 ft), with two windows and entrance door in the south wall, in order to provide shelter during severe winter weather. The floor of the structure was covered with 25 cm (10 in) of sharp sand. The arrival of the cheetahs coincided with the onset of the warm summer temperatures and both animals adjusted quite well to their new surroundings.

After being introduced into our collection, the male was given 2.26 kg (5 lb) and the female 1.8 kg (4 lb) of raw horse or beef meat daily. This was rolled in Vimix powder – a vitamin, amino-acid, mineral supplement. This diet was varied by feeding freshly killed chickens and rabbits four times per month. A female cheetah observed in Serengeti consumed approximately 4 kg (8.8 lb) per day (Schaller, 1968), while the recommended ration for captive cheetahs is 1.8 kg (4 lb) for males and 1.36 kg (3 lb) for females (Crandall, 1964).

In September the average daily temperature was 20°C (68°F), with average night temperatures of 11°C (51.8°F). The cheetahs were gradually introduced to our feline diet as described earlier (VanEysinga, 1969). Initially, they were not too receptive to this dietary change but we managed to overcome this by rolling the meat in the carnivore-concentrate fortified with Vimix. Although

our large felids will accept and thrive on a ratio of 50/50 raw meat and concentrate, we have found that our cheetahs would accept a ration consisting of about 90% meat (1% fat included) and 10% concentrate. As temperatures continued to fall we made gradual changes to the diet so as to raise the proportions of concentrate and fats. Thus during October (monthly average temperatures: 10–4°C; 50–39.2°F) the proportions were modified to 85% raw meat (2% fat included) and 15% concentrate. In November (5–1°C; 41–33.8°F): 80% meat (3% fat included) and 20% concentrate. In December (–2––5.5°C; 28–22°F): 75% meat (4% fat included) and 25% concentrate. In January (–1–8°C; 30.2–17.6°F): 70% meat (5% fat included) and 30% concentrate. In February (–2––20°C; 28.4––4°F): 70% meat (8% fat included) and 30% concentrate. From March on the trends in these ratios were reversed as the temperatures rose.

Although arrangements were made to heat the winter shelter, we did not observe any signs of physical discomfort, in spite of the fact that during February the thermometer several times dropped to –35°C (–32°F). Both cheetahs grew a dense and luxurious fur coat and withstood winter temperatures without any ill effect. During the day, if the wind velocity was not exceeding about 16 kph (8.7 knots), both animals had access to their spacious outdoor enclosure even though it was at times covered with a 70 cm (27 in) blanket of snow. The cooler temperatures appeared to stimulate the animal's activity and it was most interesting to note their reaction to conditions so different from those encountered on the African savannah.

The male was bolder from the outset and needed very little coaxing to enter the snow covered enclosure, but he was most cautious while trying to negotiate the terrain. He was soon joined by the female and within ten minutes both cheetahs started to cavort and chase each other in the snow. Both animals, but particularly the male, would at times roll in the snow in the same fashion as we had observed them rolling in the sand during the summer months. It was obvious that artificial heat was not required in the winter shelter when the cheetahs adapted themselves so well to cold weather conditions, and it was interesting to learn that Basle Zoo had installed electric heating in their winter quarters for

cheetahs (Lang, 1968). Our observations suggest that cheetahs may be capable of adapting to cold conditions although this adaptation may not have been sufficient to cope with major ecological changes in the past. Nevertheless their ability to adjust to climatic changes is apparently still present in the modern forms of *Acinonyx*.

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PRODUCTS MENTIONED IN TEXT

Vimix is manufactured by Austin Laboratories, Paris, Ontario, Canada.