ONTOGENY OF PREY-KILLING BEHAVIOR IN CANIDAE  

by  

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(With 3 Figures)  

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INTRODUCTION  

LEYHAUSEN (1956) has described in detail the temporal sequencing of action patterns in the Felidae associated with prey catching and killing. Prey-killing behavior has been described in the pole cat, by EIBL-EIBESFELDT (1956 and 1961), who found that movement of the prey was an essential stimulus in eliciting attack in naive subjects. In experienced subjects, this was no longer found necessary, for they would attack a stationary model of a rat.  

In a number of lower vertebrates and especially invertebrates, chemicals from the prey trigger attack and feeding (reviewed by MARLER & HAMILTON, 1966). BURGHARDT (1967) has shown that this chemical sensitization may result in prey-specificity in garter snakes, different species of which show an innate specificity for extracts of particular prey which in their natural ecology constitute the major if not sole source of food. Early experiences may also influence later food preference; this has been shown in the snapping turtle by BURGHARDT & HESS (1966) who found some evidence of food-imprinting.  

This investigation is concerned with what prey-characteristics elicit attack and subsequent consummatory killing and eating in naive canids. Chemical sensitization, movement of the prey and earlier imprinting experiences may also play a significant role in prey-killing in canidae. Species-differences in the development and sequencing of action pattern will also be evaluated.  

MATERIALS AND METHODS  

Observations were made on hand-raised canids; one male and one female wolf (Canis lupus), two male and one female coyote (Canis latrans), one male and one female grey fox (Urocyon cinereoargenteus), and one male and one female English Pointer (Canis familiaris). Additional observations were made on four red foxes (Vulpes vulpes fulva) two grey foxes and two Arctic foxes (Alopex lagopus) which were acquired after weaning at
approximately 8 weeks of age. It was not known which of these latter subjects had prior experience with live or dead prey; they were used therefore to study action patterns associated with prey-killing and play with prey stimuli.

The hand-raised wolves, coyotes and grey foxes were weaned at 21-25 days of age on to a diet of Gaines 'burgers', Esbilac (Borden's synthetic bitch-milk formula) and Purina dog meal. From 3-7 weeks of age (or until the complete sequence of prey killing and eating was present) their responses to young live rats were observed, and at a later age in the dog, wolf and coyote and three species of fox, the reactions to live adult mice were recorded. Approximately 26 hours of observations were made with the subjects in an 8' X 8' arena equipped with one-way windows. Observations were terminated when the subject had either killed and eaten the prey or ignored it after killing and/or playing with it. All sequences of prey chasing, capture, killing and play with prey were recorded on film to permit visual analysis of action patterns at slow motion.

RESULTS

GREY FOX

At 21 days of age, no reaction was seen towards a live 18 day old rat, although both foxes were eating solid food at this age. The male showed a defensive-aggressive gape and growl towards the rat.

At 30 days of age, the female attacked and shook a 24 day old rat by the hind leg for approximately 90 seconds, and then ignored it. The male showed no reaction to the rat. The rat was subsequently killed and dissected and fed to the foxes, who fought wildly over the pieces. This was their first experience of eating freshly killed food.

At 34 days of age when presented with a 2 week old rat, the female attacked it after a latency of 15 seconds. The rat was seized around the middle and shaken violently from side to side, for approximately 2 min. and was subsequently ignored. The rat apparently died in shock, for there was no blood although the skin had been punctured in several places and the thorax and abdomen perforated. After 15 min a second rat of the same age was given. The female fox attacked this moving stimulus immediately, and seized it around the thorax. It then ran off with the rat into a corner of the observation room and shook and bit it violently from side to side for approximately 20 seconds. This rat bled profusely and when it ceased to move, the blood was sniffed and licked. The fox then ate the rat, head first, using the carnassial teeth to crush its prey and incisors to pull pieces from the main body. The male fox ran towards and sniffed and pawed at an