

the AL group were quite active but did not leave the 11-in. circle because they tended to keep their rear segments anchored to the substrate. Ss of the AD group displayed little activity, indicating perhaps that this condition included the essential components of an earthworm's home burrow.

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with 50% Ethonal before and after testing of each S. At the end of the experiment, the sebaceous gland sizes of the Ss were measured.

#### Results and Discussion

Figure 1 presents the number of marks exhibited by the gerbils. The analysis of variance showed that there was a significant main day effect ( $F = 6.06$ ,  $df = 12/216$ ,  $p < .01$ ), and both males and females indicated significant day effects ( $F = 4.06$ , 1.84, and  $p < .01$ , .05 for males and females, respectively;  $df = 12/117$  in both cases). The positive correlation between marking scores and age is in agreement with findings of Lindzey et al (1968), and the number of marks exhibited by male gerbils at approximately 100 days of age observed in the present study are also similar to those reported by Lindzey et al. However, there are differences between these two studies in the time of onset of marking behavior. While Lindzey et al found that male gerbils did not mark until approximately 70 days of age, the present study showed that gerbils of both sexes began to mark as early as 35 days of age. The discrepancy may be due to differences in sampling or housing conditions.

Sex differences in the marking scores almost approached the significant level ( $F = 4.27$ ,  $df = 1/18$ ,  $p < .10$ ). Daily sex comparisons revealed that males marked more frequently than females at 16 weeks of age but not at any other age level. The significant Sex by Day interaction further indicated that the increase of marking scores proceeded differentially in males and females along the age dimension ( $F = 2.72$ ,  $df = 12/216$ ,  $p < .01$ ). Thiessen (1968a) also stated that adult males marked more frequently than adult females.

The Mann-Whitney test indicated that the mean gland size of males (L x W, 1.75 x 0.47 mm) was significantly larger than that of females (0.26 x 0.06 mm) ( $p < .01$ ). The results are congruent with reports by Thiessen (1968a) and Lindzey et al (1968).

#### EXPERIMENT 2:

##### NEST-BUILDING BEHAVIOR

Gerbils have been reported to use leaves of buckwheat, Graminaceae and Cyperaceae to build round nests about 18-25 cm in diam (Schwentker, 1965), and to shred papers of various thickness to build nests (Glickman, Fried, & Morrison, 1967). Cotton was used as nesting material to investigate nesting activity in this study.

##### Subjects

The Ss were those used in Experiment 1; they were tested and maintained under the same conditions.

## The developmental aspect of marking and nesting behaviors in Mongolian gerbils (*Meriones unguiculatus*)\*

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The marking and nest-building behaviors of male and female gerbils were studied developmentally. Gerbils of both sexes began to mark at 5 weeks of age, though males did not mark more often than females until 16 weeks of age. Both males and females were able to use cotton to build nests at 5 weeks of age. No sex difference was found in cotton consumption at any age level. The marking and nesting activities were positive functions of age.

The purpose of the present study is to investigate the development of marking and nesting behaviors in male and female gerbils.

#### EXPERIMENT 1: MARKING BEHAVIOR

Mongolian gerbils have been observed to mark prominent objects in their environment with the midventral sebaceous gland pads. This behavior has been studied extensively by Thiessen and his associates (Thiessen, 1968a, b; Thiessen, Friend, & Lindzey, 1968). Marking behavior is sex-dimorphic, androgen-dependent, and appears to relate to territoriality (Thiessen, 1968a). Lindzey, Thiessen, & Tucker (1968) reported that male gerbils began to mark at 70 days of age and showed a high degree of marking activity at about 100 days of age. Gerbils of both sexes were studied in the present experiment.

##### Subjects

Upon arrival, 10 males and 10

females, purchased from Tumblebrook Farm at 28 days of age, were housed singly in cages measuring 11½ x 7¼ x 5 in. and maintained ad lib with water and Purina Lab Chow.

##### Apparatus

The Ss were housed in an air-conditioned room with a mean temperature of 76° F (74° to 78°). The laboratory had a 12-h light-dark cycle. Polypropylene cages and chrome-plated lids from Lab Cages, Inc., were used to house Ss. The testing apparatus was a black plastic box of 24 x 24 x 18 in. with a front transparent observation window. Six pegs (1 x 1/2 x 1/8 in.) were arranged in two rows of three each, with equal spacing among pegs. The box was illuminated with a 15-W fluorescent light during testing.

##### Procedure

Ss at 4 weeks of age were tested in a random sequence once a week for 13 weeks. The S was placed in the center of the apparatus and observed for 5 min. The number of marks were recorded. The apparatus was cleaned

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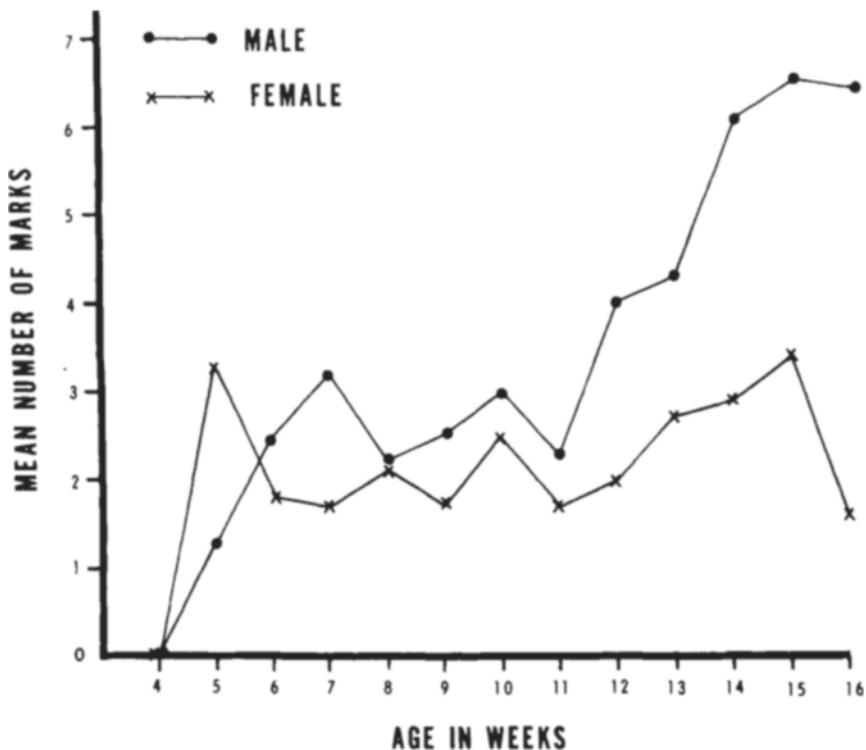


Fig. 1. Mean number of marks exhibited by gerbils at various ages in a 5-min testing period.

#### Apparatus

Cotton was used as nesting material. A Sartorius Digital Precision Balance was used to measure both S and cotton weight.

#### Procedure

Ss were tested 5 days a week for 5 weeks, starting at 5 weeks of age. The experiment was run between 1:30 and 2:30 p.m. On the first day of the experiment, cotton was placed on top

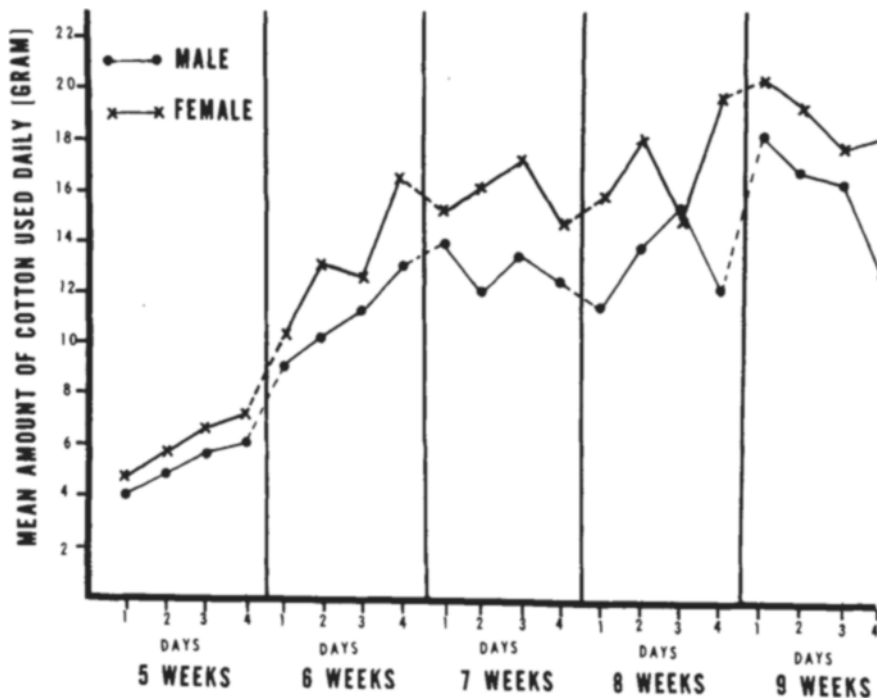


Fig. 2. Cotton consumption by gerbils at various ages.

of the cage lid. The weight of cotton and lid was recorded. The difference in weight between the first and the subsequent day was taken as cotton consumption per day. The characteristics of nests were also noted.

#### Results and Discussion

Figure 2 shows the amount of cotton used by the gerbils at various ages. The analysis of variance indicated a significant day effect ( $F = 14.40$ ,  $df = 19/342$ ,  $p < .01$ ). Both males and females used more cotton as they grew older ( $F = 4.38$ ,  $7.31$  for males and females, respectively;  $df = 19/180$  and  $p < .01$  in both cases). This is similar to findings in mice (Lee, 1969), but it differs from reports on rats, which show a higher nesting activity before puberty than at subsequent time (Kinder, 1927). There were neither significant sex differences nor a significant Sex by Day interaction. Similar to mice, deermice, and rats, gerbils do not show differences between males and nonpregnant females in nest activity (Lee, 1969; King, 1963; Layne, 1969; Kinder, 1927). Qualitatively, gerbils used cotton to build nests with tops, bottoms, and edges. The nests are similar to, but less well constructed, than those of BALB/cJ mice (Lee, 1969).

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