Mice as suggested by Criddle (1915: 134) has been verified for one species (*Perognathus parvus*) in California by Jameson (1954:592). As further evidence of their adaptation to a desert environment (or to an environment periodically suffering drought conditions) Bartholomew and Cade (1957) point to their habits of storing food, burrowing and their capacity for remaining dormant for long periods. In laboratory experiments it was possible to induce long periods of fasting at low temperatures.

These appear to be years of abundance for Pocket Mice. Eighteen which were collected south of Sceptre in the Great Sand Hills (see *Blue Jay*, 14:107-110) were caught in three nights by hand in the headlights of the car or were found dead on the road after our vehicle had passed by. They were found in the Sand Hills crossing a road bordered by buckbrush, in an open pasture of bare sand and sage plants, and were especially numerous on a weedy road bordered by grass and adjacent to alfalfa and wheat-stubble fields. One specimen found dead on the road in the latter location still had its cheek pouches full of weed seeds; the right pocket contained 195 seeds, the left 140. All 335 seeds were alike and have been identified by Mr. L. Bell, Saskatoon, Dom. Dept. Agri., as Knotweed (*Polygonum exsertum*).

One of the Pocket Mice (*Perognathus longimembris*) is the smallest North American rodent; ours is certainly the smallest rodent in Saskatchewan. Specimens taken here are about five inches in total length, are olive-gray on the back and on the sides, and are white beneath. A yellow wash is apparent low on the sides. They can be recognized at once by their external fur-lined cheek pouches which have an opening on both sides of the lower head beside the mouth. Since they are nocturnal one needs to look for them late in the evening or after dark. They prefer rather bare open country with weedy places and make tiny burrows in the ground. Additional specimens are needed to fill out the incomplete range picture shown by the map.

Distribution of the Pocket Mouse in Saskatchewan.

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Behaviour of a Captive Pocket Mouse

by Robert W. Nero, Saskatchewan Museum of Natural History

A Pocket Mouse (*Perognathus fasciatus*) captured at Sceptre, Sask. on September 18, 1956 has been kept alive in a small cage at my home right up to the present. In addition to providing a great deal of amusement over this period, keeping the mouse has allowed me to make certain observations which seem worth recording. Its only food throughout this period has been Budgie bird seed. It was offered water, apple and celery at first but showed no signs of interest in these. Oddly

enough one Pocket Mouse which was kept alive at the Museum for several weeks regularly ate a considerable amount of apple whenever this was offered. According to Cahalane (1947:439) a species of Pocket Mouse survived for seven years on a diet solely of bird seed, necessary water being obtained from this food by digestive processes evidently peculiar to these mice. Living quarters for my mouse consisted of a glass jar with a screen top and later, a tin box with a glass front. Fine sand provided a medium in which the mouse seemed comfortable. Bird seed was simply dumped into the cage at irregular intervals; the handling and storage of this food was one of the major activities of the mouse. A good deal of the time was spent burying whole or hulled seeds in caches; the seeds were frequently later moved again and cached elsewhere. The method of hulling the seeds was as follows: they were picked up with the forepaws and hulled, the cleaned seeds being placed in the pockets, the hulls falling to the ground. Every few seconds the litter of hulls was swept back behind the mouse by a few backward kicks of the hindfeet. The seeds were usually removed from the loaded pockets when being cached by a swift sweeping forward motion of the forepaws, although sometimes the seeds seemed to be dumped without the use of the paws.

Caches of seeds were usually concealed beneath the sand but when the mouse was given a tiny flowerpot it cached its food in this container. Once when the pot was lying on one side the mouse emptied its pouches through the quarter-inch hole in the bottom of the pot, flipping the seeds through the hole rapidly and one by one with a fast, regular motion of its forepaws. A little later it tried persistently to remove the seeds through the same hole, but it could not reach the seeds. It then gnawed and scratched on the edge of the hole in an evident attempt to enlarge it, sprawling and twisting its body about while vainly attempting to reach the seeds with a forepaw stretched inside the hole. A few seconds later it went around the pot to the large opening, crawled inside and went to sleep next to the seeds. When locating buried seeds it pushed its nose deep into the sand and appeared to find them by smelling them.

The mouse spent most of its time moving sand about, altering the shape of the floor of its quarters. Sand was moved by three rather stereotyped methods which occurred in more or less regular sequence: the mouse would first dig backwards like a dog, scratching sand with its forepaws between its widely-spaced hindfeet (fig. 1) and then suddenly kick rapidly backwards with its hindfeet which were brought close together (fig 2). It would then turn about and push the accumulated sand with a rapid shoving motion of its nose and braced forepaws (fig 3), while at the same time it pushed with its hindfeet. It would also employ a shovelling-like motion thrusting upward and forward with its rigid forefeet. Sand was moved the greatest distance by these pushing movements. Finally, the sand would be patted or "drummed" into place, frequently in a corner, or against an edge, by rapid and alternate pounding with its forepows (fig. 4). Seeds were frequently packed into place in a cache by drumming. A buzzing sound was often produced when the mouse was drumming, especially when drumming against the side of the container, the whole body quivering with the resultant vibration. During this process it would also move its forequarters about with its nose close to its paws as if sensing and measuring the amount of change in the surface of the sand. The combined method of digging and transporting sand as described above was very effective; a hole up to three inches in depth could be dug and the sand moved to the far end of the cage in a few minutes.

Pocket Mice are generally supposed to be voiceless and certainly no loud squeaking was ever given by this mouse. However, when the mouse was held rather tightly in the hand a barely audible but constant, soft and rapid squeaking was emitted. I could perceive this sound up to a distance of about 12 inches. When the squeaking mouse was held near a Kangaroo Rat (*Dipodomys ordii*) the latter at once responded to the sound, scampering over to the entrance, climbing on my hand and bitting hard and scratching with its forefeet in an attempt to reach the mouse. On one occasion the Ra

g. 1.

Fig. 2.

g. 3.

Fig. 4.

uddenly turned and took a quick and bath (see below) and then t once returned to attempting to each the mouse in my hand. Sand athing under these conditions appeared to be a displacement behavior, e., a discharge of nervous energy hrough an inappropiate activity.

Something more should be said bout the evident aggression of the Kangaroo Rat toward the Pocket Mouse. When a Pocket Mouse was ntroduced into a large cage with wo rats it was at once severely itten and chased furiously by a at. It recovered and lived and is n fact the hero of this story. Whenver a rat was allowed to smell a Pocket Mouse held in my hand it vas at once aggressively interested nd would bite hard on my hand n an attempt to reach the mouse. Once aroused the Rat would often ttack my hand furiously for several ninutes. This antagonism on the art of the Rat, however, was not imited to the Pocket Mouse. When White-footed Mouse (*Peromyscus p.*) was placed in the cage with a Rat, the latter, as soon as it smelled he mouse, leaped on it and tore t it with its hind claws, these seemng to be its most effective weapons. Both Rat and Pocket Mouse are nutually intolerant of their own kind nd each will kill its own kind when confined in small quarters. Our Pocket Mice and Kangaroo Rats had o be transported in separate cages. Females of both species seemed to e far more aggressive and intolerant han the males. In one instance my emale Pocket Mouse killed a male which was kept in the same conainer—a six-inch square jar with a screen top. The male had continually leaped to the screen where it spent much time gnawing, as if attempting to escape. The female had showed no such inclination.

Sand-bathing, i.e., dressing or cleaning the fur by rubbing in or rolling in sand was performed only rarely by the Pocket Mouse but could regularly be elicited by wetting the head of the mouse. Its behavior when bathing was quite similar to that of the Kangaroo Rat. Usually it would rub its head sideways and forward in the sand. Once after being wetted it first dug in the sand and then rolled the side of its head into the sand, thrusting its head and shoulder along in the sand with abrupt motions, then it did a quick half-roll rubbing the side and part of the back, then it made a fast movement with the whole side and part of the back being rubbed.

Pocket Mice are placed in the same family as Kangaroo Rats and have several similarities in addition to that of sand-bathing. For example, they commonly rest upright on their hindfeet, braced by the tail, while handling food. However, it is as an adaption of its specialized foraging habits that the Pocket Mouse has evolved enlarged hind legs, reduced front legs, etc., according to Bartholomew and Cary (1954). They have shown that locomotion in Pocket Mice is quadrupedal rather than bipedal as in the Rats.

The fur-lined cheek pouches of the mouse were frequently turned inside out and cleaned. The pockets were everted suddenly, evidently by a quick motion of its forefeet. Observations made on a typical occasion follow: the left pocket was being

cleaned by a stretching and stroking motion—pulling with both forepaws at the same time; the mouse made six strokes from the "chin" to the end of the everted pocket, then five more rapid strokes — each time stretching the pink flabby everted pocket and letting it contract suddenly when released. This was repeated with both pockets pulled out. When stroking, i.e., pulling on the pocket with the forefeet, the head and nose were lifted, thus increasing the effect of the motion. The mouse often moved about with its pockets inside out, occasionally stopping to stroke them again. Sometimes the everted pockets (which appeared to be tender) were pushed along in the sand. The pockets sometimes were left out for several minutes (fig. 5) and were apparently returned quite suddenly without the use of the forefeet. They would be retracted at once when the mouse was picked up.

The mouse yawned with the head raised and the mouth wide open. It often stretched both hind legs straight out behind at the same time; the front legs were stretched the same way. It slept or rested in several positions: on one side with the forefeet together near the chin and the tail curled around the bottom of the body; on its side with the tail beneath the body, all four feet drawn up close tightly; on its back—quite upside down—with its forefeet crossed (fig. 6); frequently, upright with the head bowed under to such an extent that the nose touched the belly and the

Fig. 5 —*Photos by R. W. Fyfe*

head lay on the sand (fig. 6), the tail curled around the right side of the body and in front and touching the head, the forefeet being held between the chin and the chest. In this latter position the mouse rested on its hindfeet and the top of its head. Sometimes the hind toes were also tucked up against the belly. When the mouse assumed this position the head was tucked under in one quick motion.

The tendency toward torpidity in Pocket Mice described by several authors was noticed in my mouse. Several times in Septmber and October, 1956, and September, 1957, it was found in a torpid condition, especially early in the morning, huddled up or on one side with no apparent movement. When the mouse was picked up the eyes would open only partly and a slow rate of breathing accompanied by slow movements was evident. Many a time, at first, the mouse was assumed to be dead or dying, but each time it would awaken fully after several minutes.

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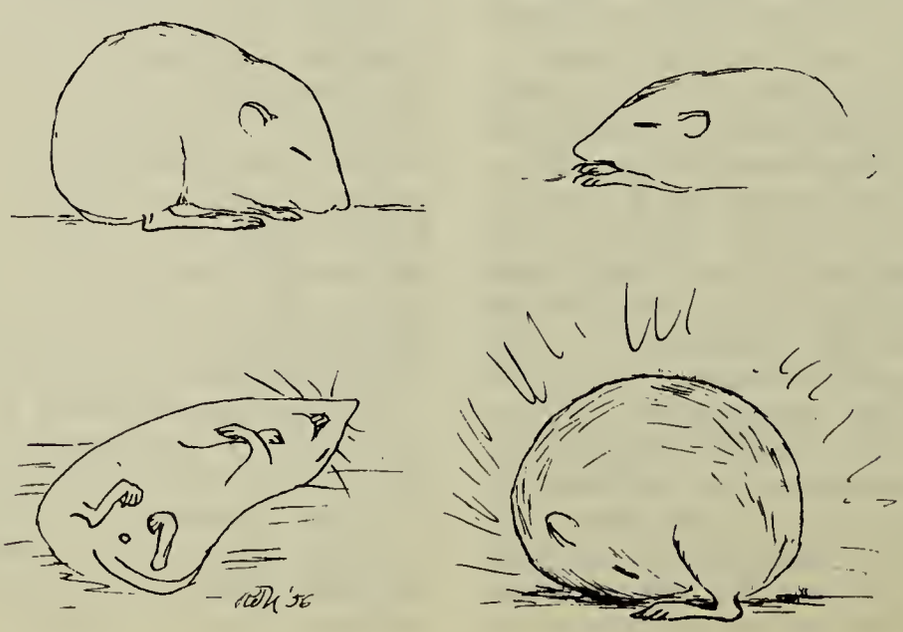

Fig 6.