American Kestrel rejects captured spadefoot toad.—Although the diet of the American Kestrel (*Falco sparverius*) includes a wide range of prey items (Heintzelman, Wilson Bull. 76:323–330, 1964), I could find no records of American Kestrels preying on toads. Therefore, the following observation of a kestrel capturing but not eating a toad is of interest.

On 17 October 1975 at 09:40, about 5 km west of Elgin, Arizona, I observed a female American Kestrel fly about 50 m from a utility pole to the ground in an open short-grass field. Shortly she returned to the pole carrying a toad in one foot. The kestrel picked at the head of the toad sporadically and occasionally shook her head from side to side. After 2 min 55 sec, when she was frightened by a passing vehicle, she carried the toad about 150 m to another pole. She held the toad 3 min 45 sec on this perch before making an attempt to eat it, then began biting the head again but shook her head violently after each bite. After 5 min 55 sec of intermittent bites and head shakes she carried the toad about 200 m to a fence post. Soon she flew a short distance to the ground and returned to the post without the toad. She sat on the post with her feathers ruffled, constantly changed foot positions, and continued the head shaking. After 2 min she flew to the ground and captured a grasshopper which was carried to a utility pole farther out in the field. After eating the grasshopper she still occasionally shook her head.

I found the toad on the ground near a small bush. It was crawling feebly and the rostrum was covered with blood but it had no other injuries. The toad, a western spadefoot (*Scaphiopus hammondi*), measured 44 mm SVL and weighed 14 g. It exhibited normal locomotion and behavior within 24 h and lived for 22 days before being released.

Bent (U.S. Natl. Bull. 170, 1937) lists "toads" in the diets of 4 species of Accipitridae and Sexton and Marion (Wilson Bull. 86:167–168, 1974) report evidence of Swainson's Hawks (*Buteo swainsoni*) feeding on plains spadefoot toads (*Scaphiopus bombifrons*). Perhaps there are differences in the tolerances of different hawks to the distastefulness of toads and differences in the distastefulness of different species of toads.

That the toad was carried to the ground and released rather than dropped from a perch is probably explained by the food storing behavior of American Kestrels. Tordoff (Wilson Bull. 67:139–140, 1955) and Stendell and Waian (Condor 70:187, 1968) reported food storing by American Kestrels, and I have observed it in the Elgin area on 5 occasions; 3 times prey was stored in a small bush.—G. Scott Mills, *Dept. of Ecology and Evolutionary Biology, Univ. of Arizona, Tucson 85721.* *Accepted 20 July 1976.*

Winter distribution of Red-tailed Hawks in central New York state.—The winter distribution of raptors in relation to their prey has seldom been investigated systematically. Several authors (e.g. Snyder and Hope, Wilson Bull. 50:110–112; Weller et al., Wilson Bull. 67:189–193) have noted concentrations of raptors where meadow voles (*Microtus* sp.) were abundant and Craighead and Craighead (Hawks, Owls, and Wildlife, Dover, N.Y. 1969:144) concluded that in a 90 km^2 study area in Michigan raptor density in winter was highest where vole density was highest.

While driving between Ithaca and Albany, New York I noticed on several occasions that Red-tailed Hawk (*Buteo jamaicensis*) density along the route varied greatly. This study was undertaken to determine whether the differences in hawk density were correlated with density of meadow voles (*Microtus pennsylvanicus*), one of their principal prey species (Craighead et al., USDA Circ. 370, 1935).

Methods.—Five surveys were made on clear days between 1 February and 1 March 1974 on the 241 km route which followed US Rt. 13, NY Rt. 26, and US Rt. 20.

TABLE 1

RELATIVE DENSITY OF RED-TAILED HAWKS, FREQUENCY OF VOLE HABITAT, AND VOLE RUNWAYS BETWEEN ITHACA AND ALBANY, NEW YORK IN WINTER, 1974

Hawk density Hawks/km	Frequency of good habitat	Runways in good habitat Mean* (SD)	Frequency of fair habitat	Runways in fair habitat Mean* (SD)
0.016 (low)	.006	54.8 (15.0)	.458	4.0 (4.9)
0.067 (medium)	.050	44.7 (7.4)	.372	1.0 (1.7)
2.190 (high)	.440	93.5 (10.7)**	.125	1.0 (1.5)

* N = 6 fields in each case (20 samples/field).
** Use of the Student-Newman-Keuls test (Sokal and Rohlf, Biometry, Freeman, San Francisco, 1969) showed that in good habitat there were more ($p \leqslant .01$) runways in high hawk density areas than in medium or low hawk density areas. No other differences in runway density were significant.

I measured *Microtus* habitat by driving the route slowly and visually classifying the habitat every .32 km on both sides of the road as "good," "poor," or "unsuitable." Good habitat consisted of recently abandoned fields with a matted, grassy cover. Grass shoots, on which voles feed, were common under this cover. Poor habitat included fields without the distinctive matted cover and had few grass shoots for voles to feed on. Unsuitable habitat included all areas such as plowed fields or woodlots where voles would not be found or where Red-tails would not hunt.

Hawk density was particularly high in a short 4.2 km section at the east end of the route. To measure *Microtus* habitat frequency more accurately in this section, I used aerial photographs and ground surveys to prepare a habitat map of the entire area within 400 m of the road (the average maximum distance at which I recorded hawks).

Using the results of the roadside survey (1480 samples) and the habitat map prepared for the short section at the east end of the route, I calculated habitat frequency for the entire route (Table 1).

Microtus population levels were then measured in good and poor habitats by counting the number of runways crossing the perimeter of a randomly placed .25 m^2 wire frame. Twenty samples were obtained in each of 18 good and 18 fair habitat fields regularly spaced along the route (Table 1).

Results.—Starting at the east end of the route, hawk density per kilometer varied from 2.19 in the first 4 km to .063 in the next 51 km to .016 in the final 186 km. Paralleling the change in hawk density, the frequency of good vole habitat dropped from .44 to .05 to .006 in the high, medium, and low hawk density sections respectively (Table 1). Good vole habitat thus varied about as much, and in the same direction, as hawk density.

There were few vole runways in any of the poor habitats sampled (0–4 runways per field). The number of runways in good habitat was about equal in low and medium hawk density areas but significantly higher ($p \leqslant .01$) in high hawk density areas (Table 1).

The number of Red-tailed Hawks observed was thus correlated with the frequency of good *Microtus* habitat and with high *Microtus* population indices within good habitat. These results support the hypothesis that, in the study area, *Microtus* distribution is a major factor determining the distribution of Red-tailed Hawks in winter.

The *Microtus* sampling method was suggested by M. Richmond who also greatly improved the manuscript. T. Cade and L. Oring offered additional helpful suggestions on the manuscript.—JONATHAN BART, *New York Cooperative Wildlife Research Unit, Dept. of Natural Resources, Cornell Univ., Ithaca, NY 14853.* *Accepted 14 Sept. 1976.*

Osprey catches vole.—On 3 October 1975 at Lighthouse Point Park, New Haven Co., Connecticut, I observed an Osprey (*Pandion haliaetus*) circle low over a salt marsh, rise slightly, hover in the same pattern it would in catching a fish and then plunge to the ground. It sat motionless for a moment in the short *Spartina patens* grass looking at its feet then took flight clutching a small rodent. It flew to the ridgepole of a nearby cottage and through a 20× spotting scope I watched it tear its prey apart. When it had finished and left, I retrieved all that remained: the skin from the sides, feet and some entrails of a meadow vole (*Microtus pennsylvanicus*).

Brown and Amadon (1968. Eagles, Hawks, and Falcons of the World. McGraw Hill, New York) list numerous vertebrates as acceptable Osprey prey including birds, frogs, and crustaceans in addition to its normal diet of fish. Wiley and Loher (Wilson Bull. 85:468-470, 1973) give detailed lists of Osprey prey including 12 species of birds, several reptiles and amphibians, and 8 species of mammals, but not *M. pennsylvannicus.* Spitzer (pers. comm.) found what he believed to be *M. pennsylvannicus* remains in at least 1 Osprey nest. The literature is lacking in actual sightings of how these mammals are taken.—NOBLE S. PROCTOR, *Biology Dept., Southern Connecticut State College, 501 Crescent St., New Haven 06515.* *Accepted 6 Aug. 1976.*

Patterns of feeding Field Sparrow young.—As part of a study of Field Sparrow (*Spizella pusilla*) breeding ecology (Best, Ph.D. thesis, Univ. of Illinois, Urbana, 1974), I recorded the activities of parents feeding nestlings on the 6th day after the first young hatched. Observations were made from a blind and covered the periods: dawn–08:00, 09:00–12:00, 13:00–16:00, and 17:00–dusk. A mirror positioned above the nest permitted observation of its contents. Airplane paint was applied to each nestling's bill for individual recognition (this had no noticeable effect on parental feeding behavior) and adults were marked with colored leg bands. Besides documenting the frequency and temporal distribution of feeding visits (Best, Auk, 94:308–319, 1977), the pattern of food delivery to individual nestlings was also recorded for 6 broods. The pattern of food delivery, which is rarely reported, is the subject of this note.

To determine if the sequence of feeding nestlings was random, an interval-distribution test (Ghent and Hanna, Am. Midl. Nat. 85:188–195, 1971) was employed. In only 2 of the 16 nestlings tested (representing 2 of 6 broods), were the intervals between feedings significantly different from a random sequence ($P < 0.05$). Although this implies no sequential pattern in feeding most nestlings, certain nonsignificant trends were evident. In all 16 nestlings the "observed" frequency of consecutive feedings (the same nestling being fed twice in immediate succession) was less than the "expected" frequency, while the observed frequency of alternate feedings (another nestling being fed between successive feedings of the nestling in question) was greater than the expected frequency in all but 3 nestlings (representing 2 broods). These trends indicate that on the basis of