fully for a moment, and then swallowed. The bird then wiped its bill twice and moved away.

On 11 May 1975, a Yellow-rumped Warbler (*Dendroica coronata*:Parulidae) hovered in front of a vertically-placed spider web attached to the tips of branches high in a tree, plucked one prey item from the web, and flew off. There were no perches convenient to the web as in the case of the Cedar Waxwing reported by Burtt et al. The web had 13 remaining prey items visible in it and despite many warblers of several species foraging in this tree and others nearby, no other bird fed from or even inspected the spider web in the 10 min after the feeding instance.

Our observations suggest that web-feeding is more widespread than the paucity of literature on the subject suggests. Perhaps observers have overlooked it or assumed that it was already so well known that it was not important to mention it. It may be significant that 3 of the 4 tropical species were observed web-feeding during the breeding season, when a need for higher protein intake may occur. Hummingbirds in particular are not well adapted for capturing insects, but their hovering abilities make it possible for them to secure protein by cleptoparasitism from spider webs.—ROBERT B. WAIDE AND JACK P. HAILMAN, *Dept. of Zoology, Univ. of Wisconsin, Madison 53706.* *Accepted 1 May 1976.*

Winter nest microclimate of Monk Parakeets.—Monk Parakeets (*Myiopsitta monachus*) have a broad distribution in South America where their range extends from tropical Bolivia and Brazil well into the temperate regions of Argentina (Bull, Wilson Bull. 85:501–505, 1973; Olrog, Las Aves Sudamericanas, Universidad Nacional de Tucuman, Argentina, 1968). While the species normally encounters a wide range of local climates, in North America it survives winters which are more severe than those of its native range (Bump, U.S. Fish and Wildl. Serv., Bureau of Sport Fisheries and Wildlife, Wildlife Leaflet No. 496, 1971). Among psittacids Monk Parakeets are unique in building large enclosed nests composed of interwoven twigs. (Forshaw, Parrots of the World, Doubleday and Co., Inc., New York, 1973). Unlike most birds Monk Parakeets occupy their nests throughout the year. The role of enclosed nests in contributing to the maintenance of a favorable microclimate has been demonstrated for several species (Ricklefs, *in* Avian Energetics, R. Paynter, ed., Publ. Nuttall Ornithol. Club 15:152–297, 1974). Tolerance of low winter temperatures in this species may be improved by the use of these stick nests for nighttime roosts. In this paper we investigate the possibility that during the winter the nest of the Monk Parakeet contributes to energy savings by creating a favorable microclimate.

Methods.—Measurements of air temperature (Ta) and nest temperature (Tn) were made at a nest which had been constructed by a breeding pair in the upper corner of a large ($4 \times 3 \times 2$ m) outdoor flight cage. The nest was situated approximately 10 cm below the cage roof, but otherwise exposed on all sides. The nest (Fig. 1) was 0.5 m long, 0.3 m deep and 0.3 m wide. At the time of study it was occupied by a mated pair.

Temperatures were measured with 20-gauge copper-constantan thermocouples and were recorded at intervals of 2 min with a Honeywell recording potentiometer (model 112). The uncertainty of measurement did not exceed 0.2°C. Ta was recorded from a thermocouple placed 5 cm from the back of the nest. Tn was recorded from thermocouples implanted at several locations within the nest, but concentrated around the inner nest chamber (Fig. 1). An additional thermocouple was positioned on the floor of the inner nest chamber such that it was in contact with the birds when they occupied the nest. This probe signaled when the birds entered or left the nest.

Measurements were made during 10 days in January and February usually from 16:00

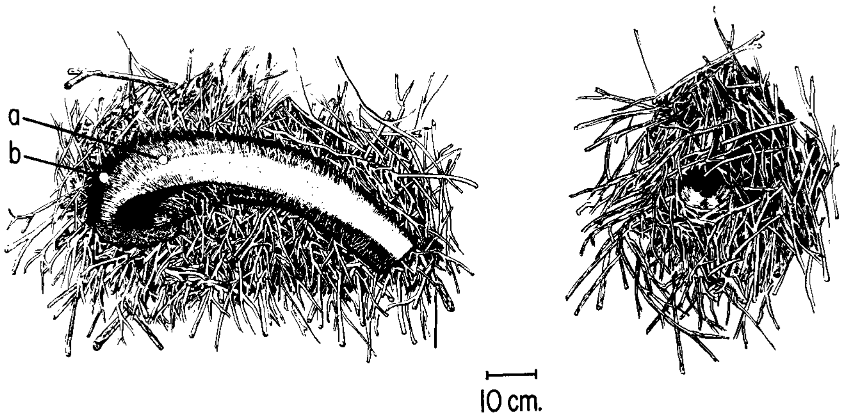

FIG. 1. Representation of the Monk Parakeet nest seen in longitudinal section (left) and on end (right). Points marked *a* and *b* correspond to the position of the thermocouples represented in Fig. 2 by the dots and solid line respectively.

until 09:00 of the following day. Wind velocity was obtained from records of the university meteorological station located approximately 100 m from the nest.

Results.—The birds entered the nest at various times during the day for short periods, especially during inclement weather. They also entered the nest around 17:30 (½ h after sunset) and remained in the nest until approximately 06:30 (½ h before sunrise) the following day. While the birds were in the nest, temperatures within the inner chamber generally exceeded Ta; temperatues within the tunnel never exceeded Ta. This reflected the birds' position within the nest.

Fig. 2 illustrates a typical record of night time Ta and Tn. Early in the night Tn's were only slightly above Ta. However, with time the difference between Tn and Ta increased. The increase in Tn over Ta during the early morning hours corresponded with a decrease in wind velocity as shown in Table 1. The maximum temperature difference (Tn-Ta) observed on any night was 4.6°C. The mean Ta calculated during the time the birds were in the nest was −5.65°C while the mean nest temperature (calculated as

TABLE 1

WIND VELOCITY AND THE GRADIENT BETWEEN NEST TEMPERATURE AND AIR TEMPERATURE

Time of day	Wind velocity[1], m/sec		T[2], °C	
hours	maximum	minimum	maximum	minimum
1700–1950	8.5–11.6	1.8–3.1	1.0	–0.1
2000–2250	8.0– 8.9	1.8–2.7	1.4	0.0
2300–0150	5.4– 8.0	1.8	2.0	0.1
0200–0450	3.6– 5.8	0.4–0.9	3.3	0.1
0500–0750	3.1– 4.5	0–0.9	3.0	0.8

[1] Ranges for values determined over 10 min intervals.
[2] Range of values for the difference between nest temperature and air temperature in Fig. 2 while birds occupied the nest.

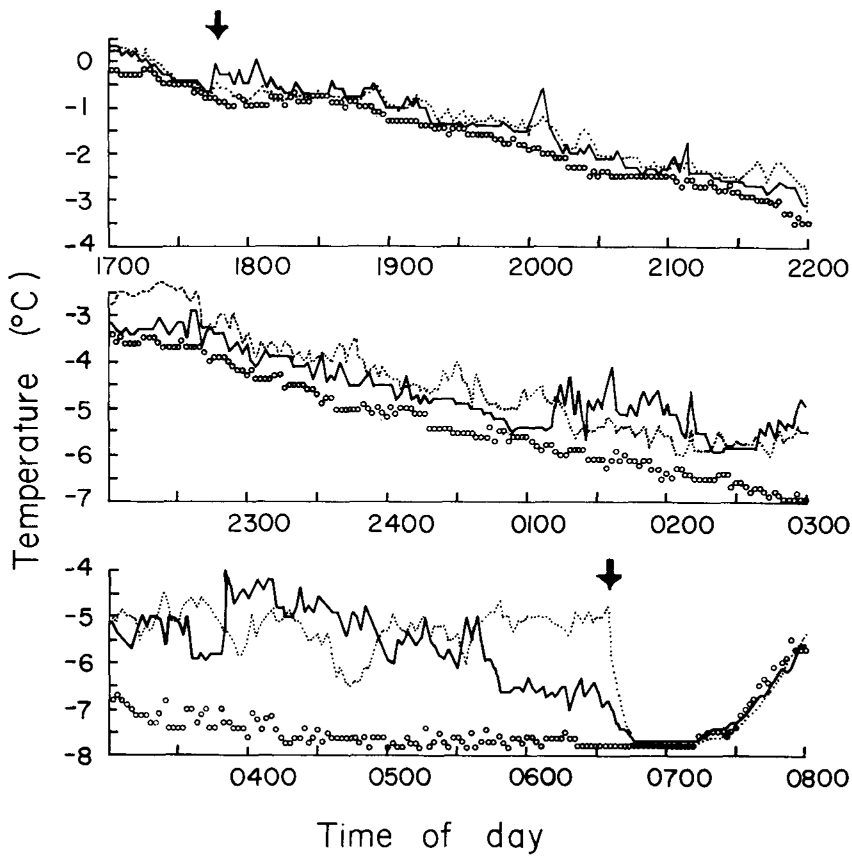

FIG. 2. Relation of air temperature (circles) and nest temperatures (line and dots) to time of day. Arrows indicate time when birds entered and left the nest.

the mean of the 2 thermocouple temperatures recorded within the inner nest chamber) was 3.89°C. Thus on the average Tn exceeded Ta by 1.76°C.

Discussion.—The nest examined in this study was relatively small. As Monk Parakeets nest gregariously, nesting assemblages may contain up to 20 inner chambers, weigh 200 kg, and measure 2m or more across (Forshaw 1973; Roscoe, et al., N.Y. State Fish and Game J. 20:170–173, 1973). Despite this fact, temperatures near the inner chamber of the nest were as much as 4.6°C above Ta, and on a typical night exceeded Ta by an average of 1.76°C. It seems probable that temperatures would be even more moderate in larger nests which should be better insulated. Additionally, since winter nests may be occupied by both adults as well as the juveniles of the previous breeding season (pers. obs.), even higher temperatures might be anticipated.

Although nest temperature was higher than air temperature, a major advantage of using the nest as a winter roost might be in reducing radiant heat loss, since heat loss to the cold night sky may represent an appreciable fraction of the total heat loss (Schmidt-Nielsen, Oxford Univ. Press, New York, 1964; Webster, J. Appl. Physiol. 30:684–690, 1971). By ameliorating the effects of wind, particularly in large nests, convective losses also may be reduced.

The minimum energy savings resulting from elevated nest temperatures can be estimated from the relation of oxygen consumption (VO_2) to Ta of Monk Parakeets (Weathers and Caccamise, Oecologia 18:343–358, 1975). Below 25°C VO_2 of Monk Parakeets increases linearly with decreasing Ta at a rate of 0.099 ml O_2 g^{-1} hr^{-1} $°C^{-1}$. The energy savings attributable to the nest is the product of the excess of Tn over Ta and this factor. Taking the average Tn – Ta to be 1.76°C then

$$\text{Energy Savings} = (1.76°\text{C}) \times (0.099 \text{ ml } O_2 \text{ g}^{-1} \text{ hr}^{-1} \text{ °C}^{-1}) = 0.174 \text{ ml } O_2 \text{ g}^{-1} \text{ hr}^{-1}.$$

The resting metabolic rate of Monk Parakeets measured at night and in the thermal neutral zone is 1.17 ml O_2 g^{-1} hr^{-1} (Weathers and Caccamise, 1975). Thus the mean energy savings for the night depicted in Fig. 2, based on the difference between Tn and Ta, represents 15% of the standard metabolic rate. Expressed as the difference in predicted metabolic rate at –5.65°C versus –3.89°C the energy savings is 3.7%. This value does not take into account the effect of the nest in reducing radiant heat loss and therefore should be considered a minimal estimate of the energetic advantage of using the nest as a winter night-time roost.

We thank Helen Mozdic and Peter Alexander for technical assistance, and Mr. Charles Wagg of the Division of Plant Industry, New Jersey Department of Agriculture who was instrumental in obtaining the birds.

This report is a paper of the Journal Series, New Jersey Agricultural Experiment Station, New Brunswick, New Jersey.—DONALD F. CACCAMISE AND WESLEY W. WEATHERS, *Dept. of Entomology and Economic Zoology and Dept. of Environmental Physiology, Rutgers, The State Univ. of New Jersey, New Brunswick 08903* (Present address WWW: *Dept. of Avian Sciences, Univ. of California, Davis 95616*). *Accepted 17 Feb. 1976.*

Snake predation on Bell's Vireo nestlings.—Bent (U.S. Natl. Mus. Bull. 197: 260, 1960) found that cats and cowbirds were the Bell's Vireo's (*Vireo bellii*) worst enemies; he makes no mention of snakes. However, Mumford (Wilson Bull. 64:231, 1952) and Barlow (Univ. Kansas Publ. Mus. Nat. Hist. 12:291, 1962) both suggested snake predation as a cause of nest losses. Nolan (Condor 62:241, 1960) implicated the black rat snake (*Elaphe obsoleta*) and black racer (*Coluber constrictor*) as nest predators based on their abundance in the scrub habitat he studied. This note documents 3 observations of snake predation on nestling Bell's Vireos in Douglas County, Kansas.

On 14 June 1974, about 08:45, I heard the scolding notes of a pair of Bell's Vireos and several Dickcissels (*Spiza americana*) and Northern Yellowthroats (*Geothlypis trichas*) near a dogwood (*Cornus drummondii*) where I had discovered a vireo nest 3 days earlier. I reached the nest in time to see a black rat snake (*E. o. obsoleta*) with a vireo nestling in its mouth climbing quickly off the nest limb to the ground. The nest, which previously held 4 nestlings, was empty. This pair of vireos built a new nest about 10 m from the old site and laid a clutch of 3 eggs.

On 25 June 1975, about 10:00, I heard scolding notes of a pair of Bell's Vireos in the vicinity of a small dogwood. I located the nest on the southeast corner about 38 cm from the ground and observed a red-sided garter snake (*Thamnophis sirtalis parietalis*) on the supporting limb of the nest with its head in the nest engulfing the back half of a very young nestling. It dropped to the ground as I pulled back a branch for a closer look, and as I attempted to grab the snake, it dropped the live but bleeding nestling and escaped. I returned the nestling to the nest, but when I checked the nest again some 10 min later