of winter above that in the preceding spring, depending upon over-all productivity, mortality in other habitats and wintering areas, and other factors.

It is impossible for a single team of observers to adequately census all habitats in a region within the time limitations required, but studies that do not cover all of the habitats used by the winter species are likely to be misleading on questions of population change during the season. Habitat availability must also be considered in such studies, but data on availability of even gross (vs micro) habitat types are generally lacking. Two patterns that seem clear from this and our previous (1979) study is that notable declines occur over winter in natural habitats in mild as well as in severe winters, and that the steepness of the decline is related especially to the size of the starting population.

The observation that bird populations declined through the winter in both mild and severe winters is important to those who census winter birds. The seasonal limits designated for Audubon winter bird studies is 20 December–10 February (Robbins, Studies in Avian Biology 6:52–57, 1981). The results would differ according to the pattern of censusing in that period—early censuses indicating high populations, later censuses lower populations. Fortunately the dates of censuses are usually presented, but the rules of censusing may need to be more precisely delineated, as Robbins (1981) has suggested.

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Comparative preening behavior of wild-caught Canada Geese and Mallards.—Comfort movements have been described for many birds (c.f., Goodwin, Br. Birds 60:363–364, 1967; Weisbrod, Living Bird 10:271–284, 1971; Ainley, Behaviour 50:16–51, 1974; Potter and Hauser, Auk 91:537–563, 1974). Preening, perhaps the most conspicuous of all comfort movements, functions in cleaning, arranging, aligning, and oiling the feathers.

Preening is usually observed in bouts lasting from a few minutes (Coutlee, Wilson Bull. 75:342–357, 1963) to over 2 h (Schreiber, Ornithol. Monogr. No. 22, 1977). McKinney (Behaviour 25:120–220, 1965) divided preening bouts in waterfowl into two main components, oiling and nibbling. Oiling is characterized by contact with the uropygial gland and the subsequent bill movements which spread oil to the feathers. Nibbling consists of rapid movement of the mandibles in a "chewing" motion.

In this note I report on preening behavior in Canada Geese (*Branta canadensis*) and Mallards (*Anas platyrhynchos*) during summer and consider: (1) if there are any general behavioral patterns in a preening session; and (2) possible interspecific differences.

Methods.—This study was conducted at the W.K. Kellogg Bird Sanctuary of Michigan State University. Three-h observation periods were made during daylight hours at randomly chosen times. Observer disturbance was reduced by observing the geese from a distance of 35 m and the Mallards from a blind located 10 m from their pen. To further reduce bias, no data were recorded for the first 30–60 min of each observation period. Usually, only one or two preening sessions were recorded during the 2-h data collection period.

All geese were wing pinioned and housed in six similar outdoor pens (45 × 60 m). Three male and three female geese in each pen were identified by color-coded neck collars. Five male and four female wild-caught mallards were housed in a 8 × 15 m pen located on a small pond.

A session was defined as the time during which preening was observed. Pauses of less than 2 min between subsequent preens were considered part of a session. A preening movement was judged to begin when the bill, head, or foot contacted feathers and to end when contact was broken. Data were recorded from the first bird of a group that began to preen. Although other birds often began to preen at the same time, no data were recorded from them.

Classification of preening (after van Rhijn, Behaviour 63:71–109, 1977) was based upon the body area contacted and the form (bill movement and use of the head or foot). The terminology proposed by McKinney (1965) to describe preening movements was used except the term "bill rub" (a movement in which the trailing edge of the bill was brushed against the lay of the feathers) was substituted for the term "oiling." The body area contacted and form of preening movement was recorded. Durations of individual preens were timed using a metronome set at 60 clicks per min. The frequency of occurrence and duration of each preening movement was determined. The duration of each movement was reported as a mean for each session, and the table values reported for each response were a mean of the session means. Preening sessions in which oiling occurred were considered to be different from sessions in which it did not. Mann-Whitney *U*-tests, used for all statistical comparisons, were done at Bowling Green State University.

Results.—Twenty-one oiling and 19 non-oiling sessions which were recorded from Canada Geese contained a total of 2509 preening movements. In Mallards, oiling occurred in 28 of 40 sessions. A total of 2650 preening movements was recorded from Mallards.

Canada Geese preened more during oiling sessions than in non-oiling sessions (87.6 ± 32.6 [$\bar{x}$ ± SD] vs 37.6 ± 22.8, $U = 37$, N = 19,21, $P \leq 0.001$). Also, the mean duration of oiling sessions, 16.8 ± 6.9 min, was longer ($U = 98$, N = 19,21, $P \leq 0.01$) than non-oiling, 9.6 ± 5.0 min. Mallard oiling sessions contained more ($U = 71$, N = 12,28, $P \leq 0.01$) preens, 74.9 ± 41.6, than did non-oiling sessions, 46.0 ± 54.6. The average duration of a Mallard oiling session, 10.2 ± 6.5 min, was not significantly greater ($U = 107$, N = 12,28, $P \geq 0.05$) than non-oiling sessions, 7.8 ± 8.3 min.

Nibbles and bill rubs comprised 80% of all preening movements in Canada Geese and Mallards. Nibbles were more frequent ($U = 91$, N = 19,21, $P \leq 0.01$) in Canada Goose oiling sessions (Table 1), while their average durations were not significantly greater ($U = 5$, N = 5,5, $P \geq 0.05$) than in non-oiling sessions. Bill rubs were also more frequent ($U = 7$, N = 13,21, $P \leq 0.001$) in oiling sessions but were not significantly longer ($U = 10$, N = 4,5, $P \geq 0.05$). The bill rub-nibble, a movement combining a bill rub and nibble in rapid succession without feather contact being broken, showed little variation between oiling and non-oiling sessions (frequency: $U = 38$, N = 10,13, $P \geq 0.05$; duration: $U = 4$, N = 2,4, $P \geq 0.05$). The frequency of bill rubbing in oiling and non-oiling sessions, though significantly different ($U = 46$, N = 8,28, $P \leq 0.05$), was highly variable in Mallards (Table 1). In Mallards, the frequency of bill rubbing per session was found to be bimodally distributed about the mean. Although the frequency of bill rubbing varied, the average duration was relatively constant ($U = 103$, N = 8,28, $P \geq 0.05$). The other preening movements in Mallard sessions showed only small differences (nibble: frequency $U = 146$, N = 12,28, $P \geq 0.05$; duration $U = 157$, N = 12,28, $P \geq 0.05$; bill rub-nibble: frequency $U = 37$, N = 5,14, $P \geq 0.05$; duration $U = 21$, N = 5,14, $P \geq 0.05$).

Preening movements involving rubbing of the head on the wings were classified as shoulder-rubbing by McKinney (1965). Shoulder-rubbing was more common in oiling sessions in both species (Canada Geese: $U = 66$, N = 7,21, $P \geq 0.05$; Mallards: $U = 0$, N = 1,28, $P \geq 0.05$). Canada Geese did not stretch or scratch frequently during preening sessions and no differences were found in frequencies (stretches: $U = 46$, N = 11,7, $P \geq 0.05$; scratches: $U = 30$, N = 6,9, $P \geq 0.05$) or durations (stretches: $U = 3$, N = 3,2, $P \geq 0.05$; scratches:

TABLE 1

MEAN FREQUENCY AND DURATION OF PREENING MOVEMENTS IN OILING AND NON-OILING SESSIONS OF CANADA GEESE AND MALLARDS

		Mean frequency of movements ($\bar{x}$ ± SD [no. of sessions in which movement was observed])		Mean duration (sec) ($\bar{x}$ ± SE [no. of sessions in which movement was timed])	
		Canada Goose	Mallard	Canada Goose	Mallard
Nibble	Oiling	51.8 ± 26.6 (21)**[a]	42.1 ± 37.7 (28)	11.8 ± 0.6 (5)	11.6 ± 0.6 (28)
	Non-oiling	26.2 ± 18.3 (19)**	31.1 ± 23.7 (12)	7.8 ± 0.5 (5)	8.0 ± 0.3 (12)
Bill rub	Oiling	16.5 ± 7.8 (21)***	15.7 ± 8.3 (28)*	3.8 ± 0.2 (5)	3.0 ± 0.0 (28)
	Non-oiling	3.4 ± 3.0 (13)***	15.8 ± 31.0 (8)*	3.8 ± 0.4 (4)	3.1 ± 0.2 (8)
Bill rub-nibble	Oiling	2.7 ± 1.8 (13)	1.8 ± 0.8 (14)	7.6 ± 1.1 (4)	8.3 ± 0.4 (14)
	Non-oiling	1.6 ± 1.6 (10)	4.2 ± 5.6 (5)	8.5 ± 1.1 (2)	4.3 ± 0.5 (5)
Shoulder-rubbing	Oiling	11.2 ± 8.8 (21)	8.8 ± 4.0 (28)	4.1 ± 0.3 (5)	2.1 ± 0.0 (28)
	Non-oiling	9.9 ± 7.5 (7)	1.0 ± 0.0 (1)[b]	2.5 ± 0.4 (2)	3.0 ± 0.0 (1)[b]
Stretch	Oiling	1.7 ± 1.1 (7)	1.5 ± 0.7 (15)	7.5 ± 1.1 (2)	6.1 ± 0.2 (15)
	Non-oiling	2.1 ± 1.3 (11)	1.0 ± 0.0 (6)	8.0 ± 0.0 (3)	5.5 ± 0.4 (6)
Scratch	Oiling	1.3 ± 0.5 (9)	3.6 ± 2.6 (25)	23.0 ± 0.0 (1)[b]	4.4 ± 0.1 (25)
	Non-oiling	1.8 ± 1.3 (6)	3.4 ± 4.3 (7)	6.0 ± 0.0 (1)[b]	3.8 ± 0.2 (7)

[a] Values for oiling and non-oiling having the same number of asterisks are significantly different at the level specified, * $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$.
[b] Not a mean, but an absolute duration of one observation.

$U = 0$, N = 1,1, $P \geq 0.05$). McKinney (1965) described the both-wing stretch in waterfowl. This movement consists of both wings being raised above the body while the manus remained folded. During my observations I observed only one both-wing stretch in Canada Geese. The duration of only two scratches were recorded from Canada Geese. The occurrence and duration of stretching and scratching movements in Mallard oiling and non-oiling sessions were similar (stretches: frequency $U = 27$, N = 6,15, $P \geq 0.05$; duration $U = 38$, N = 6,15, $P \geq 0.05$; scratches: frequency $U = 60$, N = 7,25, $P \geq 0.05$; duration $U = 62$, N = 7,25, $P \geq 0.05$). Four both-wing stretches were observed in Mallards and lasted 2.5 ± 0.2 sec.

Comparisons of Canada Goose and Mallard oiling sessions showed that the mean number of movements performed by each species was similar ($U = 223$, N = 28,21, $P \geq 0.05$). However, Canada Geese preened for a longer time ($U = 151$, N = 28,21, $P \leq 0.01$) than Mallards. The frequencies and durations of bill rubs and nibbles were similar for both species (bill rubs: frequency $U = 269$, N = 28,21, $P \geq 0.05$; duration $U = 42$, N = 28,5, $P \geq 0.05$; nibbles: frequency $U = 209$, N = 28,21, $P \geq 0.05$; duration $U = 40$, N = 28,5, $P \geq 0.05$). Although the frequency of shoulder-rubbing was not different ($U = 278$, N = 28,21, $P \geq 0.05$), the duration of shoulder-rubbing was greater ($U = 13$, N = 28,5, $P \leq 0.01$) in Canada Geese.

Stretching and scratching comprised only 4% of all preening movements. No differences were found in the occurrence ($U = 50$, N = 15,7, $P \geq 0.05$) or duration ($U = 10$, N = 15,2, $P \geq 0.05$) of stretching between Canada Geese and Mallards. Scratching movements were more frequent ($U = 190$, N = 25,9, $P \leq 0.05$) in Mallard preening sessions, but there were no differences in the durations of these movements ($U = 0$, N = 25,1, $P \geq 0.05$).

Both Mallards and Canada Geese oiled the same number of times per session (3.3 ± 1.3 and 3.2 ± 0.8, respectively; $U = 316$, N = 28,21, $P \geq 0.05$). The duration of gland contact in Canada Geese, 5.8 ± 0.4 sec, was significantly longer ($U = 8$, N = 28,5, $P \leq 0.002$) than in Mallards, 3.4 ± 0.4 sec.

Discussion.—Data from the present study on waterfowl and the observations by Bekoff et al. (Wilson Bull. 91:255–270, 1979) showed differences between oiling and non-oiling sessions. Non-oiling sessions were shorter and contained fewer preening movements per minute (Table 1). The decrease in duration of non-oiling sessions in both Canada Geese and Mallards can be attributed to the decrease in frequency of bill rubbing and nibbling. The change in frequency of bill rubs and nibbles did not affect the duration of these movements. This further indicated that the differences between oiling and non-oiling sessions were the result of no uropygial gland contact and, therefore, no need to spread preen oil.

McKinney (1965) reported that uropygial gland contact alternates from side-to-side in waterfowl. I also observed this pattern. Both Canada Geese and Mallards preened the same side of the body as that on which the gland was contacted 96% of the time.

Ainley (1974) described a bill movement in penguins associated with uropygial gland contact and similar in form to bill rubs in waterfowl. This movement was first used in a preening session to remove water from the feathers and was termed "wiping" by Ainley. Canada Geese and Mallards performed bill rubs immediately after leaving the water and water droplets were observed being brushed off the feathers.

Because bill rubs occurred in non-oiling preening sessions, and did not perform the sole function of spreading preen oil, the term "oiling," as defined by McKinney (1965), is inappropriate. McKinney's terminology hinders the description of preening because it forces a function (oiling) on a movement that does not perform that function (wiping or bill rubbing). The use of the term "bill rub" is more appropriate.

Interspecific comparisons of preening showed few differences between Canada Geese and Mallards. McKinney (1965) reported that oiling sessions in Mallards and White-fronted Geese (*Anser albifrons*) lasted fewer than 5 min. Even though Canada Geese and Mallards contacted

the uropygial gland an equal number of times per session the duration of contact was longer in Canada Geese.

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Bald Eagle predation on domestic sheep.—Bald Eagles (*Haliaeetus leucocephalus*) feed on domestic sheep (*Ovis*) (see for example, Retfalvi, Condor 72:358–361, 1970; Platt, Am. Birds 30:783–788, 1976) which, in some areas, may be an important food item during winter (Hancock, Wilson Bull. 76:111–120, 1964). Both carcasses and afterbirths are eaten; but Hancock (1964) reports no incidences of predation by Bald Eagles even though sheep carrion was the eagle's most prominent food item. Most records of Bald Eagle predation on livestock (e.g., Oberholser, USDA Biol. Surv. Bull. No. 27, 1906; Herrick, Auk 41:389–422, 1924) are circumstantial. Only two records (Pirnie, Jack-Pine Warbler 24:105–107, 1946; Wiley and Bolen, Southwestern Nat. 16:151–169, 1971) appear to be authentic, and neither is a first-hand eyewitness account. In both, evidence of eagle predation was based on the presence of characteristic talon punctures accompanied with subcutaneous bleeding (O'Gara, pp. 206–213 *in* Proc. 8th Vert. Pest Conf., 1978). Even in these cases, Bald Eagles could have displaced a Golden Eagle (*Aquila chrysaetos*) from a sheep the latter had killed. Sheep and calf predations by Bald Eagles have been reported to us by S. Crowe and B. O'Gara (pers. comm.), but these too are not eyewitness accounts. This note is the first documentation of eyewitnessed observations of Bald Eagles preying on live domestic sheep.

While studying Bald Eagle habitat during the winter of 1980–81 near Woodruff, Rich Co., Utah, we observed Bald Eagles preying on domestic sheep.

At about 11:00 on 10 February 1981 we saw an adult Bald Eagle perched on a fence post 60 m from a band of sheep and 200 m from a ranch house. At 12:50 the eagle flew to and attacked an apparently healthy lamb, estimated to be 4 days old, which was separated from its ewe. The lamb struggled a little, but died shortly. The ewe ran at the eagle once to within 2 m without effect. After about 40 sec the eagle flew off, but returned in about 5 min and began to feed while perched on the lamb's sacral region. At 13:23 the eagle left the carcass, landed in a puddle, wiped its beak, and cleaned its talons.

On 17 February, at 13:12, we observed an adult and an immature Bald Eagle perched near sheep in a pasture 400–500 m from a ranch house. A pregnant ewe had fallen down and was struggling to stand up but could not. Either she simply was unable to stand back up—as sometimes happens with apparently healthy sheep (E. Pearson, pers. comm.)—or she may have been ill. The struggles of the ewe soon attracted the adult eagle which flew from the fence post, landed on the ground, and then jumped on her. The eagle began plucking wool from the sacral area while perched. The ewe continued unsuccessfully to try to stand up. At 13:20 the eagle began to feed in the area it had plucked; it ceased feeding at 13:38 and moving away stood on the ground about 10 m from the ewe. At 13:42 the adult eagle flew