finches and red squirrels (*Tamiasciurus hudsonicus*) (Brink and Dean, J. Wildl. Manage. 30:503–512, 1966) for conifer seeds by taking birch and alder seeds. Since redpolls show no hypothermic tendencies (Chaplin, J. Comp. Physiol. 89:321–330, 1974), in order to maintain a normal body temperature (>40°C) at very low ambient temperatures (West, Comp. Biochem. Physiol. 43A:293–310, 1972) they may have to consume as much as 42% of their body weight in 1 day (White and West, op. cit.). A very reliable food source is therefore important and redpolls are probably very sensitive to changes in food abundances.

Bock and Lepthien (Am. Nat. 110:559–571, 1976) found that the Common Redpoll is one of the most synchronously irrupting boreal seed-eating birds in North America, suggesting that widespread seed failure causes many redpolls to move southward (see also Kennard, Bird-Banding 47:231–237, 1976). Redpolls leave the Fairbanks, Alaska, area when birch and alder seed crops fail rather than switching to spruce (C. White, pers. comm.), suggesting that redpolls do not use spruce seeds on their usual wintering grounds. I suspect that spruce seeds are an important secondary food source for Common Redpolls when they are forced out of northern latitudes (see also Clement, U.S. Nat. Mus. Bull. 237:407–421, 1968). At the time of my study the spruce crop in northern Utah was at its highest peak in 30 years, with some trees bearing over 4000 cones (see Smith, West. Birds 9:79–81, 1978). Redpolls may only use the high-energy spruce seeds whenever they are abundant and easily gathered. Also, redpolls may switch to spruce when other preferred seeds are unavailable. Neither birch nor alder are present near my study area, nor were weed seeds available when the redpolls were collected, due to several feet of snow. Another possibility is that northern cones are inferior in quality compared to southern cones as shown by Pulliainen (op. cit.) in Finland, which would affect the efficiency with which cones could be used in the north.

The birds I observed did not appear to have any trouble manipulating spruce cones, so that an energy loss due to differential foraging time (Norberg, J. Anim. Ecol. 46:511–529, 1977) on spruce as opposed to birch would be minimal, provided that spruce cones are abundant. As with Pine Siskins, redpolls, while hanging upside down—either on the cone itself or from the branch to which the cone was attached, extracted seeds from the open cones. Since crossbills were extremely common during 1977 (Smith, op. cit.), the siskins and redpolls may have possibly relied to some extent on cones already opened by crossbills (see Turček, Ibis 98:24–33, 1956).

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Small mammals and birds as food items of Ring-billed Gulls on the lower Great Lakes.—Vermeer (Can. Wildl. Serv. Rep. Ser. 12:1–52, 1970) noted the importance of rodents, mostly the meadow vole (*Microtus pennsylvanicus*), in the diet of Ring-billed Gulls (*Larus delawarensis*) in Alberta, Canada. In contrast, for Ring-billed Gull colonies on Lakes Michigan and Huron, Ludwig (Great Lakes Res. Div., Univ. Mich., Publ. No. 15:80–89, 1966) did not mention the presence of small mammals in his food collections. Jarvis and Southern (Wilson Bull. 88:621–631, 1976) noticed only 1 vole (*Microtus* sp.) regurgitated by an adult Ring-billed Gull during 12 years of observation (1963–1974) at the Roger City, Lake

Huron colony. However, in 1975 they noted *Microtus* sp. remains in 2 food samples (W. E. Southern, pers. comm.). Haymes and Blokpoel (1978) found that regurgitations of Ring-billed Gull chicks at the Toronto Outer Harbour rarely contained mammal remains—in 2 cases meadow voles and in 1 case deer mouse (*Peromyscus maniculatus bairdii*) (Can. Field-Nat. 92:392–395, 1978).

While censusing Ring-billed Gull colonies on the lower Great Lakes system we noted pellets in and around the nests. Those pellets contained remains of insects, fish, birds and mammals. Pellets containing mammal remains were generally of 3 types: tightly packed ovals of fur and bones, whole and flattened specimens and small balls of fur. Pellets containing bird remains were usually ovals of packed bones and feathers. Many of the pellets with bird and mammal remains were still moist, suggesting that they were freshly cast.

We collected pellets with mammal and bird remains during May and June 1977 in 4 colonies: the Canada Furnace yards at Port Colborne, Ontario, at the eastern end of Lake Erie; Grassy Island on the Niagara River; Leslie St. Spit (the eastern headland of Toronto Outer Harbour) on western Lake Ontario; and Strachan Island near Cornwall, Ontario, on the upper St. Lawrence River.

To quantify the occurrence of pellets containing mammal and bird remains, we arbitrarily selected a point in the colony and collected all such pellets in and around the first 100 nests that we encountered while moving away from the original point. At Port Colborne we sampled 400 nests over 3 collection dates and at Leslie St. Spit we sampled 900 nests over 5 collection dates. Each 100-nest sample was taken from a different part of the colony. At the Grassy Island colony we collected pellets from only 80 nests. At the Strachan Island colony we did not quantify the occurrence of pellets.

We collected a total of 107 pellets containing mammal remains near 400 nests ($\bar{x}$ = 0.268 pellets per nest) at the Canada Furnace colony, 18 pellets near 80 nests ($\bar{x}$ = 0.225) at Grassy Island and 14 pellets near 900 nests ($\bar{x}$ = 0.016) at Leslie St. Spit. At Strachan Island we collected 15 pellets.

The observed inter-colony differences in the occurrence of pellets with mammal remains may reflect the relative availability of small mammals and other food sources at the colonies concerned. For instance, the infrequent occurrence of pellets containing small mammal remains at Leslie St. Spit on the Toronto waterfront may reflect the low availability of small mammals in a large metropolitan center. Conversely, it may indicate an abundance of, or preference for, other food sources.

Mammal remains in the 83 pellets that contained skulls or jaws were identified by skeletal and dental characteristics. The meadow vole was the most common species, comprising more than 80% of those identified. The remainder were short-tailed shrew (*Blarina brevicauda*) and *Peromyscus* spp.

In addition to the 154 pellets of mammal remains, we collected 8 pellets with remains of birds. Remains in 5 pellets could be identified to species: Spotted Sandpiper (*Actitis macularia*, a chick), Savannah Sparrow (*Passerculus sandwichensis*), White-throated Sparrow (*Zonotrichia albicollis*) and Song Sparrow (*Melospiza melodia*, in 2 pellets). One pellet contained remains of *Oporornis* sp. (probably Mourning Warbler [*O. philadelphia*]) and another consisted of remains of *Melospiza* sp. (probably Swamp Sparrow [*M. georgiana*]). The eighth pellet contained remains of a Chipping Sparrow (*Spizella passerina*) and of a small unidentified emberizid. W. E. Southern (pers. comm.) observed songbirds being pursued and captured by Ring-billed Gulls and noted the presence of mummified songbird carcasses in Ring-billed Gull colonies on Lake Huron.

T. Hince and R. J. Prins assisted in the field. D. B. Campbell helped to identify the mammal remains. H. Ouellet identified the bird remains. J. E. Bryant and S. G. Curtis

commented on an earlier draft.—HANS BLOKPOEL, *Canadian Wildlife Service, Ontario Region, 1725 Woodward Drive, Ottawa, Ontario, Canada K1G 3Z7,* AND GERARD T. HAYMES, *Ontario Hydro, Aquatic Biology Section, 800 Kipling Avenue, Toronto, Ontario, Canada M8Z 5S4.* *Accepted 15 Feb. 1979.*

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Premigratory fat in the American Kestrel.—Premigratory fat deposition has been reported in many avian families (King and Farner, Annu. N.Y. Acad. Sci. 131:422–440, 1965), but I do not know of any previous report of it among the Falconiformes.

Methods.—Fourteen adult males, 1 immature male, 7 adult females and 1 immature female American Kestrel (*Falco sparverius*) were trapped in Balchatri traps in Cache County, Utah, in April, July, and September of 1973 and 1974. Birds were transported to the laboratory at Utah State University, and weighed to the nearest 0.1 g. Each was then sacrificed in an atmosphere of N_2, frozen and stored. Later, each carcass was vacuum dried at 5 mm Hg for a minimum of 3 days to constant weight. To facilitate drying, the body cavity was opened and the pectoral muscles were macerated. Each carcass was chopped into small pieces and the fat extracted in a Soxhlet apparatus using petroleum ether (B.P. 60–80°C) as the solvent, and dried to constant weight in a hot-air oven at 80°C. The weight of body fat was equated with the vacuum-dried weight minus the dry weight of the fat-extracted carcass (i.e., the fat-free dry weight). Student's *t*-test was used to compare any 2 means.

Results.—Body fat of males decreased from April to early September, then increased sharply in the latter half of September (Fig. 1). Body fat of females decreased from April to late July and increased steadily during September.

The average weight of body fat on males expressed as a percentage of body weight was about 4% in April. In July it was 3–4% for both males and females. Females had significantly more fat than males in September (7.0 and 5.3%, respectively).

The pattern of seasonal change in fat levels in the kestrel is typical of a migrant, i.e., the lowest level occurs soon after the breeding season in mid-summer and rapid deposition of fat occurs preceding and/or during the southward migration in the fall. The timing of the southward migration was identified by the disappearance of color-marked summer resident birds from the county. In spring, kestrels that winter south of Utah begin to arrive in Cache County between the last week of March and the first week of April. The summer population of adult kestrels in Cache County is about 10 times larger than the winter population. The population decreases noticeably in mid- to late September as the summer resident kestrels move southward. Banding records show that some individuals that summer in northern Utah migrate to Mexico (Gessaman, unpubl. data). The birds collected in September may represent a mix of summer residents in northern Utah and others which had bred at locations further north.

The percentage of fat in kestrels immediately preceding or during the fall migration is significantly less than the 15–50% reported for land birds that migrate over large bodies of water or extensive desert areas (Odum, Science 123:892–894, 1956; Ward, Ibis 105:109, 1963). The kestrel's fall migratory routes likewise do not pass over these kinds of barriers (Bent, Life Histories of North American Birds of Prey. Pt. 2. U.S. Natl. Mus. Bull. 170, 1938).