

FROM FIELD AND STUDY



Long-eared Owl (*Asio wilsonianus*) at its nest in San Diego County, California. Photograph by Ed Harrison and Frances Roberts.

Sub-nival Feeding of the Redpoll in Interior Alaska: A Possible Adaptation to the Northern Winter.—The Common Redpoll (*Acanthis flammea*) is one of the few species of bird that regularly over-winters in the cold, interior region of Alaska. There are but five other passerine birds that do so in the Fairbanks area—the Raven (*Corvus corax*), the Canada Jay (*Perisoreus canadensis*), the Black-capped Chickadee (*Parus atricapillus*), the Hudsonian Chickadee (*Parus hudsonicus*), and a second fringillid, the Pine Grosbeak (*Pinicola enucleator*). The Hoary Redpoll (*Acanthis hornemanni*) perhaps also over-winters here, as a few specimens have been taken from mixed flocks of the two species in the late winter and early spring, but this fact is difficult to establish from field observations, and all but three specimens out of a series of thirteen from the Fairbanks area seem to be referable to *flammea*. In addition to the above, wintering populations of the White-winged Cross-bill (*Loxia leucoptera*) may, as elsewhere in the North, occur at sporadic intervals, probably correlated with the fluctuation in the abundance of its specialized food, coniferous seeds.

Little is known about how these birds are capable of surviving under sub-arctic winter conditions, which present two major problems to living organisms: (1) an extremely low environmental temperature and (2) a marked scarcity of food. Certainly a complex of physiological, somatic, behavioral, and ecological factors is involved. The excellent series of papers by Scholander, Hock, Walters, Irving, and Johnson (*Biol. Bull.*, 99, 1950:225-271) has opened a way to an understanding of the roles of physiological heat-regulation and body-insulation in the adaptation of arctic animals to cold. On the other hand, the winter problem of food-scarcity has not, to my knowledge, received detailed treatment in the literature, although it is quite generally recognized to exist.

With this latter problem in mind, the following observations on the Common Redpoll are offered to suggest the basis for a more extended view of the many possible ways in which birds come to face the far northern winter.

Near the Fairbanks Country Club, about seven miles outside Fairbanks, there is a grain field, well-sown to weeds, mostly *Chenopodium album*, to which the redpolls commonly resort for food. On the afternoon of December 2, 1950, as I was skiing past this field, a group of seven redpolls, fol-