

## Frank A. Pitelka (1916–2003)

Although the biological lore of Arctic Alaska had many early contributors, our biological knowledge of the North Slope grew exponentially after 1947, when the U.S. Naval Arctic Research Laboratory (NARL) was established at a navy base just north of Barrow, Alaska. Among the many distinguished scientists who have since studied the biota of the North Slope of Alaska, none has contributed more to our understanding of the distribution, abundance, and behavior of terrestrial mammals and birds than Frank A. Pitelka. During the 1950s, 60s, and 70s, he not only led major research projects of his own but also recruited a substantial coterie of graduate students and post-doctoral fellows to work in Arctic tundra.

Born on 27 March 1916 and raised in Berwyn, Illinois, a suburb of Chicago, Pitelka came from a family of Czech immigrants and spoke Czech at every opportunity throughout his life. His development as a biologist began in elementary school, when he began to take bird walks with his teacher. As his interests in birds gathered momentum during high school, he found a mentor in Mrs. Nellie J. Baroody, who was active in the Illinois Audubon Society. Upon graduation he wanted to go university to begin his formal training as a biologist, but the Great Depression and the need to earn money stood in his way. While employed at General Electric, he managed to take courses at a local two-year college (Morton Junior College in Cicero, Illinois) and finally entered the University of Illinois at Urbana-Champaign in 1937, at age 21. Because he was an older, dedicated student who had already begun publishing his observations on birds, he soon caught the attention of two eminent ecologists then at Illinois, Victor E. Shelford and S. Charles Kendeigh. He became Kendeigh's research assistant and continued to publish papers. As a result of these activities, he shared an office with graduate students, one of whom was no less than Eugene Odum, a PhD student of Kendeigh at that time. After graduation in 1939 (summa cum laude with a double major in zoology and chemistry), Pitelka arranged to start a doctoral program at the University of California at Berkeley with another prominent ecologist, Joseph Grinnell, the founding director of the Museum of Vertebrate Zoology (MVZ). Unfortunately, Grinnell unexpectedly died of a heart attack, so Pitelka needed to find another sponsor, and he became the student of Alden Miller, a prominent ornithologist and the new director of MVZ. Under Miller's guidance, Pitelka's interests took a turn toward evolution and systematics.

During World War II, presumably because of a medical deferment from military service, Pitelka continued his doctoral work on jays in the genus *Aphelocoma*. He published a series of papers and received his PhD in 1946. His work on jays culminated in a monograph published by the University of California. His publication record shows that he continued his interest in ecology and behavior,

however, and when new faculty were needed to handle the crush of returning veterans, he was hired to teach ecology at Berkeley, largely because of his training at Illinois. He continued to work on systematic problems, but it was his ecological research that attracted national attention when his paper on interspecific territoriality in hummingbirds (Pitelka, 1951) won the prestigious Mercer Award of the Ecological Society of America. This award is given to a young investigator (under 40) who has published the best paper on ecological research during the previous two years.

In 1951, at the invitation of Ira Wiggins, the director of NARL, Pitelka went to Barrow to begin research on the myriads of breeding birds on the nearby coastal tundra, and he continued that research for about 30 years. As luck would have it, brown lemmings were also fairly abundant in 1952 and built to peak densities in 1953, so he could observe firsthand the dramatic events at snowmelt during a lemming high. Lemmings scurried everywhere, the vegetation appeared devastated, and predatory birds and mammals feasted on the lemmings (for a detailed description of these events, see Thompson, 1955). This experience convinced Pitelka that lemmings played a crucial role in the dynamics of the tundra ecosystem as a whole, and he began to envision an expanded research program. Because Daniel Thompson, a graduate student from the University of Missouri, was already working on lemmings and did not complete his field research until 1954, Pitelka did not begin his formal, 20-year study of the ecology of arvicoline rodents (lemmings and voles) on the North Slope of Alaska until 1955. This work included not only intensive studies on lemmings in the Barrow region, which he conducted with his doctoral students (G.O. Batzli and D.A. Mullen) and a large group of research assistants, but also widespread surveys of lemmings and voles across the North Slope, also conducted with a doctoral student (H.E. Childs, Jr.) and several research assistants. The latter studies gathered comparative data at sites along the north coast of Alaska (from west to east: Cape Sabine, Wainwright, Barrow, Chipp River, Cape Simpson, and Pitt Point) and at inland sites (from west to east: Inaru River, Atqasuk on the Meade River, Umiat on the Colville River, Shaviovik River, Okpilak River, and Jago Lake).

Pitelka followed up his interest in the interactions of components of tundra ecosystems in two ways. First, he and his students (W.J. Maher and S.F. MacLean, Jr.) documented the dramatic responses of avian and mammalian predators to fluctuating lemming populations and studied the potential impact of predation on those populations. Second, he recruited Arnold Schultz, a plant ecologist and colleague from Berkeley, to begin a study of lemming-plant-soil interactions. That collaboration resulted in the well-known Nutrient Recovery Hypothesis (Pitelka, 1964; Schultz, 1964), which explained how the



FIG. 1. Frank Pitelka weighing a nestling snowy owl on tundra near Barrow, Alaska, circa 1955. The hard hat provided protection from adult snowy owls, which often aggressively defend their young. Pitelka and his students found that densities of nesting predators (owls and jaegers) depended on the density of brown lemmings, and that growth and survival of young owls tracked changes in lemming density during the summer. Photo: W. J. Maher.

high lemming populations reduced plant cover and the insulation provided by dead vegetation, thereby increasing the depth of thaw and diluting the soil nutrient pool. The resultant delay in recovery of plant quality and production could account for the cyclic population dynamics of lemmings and their predators in the coastal tundra on the North Slope. Although not all aspects of this hypothesis have been confirmed, it has stimulated research on the role of changes in food quality and quantity in the population dynamics of arvicoline rodents.

During the 1950s–70s, Pitelka, his graduate students, and his post-doctoral associates (T.J. Cade, P.G. Connors, T.W. Custer, R.T. Holmes, S.F. MacLean, Jr., W.J. Maher, and J.P. Myers) also produced a spate of important publications on Arctic birds. These included studies on the ecology of predatory birds (jaegers and owls); on the distribution, taxonomy, social behavior, and ecology of shorebirds; and on the demography and food requirements of the Lapland longspur, a fringillid common near Barrow. Many observations also were made on the avifauna in general (Pitelka, 1974). Finally, because of his interests in food availability and the impact of weather, Pitelka even supported studies of soil arthropods (the main food of many breeding shorebirds) and variability in summer temperature.

Throughout his career, Pitelka and his students also maintained active research programs at temperate latitudes, primarily on shorebirds that overwinter and migrate along California shores, on social behavior of acorn woodpeckers, and on population dynamics of California voles. As a result, Pitelka published a total of about 130 papers during his career, many more if all notes, reviews, and commentaries are included.

During my years of Arctic research at Barrow (1972–74), I learned firsthand of Pitelka's enthusiasm for fieldwork, natural history, and the history of biology. After a hard day in the field, several of his friends and students would gather in Pitelka's lab, have a drink before dinner, discuss the day's discoveries, compare humorous anecdotes, and reminisce about the old days at NARL. These were golden times, full of excitement and hilarity. One old-timer told me a story about the early days at NARL, when Pitelka was studying avian predators. His work took him close to snowy owl nests, and some of the owls strongly objected, so much so that they would attempt to rake his skull with their talons. As a defensive measure, Pitelka scavenged among some old equipment that had been discarded and fashioned a helmet out of a lightweight urinal. Unfortunately, no one thought to get a photo of him

parading around the tundra like that! He later found more appropriate headgear (Fig. 1). Additional insights into Pitelka's remarkable personality can be found in two memorial resolutions written by his former students (Koenig and Sherman, 2004; Root and Batzli, 2004).

In addition to his activities in research and teaching, Pitelka served in a variety of administrative positions at the University of California at Berkeley, as an editor of several professional journals, and on advisory panels to national and international agencies. Most relevant for this profile, he also served as the first director of the Tundra Biome, a large ecosystem research program in the early 1970s that was supported by the National Science Foundation as a U.S. contribution to the International Biological Program.

As a result of all this activity and as a tribute to his achievements, Pitelka received numerous professional awards, including the William Brewster Award from the American Ornithologists Union (1980), the Mercer Award (1953 — mentioned above) and the Eminent Ecologist Award (1992) from the Ecological Society of America, the Distinguished Teaching Award from the University of California at Berkeley (1984), the LAS Alumni Achievement Award from the University of Illinois (1993), and an honorary doctoral degree from Masaryk University in Brno, Czech Republic (1997). Finally, he was an elected fellow of the Arctic Institute of North America, the American Ornithologist's Union, the American Association for the Advancement of Science, the Animal Behavior Society, and the California Academy of Sciences, and an honorary member of the Cooper Ornithological Society. Surely these honors confirm the importance of Pitelka's contributions to biology in general and to Arctic biology in particular.

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*George O. Batzli*  
*Department of Animal Biology*  
*University of Illinois*  
*Urbana, Illinois, U.S.A.*  
 61801