# BIRDS OF THE NOATAK RIVER, ALASKA

By JOHN Q. HINES

Until the present time, observations on the avifauna of the Noatak River drainage in northern Alaska (fig. 1) have been limited to those of McLenegan, who in 1885 explored the river to its headwaters by canoe for a distance of "about five hundred miles from the coast" (McLenegan, 1887:70). His observations are, by his own admission, fragmentary (*op. cit.*:76). Grinnell (1900) spent a year, 1898–1899, on the Kowak (now the Kobuk) River, and considered the Noatak River as part of the hydrographic basin that makes up this area, although he apparently made no observations there.

It is the purpose of this report to add further information on birds of this area by presenting data on observations and collections made in 1960 and 1961.

During the summers of 1959, 1960, and 1961, I was one of several biologists employed by the United States Public Health Service under the direction of Francis S. L. Williamson for the purpose of studying the bird life of the arctic coast of Alaska in the vicinity of Cape Thompson (lat. 68° 06′N, long. 165° 46′W). In order to understand better the appearance of certain unexpected species, as well as to extend our general knowledge of birds in this sector of Alaska, several short reconnaisance trips were made to the country adjoining our immediate study area. One trip from July 29 to August 1, 1960, was to the confluence of the Noatak and Kelly rivers (lat. 67° 56′N, long. 162° 20′W). A second trip was made from September 1 to 3, 1960. During the summer of 1961, four trips were made to the Noatak-Kelly river confluence: June 16 to 21; July 5 to 8; July 23; and July 27. In addition I visited a locality on the Kelly River (lat. 68° 26′N, long. 162° 08′W), approximately thirty miles above the Noatak-Kelly river confluence, also on July 23, and observations were made during a flight from the junction of these two rivers, down the Noatak Valley, to Kotzebue on July 27. The precise locations given here for both of the study areas are based on the Noatak and DeLong Mountain sheets, Alaska Reconnaisance Topographic Series, 1951 edition, published by the United States Geological Survey. The observations and collections made during these two summer seasons form the basis of the present report.

## ACKNOWLEDGMENTS

I am grateful to David W. Johnston and Max C. Thompson for aid in the collection and preparation of specimens and for free use of their field notes. Ross Johnson aided in identification of botanical materials, and Douglas Hilliard and Jerry Tash contributed valuable observations. Paul Baldwin generously identified the redpolls. I particularly wish to thank Francis S. L. Williamson for aid in collecting, for identification of all the specimens except the redpolls, and for critical examination of the manuscript. These investigations were supported by the Division of Biology and Medicine of the Atomic Energy Commission (Agreement No. SF–54–373, Environmental Studies of Project Chariot).

## DESCRIPTION OF THE AREA

The southern slopes of the Brooks Range in northwestern Alaska are drained by the Noatak River, and according to McLenegan (*op. cit.*: 59), this river originates on a broad plateau from "a number of branches, each of which has its source in a small lake." It flows west for a distance of approximately 250 miles, then turns gradually and flows to the south for approximately 100 miles before entering Hotham Inlet, a portion of Kotzebue Sound. On the north side the river is paralleled by the steep, jagged DeLong Mountains of the Brooks Range and, to the south, by the Baird Mountains.

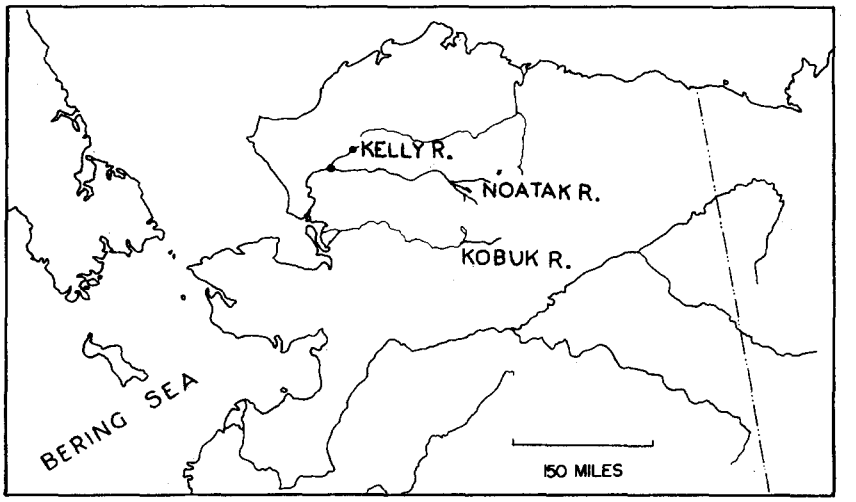


Fig. 1. Outline map of Alaska, showing Kelly, Noatak, and Kobuk rivers. Areas studied are indicated on the Kelly and Noatak rivers.

The Kelly River is approximately 40 miles long and flows into the Noatak River from the north at a point about 100 miles from Hotham Inlet. At the confluence of these streams the Noatak Valley is approximately 20 miles wide. The land is nearly level for one-half to five miles on either side of the river before sloping gently upward to the bases of the very steep, loose and rocky mountain slopes (fig. 2). The Noatak River is shallow at the junction with the Kelly River and is approximately 100 yards in width during periods of low water.

The Noatak River winds through extensive gravel bars which have a sparse covering of fireweed (*Epilobium angustifolium*) and arctic lupine, *Lupinus arcticus* (fig. 3). Higher, sandy areas, bordering the bars or occurring as islands on the bars, have rich riparian woodland (fig. 4), consisting primarily of feltleaf willow (*Salix alaxensis*) up to fourteen feet in height. This and other willows are interspersed with alder (*Alnus*) and balsam popular (*Populus tacamahaca*), occurring singly or in small groves. Beneath these trees grows a wide variety of willows, forbs and grasses including arctic brome grass (*Bromus pumpellianus*), reedgrass (*Calamagrostis*), alpine milk vetch (*Astragalus alpinus*), sweet pea (*Hedysarum*), and cinquefoil (*Potentilla fruiticosa*), as well as horsetails (*Equisetum*).

The riparian woods of willow, popular, and alder extends into the dense white spruce (*Picea glauca*) forest (fig. 5) for distances ranging from a few hundred feet to a mile or more. This mixing is due in part to the presence of old water courses which thread their way through the woodland resulting in avenues of willow, alder and birch (*Betula*). The spruce range in height up to thirty feet and reach a maximum breast-high diameter of approximately ten inches. Beneath these mixed stands of trees alpine bearberry (*Arctostaphylos alpina*), arctic lupine, blueberry (*Vaccinium*), soapberry (*Shepherdia canadensis*), cinquefoil, lungwort (*Mertensia*), and low juniper (*Juniperus communis*) are abundant. On the floor of the spruce forest lies a dense mat of sphagnum moss (*Sphagnum*).

Bogs, small lakes, and ponds are common. The bog vegetation consists primarily of sedges (*Carex*) and tussocks of cottongrass (*Eriophorum*), plants which also border the lakes.

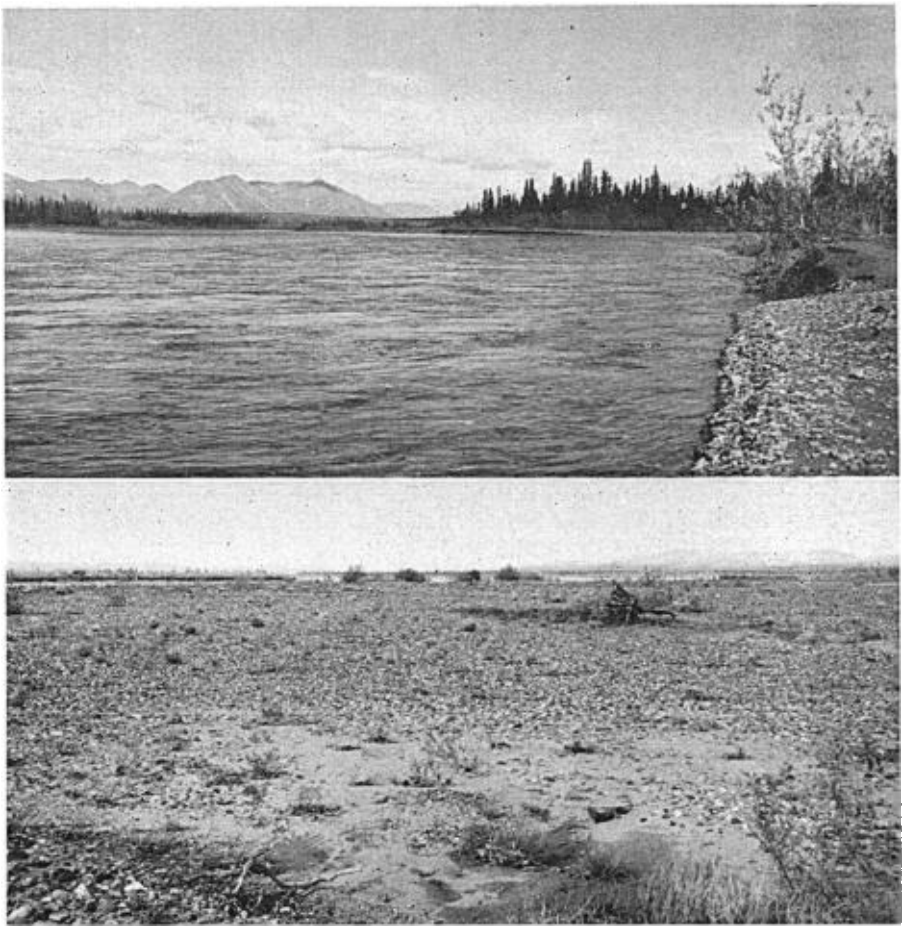

Fig. 2 (above). Waters of Kelly River and streamside alluvium in foreground; spruce forest, tundra, and DeLong Mountains of Brooks Range in distance.

Fig. 3 (below). Streamside alluvium with willow, fireweed, and lupine in foreground. Noatak River in background. Photograph taken during a period of low water in June, 1961. All photographs by F. S. L. Williamson.

The timber commonly extends two miles from the river before tundra vegetation appears, and while the timbered regions are quite low and flat, the tundra is rolling and frequently sloped. Here, the streamside alders may reach a height of eight feet, and dwarf birch (*Betula nana*) grows to five feet. Low willows, heath (*Ledum*), blueberry and cinquefoil form the ground cover. The very rocky slopes are sparsely covered with lichens and mountain avens (*Dryas*). In wet areas the vegetation is usually quite low, less than fifteen inches in height. Blueberry is widespread, especially on frost heaves; sedges, sphagnum moss, heaths, and cinquefoils abound in depressions.

On the higher, dry slopes *Dryas* is the most abundant plant while cinquefoils, blueberry, birch, willows, sedges, and lichens are scattered.

## CLIMATE

The only climatological data available for this portion of Alaska are those from

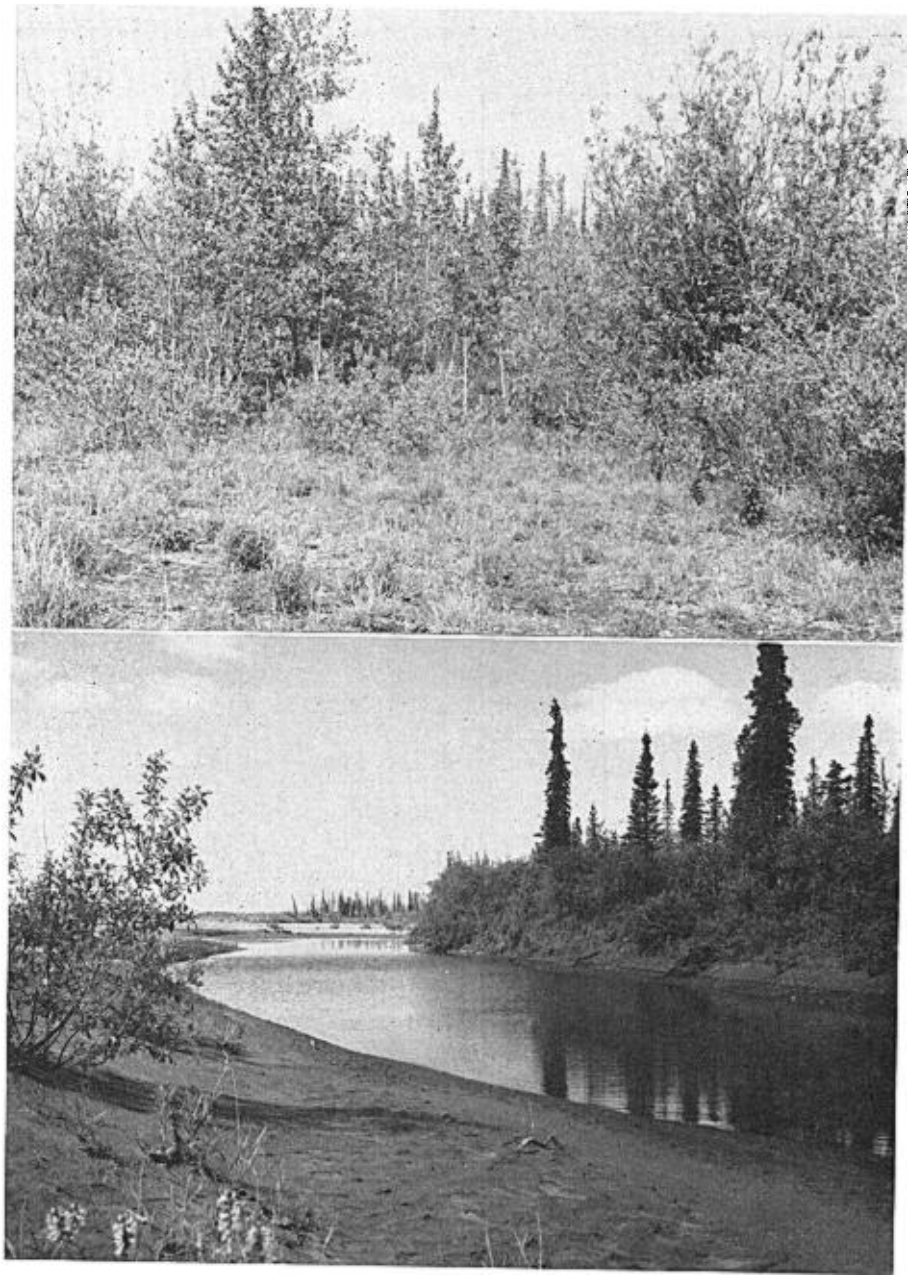

Fig. 4 (above). Riparian woodland consisting primarily of willow and poplar, with dense understory of forbs and grasses, June 19, 1961.

Fig. 5 (below). White spruce forest in background with dense riparian vegetation adjoining streambanks. Willow and forbs in foreground. Photograph taken in June, 1961, shortly after a flood. The temporary channel in the foreground was virtually dry two weeks later.

Kotzebue, gathered by the United States Weather Bureau during the period 1941 to 1955 and summarized by Watson (1959).

The climate of this region is severe, characterized by long cold winters and short cool summers. The mean annual temperature is 20.6°F., and the ground, with the exception of a very shallow upper layer of earth, is perpetually frozen.

The winters last about nine months with the lowest mean monthly temperature, –6.6°F., occurring in January. The extreme low recorded in Kotzebue during the period 1941 to 1955 was –48°F., although –58°F. was recorded in March, 1930. The mean maximum for January is 0.6°F., but the Kotzebue Sound area experiences occasional warming trends from southwesterly winds during all months of the year, and the extreme maximum recorded for January is 36°F. The major rivers of arctic Alaska freeze in mid-October and ice breakup occurs about May 20. The sun is continuously above the horizon from the latter part of May through mid-July. The warmest month is July with a mean monthly temperature of 52.6°F., a mean maximum of 58.5°F., and an absolute maximum of 82°F. The average frost free season is about 90 days.

The average annual precipitation is slightly over eight inches, almost half of which occurs as rain during July and August. The mean annual snowfall is 41.1 inches. On the Noatak River during the summer, rain falls predominantly as showers with large quantities falling briefly on small areas.

Interpolation on various isoline maps provided by Watson (*op. cit.*) indicate few significant differences in temperature and precipitation between Kotzebue and the confluence of the Kelly and Noatak rivers. One would, however, expect greater extremes in mean temperature between winter and summer and less precipitation in the interior than on the coast. As the sea freezes in the late fall and open water virtually disappears for the winter, the maritime influences are greatly diminished. Thus, the differences in winter may not be so great as one might expect between inland and coastal areas.

## AVIAN HABITATS

On the basis of the physical and vegetational features of the area, eight major avian habitats seem easily recognizable. In characterizing these, units similar to those used by Miller (1951) and by Fay and Cade (1959) have been employed. The superscript [1] and [2] indicate, respectively, habitats of primary and secondary affinity. The superscript is omitted wherever our data are inconclusive.

*Fluviatile waters.*—Included here are flowing waters and the associated streamside alluvium (fig. 3). The only species observed nesting in this habitat was the Semipalmated Plover, although the Spotted Sandpiper and the Arctic Tern probably also nest there. Other species commonly associated with fluviatile waters are:

Yellow-billed Loon[2]
Arctic Loon[2]
Red-throated Loon[2]
Goldeneye
Red-breasted Merganser[1]
Marsh Hawk[2]
Osprey[1]
Semipalmated Plover[1]
Black Turnstone[1]
Spotted Sandpiper[1]
Solitary Sandpiper[2]
Parasitic Jaeger[2]
Glaucous Gull[2]
Herring Gull
Mew Gull[1]
Arctic Tern[1]
Belted Kingfisher[2]

*Lacustrine waters and edges.*—Lakes and ponds are important features of the sloping country between the river and the mountains, as well as in the forested areas. It is unfortunate that observations in this habitat were so limited. Species commonly associated with this formation are:

Yellow-billed Loon[1]
Arctic Loon[1]
Red-throated Loon[1]
Whistling Swan[1]
Canada Goose[1]
Pintail[1]
Glaucous Gull[1]
Belted Kingfisher[1]

*Barrens.*—This habitat is defined by Fay and Cade (*op. cit.*:89) as one characterized by "dry, rocky ground covered with crustose and foliose lichens, a few scattered herbs, particularly of the family Caryophyllaceae, and some *Dryas* and *Salix*." Observations here were made late in the season, and it is suspected that the species normally utilizing this habitat had already moved into the lowlands or had migrated. The only species observed was the Rock Ptarmigan.

*Riparian woodland.*—This woodland is dominated by willows, poplars, and alders together with an understory of forbs and grasses (fig. 4). The White-crowned Sparrow, Tree Sparrow and Gray-cheeked Thrush are the most characteristic birds of this habitat, although many others utilize it for either nesting or foraging. The species observed in this habitat were:

Pigeon Hawk[1]
Western Wood Pewee
Gray Jay[2]
Robin[2]
Varied Thrush[2]
Gray-cheeked Thrush[1]
Arctic Warbler[1]
Northern Shrike[2]
Orange-crowned Warbler[1]
Blackpoll Warbler[2]
Northern Waterthrush[1]
Wilson Warbler[1]
Pine Grosbeak[2]
Hoary Redpoll[2]
Common Redpoll[2]
Tree Sparrow[1]
White-crowned Sparrow[1]
Fox Sparrow[1]

*Spruce forest.*—Thirty species of birds were observed in the spruce forest making it the most important habitat for birds in the area. However, Miller (*op. cit.*:554) and others conducting similar studies have found the most diversified avifauna to be associated with the riparian woodland and that generally fewer species of birds occur in coniferous forest. The situation on the Noatak seems anomalous and can, in part, be attributed to the dense riparian element present in the spruce woods. This explains the presence of the White-crowned Sparrow and perhaps several other species that would not be expected in the spruce forest formation. Many species which show a nesting preference for the spruce woodland were observed at a later date exhibiting a definite preference for riparian vegetation. The species commonly observed in this habitat were:

Golden Eagle
Osprey[2]
Spruce Grouse[1]
Lesser Yellowlegs(?)
Mew Gull[2]
Great Horned Owl[1]
Belted Kingfisher[2]
Yellow-shafted Flicker[1]
Northern Three-toed Woodpecker[1]
Olive-sided Flycatcher[1]
Gray Jay[1]
Gray-headed Chickadee[1]
Boreal Chickadee[1]
Robin[1]
Varied Thrush[1]
Gray-cheeked Thrush[2]
Ruby-crowned Kinglet[1]
Arctic Warbler[2]
Bohemian Waxwing[1]
Northern Shrike[1]
Myrtle Warbler[1]
Blackpoll Warbler[1]
Pine Grosbeak[1]
Savannah Sparrow
Hoary Redpoll[1]
Common Redpoll[1]
Slated-colored Junco[1]
Tree Sparrow[2]
White-crowned Sparrow[2]

*Freshwater marsh.*—This habitat is differentiated from the lacustrine waters and their edges primarily on the basis of small size of the open water and the presence of emergent vegetation. Included are the small temporary, although occasionally permanent, watercourses; these are usually very shallow and less than twenty feet across. This formation is dry or nearly so during most of the year, and dense tangles of willows and birch frequently grow in and around these periodically inundated areas. Solitary Sandpipers and Rusty Blackbirds show a decided preference for this habitat.

*Wet tundra.*—This formation is essentially the same as that defined by Fay and Cade (*op. cit.*:90): "The chief characteristic of this formation is the wetness of the soil. A depression, such as that made by the human foot, will immediately begin to fill with water from the saturated soil, or standing water may actually overlie the ground for one or two inches or more." Sphagnum moss and sedges are the principal plants. The Sandhill Crane and Common Snipe show a preference for this habitat.

*Dwarf birch–heath tundra.*—Most of the vegetation in this formation is waist or knee high. Long low ridges, perhaps a foot high and a foot wide, the result of frost action in the ground, are obvious features of the landscape. Birds associated with this formation are:

Rock Ptarmigan[1]
Hoary Redpoll
Common Redpoll
Tree Sparrow[2]
White-crowned Sparrow[2]

## ANNOTATED LIST OF SPECIES

A total of 83 species of birds has been recorded from the Noatak River drainage. I observed sixty-one of these and the remainder were seen by McLenegan (1887). Available field notes permit use of the relative abundance ratings of abundant, common and uncommon as defined by Williamson (1957:326): "The category 'abundant' indicates that the species in question was repeatedly observed or heard in the inhabited formations, with indications that its available habitat was being nearly fully utilized. The term 'common' denotes that the species was observed on all or nearly all the trips into the field, but that some apparently suitable habitat, or at least areas like the ones occupied, were vacant. 'Uncommon' indicates that the species was seen only on a small number of trips and that large areas were evidently not being utilized." Notations on relative abundance pertain only to the summer months. Subspecific nomenclature is utilized only where specimens have been secured and where identifications have been made using comparative material.

*Gavia adamsii.* Yellow-billed Loon. This species was uncommon. McLenegan (*op. cit.*:80) saw several, and we saw a total of three during both seasons. In addition, loons heard calling on several occasions, as they flew over our tent during the night, were thought to be of this species.

*Gavia arctica.* Arctic Loon. McLenegan considered this loon moderately abundant. Arctic Loons were observed on or about the river on several occasions, and one pair was seen swimming on a small lake about one-half mile NNE of the Kelly-Noatak river confluence in July, 1960. A single bird was observed on the same lake in June, 1961. This species is believed to breed on some of the larger tundra and spruce forest lakes.

*Gavia stellata.* Red-throated Loon. This was the most frequently observed loon and it probably breeds on the ponds and lakes of the tundra. Individuals and, on two occasions pairs, were observed either swimming in or flying over the river.

*Olor columbianus.* Whistling Swan. The first swans observed on the Noatak River were seen on June 17, 1961, when two birds flew low across the river to the southwest. On the evening of June 20, 1961, a pair, plus one lone adult that flew some distance behind, was seen flying across the river in

the previously noted direction. Five were observed from the air on a small lake about twenty miles west of the Noatak River on July 23, 1961, and many were seen in groups of from one to five on the tundra pools that lie to the south of the lower reaches of the river. This swan undoubtedly breeds in the Noatak Valley.

*Branta canadensis*. Canada Goose. Canada Geese were heard calling in the distance almost every day of our stay during June, 1961. Flocks of 17, 8, and 25 birds were observed in flight on three occasions. On July 8, 1961, a group of four geese flew within 100 yards of us and although they were small, they were much lighter in color than *B. c. minima*. According to Delacour's (1954:156) distributional map, birds from this area may be either *B. c. minima* or *B. c. taverneri*; specimens are needed to establish the identity of this population. Four adults taken on the Kukpuk River have been identified as *B. c. taverneri*.

*Anser albifrons*. White-fronted Goose. McLenegan (*op. cit.*:79) found this goose to be very abundant on the lower river marshes.

*Anas acuta*. Pintail. Two Pintails were observed flying up the Noatak River on June 16, 1961, and two others flew past our plane on July 5, 1961, as we approached the river for a landing. One flock of approximately fifty flightless birds, apparently of this species, was seen from the air on a lake about ten miles west of the Noatak River on July 23, 1961. McLenegan recorded the Pintail along every section of the river and considered it moderately abundant.

*Anas carolinensis*. Green-winged Teal. We observed no teal, although McLenegan saw a few along the coast, presumably near the mouth of the Noatak River.

*Mareca americana*. American Widgeon. McLenegan observed this species singly or in pairs everywhere along the river and he recorded young birds in mid-July.

*Bucephala* sp. Goldeneye. McLenegan's observation of a pair of Common Goldeneyes (*Bucephala clangula*) on the lower Noatak River is the only record of this species reported from arctic Alaska (Bailey, 1948:167). On the evening of June 20, 1961, a female goldeneye, possibly of this species, was seen flying down the Noatak River.

*Somateria mollissima*. Common Eider. McLenegan (*op. cit.*:79) observed one male "about three hundred miles above the mouth of the river."

*Mergus serrator*. Red-breasted Merganser. This merganser is abundant on the Noatak River and was observed on several occasions on the upper Kelly River. One female with six young was seen on July 30, 1960.

*Buteo lagopus*. Rough-legged Hawk. McLenegan (*op. cit.*:78) observed this species on several occasions and found two nests along the lower stretches of the river.

*Aquila chrysaëtos*. Golden Eagle. One Golden Eagle was seen circling high over our camp on July 31, 1961. Neither Grinnell (1900) nor McLenegan (1887) observed this species in the Kotzebue Sound area, although it has been observed to the northeast on the Kaolak River (Maher, 1959:358) and has been found nesting in the Brooks Range west of the Anaktuvuk River (Campbell, 1960:298).

*Haliaeetus leucocephalus*. Bald Eagle. We observed no Bald Eagles. McLenegan (*op. cit.*:78), however, lists this species as "the most common bird of prey in the region."

*Circus cyaneus hudsonius*. Marsh Hawk. One immature female was taken on the Noatak River on August 26, 1960; no fat, weight 523.5 gm. The bird had a *Microtus* in its stomach. McLenegan found this species to be quite common along the lower river.

*Pandion haliaetus*. Osprey. One pair of Ospreys was observed flying up the Noatak River on July 31, 1960, and two birds were seen circling high overhead on July 23, 1961. On that same day a probable Osprey nest was seen in a tall spruce as we flew overhead. Grinnell (*op. cit.*:38) lists this as a common breeding species on the Kobuk River.

*Falco columbarius bendirei*. Pigeon Hawk. One male was collected on a high, rocky, *Dryas*-covered slope east of the upper Kelly River on July 23, 1961; testis 1 × 2 mm., light fat, weight 164.1 gm. This bird behaved in a manner suggesting the presence of a nest, but subsequent search of poplars and willows in the vicinity was unsuccessful. This was the only falcon that I observed on either the Noatak River or the Kelly River.

*Falco sparverius*. Sparrow Hawk. The status of this falcon in the Noatak drainage is uncertain. McLenegan (*op. cit.*:78) listed Sparrow Hawks as "more or less abundant . . . principally in the mountain districts."

*Canachites canadensis osgoodi.* Spruce Grouse. Numerous droppings of this species, or possibly of ptarmigan (*Lagopus*), were seen during June and July of 1961 in the clearings of the gravel bars between the spruce and riparian woodland. One adult male was collected on August 1, 1960; heavy molt, no fat, weight 649.0 gm.

*Lagopus lagopus.* Willow Ptarmigan. We observed no Willow Ptarmigan but found large quantities of droppings, apparently from birds that winter in the cover provided by the spruce and willow. These droppings may also have been from Spruce Grouse or Rock Ptarmigan. McLenegan lists the Willow Ptarmigan as a resident of the tablelands.

*Lagopus mutus.* Rock Ptarmigan. The right wing and the right foot of a Rock Ptarmigan in winter plumage were found lying in a spruce thicket on June 20, 1961. One male was heard calling from a rocky bluff above the upper Kelly River on July 23, 1961. Rock Ptarmigan are undoubtedly more numerous than these few observations might indicate.

*Grus canadensis.* Sandhill Crane. Cranes were heard calling from the tundra on numerous occasions, particularly in the early morning about 2:00 to 3:00 a.m. One flock of approximately fifteen birds was seen flying across the river on June 21, 1961. Although McLenegan (*op. cit.*:79) lists this as a rare species, my observations indicate it is common or abundant. It probably nests on the tundra between the river and the mountains.

*Charadrius semipalmatus.* Semipalmated Plover. This species was seen regularly on the gravel bars of the river and during our visit of June 16 to 21, 1961, two nests were located within 200 yards of our camp. These consisted of small depressions in the gravel perhaps four inches in diameter by one and one-half inches deep and lined with fine twigs. The first nest contained four eggs and was found on June 18, 1961. The second nest was found on June 19, 1961, at 9:00 a.m. Three eggs were present at that time, but when the nest was revisited at noon, there were four.

The first nest was revisited on July 7, 1961, and although we could not locate the young, their presence in the area was indicated by the distraction display of the adults. The second nest, although on relatively high ground, had been washed out by summer floods.

*Pluvialis dominica.* American Golden Plover. McLenegan (*op. cit.*:78) observed one small flock near the headwaters of the Noatak River.

*Squatarola squatarola.* Black-bellied Plover. The Black-bellied Plover has been recorded from this part of the arctic only by McLenegan, who listed it as a common breeding species.

*Arenaria melanocephala.* Black Turnstone. Black Turnstones were common as presumed transients along the Kelly and Noatak rivers during the period July 29 to August 1, 1960. Many individuals and flocks containing as many as eight birds were seen. No turnstones were observed in 1961. One adult female was collected in 1960; ovary regressing, heavy fat, weight 124.5 gm.

*Capella gallinago.* Common Snipe. No snipe were observed during 1960, but winnowing was heard throughout the period of study in 1961. Two individuals were flushed from wet *Carex* marsh on the upper Kelly River on July 23, 1961.

*Numenius phaeopus.* Whimbrel. McLenegan lists the Whimbrel as an abundant species on the upper river.

*Numenius borealis.* Eskimo Curlew. McLenegan (*op. cit.*:78) states that the Eskimo Curlew "together with the red-bellied snipe [*Limnodromus scolopaceus*] and the Hudsonian curlew [*Numenius phaeopus*], forms the three most abundant species characteristic of the region."

*Actitis macularia.* Spotted Sandpiper. Individuals and occasionally pairs were commonly seen along the water's edge where they frequented gravel bars beside the river, and more often, the muddy edges of temporary pools. No nests were located but the specimens indicate that breeding occurs. On June 17, 1961, a pair was observed and the male was taken; testis 8 mm., well developed incubation patches, light fat, weight 41.0 gm. A second male was collected on July 23, 1961; testis 3 × 2 mm., light fat, weight 33.0 gm.

*Tringa solitaria cinnamomea.* Solitary Sandpiper. Early in the summer these sandpipers were restricted to fresh-water marshes of the closed type. By August, however, isolated individuals were seen on the gravel bars along the river's edge. This species undoubtedly breeds in the area and one pair showed marked alarm over our presence on June 20, 1961. Specimens taken include a juvenal female, July 29, 1960, heavy fat, weight 40.0 gm.; male, July 6, 1961, well developed incubation patches, testis 1 × 2 mm., light fat, weight 45.8 gm.

*Totanus flavipes*. Lesser Yellowlegs. McLenegan lists this species as a breeding bird of the marshes along the lower river. A bird with a call-note resembling this species was heard on June 17, 1961.

*Erolia minutilla*. Least Sandpiper. McLenegan lists this as a widely distributed, although not abundant, species.

*Limnodromus scolopaceus*. Long-billed Dowitcher. According to McLenegan this dowitcher is very abundant on the upper portions of the Noatak River.

*Ereunetes pusillus*. Semipalmated Sandpiper. McLenegan found this sandpiper to be moderately abundant along the lower river.

*Crocethia alba*. Sanderling. Sanderlings are listed as irregularly distributed summer residents by McLenegan.

*Stercorarius parasiticus*. Parasitic Jaeger. This species was observed on but two occasions during 1961: one in light phase and one in dark phase were seen flying down the river on June 18 and July 23, respectively.

*Stercorarius longicaudus*. Long-tailed Jaeger. This jaeger was not recorded, although McLenegan (*op. cit.*:79) reported it as regular but uncommon.

*Larus hyperboreus*. Glaucous Gull. Abundant throughout the area, these gulls were seen on every trip afield. First-year birds were observed along the river in September, 1960; prior to that time, all birds recorded appeared to be adults. No immatures were seen in 1961. This species is believed to breed in the area.

*Larus glaucescens*. Glaucous-winged Gull. McLenegan lists this as a nesting species, more abundant than the Glaucous Gull.

*Larus argentatus*. Herring Gull. This species was recorded only once, June 16, 1961, when a lone bird was observed flying down the Kelly River. This gull is probably a rare transient in the Noatak area.

*Larus canus*. Mew Gull. Mew Gulls appear to be more abundant on the upper reaches of the Kelly River than on the Noatak itself. A pair observed on the Kelly River on July 23, 1961, made repeated dives at us while calling excitedly. This behavior was observed by Grinnell (1900:11) as indicating the presence of young or eggs nearby. Nesting probably occurs about lakes in the spruce woodland.

*Larus philadelphia*. Bonaparte Gull. This gull was observed on several occasions by McLenegan, who reported it a regular but not abundant species.

*Sterna paradisaea*. Arctic Tern. This species was frequently seen foraging over the river or sitting on the gravel bars. Terns were observed as singles and pairs, and occasionally formed small flocks. Nesting surely occurs somewhere in the area.

*Bubo virginianus*. Great Horned Owl. An owl tentatively identified as this species was heard calling from the spruce woodland on two occasions in July, 1961.

*Nyctea scandiaca*. Snowy Owl. This owl was observed by McLenegan (*op. cit.*:77) only rarely. The occurrence and breeding of this species in the area, as at Barrow (Pitelka, Tomich, and Treichel, 1955) probably depends upon the abundance of microtine rodents.

*Megaceryle alcyon*. Belted Kingfisher. The characteristic staccato note of this bird was heard on June 19, 1961, when one flew into view from around a bend in the river and continued eastward until out of sight. A pair was observed by Tash and Hilliard flying about a small lake about one mile above the confluence of the Kelly and Noatak rivers on July 27, 1961.

*Colaptes auratus*. Yellow-shafted Flicker. A flicker was heard calling several times in the spruce woodland on June 17, 1961.

*Picoïdes tridactylus fasciatus*. Northern Three-toed Woodpecker. This woodpecker was observed in the spruce forest on five occasions during the two summers. The trees showed little evidence of woodpecker activity, and this species must be considered uncommon. Data for two specimens taken in 1960 are: male, July 30, testis 2 mm., light fat, weight 53.6 gm.; male, heavy molt, no fat, weight 56.5 gm. Data for a male with well developed incubation patches taken on June 20, 1961: testis 5 mm., no fat, weight 55.5 gm.

*Contopus sordidulus*. Western Wood Pewee. This species was recorded once, in 1961, when a lone bird was observed calling from a willow.

*Nuttallornis borealis*. Olive-sided Flycatcher. One bird of this species was observed perched in one of several lofty spruce trees overlooking a small wet bog on three successive days during the

period June 16 to 21, 1961. From this vantage point it repeated its three-noted call throughout the day; this could be heard clearly for perhaps 200 yards.

*Iridoprocne bicolor.* Tree Swallow. Although never abundant, swallows of this species were observed regularly. Williamson (1957:332) suggested that the scarcity of Tree Swallows at the edge of the coniferous forest may be merely a reflection of the relative scarcity of woodpeckers and the homesites that they provide. A female was taken on July 6, 1961; ovary minute, incubation patch well developed, moderate fat, weight 21.0 gm.

*Riparia riparia.* Bank Swallow. We observed no Bank Swallows and McLenegan (*op. cit.*:77) reported that this species was much less abundant than the Barn Swallow.

*Hirundo rustica.* Barn Swallow. McLenegan (*op. cit.*:77) reported that this species was "everywhere in varying abundance, especially in the vicinity of the abandoned huts of the natives." F.S.L. Williamson (personal letter) informs me that a decline of Barn Swallows has occurred at Lake Iliamna, Alaska. He states that "Barn Swallows were very numerous at Iliamna in 1900–1925 when Cliff Swallows [*Petrochelidon pyrrhonota*] became the abundant species and Barn Swallows virtually disappeared."

*Perisoreus canadensis pacificus.* Gray Jay. This jay, abundant throughout the spruce woodland, was seen virtually every day in the field. Adults and fledged young were found as early as June 18, 1961. Data for one male collected on July 29, 1960, are: testis 1 mm., no fat, weight 74.6 gm. The average weight of seven juveniles taken during the period July 29 to August 1, 1960, was 72.9 gm. (range 66.8 to 78.0).

*Corvus corax.* Common Raven. Individuals and occasionally pairs of ravens were observed flying up and down the river and over the spruce forest nearly every day in the field.

*Parus cinctus lathami.* Gray-headed Chickadee. Of the two species of chickadees in the area, *cinctus* appears to be more common than *hudsonicus.* Although widely distributed throughout the spruce forest, the largest concentration of *cinctus* appeared to occur in a formation consisting primarily of willow and low spruce less than twenty feet high. The average weight of nine juveniles taken in late July, 1960, and in the first week of July, 1961, was 12.4 gm. (range 11.3 to 13.0).

*Parus hudsonicus hudsonicus.* Boreal Chickadee. Several of these chickadees were observed mixed with small flocks of *cinctus* in 1960. Boreal Chickadees were observed on only two occasions during 1961 when a pair was collected in a spruce thicket and a second pair was observed flitting about in willows beside an old watercourse through the spruce. Data for two females taken are: July 30, 1960, ovary granular, no fat, weight 10.8 gm.; June 17, 1961, ovary granular, molting, incubation patch, no fat, weight 11.7 gm.

*Turdus migratorius.* Robin. Several Robins were observed during the period July 29 to August 1, 1960. However, they were scarce during June, 1961, becoming more apparent in early July. In late July, 1961, on the upper stretches of the Kelly River, they were abundant, particularly in the spruce forest. An immature female was collected on July 7, 1961; ova minute, light fat, weight 69.2 gm.

*Ixoreus naevius meruloides.* Varied Thrush. This species was abundant in the spruce woodland, and, later in the summer, it was common along the edge of the spruce where there was a mixture of willow, birch, and poplar. Considerable singing was heard in late June, although a male carrying food was taken on June 16, 1961, and fledglings were observed on July 7, 1961. The average weight of three males taken in late June and early July, 1961, was 76.6 gm. (range 68.7 to 82.8). The average testis measurement was $6 \times 11$ mm.

*Hylocichla minima minima.* Gray-cheeked Thrush. This species was abundant in both the spruce and riparian woodland. One nest containing four eggs was found on June 17, 1961, in low willows. A few were still singing in early July, 1961, while others were observed carrying food. Two specimens were collected: female, August 1, 1960, juvenile, weight 30.5 gm.; male, June 17, 1961, testis $6 \times 9$ mm., light fat, weight 29.5 gm.

*Phylloscopus borealis kennicotti.* Arctic Warbler. This warbler was seen rather infrequently during the early part of the summer; males were observed singing a few times each day during the period July 5 to 8, 1961. By the latter part of July, 1960 and 1961, however, Arctic Warblers were abundant in the willows as well as in the spruce thickets. This appeared to be the most numerous species in the understory of the spruce forests of the upper Kelly River on July 23, 1961. Data for two specimens taken are: female, July 30, 1960, ova minute, incubation patch, light fat, weight 8.1 gm.; male, June 19, 1961, testis $4 \times 7$ mm., light fat, weight 9.5 gm.

*Regulus calendula calendula.* Ruby-crowned Kinglet. This species was a common resident of the spruce forest and considerable singing activity was recorded during the periods June 16 to 21, and July 5 to 8, 1961. Data for three males collected in 1961 are: June 17, testis 6 mm., light fat, weight 6.7 gm.; June 20, testis 5 mm., light fat, weight 7.0 gm.; July 8, testis 2 mm., light fat, weight 6.4 gm.

*Motacilla flava.* Yellow Wagtail. A small number of these birds, believed to be transients, was seen along the gravel bars during the period July 29 to August 1, 1960.

*Bombycilla garrula pallidiceps.* Bohemian Waxwing. Waxwings were common residents of the spruce forest where pairs and individuals passed overhead each day. A female taken on July 5, 1961, was still laying and was possibly attempting a renesting, since two weakly flying fledglings were collected on the next day from a family group of two adults and four young. Data for the two adults secured: female, July 5, 1961, ova to 7 mm., two collapsed follicles, incubation patch, light fat, weight 55.8 gm.; male, July 5, 1961, testis 6 × 8 mm., mate of above female, light fat, weight 48.5 gm. Two juvenal males taken July 6, 1961, weighed 35.9 and 38.1 gm.

*Lanius excubitor invictus.* Northern Shrike. Shrikes were observed on two occasions. A male was collected in a spruce thicket on July 7, 1961; testis 2 × 4 mm., medium fat, weight 67.5 gm. A search of the area in which the bird was first observed revealed five fledglings, and that evening a second adult was seen calling from a spruce tree about one and one-half miles distant.

*Vermivora celata celata.* Orange-crowned Warbler. This warbler was observed infrequently during early summer; only four records were obtained from June 16 to 21, 1961. However, Orange-crowned warblers were abundant and conspicuous in willow thickets later in the season from July 5 to 8, 1961. At that time several fledglings were observed with the parents. Data for two specimens taken are: male, June 18, 1961, testis 8 mm., light fat, weight 9.2 gm.; female, July 5, 1961, ovary minute, incubation patch, light fat, weight 10.0 gm.

*Dendroica petechia.* Yellow Warbler. On June 18, 1961, and again on June 20, songs thought to be those of the Yellow Warbler were heard in the spruce woodland.

*Dendroica coronata hooveri.* Myrtle Warbler. Myrtle Warblers were abundant in both the willow understory of the spruce forest as well as in the spruces where singing was common during the period June 16 to 21, 1961. By early July many adults were observed carrying food and singing was reduced. Data for two specimens collected in 1961 are: female, June 17, ova to 2 mm., incubation patch, light fat, weight 15.3 gm.; male, June 18, testis 7 × 10 mm., medium fat, weight 12.3 gm.

*Dendroica striata lurida.* Blackpoll Warbler. This warbler was seen only once from July 29 to August 1, 1960, but was common in 1961, more so than *D. coronata.* Fledglings were observed in early July and it is assumed that *striata* is probably an early migrant. F. S. L. Williamson (*in litt.*) feels that the subspecies present in this area is *lurida*, a race not currently recognized by the A.O.U. Check-list and is "readily distinguishable in series from subspecies *striata.*" Data for two specimens collected in 1961 are: male, June 17, testis 8 mm., light fat, weight 13.1 gm.; female, June 18, ova to 6 mm., 2 collapsed follicles, medium fat, weight 15.7 gm. The average weight of seven other adults, collected from June 17 to July 8, 1961, was 12.8 gm. (range 11.5 to 14.5).

*Seiurus noveboracensis notabilis.* Northern Waterthrush. This species was seen on few occasions in late July of 1960 but was common in 1961. It was most frequently found in thick stands of willows, especially about wet boggy areas. Data for two specimens collected are: male, June 18, 1961, testis 4 × 6 mm., medium fat, weight 17.7 gm.; female, July 6, 1961, ova minute, incubation patch, molting, light fat, weight 16.3 gm.

*Wilsonia pusilla pileolata.* Wilson Warbler. This warbler exhibited a definite affinity for alders where the few observed along the Noatak were found. On the upper Kelly where these trees formed large stands adults and juveniles were abundant. Data for one female taken are: July 5, 1961, ovary minute, incubation patch, light fat, weight 6.4 gm.

*Euphagus carolinus carolinus.* Rusty Blackbird. Pairs of this species were seen occasionally in 1961. One fledgling with parents in attendance was observed in a stand of birch on June 19, 1961. Data for two males collected on June 19, 1961, are: testis 7 × 10 mm., light fat, weight 58.5 gm.; testis 12 mm., light fat, weight 60.6 gm.

*Pinicola enucleator alascensis.* Pine Grosbeak. This was an abundant species throughout the period of fieldwork. It showed a preference during the early summer for the spruce woodlands, but as the season advanced it moved out into the willows of the gravel bars where there was less cover

but possibly more food. The average weight of twelve adults taken was 59.8 gm. (range 54.5 to 62.8). Testis measurements of six males showed a progressive reduction in length from a maximum of 13 mm. on June 17 to a minimum of 2 mm. on August 1. Fledglings were first observed on July 8.

*Acanthis hornemanni exilipes.* Hoary Redpoll. Two male redpolls of this race were collected in 1961: June 18, testis 7 mm., first year, light fat, weight 12.4 gm.; June 19, testis 4 × 6 mm., adult, light fat, weight 14.8 gm. Further comment on redpolls is presented beyond.

*Acanthis flammea flammea.* Common Redpoll. Redpolls were common in the spruce forest and were seen overhead in flight each day. They occurred in small groups, as individuals, or more often as pairs; immatures were numerous in late July. Following Baldwin's (1955) tentative conclusion that only one species, *A. hornemanni,* was present in the Colville River area, we made no attempt to separate the two species in the field. Baldwin has identified the Noatak birds as four *Acanthis flammea flammea,* two *Acanthis hornemanni exilipes,* and two intermediates (*A. f. flammea* × *A. h. exilipes*). The average weight of the male Common Redpolls taken in 1961 was 13.2 gm. (range 13.0 to 13.4), and the average testis length was 7 mm. (range 6 to 8). Data for two intermediate males taken on June 19, 1961, are: testis 11 mm., adult, light fat, weight 15.4 gm.; testis 3 × 6 mm., first year, medium fat, weight 14.5 gm.

*Passerculus sandwichensis.* Savannah Sparrow. Several juveniles and adults were seen in the riparian woodland during late July, 1960. None was seen in 1961, and those previously observed were probably transients. An immature male was taken on July 30, 1960; no fat, weight 18.7 gm.

*Junco hyemalis hyemalis.* Slate-colored Junco. Juncos were common throughout the spruce woods and bordering alder thickets. Adults and juveniles were common in the spruce forests of the upper Kelly River on July 23, 1961. Two males were collected in 1961: June 19, testis 8 mm., light fat, weight 20.4 gm.; June 20, testis 10 mm., light fat, weight 20.0 gm.

*Spizella arborea ochracea.* Tree Sparrow. Tree Sparrows were abundant, especially in the willows along the edges of the spruce forest. On the upper Kelly River this species was the dominant one numerically in the dwarf birch-heath tundra. Data for a male taken on July 6, 1961, are: testis 3 × 6 mm., medium fat, weight 18.5 gm.

*Zonotrichia leucophrys gambelii.* White-crowned Sparrow. This species was perhaps the most numerous of all the birds observed, and although not limited to any particular habitat, displayed a definite preference for the willows and poplars along the edges of the spruce forest. Fledglings were common during the first week of July in 1961. Data for one male are: July 17, 1961, testis large (shot), light fat, weight 26.2 gm.

*Zonotrichia atricapilla.* Golden-crowned Sparrow. McLenegan (*op. cit.*:77) lists this sparrow as a regular, although not abundant, summer resident.

*Passerella iliaca zaboria.* Fox Sparrow. Fox Sparrows were commonly associated with alders and willows within the spruce forest. Fledglings were observed in early July when males were still singing, although at a reduced level. Data for two adults taken in 1961 are: male, June 19, testis 8 mm., light fat, weight 38.9 gm.; female, June 21, 3 collapsed follicles, incubation patch, light fat, weight 41.8 gm. A juvenile weighing 34.4 gm. was collected on July 7, 1961.

## DISCUSSION

The area under consideration lies near the northernmost limit of spruce forest in northwestern Alaska (Taylor and Little, 1950:30–31), a factor which strongly influences the breeding distribution of many species of birds. The marginal nature of this area for birds associated with woodland encourages comparison of the Noatak avifauna with that of areas with more extensive spruce forests, such as the Kukpuk River to the south.

Black Turnstones appeared frequently on the Noatak River as transients during 1960, but they have not been recorded from the Kobuk. Semipalmated Plovers were common on the Noatak but were seen by Grinnell (*op. cit.*:29) only once. Pectoral Sandpipers (*Erolia melanotos*), Baird Sandpipers (*Erolia bairdii*), Bar-tailed Godwits (*Limosa lapponica*), and Northern Phalaropes (*Lobipes lobatus*) have been recorded

from widely separated surrounding areas (Grinnell, *op. cit.*; Bee, 1958; Kessel and Cade, 1958) and would be expected in the similar habitats of the Noatak drainage.

Our observations along the Noatak River indicate a paucity of raptorial birds; only six were seen during the two summers. Grinnell (*op. cit.*) lists four species of raptors from the Kobuk River that are not known to inhabit the Noatak drainage: the Sharp-shinned Hawk (*Accipiter striatus*), Gyrfalcon (*Falco rusticolus*), Hawk-Owl (*Surnia ulula*) and Short-eared Owl (*Asio flammeus*). In addition, McLenegan (1889) records the Goshawk (*Accipiter gentilis*) and the Great Gray Owl (*Strix nebulosa*) from the Kobuk River. I have observed Gyrfalcons and Short-eared Owls along the Kukpuk River and would expect to find these species in similar tundra habitats of the Noatak Valley. The Marsh Hawk, Pigeon Hawk, Osprey and Snowy Owl are common to both the Noatak and Kobuk drainages. Those raptorial species seen on the Noatak River, but not on the Kobuk, include the Rough-legged Hawk, Golden Eagle, Bald Eagle, Sparrow Hawk and Great Horned Owl. McLenegan lists the Sparrow Hawk but because he fails to mention the Pigeon Hawk, Grinnell (*op. cit.*:76) considered this a doubtful record.

Grinnell (*op. cit.*) lists thirty-eight species of passerine birds from the Kobuk interior, at least thirty of which also occur along the Noatak. Of these eight missing passerine species, four: the Clark Nutcracker (*Nucifraga columbiana*), Lincoln Sparrow (*Melospiza lincolnii*), Dipper (*Cinclus mexicanus*) and Black-capped Chickadee (*Parus atricapillus*) were seen but once. Grinnell observed the Water Pipit (*Anthus spinoletta*), White-winged Crossbill (*Loxia leucoptera*), Lapland Longspur (*Calcarius lapponicus*) and Snow Bunting (*Plectrophenax nivalis*) on the Kobuk River, and these species probably also occur in the Noatak Valley. His comments indicate also that the Yellow Warbler is common in late August in the Kobuk Valley, lending support to my opinion that this species occurs in the area here considered.

Neither the Western Wood Pewee nor the Olive-sided Flycatcher has been recorded from the Kobuk Valley and they are probably accidental on the Noatak.

Of the thirty passerine species common to both the Kobuk and Noatak river valleys, only four, the Bohemian Waxwing, Orange-crowned Warbler, Willow Warbler and Wilson Warbler, were more abundant along the Noatak. Gabrielson and Lincoln (1959:702) state that Grinnell's single observation of a flock of Bohemian Waxwings represents the "most northern Alaskan record for this waxwing." The presence of this species on the Noatak extends the known range and establishes this as a breeding bird of the arctic. Although McLenegan (1889:114) considered the Orange-crowned Warbler quite common along the Kobuk, Grinnell (*op. cit.*:55) saw it only once. Even though Bailey (1948:287) expressed some doubt regarding the accuracy of McLenegan's observation, the abundance of this warbler indicates the identification was probably correct.

The results of the taxonomic study of the small sample of redpolls should not be construed to reflect relative abundance of the two species present. Collecting was selective and only the more brilliantly colored males were taken. Of more significance regarding relative abundance is Grinnell's (*op. cit.*:48) more random collection of 112 redpolls, 104 of which he identified as *Acanthis hornemanni exilipes*.

The Yellow-shafted Flicker is rare along the Noatak River, but its presence was not completely unexpected since it has been previously recorded from this portion of Alaska. McLenegan (1889:117) reported one from the upper Kobuk, and Kessel and Cade (1958:61) listed a straggler that was taken along the Colville River in 1937.

As previously mentioned, observations on the tundra and the foothills of the Noatak

drainage are inadequate. This inadequacy leads to uncertainty regarding the status of several species. In addition, this area represents a marginal situation to both tundra dwelling species and spruce forest inhabitants and changes in population levels are to be expected. Future work in the area might be directed toward a more thorough investigation of all the ecological formations.

## SUMMARY

In conjunction with studies conducted at Cape Thompson on the bird life of the arctic coast of Alaska, portions of the country about the Kelly and Noatak rivers were visited in the summers of 1960 and 1961. In this area, riparian woodland of willow, poplar, and alder extends into a dense forest of white spruce. Bogs are common and there are many small lakes and ponds.

The climate of this area is severe, with long cold winters and short cool summers. The mean annual temperature is 20.6° F., and the ground is perpetually frozen, except for a shallow upper layer of earth. The coldest month is January, with a mean monthly temperature of −6.6° F., and the warmest month is July, with a mean monthly temperature of 52.6° F. The average frost free season is about 90 days. The average annual precipitation is slightly more than eight inches, and the mean annual snowfall is 41.1 inches.

Eight major avian habitats are recognizable: fluviatile waters, lacustrine waters and edges, barrens, riparian woodland, spruce forest, freshwater marsh, wet tundra, and dwarf birch–heath tundra. Birds characteristic of these habitats are listed.

A total of 83 species of birds has been recorded from the Noatak River drainage. Only six raptorial birds were recorded in the summers of 1960 and 1961. The Western Wood Pewee and the Olive-sided Flycatcher are probably accidental; the Yellow-shafted Flicker is rare.

The avifauna of the Noatak River is compared in some degree to the avifauna of the more continuous spruce forest of the Kobuk River. More detailed investigations of all ecological formations are needed to establish the status of some species of birds.

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