Transcriber's Notes

This file was derived from scanned images. With the exception of some minor corrections made silently (for example missing commas or periods) and typographical errors corrected as listed below, the original text is presented. Some text may have been moved to rejoin paragraphs split in the original by Tables or images.

Typographical Corrections

Page 172 Para. 5	:	Koalak	=>	Kaolak
Page 173 Para. 3	:	gutteral	=>	guttural
Page 182 Para. 2	:	logopus	=>	lagopus
Page 184 Para. 4	:	was	=>	were
Page 186 Para. 3	:	Topagurak	=>	Topagaruk
Page 192 Para. 1	:	averages	=>	averaged
Page 195 Para. 4	:	few	=>	flew
Page 197 Para. 4	:	70"34'	=>	74°34'
Page 197 Para. 5	:	(93-87)	=>	(87-93)
Page 210 Para. 4	:	then	=>	than

[Cover]

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Volume 10, No. 5, pp. 163-211, pls. 9-10, 1 fig. in text

March 12, 1958

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JAMES W. BEE

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INTRODUCTION

In the summers of 1951 and 1952 some data on birds were gathered incidental to a study of the mammals of the Arctic Slope of northern Alaska (see Bee and Hall—Mammals of Northern

Alaska ..., Univ. Kansas Mus. Nat. Hist., Miscl. Publ., 8, March 10, 1956). Other students, currently preparing comprehensive accounts of the birds of northern Alaska, have urged that the information obtained in 1951 and 1952 be made available. For that reason, and because relatively little is on record concerning birds of the area visited, I have prepared the following account. The aim is to include only non-published data because the comprehensive accounts alluded to above, by others, can more appropriately include data from previously published accounts.

The area is the treeless tundra delimited by the crest of the Brooks Range to the south, the international boundary to the east and the Arctic Ocean to the north and west.

Three hundred and fifty-one birds of 44 species (Nos. 30371-30866, and 31301-31355) were collected. Twenty-nine additional species were seen. All specimens are skeletons, unless otherwise noted in the text, and are catalogued and housed at the Museum of Natural History, University of Kansas. Photographs are by the author.

The report results from a contract (Nonr-38700) between the Office of Naval Research and the Museum of Natural History of the University of Kansas. Field headquarters were at the Arctic Research Laboratory at Point Barrow, Alaska. Professor John Fields and Dr. Louis O. Quam of the Office of Naval Research, Professor Ira L. Wiggins, Scientific Director of the Arctic Research Laboratory, and Mr. M. R. Lipman of the University of Kansas Regional Office of the Office of Naval Research are four of the persons to whom I am deeply indebted. J. Knox Jones, Jr., and Edward G. Campbell, students at the University of Kansas, participated in the field work and deserve credit for a large part of the accomplishment registered in the field.

The author is greatly indebted to Professor E. Raymond Hall for assistance at many stages in the work. I am grateful to Professor Harrison B. Tordoff for numerous suggestions and for verifying the identifications of the specimens. The skeletons were identified by measurement and comparison of feet, bills, and the dried, flat skins that had been removed and labeled with the field numbers of the corresponding skeletons. Where subspecific identification was difficult because of the fashion in which the material was preserved it should be understood that the subspecific name assigned was based largely or entirely on geographic probability. This is wholly true for sight records. Robert G. Bee read the manuscript in its entirety and offered editorial comments and my wife, Annette, typed the manuscript and made numerous corrections. The names of several other individuals who rendered assistance appear at appropriate places in the following pages.

ITINERARY

Camps and collecting localities on the Arctic Slope of northern Alaska in 1951 and 1952 (Bee and Jones, July 3-September 6, 1951; Bee, September 6-11, 1951; Bee and Campbell, June 14-August 25, 1952; Bee, Campbell, and Hall, August 26-September 12, 1952) were as shown in Fig. 1.

Camps, and localities in the vicinity of each camp, are arranged geographically from north to south. The localities listed below under camps are only those which one or more of us (Bee, Campbell, Jones and Hall) visited. Travel between camps was by airplane; heavy black lines show routes followed.

Point Barrow

(1951: July 3-5, 10-12, 18-20, 27-29, Aug. 5-7, 28-30, Sept. 4-11. 1952: June 14-24, Aug. 23-27, Aug. 31-Sept. 12). Longitudes and latitudes taken from U. S. Coast and Geodetic Survey map No. 9445, 2nd edition, Point Barrow and vicinity, corrected May 21, 1951.

Point Barrow, 156°27'25", 71°23'11", 3 ft. (June 20, 21, Aug. 25, 1952).

Point Barrow, 156°30'00", 71°22'10", 0 ft. (Sept. 11, 1952).

4½ mi. SW Point Barrow, 5 ft. (Sept. 7, 8, 1951), but in the second year (June 14, 16, 1952) specimens from this same place were inadvertently labeled at "Birnirk Mounds, 156°36'02", 71°20'40", 8 ft.".

NW Elson Lagoon, 156°35'45", 71°20'27", 0 ft. (Sept. 2, 1952).

Point Barrow, 156°40'40", 71°19'30", 8 ft. (Sept. 9, 1952).

Point Barrow, 156°35'45", 71°19'30", 8 ft. (Sept. 9, 1952).

Point Barrow, 156°39'40", 71°19'03", 6 ft. (Sept. 3, 4, 7, 8, 1952).

West side Salt Water Lake [Lagoon], 156°42'00", 71°18'41", 4 ft. (June 18, 19, 1952).

1/10 mi. W Salt Water Lake [Lagoon], 156°42'02", 71°18'26", 10 ft. (June 16-19, 1952).

9/10 mi. E and 8/10 mi. N Barrow Village, 156°44'15", 71°18'20", 8 ft. (June 22, 23, 1952). [Pg 167]

1 4/10 mi. S and 6/10 mi. E Barrow Village, 156°45'25", 71°16'20", 20 ft. (June 20, 1952).

7½ mi. S and 7 mi. W Point Barrow, 156°49', 71° 17' (September 6, 1952).

Teshekpuk Lake

(1951: July 29-Aug. 4). Shown on a map, titled "Trails and Caches 1951 Season, Naval Petroleum Reserve No. 4, ... traced and reproduced from U. S. Geological Survey Maps, March 1945, compiled from AAF Trimetrogon photography for Aeronautical Chart Service."

NE Teshekpuk Lake, 153°05'40", 70°39'40", 12 ft.

Topagaruk

(1951: July 5-10). Named on map "Trails and Caches 1951 ..." cited immediately above, but is actually seven miles due south of name shown on that map. Correct position is 155°55', 70°34', 10 feet; but specimens are incorrectly labeled 155°48'....

Kaolak River

(1951: July 12-18). River shown on map cited above under Teshekpuk Lake.

[Actual camp on] Kaolak River, 159°47'40", 70°11'15", 30 ft.

Kaolak

(1951: July 20-27). Longitude and latitude computed from map cited above under Teshekpuk Lake.

Kaolak, 160°14'51", 69°56'00", 178 ft.

Gavia Lake

(Aug. 19-23, 1952). Longitude and latitude computed from World Aeronautical Chart (63) Brooks Range, U. S. Coast and Geodetic Survey, 5th ed., February 2, 1949.

Gavia Lake, N White Hills, 150°00', 69°35', 460 ft.

Umiat

(1951: Aug. 30-Sept. 4. 1952: June 24-July 3, 18-23, Aug. 16-19, 23, Sept. 12). Longitude and latitude taken from U. S. Geological Survey Topographic Map.

Bearpaw Creek, 1 7/10 mi. E and 1 7/10 mi. N Umiat, 152°04'50", 69°23'30", 550 ft. (June 28, 1952).

1 3/10 mi. E and 1 3/10 mi. N Umiat, 152°05'30", 69°23'12", 350 ft. (June 26, 27, 1952).

9/10 mi. W and 9/10 mi. N Umiat, 152°10'58", 69°22'53", 380 ft. (June 29, 30, July 1, 1952).

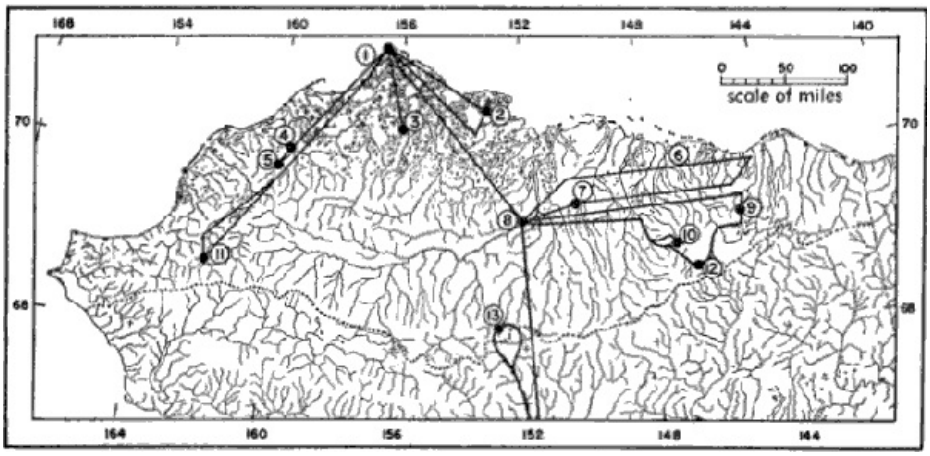
1½ mi. W and ¾ mi. N Umiat, 152°08'10", 69°22'18", 370 ft. (Aug. 30, Sept. 4, 1951).

Umiat, 152°08', 69°22', 337 ft. (Aug. 19, 1952).

Umiat, 152°09'30", 69°22'08", 352 ft. (June 24, 26, July 21, 22, 1952).

As shown on fig. 1 a reconnaissance flight was made from Umiat to Sadlerochit River and return (July 22, 1952).

[Pg 168]



Click on map to view larger size version.

FIG. 1. Routes of travel and base camps of field party in 1951 and 1952.

1. Point Barrow
2. Teshekpuk Lake
3. Topagaruk
4. Kaolak River
5. Kaolak
6. Reconnaissance flight
7. Gavia Lake
8. Umiat
9. Lake Schrader-Lake Peters
10. Wahoo Lake
11. Driftwood
12. Porcupine Lake
13. Chandler Lake

LAKE SCHRADER-LAKE PETERS

[Pg 169]

(July 23-Aug. 16, 1952). Longitudes and latitudes taken from map entitled "Preliminary Copy," U. S. Petroleum Reserve No. 4, U. S. Geological Survey, March 1948, scale 1-6900.

Spawning Creek, W side Lake Schrader, 145°11'40", 69°25'08", 2908 ft.

SW Lake Schrader, 145°11'30", 69°24'32", 2925 ft. (July 27, 28, 1952).

Lake Schrader, 145°09'50", 69°24'28", 2900 ft. (July 23, 24-30, 1952).

East side Lake Schrader—Lake Peters Channel, 145°09'30", 69°24'15", 2905 ft. (July 29, 30, 1952).

Mouth Chamberlin Canyon, S end Lake Peters, 145°08'34", 69°20'58", 3690 ft. (Aug. 4, 5, 1952).

SE end Lake Peters, 145°09'26", 69°20'56", 2950 ft., Romanzof Mountains (Aug. 1-9, 14, 1952).

Mount Mary, S end Lake Peters, 145°10'05", 69°20'35", 3012 ft. (The mountain between Carnivore River on the east, Whistler Creek on the west, mouth of Whistler Creek on the north, and the crest of the Brooks Range on the south.) (Aug. 13-16, 1952.)

Mount Mary, S end Lake Peters, 145°10'02", 69°20'30", 2920 ft. (July 30-Aug. 11, 1952).

S end Lake Peters, 145°09'50", 69°20'15", 2906 ft. (Aug. 15, 1952).

Weasel Point, S end Lake Peters, 145°09'30", 69°20'15", 2920 ft. (Aug. 9-11, 1952).

Carnivore Lakes (Carnivore is the name of the three lakes at elevations of 3260, 3385 and

3400 ft. between 69°18' and 69°17' on Carnivore River, which flows from James Robert Lake to Lake Peters). (Aug. 8, 1952.)

James Robert Glacier, 145°09', 69°16', approximately 3700 ft. (Aug. 8, 1952).

Wahoo Lake

(July 3-11, 1952). Longitude and latitude taken from map entitled "Preliminary Copy," Naval Petroleum Reserve No. 4, U. S. Geological Survey (of same series as map used at Porcupine Lake,

see below

).

Wahoo Lake, 146°58', 69°08', 2350 ft.

Driftwood

(Aug. 27-31, 1952). Longitude and latitude computed from map cited above under Teshekpuk Lake.

2 mi. W Utukok River, 161°15'30", 68°54'50", 1275 ft. (Aug. 30, 1952).

Driftwood, Utukok River, 161°12'10", 68°53'47", 1200 ft. (Aug. 27-31, 1952).

Porcupine Lake

(July 11-18, 1952). Longitude and latitude computed from map titled "Preliminary Copy," Naval Petroleum Reserve No. 4, compiled by U. S. Geological Survey, May, 1949, Alaska, K6, scale 1:4800.

Porcupine Lake, 146°29'50", 68°51'57", 3140 ft. (July 12-16, 18, 1952).

Mount Annette, 146°28'51", 68°50'38", approximately 5700 ft. (Mount Annette is in the Annette Range south of Porcupine Lake between the Canning River and the Ivashak River.) (July 17, 1952.)

Chandler Lake

(Aug. 9-25, 1951). Longitude and latitude taken from World Aeronautical Chart (63) Brooks Range, U. S. Coast and Geodetic Survey, 5th ed., February 2, 1949.

Chandler Lake, 152°45', 68°12', 2900 ft.

ACCOUNTS OF SPECIES

Gavia adamsii (Gray): Yellow-billed loon.—Specimens, 3: Kaolak (Kuk) River, 159°47'40", 70°11'15", 30 ft., No. 30571, ad. female, July 18, 1951; Wahoo Lake, 146°58', 69°08', 2350 ft. (a breeding pair), No. 31301, ad. male and No. 31302, ad. female, July 9, 1952.

Upon our arrival at Wahoo Lake (July 3, 1952), two yellow-billed loons were swimming, side by side, on the east end of the lake. On July 8, the pair were seen swimming close together 400 feet distant from the nest. It was located on July 4 and held two fresh eggs. Three days later at 3:00 A.M. one of the pair called directly in front of our camp, which was approximately 4000 feet from the nest at the other end of the lake. The call was the first uttered in the area since our arrival. Except for the two instances noted above, only a single loon was seen at any one time almost certainly because the other was sitting on the eggs. At 3:00 P.M. on July 9, by means of a boat,

we visited the nesting area; the male was incubating and the female was absent from the area. As we approached to within 30 feet of the nest, the male, conspicuous as it sat upon the nest with neck held low and extended, became nervous. When we were 25 feet away the bird plunged into the lake. His feet and wings beat the water, increasing his speed; he flew to our right approximately 30 feet from the nest and was shot. The nest and eggs were photographed and we left the area. At 5:30 P.M., the female was swimming on the lake in the general area of the nest. In an effort to obtain the bird we pursued her down the middle of the lake, approximately 1000 feet from her nest and in the direction from which we came. Turning shoreward she dived and resurfaced approximately 300 feet in the opposite direction from which she was being pursued. Two additional dives brought her to the vicinity of the nest. No cry was uttered by either of the birds during our pursuit.

Although the female had been incubating two nearly fresh eggs, her ovary, 35 mm long and 19 mm in diameter, contained ova of various sizes up to six mm in diameter. The female measured 850 mm in total length and weighed 4536 grams; the male was 900 mm in total length and weighed 6804 grams.

The nest, approximately 60 cm in diameter, of sedges, grasses and an assortment of plant debris, was on a mound of soil 23 cm above, and 40 cm from, the open water. The cup of the nest measured 37 mm in depth. The site of the nest (southeast corner of the lake) was near the area supporting the most lake trout (*Cristivomer namaycush*). Between open water of the lake and the shore, 20 feet of sedges and grasses deterred wolves (*Canis lupus*), red foxes (*Vulpes fulva*), and caribou (*Rangifer arcticus*) from molesting the nest; tracks of these mammals were numerous on contiguous shore areas.

The early run-off entering the lake created a variable water level (the overflow decreased 60 per cent in the period July 2 to July 11). The loons lay their eggs when the lake's level is fairly well stabilized. The cotton-grass (*Eriophorum*) at the latter date was developing white flowers and the sedges, growing in dense stands, were showing springtime green.

The force with which the excrement of the loon is expelled while standing on land, accounts for long white lines upwards of one meter in length. These lines of dried excrement, reaching as far as one and one-tenth meters landward, were noted at several places along the shore.

At Topagaruk on July 9, 1951, a single yellow-billed loon was observed. At Kaolak River (July 12-18, 1951) the yellow-billed loon was occasionally heard at night and, at times in the day. On July 18, an Eskimo, Atanak, accompanied by two companions from Wainwright, shot two loons of this species approximately two miles down the Kaolak River from our camp. They had planned to prepare the birds for their evening meal. With the exception of twelve pebbles averaging 3.5 mm in diameter in the one, the stomachs of the loons were empty. The female was given to us by the Eskimos. It measured 870 mm in total length, 1600 mm in wing spread, and 5897 grams in weight. The ovaries contained many ova, the largest eight mm in diameter. Many of the individual ova were black.

At Porcupine Lake a yellow-billed loon was seen every day (July 13-18, 1952) but was not heard until 8:00 P.M. on July 17; its call was the first since our arrival on July 13. Thereafter its long drawn-out wail or raucous, hilarious call was uttered at intervals in the evening and well toward midnight. [Pg 171]

A yellow-billed loon was on the south end of Lake Peters on August 4, 1952. At 9:00 A.M. it caught a small fish at the mouth of Carnivore River. The loon flew north approximately five miles to Lake Schrader where it was known to have young.

Of the three species of loons observed on the Arctic Slope, the yellow-billed loon is the least numerous. Owing to its large size this loon is more often taken than either of the others. Eskimos consider its dark, fine grained flesh a delicacy. On the more isolated areas of the Arctic Slope the yellow-billed loon remains common; elsewhere it needs protection.

Additional specimens, especially from the contact zone between the areas of geographical distribution of *Gavia immer* and *Gavia adamsii*, are needed in order to decide on the subspecific *versus* specific status of these two kinds of loons.

Gavia arctica pacifica (Lawrence): Arctic loon.—Specimens, 2: Barrier Lake, NE Teshekpuk Lake, 153°05'40", 70°39'40", 8 ft., No. 30570, ad. female, July 29, 1951; Topagaruk River, 155°48', 70°34', 10 ft., No. 30572, ad. female, July 7, 1951.

On July 3, 1952, between Umiat and Ivashak River, pairs of Arctic loons were on only small and medium sized lakes; on this date they mostly were free of ice whereas large lakes were ice covered and thus unavailable to this species of loon. The use of small and medium sized lakes by this loon may result from the described unavailability of large lakes at nesting time. The tundra, at this time, when nesting has begun, is free of snow except for cornices and deposits in deep gullies. Willows and alders at Umiat on July 3 were without foliage, whereas these plants farther east were in leaf. On July 4, 1951, at two-tenths of a mile south of the Arctic Research Laboratory, a single bird flew over the tundra and onto the Arctic Ocean beyond. It called

regularly as it passed overhead. At Topagaruk (July 5, 1951) the pairs of Arctic loons were nesting on the vegetated edges of lakes of medium size. This species of loon constituted less than one per cent of the avian population of the area. A nest of this loon on a promontory between two lakes and within 30 centimeters of deep water was damp, shallow, slightly depressed and held eggs exposed to view. On July 7, the female was killed as she left the nest. The wind blowing offshore drifted her toward the center of the lake. Later, as she reached a point near the opposite side, the male alighted near the dead female and indulged in its courtship display of raising and lowering its head and neck. Swimming around the mate several times he continued to solicit attention from the lifeless form. An hour later we examined the off-shore and found the dead female among the sedges. By this time the male had abandoned its mate and was observed feeding in an adjacent lake. Arctic loons on several adjacent lakes could be heard. The male that had been deprived of its mate, did not respond.

The female weighed 1200 grams. The largest ovum was eight mm in diameter; others were smaller and the smallest were in clusters. On leaving the nest we placed mosses and grasses over it to protect the single egg from the parasitic jaegers. We wished to learn whether the male returned and incubated the egg. On our approach on July 8 he was on the nest but left and swam [Pg 172] approximately 200 feet under water before surfacing. On the afternoon of the same day the single egg was cold and unattended. The male was swimming on a nearby lake some 300 yards distant. Two pairs of the Arctic loon were observed swimming on adjacent lakes. On July 9, the male was again incubating the egg.

The Arctic loon calls frequently when flying overhead. The Eskimos were adept at imitating the loon's call and were successful in having the birds respond.

At Kaolak River (July 12-18, 1951), pairs of the Arctic loon used the course of the stream as a flight lane.

On an airflight from east to west between the mouth of the Canning River Canyon and Umiat (July 18, 1952) I noted an increase in the numbers of this loon, especially over the lakes near the Colville River.

Seven pairs and two singles of this species were observed between the mouth of the Avalik River and a point 23.3 miles from the Arctic Ocean when I flew directly from Kaolak to Point Barrow. In the above 33 miles of coastal plain, the greatest interval between loons was 9.7 miles, the shortest 1.9 miles, the average 5.9 miles. The last 23.3 miles before reaching the Arctic Ocean, produced no records of the loon. On a lake near the Arctic Ocean, 3.8 miles southwest from Barrow Village, a single pair was observed.

Upon our arrival at Barrier Lake, northeast of Teshekpuk Lake (July 29, 1951), there were two adult and two young Arctic loons at the south end of the lake at a point approximately 300 feet from where we camped. During our stay at the lake, the loons nearly all of the time remained on approximately 1½ acres of water in spite of being disturbed and having their territory periodically invaded by us. Adjacent to the area of the lake used by this family of loons were three small lakes connected by wide channels to Barrier Lake. Other small lakes to the east were connected by smaller channels. The loons preferred to feed in the lakes having larger connecting channels.

In the evening of the first day of observation, the female together with her two young was on land. The male was swimming approximately 200 feet out on the lake. The female was shot as she was flushed from the bank. The largest ovum was four mm in diameter. On the morning of the second day (15 hours after the female was shot) the male was observed tending the young; one young was by his side and the other had wandered to a point 40 feet away. A parasitic jaeger came and hovered above the straying young loon and then dived vertically to seize it. The male loon was too far away to reach its young before the jaeger departed. As the jaeger was leaving the area, three other parasitic jaegers pursued the first in an attempt to wrest from its beak the young loon. The contest for possession of the young loon continued as far as the eye could follow the contestants.

On August 2, at 3:35 P.M. the surviving members of this loon family—the male and the one young—rested on the water of the lake, approximately 200 feet from shore. The adult dozed with its head tucked under its wing—head end oriented into the wind except for occasional complete turns. These were made without visible change of posture. The young one alternated by swimming around its parent and resting at which time it tucked its head under its wing. Toward evening, the male was shot. A survey of the area the following morning disclosed the absence of [Pg 173] the young loon, not to be seen again during our stay. It was noted that during our sojourn of seven days, when the male was left with the orphaned young, the parent would fly to Teshekpuk Lake some 1½ miles to the south to procure food. The young loon when left alone would dive under water when approached.

On August 4, a pomarine jaeger pursued the male loon as it was returning from fishing on Teshekpuk Lake. When the birds first were seen, the jaeger was approximately 200 feet behind the loon, but in a distance of approximately 300 feet the jaeger overtook the loon which had reached the shore of Barrier Lake. When the jaeger was ready to strike in order to make the loon drop the fish it was carrying, the loon dropped over the erosional cliff and splashed into the water. After 30 seconds of hovering over the submerged loon, which remained under water for

one minute, the jaeger departed to the west. The loon came to the surface holding the fish tightly crosswise in its beak.

Numerous calls of the Arctic loon were heard on the Barrier Lake area. When a person enters the territory of a family of loons, the male makes a sound similar to a courting tomcat. The female responds with a like sound and in addition concludes her call with a high pitched note. When mildly disturbed, low guttural notes are uttered by both sexes, and are continued as a person penetrates farther into the territory of the loons, especially when young are present. In addition to the above-mentioned calls, loons have a ravenlike call, one resembling the cackling of a domestic fowl, and another resembling the bleating of a lamb.

The male concerns himself less than does the female with the safety of the family; nevertheless, attempts were noted in which the male endeavored to decoy the intruder and allow the female and young to retreat from the area. The loons react to caribou, if these animals approach too closely to the shore line adjacent to the territory of the loons.

On July 30, 1951, pairs of loons were flying over the tundra between Barrier Lake and Teshekpuk Lake.

On an airflight from Teshekpuk Lake to Point Barrow (Aug. 4, 1951) I saw Arctic loons as follows: 63 miles from Point Barrow, one; 25 miles from Point Barrow, two; 10 miles from Point Barrow, four.

At Chandler Lake (Aug. 12, 1951), a single Arctic loon was frequently heard at the southeast end near the mouth of the Chandler River. In the evening of August 13, the wind changed from the normal southern wind to a cold wind from the north. Thereafter no Arctic loon was detected at the mouth of the river until August 22 when a bird there called at three intervals in the day. Presumably the change in direction of wind caused the fish and the loon to leave the south end of the lake. Arctic loons in other parts of the lake were heard every day from August 8 to August 25 inclusive.

On August 19, 1952, when we flew from Umiat to Gavia Lake, the loons seemed to be more restless and more easily disturbed than on our earlier flights. Wariness probably increases as the season advances.

On August 20, 1952, through August 23, 1952, six pairs of Arctic loons and 10 old squaw ducks were on Gavia Lake (named after the Arctic loon, genus *Gavia*). These were the only large birds on the lake on these dates. The loons dove as they sensed danger, emitting, before the dive, a single doglike yelp.

On September 2, 1952, at ½ mile northeast of Barrow Village, we passed an Arctic loon on the beach six feet from the waters of the Arctic Ocean. On the return trip, two hours later, the loon was again seen in the same area, now preening its feathers. As we approached it walked to the water and began to swim through the breakers of the ocean. Snow was falling, telling of the approach of the migratory season for this species. [Pg 174]

Gavia stellata (Pontoppidan): Red-throated loon.—Specimens, 4: NE Teshekpuk Lake, 153°05'40", 70°39'40", 8 ft., No. 30576, ad. male and No. 30577, ad. female, July 29, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., No. 30574, ad. male, July 18, 1951 and No. 30575, ad. female, July 14, 1951.

At the west side of Salt Water Lagoon (June 17,1952) we observed a single red-throated loon feeding in the lake. At Point Barrow (June 21, 1952) 15 birds in one loose flock flew east along the shore of the Arctic Ocean.

At Kaolak River (July 13, 1951) three pairs of red-throated loons nested among high sedges along the edges of small lakes (some as small as 100 × 40 feet). Of the three species of loons on the Arctic Slope, this one chooses the smallest bodies of water for nesting. Each of two nests held two eggs approximately ½ incubated. One nest and that of an Arctic tern were approximately 30 feet apart on an island in the center of the lake. The loons arrived and departed from the lake without molestation by the terns, but whenever we approached the lake a tern would fly 300 feet out on the lake to meet us. On July 14, the female loon was shot. The largest ovum was 8 mm in diameter. On July 16, we again visited the above mentioned nest. The male was incubating and left unnoticed. While we were inspecting the nest the loon reappeared only six feet away and uttered one guttural note seemingly of surprise. The loon hurriedly swam away keeping its head turned toward us and when at a distance of 25 feet, dove again. Fifteen minutes after we left the nest the bird could still be seen swimming about in the lake. On July 18 the male was shot. It weighed 2268 grams and its testes were 10 mm long. The eggs, measuring 73 × 42 and 69 × 43 mm, of this pair of loons held embryos having natal down. Although the loon usually approached the nest from the direction of open water, several trails led to the nest among sedges. One call by these birds resembled that of a wolf and was generally given between 11:00 P.M. and 2:00 A.M. Other calls were froglike, humanlike and birdlike in quality.

On a small lake between Barrier Lake and Teshekpuk Lake (July 29, 1951) a male and female attracted our attention by uttering guttural notes and occasionally a sound resembling the

meowing of a cat. This lake was approximately 200 feet long and 40 feet wide and was bordered by exceptionally high sedges. Several points of sedges projected into the lake from its edge. When the loons were approached they dove under water with a splash suggesting the sound made by a beaver as it strikes its tail against the water before submerging. A loud high-pitched shrieklike call was given just before diving. They remained under water for about 20 seconds, came to the surface, and repeated the behavior. These birds were capable of leaving the lake but remained in close proximity to their young that were hiding in the grasses and sedges along the side of the lake. Both adult birds were collected. A broken egg was on one of the points of vegetation that projected into the lake. This lake was approximately 600 feet from feeding grounds at Teshekpuk Lake where small fish three-fourths of an inch in length were numerous (30 per square foot) along the edge of the lake. Other red-throated loons were noted on July 29 through August 4. [Pg 175]

At Chandler Lake (Aug. 15, 1951), two red-throated loons frequently fed in a small meandering creek at the south end of the lake.

Olor columbianus (Ord): Whistling swan.—On July 16, 1951, a boat with three Eskimos neared a point of land approximately 1⁄3 mile north of our camp on the Kaolak (Kuk) River. At 200 feet from the point, two adult whistling swans and three cygnets left the edge of the river. The female pretended to have a crippled wing and flapped upstream on the surface of the water for 100 feet and then continued at normal cruising speed. The male left the area but returned in a few minutes and joined the female as she endeavored to lure the hunters up the river. The Eskimos inspected the shore where the swans had been resting and then returned to their boat and continued up the river in the wake of the female swan which was then 200 yards upstream. As the boat approached the female, she fluttered out of their way and the boat passed at approximately 30 feet. The Eskimos did not attempt to shoot at the male, the female, or the three cygnets. The following day we inspected the area from which the swans had been flushed. Four molted primary feathers of the adults were found. Twenty feet from the edge of the river was an old nest which had been occupied the previous year. This nest was in willows and grasses one foot high. At our camp (July 12), numerous foot prints measuring 160 mm in length and 142 mm in width of the swan were noted on the north side of a sand bar in the river.

Atanak and his companions from Wainwright told us that other whistling swans were observed (July 16-17, 1951) from our camp on the Kaolak River to a point seven miles up the Kaolak River from the junction of the Avalik and Ketik rivers. In the previous month (June), these same Eskimos had observed 12 pairs of swans between Wainwright and our camp.

Branta canadensis minima Ridgway: Canada goose.—On July 8 and 9, 1951, four geese fed on a large lake at Topagaruk and when disturbed, flew from the lake in groups of two or four, never as single individuals. Upon returning to the lake they reformed in a group of four. Drilling for oil was underway there but geese, ducks and smaller water birds 300 or more feet away from the well were relatively unmolested and present in normal numbers. Men at the well told us that birds were not so plentiful in 1951 as in the previous year and that it was the latter part of May, this year being earlier than last year, when waterfowl and shore-birds arrived on the tundra. In late May 50 per cent or more of the ground is covered with snow and the lakes are frozen. Creeks and rivers are used until lakes open up. This is a time of loud clamor and nuptial performances when geese and brant call all night. The noise and much of the activity ceases at nesting time. In the cool weather of autumn (September 1), lakes freeze and the birds leave the tundra and congregate along the shores of the Arctic Ocean preparatory to flock formation and migration. Geese and ducks tarry but the shore-birds leave suddenly. The fall migrations at Point Barrow begin in the middle of August.

Branta nigricans (Lawrence): Black brant.—On June 19, 1951, two black brant flew east over the tundra at Salt Water Lagoon and continued in that direction as far as we could follow the birds with binoculars. On August 25, 1952, between Birnirk and Point Barrow, we flushed a flock of 60 brant seven times; they were loathe to leave the peninsula. On the following day, 58 brant were seen in the same area. [Pg 176]

Anser albifrons frontalis Baird: White-fronted goose.—Specimen, 1: 9⁄10 mi. W and 9⁄10 mi. N Umiat, 152°10'58", 69°22'53", 380 ft., No. 31303, ad. female, July 1, 1952.

As late as June 24, 1952, white-fronted geese were in flock formation at Umiat. Eight days later (July 1), 9⁄10 mile west and 9⁄10 mile north of Umiat, a nest held six incubated eggs; the embyros showed natal down. The nest was in a depression of moss (not excavated) on a mound 45 cm above water level among polygons. The concavity of the nest was 320 mm in diameter and was lined with an 80 mm thickness of sticks, pieces of moss, stems of grass and miscellaneous material. The cup, 160 mm wide and 80 mm deep, was lined with down feathers from the bird. The nest and brooding bird blended with the vegetation of *Vaccinium*, *Arctagrostis*, mosses and

lichens. When the observer was 25 feet distant the female left the nest. She measured 685 mm in total length and weighed 2268 grams. The largest ovum was three mm in diameter.

On August 30 and 31, 1951, 16 white-fronted geese were feeding on the tundra along Seabee Creek. They called frequently at night.

When we flew from Point Barrow to Kaolak (July 20, 1951), approximately 100 miles southwest of Point Barrow, 12 white-fronted geese were in one group, and on a return trip (July 27) along the same route we noted several small groups.

Upon our arrival at Barrier Lake, northwest of Teshekpuk Lake on July 29, 1951, 12 white-fronted geese were resting at the south end of the lake. They had consistently used this shore, as well as the entire east shore line as evidenced there by fecal deposits. In the seven days that we camped at this lake the geese remained in the area but never returned to their original resting grounds. In the mud and silt of a lagoon on the west side of the lake, numerous tracks of these geese were associated with tracks of caribou, Arctic fox, wolf and small shore-birds. On August 1, thirty-five white-fronted geese left the north end of the lake and flew west approximately one mile where they remained feeding and calling until midnight. On the morning of August 3, two geese flew south over our camp to Teshekpuk Lake and at 8:45 P.M., 15 flew to the west.

Chen hyperborea hyperborea (Pallas): Snow goose.—Atanak, an Eskimo, told us that snow geese were common along the coast at Wainwright in the early spring of 1951. On the date of interrogation (July 18, 1951) he reported that none was in the area.

Anas acuta Linnaeus: Pintail.—Specimens, 2: 2 mi. W Utukok River, 161°15'30", 68°54'50", 1275 ft., No. 31304 and 31305, ad. females, Aug. 30, 31, 1952.

At Kaolak River (July 15, 1951), the primary feathers of a female in breeding plumage were being replaced by new feathers then 25 millimeters long. She was unable to fly and had secluded herself in the sedges and grasses along the edge of a lake. On July 18, a male flew over this lake. These were the only two pintails observed in this area.

At Kaolak (July 21-27, 1951), within one mile of our camp there were four females with young in groups of 4, 5, and 6. The young birds of the group of five were 75 mm in length. On June 17, 1952, several pintails were feeding in the Salt Water Lagoon at Point Barrow. [Pg 177]

The largest of two adult females collected on August 30 and 31, 1952, two miles west of Driftwood, was 536 mm in total length and weighed 729 grams.

On August 25, 1951, three pintails fed in a small creek at the southwest corner of Chandler Lake. They were the first observed in the area where we began camping on August 9.

Anas carolinensis Gmelin: Green-winged teal.—On September 4, 1951, one green-winged teal was on a small lake approximately 1¼ miles northwest of Umiat.

Aythya marila nearctica Stejneger: Greater scaup.—On July 8, 1952, approximately ½ mile southwest of the east end of Wahoo Lake, a nest of seven eggs of this species was located on the edge of a small lake. Three males swam together in the lake.

Clangula hyemalis (Linnaeus): Old squaw.—Specimens, 5; Barrier Lake, NE Teshekpuk Lake, 153°05'40", 70°39'40", 8 ft., No. 35080, ad. female and 30581, ad. female, July 30, 1951; Topagaruk River, 155°48', 70°34', 10 ft., No. 30582, ad. female, July 7, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., No. 50579, ad. female, July 14, 1951 and No. 50578, ad. sex?, July 15, 1951.

Two old squaws were feeding in Salt Water Lagoon on June 17, 1952. On June 30, 1952, a nest of seven eggs was 20 feet from the edge of a lake at Umiat. One of the eggs was infertile and in the others embryos had barely begun to form. The nest was unattended but the eggs were warm and covered with down feathers. The next day the male was in the lake adjoining the nest and the female was on the nest; we collected the eggs on this date. The nest was in a natural depression in the moss on top of a hummock one foot high. A dwarf alder gave overhead protection.

Each night, at approximately 10:00 P.M. (July 3-11, 1952) a male lit in Wahoo Lake and preened, ruffled and adjusted its feathers. This behavior indicated to us that he had just been relieved from incubating eggs. Old squaws were noted also on a small lake approximately ½ mile southeast of Wahoo Lake on July 8.

Most of the old squaws (July 4-10, 1951) were in pairs or small groups at Topagaruk. They constituted less than one per cent of the avian population and were more commonly seen around the edges of stabilized lakes of medium size than elsewhere. One adult female shot on July 7, weighed 600 grams and had ova as large as 17 millimeters in diameter.

On July 8, 1952, between 1:00 A.M. and 2:00 A.M., the ice started to move and formed leads near the shore of the Arctic Ocean at Point Barrow. Ordinarily the ice does not leave until approximately the 20th of the month. These new leads brought greater numbers of old squaws nearer shore. At 6:00 P.M. that same day eighteen old squaw ducks sat on the ice off-shore and approximately 100 flew to the east in three separate groups.

At Kaolak River (July 12-18, 1951), old squaws were observed every day. On a four hour field trip (July 15), four adults were seen. On July 18 an old squaw was flying in company with a male pintail. An Eskimo hunting party of three men had killed a female (July 18) near our camp and were going to prepare it for food that evening.

At Kaolak (July 21-27, 1951) we observed one pair with young and two single adults. [Pg 178]

At Barrier Lake, northeast of Teshekpuk Lake (July 29-Aug. 4, 1951), old squaw ducks were in evidence at least once or twice a day. On July 30, three birds were sitting on an island in a small lake adjoining Barrier Lake. They were molting and although capable of flight were using the island as a place of refuge. Two females shot on July 30, weighed 650 grams and had masses of ova smaller than those in the female shot at Topagaruk 23 days earlier. The largest ovum in the latter female was 2.3 mm in diameter. On a flight on August 4, 1951, from Teshekpuk Lake to Point Barrow we saw two flocks of 18 each when 73 and 34 miles southwest of Point Barrow.

Between the mouth of the Canning River Canyon and Umiat (July 18, 1952), old squaws were more numerous in lakes adjacent to the Colville River than in lakes to the east.

Upon our arrival at Gavia Lake (Aug. 20, 1952) a family of two adults and two juveniles and another family of one adult and six juveniles were the only ducks on the lake. One of the juveniles rested on the bank instead of feeding in the lake with the other ducks, and on August 23 died. On August 21, one duckling in the second family strayed out toward the center of the lake, whereupon the adult female swam out and herded the young bird back toward the group nearer the shore line. On August 22, the female and two ducklings of the first family were shot. The adult was 390 mm in total length whereas the young were 300 mm in total length and weighed 320 grams. Neither young birds nor the mother could fly. The breast of each young consisted of only a few thin layers of muscles whereas the adult's breast was made up of thick muscles. The second family had frequented the south shore, but moved to the north side of the lake when fired upon. On August 22, one duckling was 214 mm long and weighed 119 grams. Although the season was far advanced and the snows of autumn were already falling, ducklings of the sizes specified above were still unable to fly and the females were still molting the essential flight feathers.

At Driftwood (Aug. 30, 1952) an adult and two juveniles were feeding in a lake northeast of camp.

Polysticta stelleri (Pallas): Steller's eider.—Specimen, 1: Topagaruk, 155°48', 70°34', 10 ft., No. 30325, ad. female, July 10, 1951.

An incubating female was shot at Topagaruk on July 10, 1951. Her ovary was 30 mm long, and the largest ovum was 3 mm in diameter. Her nest was in a depression of a high-centered polygon some 300 feet from any large body of water, contained five fresh eggs, and was lined with black down feathers of an adult. On each of three occasions when approached, the female left the nest when I was six feet away.

On September 7, 1952, a flock of eight Steller's eiders was swimming in a large lake approximately one mile southeast of the Arctic Research Laboratory.

Somateria mollissima v. nigra Bonaparte: Common eider.—On August 25, 1952, approximately 100 yards southwest of Point Barrow, 30 Pacific eiders were resting on the beach in company with 90 king eiders. When approached some swam and others flew out onto the Arctic Ocean where they remained until we withdrew from the area, after which time the birds returned to their resting place on the beach.

PLATE 9 [Pl. 9]

FIG. 1. A male yellow-billed loon setting on eggs in nest at Wahoo Lake on July 9, 1952.

FIG. 2. Nest and eggs shown in figure 1, July 9, 1952. Incubation had just begun.

FIG. 3. Arctic loon (upper) and red-throated loon (lower) from Teshekpuk Lake, August 1, 1951.

FIG. 4. Nest and eggs of white-fronted goose at Umiat, July 1, 1952. Incubation three fourths completed.

FIG. 5. Adult male surf scoters, July 16, 1952, at Porcupine Lake. Scoters are uncommon on the Arctic Slope.

FIG. 6. Arctic tern shot at Teshekpuk Lake on August 1, 1951. A common breeding bird in northern Alaska.

PLATE 10

FIG. 1. Shore of Arctic Ocean at Point Barrow, June 19, 1952. Many birds already were nesting on the tundra.

FIG. 2. Tundra and oriented lakes 80 mi. S Point Barrow, August 28, 1952, are breeding places for water birds.

FIG. 3. Luxuriant vegetation used by breeding birds in intermontane valley at Porcupine Lake, July 18, 1952.

FIG. 4. Willow-lined creek at Chandler Lake, August 25, 1951. Willows and alders offer nesting sites for birds.

FIG. 5. NW face of Mt. Chamberlin, 9131 ft.; terrain inhospitable to most breeding birds. August 5, 1952.

FIG. 6. Destruction of bird communities by caribou trampling south of Lake Peters. August 8, 1952.

Somateria spectabilis (Linnaeus): King eider.—Specimen 1: Point Barrow, 156°27'25", 71°23'11", 3 ft., No. 31306, ad. male, August 25, 1952.

Robert McKinley told us that in the last week of April of 1952, eiders (king?) arrived in the vicinity of the Arctic Research Laboratory in large numbers and continued to pass to the east for the next three weeks. King eiders were observed at Point Barrow on July 3, 1951.

Ninety king eiders and 30 Pacific eiders were resting on the shore of the Arctic Ocean at Point Barrow on August 25, 1952. The following day 200 king eiders were in the same area. A male, shot there, measured 560 millimeters in total length. The muscles were only a third the size of those on a normal bird. Another eider found dead also was emaciated and may have died from gun shot wounds inflicted by the guns of the Eskimos. For every bird killed by Eskimos, several are injured; many of these die along the migration route. On July 28, king eiders were flying northwest along the shore of Elson Lagoon, thence across the Point Barrow Peninsula at Birnirk, and thence southwest along the coast of the Arctic Ocean. This day was foggy and wind was from the east. On clear days and especially when wind blows from the northwest, king eiders cross the peninsula a fifth of a mile or so nearer Point Barrow, which is the most northern extension of the Peninsula. More eiders moved by on clear days than on cloudy or foggy days. In one hour, ten flocks, averaging 400 birds each, passed overhead at Birnirk (July 28); three days earlier flocks of from 50 to 300 passed approximately every 20 minutes. Eskimos on this date were shooting into these flocks of eider and bagging them in excess of the winter needs of the hunters. One Eskimo had 40 king eiders undressed and hanging on a drying rod at his home at Barrow Village (Sept. 2, 1952).

On July 29, 1951, we flew from Point Barrow to Teshekpuk Lake and observed (2:00-3:00 P.M.) only two small flocks of king eiders. On August 1, 1951, at Barrier Lake, three large flocks were flying west beyond the north end of the lake. This was the first day since July 29, on which we had seen such large flocks so far inland.

On September 11, 1952, eight king eiders were resting on the shore of the Arctic Ocean at Point Barrow.

Lampronetta fischeri (Brandt): Spectacled eider.—On July 28, 1951, at Birnirk, several flocks were flying along the Arctic Ocean.

Melanitta perspicillata (Linnaeus): Surf scoter.—Specimens, 2: Porcupine Lake, 146°29'50", 68°51'57", 3140 ft., No. 31307 and 31308, ad. males, July 15, 1952.

Two males shot at Porcupine Lake on July 15, 1952, measured as follows: Total length, 489 mm, 495 mm; length of testis, 9 mm, 11 mm; weight, 1134 grams, 998 grams. These birds were frequently seen together along the south side of the lake. At Lake Schrader (July 27, 1952), 15 scoters, in loose groups of two to six, fed in the southwest corner of the lake.

Buteo lagopus s. johannis (Gmelin): Rough-legged hawk.—On July 2, 1952, a nest of three young approximately six days old was examined ½ mile southeast of Umiat Mountain. The young were being fed small mammals. Another nest containing three addled eggs was also examined near Umiat. Many infertile and addled eggs of several kinds of birds were noted on the Arctic Slope.

Aquila chrysaëtos canadensis (Linnaeus): Golden eagle.—Marvin Mangus told us that he had seen young in nests at the following localities: Kurupa River, 155°11', 68°38', on July 1, 1946; 10 miles south of Driftwood in latter part of June, 1950; 11 miles NW from the north end of Chandler Lake, 152°56', 68°25' on June 10, 1951; Awuna River, 157°03', 69°12' July 4, 1952. Single adult birds were seen by us at Gavia Lake (Aug. 21, 1952) and at Driftwood (Aug. 31, 1952). [Pg 180]

Atanak and his companions from Wainwright saw 12 eagles while hunting (July 16-18, 1951) from the junction of the Avalik and Ketik rivers to a point seven miles up the Kaolak River, but no eagles were seen between the junction of the above rivers and Wainwright.

Golden eagles daily hunted prey along ridges where Arctic ground squirrels (*Spermophilus undulatus*) were abundant, for example, at Wahoo Lake (July 3-12, 1952) and at Porcupine Lake (July 13-18, 1952). This species of eagle hunted also in areas where marmots (*Marmota caligata*) were abundant, as on the slopes adjoining Lake Peters. There (August 6, 1952) three eagles soaring at 3800 feet elevation south of the mouth of Chamberlin Canyon elicited from each of four marmots three warning calls. Thereafter the marmots remained silent until the eagles had left the area. One eagle that consistently hunted (July 17, 1952) on the lower slope of Mount Annette along the Canning River was three times harassed by two ravens.

At the south end of Lake Peters (July 31, 1952), a pair of adult eagles soared along the slopes of Mount Mary approximately 1000 feet above the lake. Twenty minutes later these birds flew by camp at the base of the mountain. On August 2, at 8:00 P.M., two birds, one a large dark adult

and one a bird of the year (?) dropped with partly closed wings from high on the east side of the lake to an undisturbed meadow on the west side. After circling the meadow once, the two birds spiralled upward to approximately 4500 feet elevation in one steep canyon, leveled off and after gaining the head of the next canyon, plummetted down to the base of the mountain some 1500 feet below. The high-speed flight continued across the ridge to the mouth of the next canyon where they circled twice and then soared upward to repeat the act. The objective probably was to surprise and prey upon small game at the mouths of each canyon. On August 13, the eagles were still in the area at the south end of Lake Peters in spite of an abrupt seasonal change; snow and rain increased and the temperature dropped.

On August 15, a Dall sheep (*Ovis dalli*) crossed the canyon from Mount Mary to the mouth of Chamberlin Canyon. As the sheep reached the east side of the canyon an eagle flew across the canyon and alighted approximately 150 feet from the sheep. A large group of small birds immediately harassed the eagle.

Two eagles fed on a dead caribou on a delta on the east side of Lake Peters. Eagles were noted every day at Lake Peters from July 31 to August 15 inclusive.

Falco rusticolus obsoletus Gmelin: Gyrfalcon.—At the southwest corner of Barrier Lake on July 29, 1951, a gyrfalcon sat on a bank 10 feet above the water level. A dead Arctic tern was on the beach only 90 feet away and visible to the gyrfalcon. When approached to within 250 feet, the gyrfalcon, rather than flying north over the lake and lowlands, flew south across the upland tundra. On August 3, on the edge of the upland tundra approximately 3½ miles farther east a gyrfalcon ate a Sabine's gull—a bird of the year. Its feathers had been plucked and only the stomach and intestines remained. The gyrfalcon left the feeding area when approached to within 450 feet and, as did the other gyrfalcon, flew south over the upland tundra rather than over the lowlands of inundated sedges. On July 4, one gyrfalcon sat on a promontory at the south end of Barrier Lake. This bird flew south. [Pg 181]

At Umiat (Sept. 1-5, 1951) a gyrfalcon each day hunted the same areas of marsh in the river valley where tundra voles (*Microtus oeconomus*) were numerous and along the side of the valley where ground squirrels were common. On several occasions, this bird hovered 30 feet up and inspected us. This confidence was in contrast to that of the gyrfalcons at Teshekpuk Lake; they evaded us by leaving the ground several hundred feet away and flying out of sight.

Westley Redhead told us that a gyrfalcon was at Umiat as early as the latter part of May, 1952. We saw them there on September 1 and 2 in the same year. Gyrfalcons feed on ptarmigan in the river valley and on ground squirrels and small birds on the uplands by striking their prey on the ground. These falcons fly like prairie falcons and are of the same nervous disposition.

Falco peregrinus anatum Bonaparte: Peregrine falcon.—A nest was found on June 27, 1952, on the south slope of Mount Umiat approximately 225 feet above the Colville River, 40 feet from the top of the cliff and 30 feet west of the top of the mountain. The nest, three feet in depth at the front, two feet in depth at the rear, and 2½ feet wide was made of sticks of many years accumulation and was placed on a pinnacled platform 12 feet high. The nest contained one infertile egg and two others in which embryos were approximately one third developed. The female remained near us the one hour that we were in the area. She flew back and forth in front of the nest terminating each flight in an upswing arc and occasionally rested on top of the ridge to the west. She dove at us but never came closer than 10 feet before swerving upward. The male was not present. In a canyon 1⁄5 mile northeast of the nest two dead ptarmigan were at the edge of a willow cotton-grass swale. A nest of a peregrine falcon used three years before was 1 7⁄10 miles east and 1 7⁄10 miles north of Umiat. The nest was eight feet up on the face of a cliff 13 feet in height and easily accessible to either fox or wolf. Along the Colville River the falcon feeds on small shore-birds and other small birds.

Falco columbarius bendirei Swann: Pigeon hawk.—On a benchland between Chandler Lake and mountains to the west on August 12, 1952, a pigeon hawk hunted back and forth across a meadow, fearlessly inspecting us from distances of 20 to 30 feet as it searched the meadow for food. This falcon systematically searched those areas where longspurs were known by us to be most frequently found. Twice it flushed Lapland longspurs and darted at them but without success. Of the four pigeon hawks at Chandler Lake three were moving south and one was moving north down the canyon. We saw this species at Chandler Lake also on August 17, 20 and 21, 1951, and at Driftwood on August 27, 1952.

Approximately 1⁄10 mile north of James Robert Lake (Aug. 8, 1952) a pigeon hawk was harassing five ravens that were feeding on a dead caribou. This falcon flew back and forth above the ravens.

Falco sparverius sparverius Linnaeus: Sparrow hawk.—One seen in the summer of 1952 at the mouth of the Colville River by Clifford Fiscus. [Pg 182]

Lagopus lagopus alascensis Swarth: Willow ptarmigan.—Specimens, 5: Topagaruk, 155°48', 70°34', 10 ft., No. 50587, ad. female, July 8, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., No. 30586, ad. female, July 14, 1951 and No. 30585, ad. male, July 15, 1951; Kaolak, 160°14'51", 69°56'00", 178 ft., No. 30583, ad. male and No. 30584, ad. female, July 23, 1951.

Wherever ptarmigan were found, there was evidence that they were resident in the area throughout the year. At Topagaruk, informants said the ptarmigan were not so numerous in the summer (1949-1950) as in the winter. The apparent relative abundance of these birds in these two seasons could conceivably result from the birds being less conspicuous and more seclusive in the summer because of nesting activities. In summer these birds are protectively colored; at times a female only a few feet away is hardly distinguishable from the tundra. We observed only two adults and three juveniles in the area (July 5-10, 1952) although we saw considerable sign associated with the winter season. Sand dunes derived from material along the edge of the river formed a conspicuous feature of the landscape. These dunes, 20 to 30 feet high, were deeply cut by winds from the west-northwest. Ptarmigan tracks and sign were on all sides of the dunes, but the lee side was more commonly used than any other because of the protection from winds and the presence there of large willows and other plants. At Barrier Lake (July 29-Aug. 4, 1952) we noted numerous droppings of ptarmigan on the uplands between Barrier Lake and Teshekpuk Lake but we did not see any birds there. The sign could have been deposited either in the winter or in a previous season.

There are perhaps local migrations of ptarmigan. Harmon Helmericks, for instance, told us that in either April or May of 1946 he saw a ptarmigan on the ice of the Arctic Ocean 10 miles north of Pingok Island. At Gavia Lake (August 22) we observed a local shift of a group of ptarmigan. One day there were 19 birds in an area; the following day only seven birds were counted. On the third day the full complement of 19 birds were again in the area.

Ptarmigan are generally distributed on the Arctic Slope. On an airflight (July 3, 1952) from the mouth of the Canning River Canyon to Umiat the number of ptarmigan increased as we approached the drainage system of the Colville River. On this date, when these birds are nesting, the willows were just starting to grow new leaves and other vegetation of the tundra still was undeveloped. On August 16, along this same route, when young ptarmigan were nearly as large as adults, willows and alders were in full leaf and dominated the vegetation along water courses; the tundra was mature in appearance with considerably more green and yellow color in the landscape. The water in rivers and especially ponds was clear but brownish.

In the river valley at Umiat (June 28, 1952) a nest of seven eggs (½ incubated) was on an elevated mound supporting dwarf willow and birch averaging 1½ feet high. The nest was merely a concavity in sphagnum moss depressed by the weight of the bird. The female refused to leave the nest until bodily removed.

Dusting pits are actively used in the period of nesting. At Umiat (June 25, 1952), ptarmigan were using seven dusting pits on the shoulder of the airstrip. On the upland at Kaolak River (July 12, 1951), ptarmigan developed dusting pits on abandoned diggings made by Arctic ground squirrels. Most of the mounds were covered with mosses and lichens and other vegetation. [Pg 183]

Individuals and family groups were noted at various localities on the Arctic Slope. At Kaolak River (July 15, 1951) on a four hour field trip, we saw three pairs of birds and their families of four to six young. One flock of eight adults was seen from the air at the mouth of the Canning River Canyon on July 22, 1952. At Kaolak (July 21-27, 1951) they were common; ten pairs of adults (males and female) were within a one mile radius of our camp. The families of young were in groups of 1-3-4-6-8-9-10-11-14. One group consisted of one male, two females and four young. While on a flight from Kaolak to Point Barrow (July 27, 1951) we observed several ptarmigan on the tundra. At Gavia Lake (Aug. 21, 1951) ptarmigan were in groups or singles as follows: two adult singles, group of seven young and one adult, group of four young and one adult and one group of five young and two adults. According to Harmon Helmericks, ptarmigan were high in population numbers on the Arctic Slope in 1952.

Ptarmigan were associated with most of the communities of the Arctic Slope but were noted more commonly in the following situations than elsewhere: At Kaolak (July 21-27) and at Kaolak River (July 21, 1951) in damp swales of grasses and sedges in poorly drained areas where soils were damp to supersaturated and among the dwarf willows bordering lakes and creeks; at Gavia Lake (Aug. 21, 1952) among willows and alders (4 feet high) along the edges of ox-bow lakes. On windy, cold days the ptarmigan were mainly on south exposures among grasses and sedges along lakes and on windless days were on flat tundra of polygons but near dwarf shrubs. On June 27, 1⁄5 mile northwest of Mount Umiat, two dead willow ptarmigan were noted along the edge of a willow and cotton-grass swale. The feathers had been plucked by a raptor (?) preparatory to his eating the ptarmigan.

Variations in parental display are indicated by the following observations. At Kaolak River (July 12) we flushed a family of adults and young. The male called as he left the ground and then

he flew across the lake. The female, when flushed at a distance of 10 feet from the observer, feigned injury for 12 seconds before following the male. Seven young, averaging seven inches in length, left the ground and flew in the opposite direction from that taken by the male and female, to swales of cotton-grass and willow on the hillside. Another adult male and female were at the side of a young bird held in a trap. The female first left the young and fluttered over the vegetation for 40 feet and the male flew out of the area. Four other young were flushed 30 feet from the trap that held the captured ptarmigan. On July 17, while walking through a wet meadow of grasses and sedges, we flushed a male, female and four young (150 mm in length). The female crawled through vegetation for 30 feet and then rose into the air. At this same moment four young left the ground. The female, while in the air, reversed her course and joined the young, which had alighted some 300 feet away. On July 23, 1951, a family of two adults and 10 young were flushed. The male returned and chattered until the female arrived. The male then retreated 15 feet beyond the observer and remained close to the female while she tried to distract our attention from the young by pretending to have an injured wing. In a group of one male, two females and four young at Kaolak (July 21, 1951) the male and young left after the females fluttered along the ground for 30 feet.

Adults and young do not always escape by flying; on July 20, 1951, we were enroute from the [Pg 184] landing lake to Kaolak when an adult male and female with eight young ran 200 feet down established tracks of a weasel vehicle. It was necessary to reduce the speed of the vehicle to spare the young. A male at Kaolak River (July 12, 1951) ran 150 feet under the protection of willows to an opening where it remained until flushed. It flew 50 feet, then alighted in another patch of willows.

At Gavia Lake at 11:30 P.M. a ptarmigan called because one of its young was caught in a trap at the edge of a lake. The juvenal bird, unharmed, was released and inadvertently was dropped into the water where it floated but finally, becoming confused, got its head and bill under water and drowned.

On July 15, 1951, at 11:00 P.M. at Kaolak River, we heard a ptarmigan joining an Arctic tern and several sandpipers in protest to a passing red fox.

For three consecutive days a family (male, female and young) at Topagaruk was within 50 feet of one place.

The following measurements of juveniles show increase in size as correlated with advance of season: Topagaruk (July 6, 1951) two juveniles averaging 110 mm in length weighed 21 grams; Kaolak River (July 17, 1951) young of one family averaged 178 mm in length and another individual was 162 mm in length and weighed 38 grams; Kaolak (July 21-27, 1951) individuals in a group of nine were approximately ¾ the size of parents and other groups were 1⁄3 to 2⁄3 the size of adults.

In a brooding female 600 mm long from Topagaruk (July 8, 1951) the largest ovum was two mm in diameter. Females, averaging 650 mm long from Kaolak (July 23, 1951) had ovaries smaller than the normal size for breeding birds; the largest ovum was only ½ mm in diameter. Males of the same size had testes six mm in length.

Lagopus mutus nelsoni Stejneger: Rock ptarmigan.—Specimen, 1: Wahoo Lake, 146°58', 69°08', 2350 ft., No. 31309, ad. male, July 11, 1952.

At Wahoo Lake (July 6, 1952), young of one brood for the first time since July 3, called continually throughout the day and part of the night. Members of three other broods, only a few days old, did not call in the same persistent way.

Along a deeply eroded western outlet of Wahoo Lake there was an unusual concentration of fecal droppings, spaced approximately every two or three feet. This sheltered place offered protection from cold and winds of winter. Adults were associated with willows along creeks and on adjoining sidehills where willows gave way to open tundra. One family left the willows and the female flew back and forth behind the young as she herded them. The largest adult male seen here was shot on July 11. It was 365 mm in total length, weighed 460 grams, and had testes 7 mm long.

At the south end of Lake Peters (August 14, 1952), a female and her two young, along with other kinds of birds, were attracted to our tent during snowstorms. On July 18 at Wahoo Lake, a juvenile was 200 mm in total length and weighed 100 grams whereas on August 9 at Lake Peters a juvenal male was 261 mm in length and 226 grams in weight.

Rock ptarmigan were uncommon at Chandler Lake. We observed the first bird in the area on August 22, 1952, 13 days after our arrival. Droppings of the birds were only occasionally seen there.

Grus canadensis canadensis (Linnaeus): Sandhill crane.—In 1952, two sandhill cranes [Pg 185] called in the river valley north of Umiat on June 24. On June 26, 27 and 28, a single bird was seen

there. It remained in the general area and called occasionally. Sandhill cranes are only occasionally seen along the Colville River. A pair of these cranes was seen near Meade River on August 16, 1952, by Marvin Mangus.

Charadrius semipalmatus Bonaparte: Semipalmated plover.—A pair of semipalmated plovers in company with their young along the edge of Seabee Creek at Umiat were seen on four consecutive days, July 18-21, 1952. A male and female measured, respectively, total length, 180 and 175 mm; weight, 50 and 55 grams.

Pluvialis dominica dominica (Müller): American golden plover.—Specimens, 10: Kaolak River, 159°47'40", 70°11'15", 30 ft., Nos. 30592-30596 including 2 ad. males and 3 ad. females, July 12, 14, 18, 1951; Kaolak, 160°14'51", 69°56'00", 178 ft., Nos. 30588-30591 including 3 ad. males and 1 ad. female, July 21-23, 1951; Umiat, 152°09'30", 69°22'08", 352 ft., No. 31312 of an adult of unknown sex, July 21, 1952.

On July 29, 1952, we noted a pair of golden plover 3/10 mile northwest of Umiat. At Kaolak River (July 12, 1951) golden plovers could be approached to within 80 feet and were less wary than black-bellied plovers at Topagaruk. When one bird was shot the mate remained near the dead bird.

At Kaolak (July 21-27) four families of plovers were within a radius of ½ mile of camp. Each of these families remained apart from the others whereas at Kaolak River the physiography of the terrain permitted the pairs to form social groups of several families of adults and young. At Kaolak males flew to meet any intruder and attempted to decoy the intruder while the female remained with the young, but at Kaolak River an observer would approach to within 80 feet of a nest or young whereupon the female feigned injury by fluttering her wings and moving on her belly in an effort to decoy the intruder, the male meanwhile remaining within 40 feet of the observer. At Kaolak River, birds stayed in the nesting or feeding territory until approached to within a hundred or so feet. Young birds (July 21) were approximately ¾ the size of adults. The largest bird collected at Umiat (July 21) weighed 155 grams and measured 26 mm in length. Five males, shot on July 12-23 at Kaolak and Kaolak River, averaged 144(130-150) grams. The testes were 4.4(4.0-5.0) mm long. Four females collected at the same time from this area, averaged 144(140-150) grams. The ovaries were 7.7(5.0-10.0) mm long and the largest ovum was 2.0 mm in diameter.

The call of the adult was two distinct curlewlike notes that differed from the slurred call of the black-bellied plover. Golden plovers can be decoyed by imitating their call.

At Barrier Lake, in a two hour field trip (July 29, 1951) we observed a flock of eight birds and one single; golden plovers were active there all day and night.

At Kaolak River (July 12, 1951) six pairs and their young were on open and exposed surfaces.

Squatarola squatarola (Linnaeus): Black-bellied plover.—Specimens, 2: Topagaruk, 155°48', 70°34', 10 ft., No. 30597, ad. male and No. 30598, ad. female, July 9, 1951.

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At Barrier Lake, on July 4, 1951, two adults were feeding together in a bare lane which had been made and maintained by caribou. At Topagaruk on July 7, 1951, these plovers made up less than one per cent of the avian population. They were frequently on polygons having raised centers. Non-nesting or non-breeding birds were on bare wind-blown knolls adjacent to the river. On these knolls they fed with semipalmated sandpipers, pectoral sandpipers, and ruddy turnstones. On July 9, we visited polygons having raised centers and young called continually but we could not locate them. The call resembles that of the long-billed curlew but is more plaintive. Ordinarily these plovers kept beyond the range of our collecting gun but when one of the pair was killed the other, especially the male, remained near the dead bird until the collector approached to within 20 feet. Of a pair shot on this date the male weighed 207 grams and had testes 7 mm long; the female weighed 232 grams and the largest ovum was 3 mm in diameter. The species was recorded at Topagaruk from July 4 to 10, 1951, inclusive.

At the west edge of Smith Bay on July 29, 1951, while flying from Point Barrow to Teshekpuk Lake, we observed one group of approximately 40 black-bellied plovers flying along the edge of the lake. At Gavia Lake on August 21, 1952, two young were just able to fly but preferred to run on the ground.

Arenaria interpres interpres (Linnaeus): Ruddy turnstone.—Specimens, 5: Topagaruk River, 155°48', 70°34', 10 ft., No. 30599-30603 including 4 ad. males and 1 ad. female, July 6, 8, 9, 1951.

Four males shot at Topagaruk July 6-9, 1951, weighed 105(96-116) grams. The testes were

2.8(2.5-3.0) mm long. A female from the above locality, shot on July 6, weighed 125 grams. These birds constituted less than one per cent of the avian population at Topagaruk and were more frequently on polygons with high centers and on high windswept knolls than elsewhere and were in company with black-bellied plovers, pectoral sandpipers and semipalmated sandpipers. One bird was observed on July 3, 1951, at ¼ mile southeast of the Arctic Research Laboratory at Point Barrow.

Capella gallinago delicata (Ord): Common snipe.—At Umiat (June 25, 1952) at 11:00 P.M. a female was sitting and calling from the top of a leafless alder tree some 210 feet from any favorable nesting grounds. A male was performing a nuptial flight overhead. Three other birds in the air were heard.

On July 13, 1952, at Porcupine Lake, we flushed a female from a damp meadow of grasses and sedges at the west end of the lake. She pretended to have a crippled wing. Seventy-five feet from this bird an abandoned nest and fragments of egg shells rested on top of a mound six inches from water and 10 feet from the west end of the lake. Two dwarf willows on top of the mound partly concealed the nest. Two days later (July 15), juveniles were caught in a line of traps set in this marsh. Four tree sparrows, one savannah sparrow and three species of small mammals also were taken from this marsh. At this time of year (July 15) all the terrain was free of snow and ice except that two patches of snow, one 8 × 12 feet and another 6 × 6 feet remained on the protected south shore of the lake and a few ice slivers remained in the deep crevasses on some mounds in the marsh. One bird was seen on August 13, 1952, in wet low polygons between Lake Schrader and Lake Peters.

Actitis macularia (Linnaeus): Spotted sandpiper.—At the south end of Lake Peters on August 15, 1952, after snow covered the valley, a juvenal spotted sandpiper remained along the shore line nearer camp than it had been for four previous days. [Pg 187]

Heteroscelus incanum (Gmelin): Wandering tattler.—On each of the days July 3-11, 1952, a wandering tattler was flushed from dense high willows along an 8-foot-deep creek channel that carried water from the west end of Wahoo Lake into the East Fork of the Ivashak River. The bird was at home in the willows and had considerable dexterity in perching on limbs. Although the bird favored one section of the creek, an exhaustive search for young, eggs or nest was fruitless. A loud call was given by this bird when disturbed.

Erolia melanotos (Vieillot): Pectoral sandpiper.—Specimens, 52: Barrier Lake, NE Teshekpuk Lake, 153°05'40", 70°39'40", 8 ft., 33, Nos. 30616-30636, 30638-30648, 30754 including 5 ad. males, 12 juv. males, 1 ad. female and 15 juv. females, July 30, Aug. 1-3, 1951; Topagaruk, 155°48', 70°34', 7, Nos. 30649-30655, including 3 ad. males and 4 ad. females, July 6, 8, 9, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., 6, Nos. 30610-30615 of ad. females, July 12, 14, 15, 18, 1951; Kaolak, 160°14'51", 69°56'00", 178 ft., 6, Nos. 30604-30609 including 1 juv. male and 5 ad. females, July 20-23, 1951.

The earliest record of young (135 mm in length and 26 grams in weight) was at Kaolak River on July 14, 1951. On July 9, 1952, at Topagaruk the oviduct of an adult female, 86 grams in weight, contained an egg in a shell 200 mm in diameter. Her second largest ovum was 10 mm. Breeding males on this date had testes averaging 11 mm in length. The average length of testis of 15 juveniles shot on August 3, 1951, at Teshekpuk Lake was 1.9 (1.5-2.0) mm. The average weight of these juveniles was 60(50-81) grams. A comparison of male and female juveniles shows no significant differences. Nevertheless, adult males in both the breeding and post-breeding seasons are longer bodied and heavier than adult females.

In the period June 14-25, 1952, in the Point Barrow area, pectoral sandpipers were puffing their throats and cooing. On June 23, several birds were defending territories, and one half mile northeast of Barrow Village (June 23, 1952) we noted a male pectoral sandpiper that crouched low when a pomarine jaeger flew directly overhead. After the jaeger passed, the sandpiper assumed normal posture and continued feeding.

At Topagaruk (July 7, 1951) these birds represented less than one per cent of the avian population, were common on polygons having low centers, and frequently joined black-bellied plovers, ruddy turnstones, and semipalmated sandpipers to form discrete flocks.

On a four hour field trip at Kaolak River (July 15, 1951), the pectoral sandpipers (45 by actual count) were the most common of the sandpipers and were always calling overhead. The young on this date were not yet capable of flight and were being fed by adult females. One of the immatures bathed in water at the edge of the beach. On July 18, females were still attempting to decoy intruders by pretending to have broken wings. Eight adults with young were observed at Kaolak (June 21-27, 1951) but the species was not so aggressive as at Kaolak River, nor so

numerous. The fewer birds may have been correlated with lack of sand dunes, river beaches and open areas.

A group of five pectoral sandpipers frequented the shore of Barrier Lake (July 29, 1951) but the group was not seen the following day. On August 3, there was a sudden increase of pectoral [Pg 188] sandpipers in the area; most of them were in flocks of six to 50. From one point along edge of the uplands, we shot 20 birds from several different flocks consisting mostly of juveniles. They seemed curious about our presence. When a bird was shot from the flock, the entire group circled back and forth over the dead or injured bird, sometimes only three or four feet above our heads. In the late evening of this same day, the number of pectoral sandpipers increased and although some were moving westward, most of them were moving eastward. On the following day they were still present in great numbers. The day before the arrival of these migrating birds, two adults (Aug. 2) acted as if they were still attending young. On July 30, we shot at a lone bird as it flew by and thereupon it climbed upward until nearly out of sight as they frequently did when chased by falcons.

At Lake Schrader (July 23, 1952) pectoral sandpipers were active 24 hours of the day.

On August 4, 1952, at the south end of Lake Peters, a group of eight pectoral sandpipers fed near camp. On August 5, one was shot and on the following day only seven were seen, suggesting that they were established in the area and were not migrants. They left on August 12.

At James Robert Lake (3600 feet elev., August 8, 1952), which is the most southern body of water in the canyon south of Lake Peters, several pectoral sandpipers were feeding along the edge of the lake and on the alluvium outwash below James Robert Glacier.

At Gavia Lake there was a decided trend in movement of groups of pectoral sandpipers. On August 22, 1952, groups of 2, 4, 6, 8, 8, 8, 16, 17, 18 flew by to the east. The day before there were only a few sandpipers and these were not especially on the move. Comparison between dates of active movements of sandpipers in 1951 and 1952 indicate that migration was considerably earlier in 1951 than in 1952.

Erolia bairdii (Coues): Baird's sandpiper.—Specimens, 5: Topagaruk, 155°48', 70°34', 10 ft., 4, Nos. 30657-30660 including 2 ad. males and 2 ad. females, July 7, 9, 10, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., 1, No. 30656, ad. male, July 12, 1951.

On June 14, 1952, at Birnirk mounds, when snow still covered most of the ground, Baird's sandpipers were already established on territories. A nest of four eggs was examined ¼ mile southeast of the Arctic Research Laboratory on July 4. The female left the nest when the observer approached to within 20 feet and flew directly toward him and then dropped to the ground and pretended to have a broken wing. We pursued this bird for 50 feet before she took flight. The male, which flew at a much greater speed than the female, was nearby and soon joined her in flight. The female repelled her mate by chasing him, but the male persisted in accompanying her. If one or more males of this species (on one occasion as many as five) approached the territory of these nesting birds, the male would leave the female and chase the trespassers. On one occasion, after we left the nesting area, the female returned to the nest after approximately four minutes. Her approach to it was direct and without hesitation. After ½ hour we returned to the nest and the male was standing one foot away from the brooding female with his head resting on his wing. The male, followed by the female, left the nest and feigned injury. Shore-birds and water birds were more numerous on this date on the tundra and lakes nearer the Arctic Ocean (in the Point [Pg 189] Barrow area) than in the direction of the Brooks Range.

At Topagaruk (July 5-10, 1952) adults of this species were the fourth most common bird, representing four per cent of the avian population. They were near lakes among polygons some of which had low centers whereas others had high centers. One bird had a nest and four eggs approximately 150 feet from an oil derrick, surrounded on all sides by the tracks of vehicles. This bird feigned injury at the nest notably more than did Baird's sandpipers that inhabited undisturbed tundra beyond. Three adult males, shot at Topagaruk (July 7-10, 1951), averaged 44(42-47) grams in weight and had testes averaging 3.5(3.0-4.5) mm long. Two females, collected in the same period and at the same place averaged 44 grams in weight. The largest ovum was one mm in diameter and the largest ovary three mm long.

Other occurrences were: Kaolak River, July 12-18, 1951 (four juveniles observed in one four hour field trip July 15); Lake Schrader, July 24-28, 1952; Point Barrow, July 27, 1951 (most common shore-bird at fresh-water ponds adjacent to the Arctic Ocean); 2 mi. S Wahoo Lake, on a high divide between the Ivashak and Sadlerochit rivers, July 8, 1952; Lake Schrader, July 23-31, 1952 (active at all hours); S end Lake Peters, August 1 and 2 but not seen there later.

Erolia alpina pacifica (Coues): Dunlin.—Specimens, 21: Barrier Lake, NE Teshekpuk Lake, 153°05'40", 70°39'40", 8 ft., 1, No. 30661, ad. male, Aug. 1, 1951; Topagaruk River, 155°48', 70°34', 10 ft., 20, Nos. 30662-30681, 12 ad. males and 8 ad. females, July 6-9, 1951.

Specimens shot at Topagaruk River (July 6-9, 1951) yielded weights of 57(53-64) grams for

eleven adult males and 59(55-65) grams for six females. Testes were 3.5(2.0-5.0) mm long, the largest ova were 1.2 (.5-2.0) mm, and ovaries were 3.5(3.0-4.0) mm long. An adult female from Teshekpuk Lake (August 1, 1951) weighed 48 grams. Her largest ovum was one mm in diameter and the ovary was 3.5 mm long.

At Topagaruk we observed the species every day (July 5-10, 1951) and on July 7, located a nest and four eggs. Each of the seven times that the brooding female was approached she left the nest when we were approximately 80 feet away and she flew approximately 150 feet before alighting at which time she called. The call resembled that of the western grebe. The wary nature of this sandpiper was in contrast to that of the other smaller shore-birds; they left the nest only when almost stepped on. On July 9, the nest still held four eggs. Adults were the fifth most common bird and made up three per cent of the avian population. They frequented polygons having low centers adjacent to stabilized lakes. At Kaolak River (July 17, 1951) a dunlin was feeding and flying with a group of four semipalmated sandpipers. At Point Barrow (July 27, 1951) dunlins were congregating in small groups at ponds and small lakes adjacent to the Arctic Ocean. At Barrier Lake (July 29-Aug. 4, 1951) three dunlins fed in the area but did not show territorial behavior.

Limnodromus scolopaceus (Say): Long-billed dowitcher.—Specimens, 5: Topagaruk River, 155°48', 70°34', 10 ft., 2, Nos. 30687, ad. male, July 7, 1951 and 30688, ad. female, July 8, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., 3, Nos. 30684-30686, 3 ad. males, July 12, 14, 1951.

Four males shot at Topagaruk and Kaolak River (July 7-14, 1951) averaged 104(100-110) grams in weight and had testes 4.7(4-6) mm long. An adult female (July 8) from Topagaruk, [Pg 190] weighed 130 grams and her ovary was 7.8 mm long. Her largest ovum was 3.5 mm in diameter. A juvenile from Kaolak River on July 14, 1951, was 150 mm in length and weighed 28 grams; thirteen days later, at Kaolak, a juvenile was shot that measured 265 mm in length and weighed 70 grams.

At Kaolak on July 15, 1951, we saw eight pairs of adults in a four hour field trip. Their young were approximately ½ grown. One pair of adults and four young, the size of parents, were seen daily in the same general area at Kaolak (July 21-27). One bird was observed on August 4, 1951, at Teshekpuk Lake.

Ereunetes pusillus (Linnaeus): Semipalmated sandpiper.—Specimens, 28: Barrier Lake, NE Teshekpuk Lake, 153°05'40", 70°39'40", 8 ft., 4, Nos. 30692-30695 including 3 juv. males and 1 juv. female, July 30, August 1, 3, 1951; Topagaruk River, 155°48', 70°34', 10 ft., 21, Nos. 30682, 30683, 30696-30714 including 12 ad. males and 9 ad. females, July 6-9, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., 3, Nos. 30689-30691 including 2 ad. males and 1 ad. of unknown sex, July 12, 14, 15, 1951.

Eleven adult males and nine adult females shot at Topagaruk from July 5-10, 1951, weighed 29(22-30) and 28(25-31) grams, respectively. The greatest length of skulls of each of the above sexes averaged 39.2 mm. The shortest juvenile, having a skull measuring 35.9 mm long, was a male shot at Kaolak River on July 15, 1951. Juveniles shot at Teshekpuk Lake on August 1 and 3, 1951, averaged 25 grams in weight and 28.4 mm in greatest length of skull. Testes of adults decreased in size from an average of 4 mm on July 6, to an average of 2 mm on July 14. Testes of juveniles on August 3 averaged 1.3 mm in length. The ovaries of seven adults from Topagaruk, shot on July 8 and 9, averaged 2.4 mm in length and the average diameter of the largest ovum was 7⁄10 mm.

A nest of four eggs, first examined on July 5, 1951, ¼ mile southeast of the Arctic Research Laboratory, was abandoned on July 11.

At Topagaruk (July 7, 1951) we flushed several adult semipalmated sandpipers whose behavior suggested that they were nesting. Two days later one nest held newly hatched young. This species was third in abundance there, adults constituting 15 per cent of the avian population. They were numerous on polygons having low centers and on high windswept knolls in association with black-bellied plovers, ruddy turnstones and pectoral sandpipers. The call resembled that of the Hammond flycatcher and was accompanied by wing vibration.

At Topagaruk (July 9, 1951) a female semipalmated sandpiper fluttered off a nest, uttered a sharp cry, feigned injury by fluttering around the observer, became seemingly indifferent but refused to return to her nest, uttered sharp cries, came to within seven feet of the observer who was sitting within three feet of the nest and alternately chattered, ate several large dipterous insects from the ground and in approximately five minutes went back on the nest, within easy reach, although she still was not completely quiet. When the observer rose to leave she again fluttered off the nest and feigned injury (the bird was preserved as a specimen). The nest was concealed in a small depression surrounded on all sides by tufts of vegetation and contained four young, one of which had hatched no more than three hours before.

On a four field trip at Kaolak River (July 15, 1951) we counted 14 juveniles in large stands of

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willows among sand dunes. These juveniles were making short flights of from 15 to 40 feet. In contrast to the situation at Topagaruk (July 5-10), there were fewer semipalmated sandpipers than Baird's sandpipers at Kaolak River (July 12-18, 1951). July 16 was the first date on which family groups of sandpipers here ventured out on the exposed sand bars along the river for feeding. One juvenile was carried by wind over the river where it dropped into the water. When last seen the juvenile was being floated upstream by the wind. Next day in the same general area where winds had driven water on the sand, four semipalmated sandpipers were feeding with dunlin. These five birds kept together both on the ground and in flight.

At Point Barrow (July 27, 1951) semipalmated sandpipers were forming small groups and feeding on small lakes and ponds adjacent to the Arctic Ocean. At the south end of Lake Peters (Aug. 3, 1952) several semipalmated sandpipers were feeding in dry areas of alluvium trampled by caribou.

Limosa lapponica baueri Naumann: Bar-tailed godwit.—At Kaolak River on July 18, 1951, one godwit was in company with a pair of golden plovers on a bare slope of an old sand dune along the edge of the river. The godwit when approached flew 150 feet and alighted and when pursued again flew another 150 feet and then departed for a lake 1⁄5 mile away.

Phalaropus fulicarius (Linnaeus): Red phalarope.—Specimens, 11: Topagaruk River, 155°48', 70°34', 10 ft., 11, Nos. 30715-30725 including 10 ad. males and 1 ad. female, July 6-9, 1951.

At Topagaruk (July 5, 1951), we located a nest and four eggs on the edge of a small drainage channel on the tundra. The nest was among mosses and lichens, one foot from open water. The bird left the nest when the observer was only four feet distant but on a second approach one hour later, left when the observer was 20 feet away. In each instance the bird pretended to have an injured wing. On July 7, this nest held four eggs. On July 8, there were four young, hatched either the previous afternoon or night and the female left the nest when the observer was 30 feet away. Ten adult males, shot at Topagaruk (July 5-10, 1951), averaged 50(45-54) grams in weight. These birds had testes that averaged 6.5(2.5-9.0) mm long. The red phalarope on July 7 was the fifth most common bird in the area, making up two per cent of the avian population and was commonly seen on polygons having high centers.

At Kaolak River (July 12-18, 1952) red phalaropes were uncommon. On July 15, a female was noted but seemed not to have young or to be nesting. A juvenile from Kaolak (July 22, 1951) was 180 mm in length and weighed 31 grams. On September 6 and 7, we observed hundreds of these birds, mostly juveniles, feeding in the ocean two to three feet beyond beaches at Point Barrow. Small lakes and open water in marshes had been frozen over since September 5, but larger lakes still were open. Except for a few birds around edges of open bodies of water, the great bulk of red phalaropes was (Aug. 7, 1951) on the Arctic Ocean. On September 11, there was none at Point Barrow. Thomas Brower, a resident at Barrow Village, stated that he had never before seen this species congregate on the Arctic Ocean bordering the shore.

Lobipes lobatus (Linnaeus): Northern phalarope.—Specimens, 5: Topagaruk River, 155°48', 70°34', 10 ft., 2, Nos. 30729, ad. male, July 9, 1951, and 30730, ad. female, July 8, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., 3, Nos. 30726-30728 including 2 ad. males and 1 ad. of unknown sex, July 14, 15, 1951.

In the period July 8-15, 1951, four adult males at Topagaruk and Kaolak River averaged 31(28-33) grams in weight. Their testes averaged 2.3(2-3) mm long. A female (July 8) weighed 37 grams. Her largest ovum was 2 mm in diameter. A juvenile from Kaolak River (July 16) was 176 mm long and weighed 35 grams. Young northern phalaropes at Kaolak River (July 12-18, 1951) were more numerous than at Topagaruk (July 4-10, 1951) and were almost the size of adults. On July 15, on a four hour field trip, we counted 24 individuals including adults and juveniles. On this date the juveniles were almost ready for flight. At Kaolak (July 22, 1951) a young bird 212 millimeters in length was flying and feeding alone. In our seven day stay at Teshekpuk Lake only one northern phalarope was seen. It was near camp on August 3, 1951. Between Birnirk and Point Barrow (Aug. 25, 1952), approximately 3000 northern phalaropes had collected on fresh water ponds, salt water lagoons and on the Arctic Ocean. Many of them were feeding while others were nesting on matted green mosses bordering ponds. Their habit of spinning in water was noted. Those feeding on the Arctic Ocean were on the relatively smooth water immediately beyond the point where the breakers formed. On September 11, at Point Barrow, we did not see the species.

Stercorarius pomarinus (Temminck): Pomarine jaeger.—At Birnirk (June 14, 1952) while snow still covered most of the ground, pomarine jaegers hunted for lemmings by flying approximately 20 feet above the tundra and occasionally hovering. On June 15, one had eaten

parts of two large lemmings caught in traps along the edge of a snow-bound lake. On June 17, these birds were preying on live lemming and swallowing them whole. One flew 50 meters with a brown lemming in its mouth and after alighting, consumed it. The backs of several lemmings caught in traps had scars probably made by jaegers or conceivably by snowy owls. West of Salt Water Lagoon (June 17, 1952), 12 jaegers were counted with the aid of a 6 × 30 power binocular in a 90° arc to the southward. Three snowy owls also were hunting in this area. In traveling one and three-eighths miles south by east from Barrow Village on June 20, 1952, we counted eight single pomarine jaegers in the air and on the return trip the same day, five pomarine jaegers (one was dead, another was resting on a lake and 3 were in flight).

At Point Barrow (June 21, 1952) two pomarine jaegers left the land and flew north out of sight over the Arctic Ocean. At a point 9⁄10 mile east and 4⁄5 mile north of Barrow Village (June 23, 1952) we observed a pomarine jaeger cruising three feet above ground. It dropped to the tundra and picked up a lemming by its back and after adjusting the lemming swallowed it tail first. On a lake one mile southwest of the Arctic Research Laboratory a group of six and two pairs all facing into the wind were resting on ice. In an area of 240 acres (outlined by the tripod communication line to the west, "Y" line to east, and row of 50 gallon drums following the ground line to south), we counted 19 pomarine jaegers in groups of from one to four or one per 12 square acres; one snowy owl was in the area.

At Kaolak River (July 12-18, 1951) pomarine jaegers were the second most common jaeger in the area. In walking for four hours on July 15, two pairs were noted. Ordinarily, however, these birds are seen singly not in pairs. At Lake Schrader (July 23-31, 1952) pomarine jaegers were active both day and night, especially at night. At Barrier Lake (Aug. 2, 1951) two pomarine [Pg 193]
jaegers flew close together along the edge of the south end of the lake. As they left the lake and flew over the extensive marsh to the east they separated and flew as single individuals. On August 4, a pomarine jaeger was chasing an Arctic loon that had a fish in its bill. On August 10, 1951, a single pomarine jaeger was noted at Chandler Lake. As late as September 7, 1952, one half mile south of the Arctic Research Laboratory, seven pomarine jaegers were foraging for brown lemmings.

Stercorarius parasiticus (Linnaeus): Parasitic jaeger.—Specimens, 3: Topagaruk River, 155°48', 70°34, 10 ft., 2, Nos. 30732-30733, ad. females, July 6, 8, 1951; Kaolak, 160°14'51", 69°56'00", 178 ft., 1, No. 30731, ad. male, July 21, 1951.

At Topagaruk (July 5-10, 1951) parasitic jaegers ranged over nearly all plant and animal associations, but flew more frequently over polygons with low centers than elsewhere. Data on two adult females, shot on July 6 and 8, in that order are as follows: weight, 525, 320 grams; largest ovum, 3, 1 mm; length of ovary——, 5.5 mm. The bird killed on July 6 was in the black color phase.

At Kaolak River (July 12-18, 1951) the parasitic jaeger was the least common of the three species of jaegers.

At Kaolak (July 21-27, 1951) two birds nested near camp while others passed through the area. These passing birds generally were seen singly or in pairs; long-tailed jaegers commonly are in groups of four or five. The parasitic jaegers were not so noisy nor so much given to chasing others of their own species as were long-tailed jaegers. Several single birds hunted in areas of sedges and grasses that yielded lemmings. On July 21, a parasitic jaeger was flying with three glaucous gulls, and demonstrating its usual flight tactics of gliding, climbing and swooping as it accompanied the gulls. An adult male shot on July 21, weighed 460 grams.

On alluvial outwash at the southwest end of Lake Schrader (July 27, 1952) a male and female parasitic jaeger defended their territory by diving at us. Periodically both birds alighted approximately 60 feet away and each pretended to have a crippled wing for approximately a minute. The female acted as if herding the young but was not. On each of our daily inspections an adult defended the area. In a period of four days the area defended was shifted approximately 1⁄5 of a mile south in the marsh area adjacent to the lake. Parasitic jaegers were noted in the Lake Schrader area from July 23 to July 31 inclusive.

At Barrier Lake (July 30, 1951) two parasitic jaegers were harassing a glaucous gull that responded as if being attacked by a hawk. The plunging of the jaeger continued while the gull was flying 300 feet horizontally. One other jaeger chased a glaucous gull for one-fourth of a mile and finally having caught up with it dove at the gull several times, each time almost making contact. From our camp on Barrier Lake (July 29-Aug. 4, 1951) we watched parasitic jaegers hunt along the south end of the lake, following precisely the edge of the water. The wind drove debris to the south end of the lake. The long-tailed jaeger was the more numerous here; it flew along ridges and over marshes. On July 30, a single jaeger flew over the lake and after hovering above a young Arctic loon, which had strayed from its parent, dove down and picked it up. Three other parasitic jaegers arrived and competed for the prey.

A single parasitic jaeger was noted at Chandler Lake on August 10 and one on August 11, [Pg 194]
1951. At Gavia Lake (Aug. 21, 1952) there were six jaegers in one group.

Stercorarius longicaudus Vieillot: Long-tailed jaeger.—Specimens, 5: Kaolak River, 159°47'40", 70°11'15", 30 ft., 1, No. 30738, ad. female, July 12, 1951; Kaolak, 160°14'51", 69°56'00", 178 ft., 4, Nos. 30734-30737 including 2 ad. males and 2 ad. females, July 21, 1951.

The long-tailed jaeger was the second most abundant of the three jaegers at Topagaruk (July 5-10, 1951). The greatest number seen on any one day was three. At Kaolak River (July 12-19, 1951) this species was the most common jaeger. On a four hour field trip (July 15 and 18) we saw six birds. When in groups of three or more, they frequently chased each other and called vigorously. One adult female shot on July 12, weighed 300 grams. The largest ovum in the female was 1.2 mm in diameter and the ovaries were 5 and 6 mm long.

Within 1⁄5 of a mile of our camp at Kaolak (July 21-27, 1951) there were three breeding pairs of jaegers. On a four hour trip beyond this limit we saw as many as 14 individuals. Most of these were in groups of three and were commonly seen flying over meadows and along ridges. Single birds hunted by hovering or swinging upward. Territories vacated by our collecting adult birds were not immediately filled by other nesting jaegers. One pair of jaegers nested in a broad grassy meadow. The female was aggressive and demonstrative and called continually above her young. The male was less demonstrative but joined the female when she began calling. On July 24, four jaegers flew over areas where brown lemmings had been trapped in greatest numbers. Two adult males shot on July 21, weighed 270 and 250 grams. The testes of these two birds were 5.5 and 8.0 mm long. Two adult females from the same area, and shot on the same date as the males, were larger than the males. The females weighed 285 and 298 grams.

At Barrier Lake (July 29, 1951) we observed three long-tailed jaegers, all chasing and harassing a glaucous gull. These jaegers hunted mostly along ridges and over marsh. At midnight these birds were still hunting and flying about. Other long-tailed jaegers were on the lake from July 29 to August 4 inclusive.

At Gavia Lake (Aug. 21-23, 1952) two long-tailed jaegers fed from our refuse pile only 30 feet from our tent. A single individual was noted at Lake Peters on July 25, 1952, and one at Driftwood on August 27, 1952.

Larus hyperboreus barrovianus Ridgway: Glaucous gull.—Specimen, 1: Topagaruk, 155°48', 70°34', 10 ft., No. 30739, ad. male, July 9, 1951.

Robert McKinley told us that on May 16, 1952, approximately 25 gulls, probably glaucous gulls, arrived at the Arctic Research Laboratory and remained until May 25. On July 4, 1951, there, we recorded all gulls passing over the ice from 8:45 A.M. to 9:45 A.M. At this time the shore line and first 100 feet of water was free of ice; beyond, seaward, the ice was rough and dark for ¼ mile, succeeded by white ice for ¼ mile, next the high pressure ridge, and then open water of the Arctic Ocean. Glaucous gulls, singly, passed to the southwest and to the northeast at intervals of 6(3-10) minutes at a distance of 500(300-800) feet from the shore line, except for one bird that was approximately one mile off-shore.

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On July 10, 1952, off-shore from the Laboratory, where garbage from camp was deposited on the ice, approximately 130 glaucous gulls were present—some resting on the ice and some flying. At six P.M., four hours later, 84 gulls including several immatures remained. Birds in groups were constantly walking about or flying short distances, but lone individuals stood perfectly still for long periods. On July 11, only 22 birds remained; they were flying up and down the shore line. At Topagaruk (July 5-10) glaucous gulls fed on the refuse pile at camp. The number varied from day to day, from as few as 10 to as many as 22; a few remained at the feeding grounds at all times.

The testes of an adult male (30739), shot on July 9, 1951, at Topagaruk were 15 mm long and 9 mm thick.

At Kaolak River (July 12-19, 1951) gulls occasionally cruised up or down the river, but did not remain in the area. When we flew from the mouth of Canning River Canyon to Umiat (July 16, 1952) the only glaucous gulls noted were in the vicinity of the Colville River. At the Will Rogers Monument 12 miles southwest of Barrow Village (July 18, 1951), 275 glaucous gulls were at the mouth of one of the streams entering the Arctic Ocean, and 50 miles southwest from Point Barrow along the ocean six gulls flew over the water where a muddy stream from the land was discharging into the Arctic Ocean. On July 20, 400 of these gulls were near the Arctic Research Laboratory and in the large lake southwest of camp. At Kaolak (July 21-27, 1951) five to eight birds remained near camp. Along the larger creeks they flew by approximately every two hours.

On an air trip along the Arctic Ocean 56.2 miles southwest of Barrow Village (July 27, 1951) we counted 312 gulls, most or all glaucous gulls, in small groups as follows: average size of flock, 34(2-70); average distance between flocks, 5.8(1.9-13.6) miles. A large flock of 188 glaucous gulls, on this date, was in the environs of Barrow Village and the Arctic Research Laboratory. On an airflight between Point Barrow and Smith Bay (July 29, 1951) we observed three groups (1-2-7) equally spaced between the two points. The glaucous gulls were seen in only small numbers at

Barrier Lake (July 29-Aug. 4, 1951) generally as individuals or groups of two or three, and frequently were harassed by jaegers. On August 3, a glaucous gull on three occasions inspected but did not touch a freshly killed pectoral sandpiper floating on the surface of the water. On a flight from Teshekpuk Lake to Point Barrow (Aug. 4, 1951) we observed groups of gulls as follows: one at 40 miles (miles are from Point Barrow), four at 34 miles, four at 10 miles and twenty-three at 8 miles. At Driftwood (Aug. 27-31, 1952) groups of from one to 12 glaucous gulls were seen every day. At Umiat (Aug. 30-Sept. 4, 1951) several birds were flying up and down the river. In 1952 (July 18) at 10 miles east of Umiat we observed a single bird. On August 25, 1952, at Point Barrow, 33 glaucous gulls flew along the edge of the Arctic Ocean. Between Birnirk and Point Barrow (Sept. 11, 1952) a group of 230 glaucous gulls rested along the shore of the Arctic Ocean. Glaucous gulls were noted also at the following places in the Point Barrow area (1952): west side Salt Water Lagoon, June 17; 9/10 mile east and 8/10 mile north Barrow Village, June 23; 1 mile southwest Barrow Village, September 6; ½ mile south Arctic Research Laboratory, September 7.

Larus canus brachyrhynchus Richardson: Mew gull.—Specimens, 2: SE Lake Peters, 69°20'56", 145°09'26", 2950 ft., 1 imm. female No. 31314 (Aug. 6, 1952) and one adult female 31313 (Aug. 9, 1952).

At the southwest end of Lake Schrader, from July 23 to 31, 1952, a pair of mew gulls defended [Pg 196] a territory and two young in the marsh bordering the edge of the lake and flew to meet us whenever we approached. They were active day and night. On August 3, 4, and 5, the female of this pair fed at the mouth of the river that flowed into the south end of Lake Peters 4.9 miles south of the nesting territory. On August 6, both adults and the two juveniles were at the south end of Lake Peters. The young called frequently and the adults, when we came near their young, called loudly and dived at us, but remained higher in the air than they did when protecting their young on the nesting territory. On August 6, the female (435 mm long and 290 grams in weight) was shot and prepared as a specimen. The two juveniles and the male remained in the area and on August 9, one of the juveniles (female) 422 mm in length and 362 grams in weight, was shot. On August 12 the male and one juvenile were still in the same area, and active day and night.

Pagophila eburnea (Phipps): Ivory gull.—Pete Savolik told us that whenever the pack ice came near shore at Point Barrow, a few ivory gulls were generally present.

Rissa tridactyla pollicaris Ridgway: Black-legged kittiwake.—Specimen, 1: 7½ mi. S and 7 mi. W Point Barrow, 156°49', 71°17', sea level, 1 (skin) No. 31315 of an adult of unknown sex, September 6, 1952.

The kittiwakes (Sept. 6, 1952), were in the air along the Arctic Ocean at Barrow Village and all along the coast at least as far as a point 10 miles southwest of Barrow Village (only a few were seen northeast of Barrow Village) and were feeding on material floating in the pre-breaker area of the ocean and to a lesser extent on debris washed up on the sands of the beach.

Xema sabini sabini (Sabine): Sabine's gull.—Specimens, 8: 7½ mi. S and 7 mi. W Point Barrow, 156°49', 71°17', sea level, 1 (skin) No. 31316, ad. male, Sept. 6, 1952; Topagaruk, 155°48', 70°34', 10 ft., 7, Nos. 30740-30746 including 4 ad. males and 3 ad. females, July 6, 8, 9, 1951.

At Topagaruk the species was seen daily from July 4 through July 10, 1951. Six adults were nesting on July 5. They constituted less than one per cent of the avian population inhabiting stabilized lakes of medium size. On July 8, one nest held young. When we approached the nesting grounds they flew 150 feet to meet us and then returned, hovered, or flew directly over their nests. One nest was on an island one foot in diameter; other islands inhabited were as large as one square meter. The vegetation at the nest was bright green and lawnlike because of trampling and fertilization of the grasses and sedges by the birds. Correspondingly green, lawnlike areas of grass were noted on the resting grounds of ducks and geese. The Sabine's gull and Arctic tern are compatible and nest within 20 feet of each other. The young freely circulate through each other's territory. The average weight of three adult males (July 6-8) was 202(190-214) grams. The average length of the testes of these birds was 10(8-14) mm. Four adult females collected at the same place and time weighed 177(158-190) grams. The ovaries averaged 8 mm long and the largest ovum was 2.8(2.0-4.5) mm in diameter.

At Kaolak River on July 17, 1951, one gull flew along the river but did not seem to be nesting in the area. On July 20, 1951, 105 miles southwest of Point Barrow, we observed Sabine's gulls, Arctic tern and several pairs of loons on one lake. On a return trip from Kaolak to Point Barrow by air (July 27, 1951), we found Sabine's gulls generally distributed across the Coastal Plains. On [Pg 197] an air trip from Point Barrow to Teshekpuk Lake on July 29, 1951, we noted two Sabine's gulls, one 9.7 miles southeast of Point Barrow and one 5.9 miles northwest of the central western edge

of Smith Bay.

Three miles east of our camp on Barrier Lake (Aug. 3, 1951) a Sabine's gull had been eaten by a gyrfalcon. The gull was a bird of the year with the downy feathers extending beyond the ends of seven primary feathers. Three primary feathers were newly molted and of full length.

On an air flight (Aug. 4, 1951) from Teshekpuk Lake to Point Barrow we saw two Sabine's gulls 63 miles southwest of Point Barrow and two at 23 miles southwest of Point Barrow. At Point Barrow (Aug. 26, 1952), 250 Sabine's gulls were resting or flying in the area. On September 6 at 7½ miles south and 7 miles west of Point Barrow, Sabine's gulls constituted 60 per cent of the larger birds that were flying and feeding along the Arctic Ocean. The Arctic tern constituted 20 per cent, the kittiwake 5 per cent and the glaucous gulls 15 per cent of the population. An adult male shot here (Sept. 6) weighed 213 grams. Between Birnirk and Point Barrow (Sept. 11, 1952) we counted 17 Sabine's gulls feeding and resting along the shore of Elson Lagoon.

Sterna paradisaea Pontoppidan: Arctic tern.—Specimens, 11: 7½ mi. S and 7 mi. W Point Barrow, 156°49'15", 71°16'52", sea level, 2, Nos. 31315 and 31318, ad. male, Sept. 6, 1952; NE Teshekpuk Lake, 153°05'40", 70°39'40", 8 ft., 3, Nos. 30750-30752 including 2 ad. males and 1 ad. female, Aug. 1, 1951; Topagaruk River, 155°48', 70°34', 10 ft., 3, Nos. 30753, ad. female, July 7, 1951, and 30754, ad. male, July 9, 1951, and 30637, male, July 9, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., 3, Nos. 30747-30749 including 2 ad. males, July 14, 18, 1951, and 1 ad. female, July 12, 1951.

Adult males and females prepared for specimens at Topagaruk (July 7, 9, 1951) showed signs of molting, especially in the primary wing feathers. Three adult males averaged 92 (87-93) grams in weight (the largest male collected on the Arctic Slope was from Teshekpuk Lake on August 1, 1951, and weighed 106 grams). The testes of these males averaged 4.2(3-5) mm in length (in late autumn testes recede to approximately 1.0 mm in length). Two females from the same place and shot on July 7 and 12, weighed 99 and 100 grams. The average diameter of the largest ovum was 2.0 mm and the longest ovary was 6 mm.

At Kaolak River (July 12-18, 1951) an adult hunted day and night over shallow water on a sand bar approximately 500 yards from its nest. Water from lakes in an abandoned section of the river valley caused a creek to flow at night into the river. In the day ephemeral pools were formed because more water evaporated or sank into the sands. As pools were formed, small fish one inch in length were trapped. Before the pools disappeared, the tern captured all these fish. One of the terns that had been feeding on these fish flew out over the upland tundra approximately 500 feet from the river valley. This tern dove at us twice and then returned to the river valley and its nest some 800 feet away.

The nest of this bird was on one of three islands in a small lake. The nesting island was three square yards in area and had been built to a height of four feet above the level of the mainland by many years use of the island. The nest was within 30 feet of a nest of a red-throated loon, which was accepted in the territory of the tern without molestation.

Northeast of Teshekpuk Lake (July 29-Aug. 4, 1951) a pair of terns had young on a small island in a chain of lakes opening into the south end of Barrier Lake. The adults hunted small fish along the south end of Barrier Lake but especially in small lakes surrounding their nest. These birds seemed to be the only terns nesting on this large lake. As food was plentiful, available nesting sites may have governed the size of the tern population. [Pg 198]

Six pairs of Arctic terns, constituting less than one per cent of the avian population in the area, were nesting on small islands of the larger lakes at Topagaruk in the period July 5-10, 1951. On July 8, one nest held both eggs and young; other nests held either eggs or young. These birds and the Sabine's gulls showed no hostility to one another. On July 9, three miles north of camp 13 terns were among sedges in standing water. They seemed to be nesting but we could not reach them.

On June 23, 1952, at a point 9/10 mile east and 8/10 mile north of Barrow Village, Arctic terns were in flocks; one of eight flew northeast across the tundra. At a point 105 miles northwest of Point Barrow on an air trip to Kaolak (July 20, 1951) we saw Arctic terns, Sabine's gulls, and several pairs of loons in the same lake. The trip from Point Barrow to Kaolak was characterized by relatively few large birds. On the return trip (July 27) on a straight line flight from Kaolak to Point Barrow, only two terns were seen, one 33 miles northeast of the junction of the Avalik and Kaolak rivers and another 9.7 miles beyond. On our return trip from Teshekpuk Lake to Point Barrow (Aug. 4, 1951) we saw only a single tern; it was 63 miles southeast of Point Barrow. At Gavia Lake (Aug. 21, 1952) there were three pairs of terns. At 8:00 A.M. three other pairs appeared and then left. No young were observed. At Point Barrow (Aug. 26, 1952) 130 terns fished or rested on the lee side of the peninsula. Arctic terns were the second most common bird flying and feeding along the shore line of the Arctic Ocean 10½ miles southeast of Point Barrow on September 6, 1952. Associated species were Sabine's gulls, kittiwakes and glaucous gulls.

Nyctea scandiaca (Linnaeus): Snowy owl.—Harmon Helmericks told us of seeing a snowy owl catch a brown lemming that was swimming in open water 30 nautical miles north of Thetis Island in April of 1946.

On a 1000 linear meter transect (1000 × 1) east of Barrier Lake we collected (Aug. 3, 1951) 19 pellets from the edge of the uplands and from prominent mounds on the lowlands. One pellet contained a complete radius-ulna of an Arctic fox and another a foot of a ptarmigan.

At Kaolak River (July 12, 1951) the only sign of owls was pellets on the upland tundra. They were covered with green algae and fungus several years old.

On an air flight from Point Barrow to Kaolak River (July 11, 1951) we saw one snowy owl on the Coastal Plain and on the return flight (July 19) two more; one was approximately 40 miles south of the Will Rogers monument and the other about one half way between the monument and Point Barrow. When flying from Teshekpuk Lake to Point Barrow (Aug. 4, 1951) we saw one snowy owl flying over the tundra.

Greater abundance was indicated by observations in 1952, a year in which brown lemming were at a high peak in their cyclic fluctuation: Entrails of a brown lemming were on top of a [Pg 199] mound used by snowy owls as evidenced by the numerous fresh owl pellets, at the west side of Salt Water Lagoon on June 17; three snowy owls fed in the surrounding area (June 17-27); one owl seen at Driftwood on August 30-31; eight owls recorded on our two mile trip south of Barrow Village on September 6; four owls observed one half mile south of the Arctic Research Laboratory on September 7; three owls seen at Point Barrow on September 11.

Asio flammeus flammeus (Pontoppidan): Short-eared owl.—Specimen, 1: 2 mi. W Utukok River, 161°15'30", 68°54'50", 1275 ft., 1, No. 31319, ad. male, August 31, 1952.

A short-eared owl was seen at Chandler Lake on August 16, 1951. Another flew across the middle of Gavia Lake on August 22, 1952, hunted the south shore, caught two small rodents and pursued one Lapland longspur that escaped. From August 27 to 31, 1952, at Driftwood individual short-eared owls were noted daily. On August 31, a family group of five flew in close formation and fed in the low wet marsh in the valley adjacent to the river. An adult male from two miles west of Driftwood (Aug. 31, 1952) was 370 mm in length and weighed 417 grams.

Chordeiles minor minor (Forster): Common nighthawk.—Clifford Fiscus told us that a nighthawk was seen by an Eskimo in the summer of 1952 at Wainwright.

Tachycineta thalassina lepida Mearns: Violet-green swallow.—At 6:00 P.M. on August 17, 1951, at Chandler Lake, a northern violet-green swallow came to our camp, inspected us at a distance of four feet, fluttered over and around the tent for two minutes, then flew over the water, and continued south.

Corvus corax principalis Ridgway: Common raven.—Specimen, 1: Umiat, 152°08', 69°22', 337 ft., No. 31320, juv. female, August 19, 1952.

William Wyatte of Umiat told us that ravens were the only birds that remained at Umiat throughout the winter of 1951-52. He observed them flying when temperatures were so low that moisture from the ravens froze into floating ice crystals.

At Wahoo Lake (July 9, 1952) two ravens fed on a dead lake trout (18 inches in length) at the east end of the lake. The fish seemed to have died of malnutrition as it had an abnormally slender body and large head. No other carrion or dead fish was in the area. At 6:00 P.M. on August 8, 1952, in the main canyon 1⁄10 mile north of James Robert Lake, five ravens fed on remains of a dead caribou by extracting flesh from between the vertebrae; carnivorous mammals could not conveniently reach the flesh. A pigeon hawk harassed the ravens. Ravens were at Porcupine Lake, every day from July 13 to 18, 1952, mostly flying along the crest of high mountain ridges. One pair controlled a territory in the Canning River drainage east of Mount Annette and repelled an eagle on three occasions.

At the south end of Lake Peters (Aug. 10) a raven hunted low over the ground. Here, only occasionally were they seen so low in the valley. At Chandler Lake ravens were noted flying high along the crests of the mountains on August 11, 12, 13, and 25, 1951.

One juvenile female that was shot at Umiat on August 19, 1952, was 682 mm long and 1360 grams in weight. Between August 30 and September 4, 1951, ravens were noted at Umiat every [Pg 200] day; the largest group was six. Most of the time they fed at the refuse pile near camp.

On our first day at Gavia Lake (Aug. 21, 1952) a pair of ravens arrived from the west and

calling continually circumnavigated the shore line. They left in the same direction from whence they came.

Clifford Fiscus told us that in the summer of 1952, ravens were seen along the Arctic Coast between Pitt Point and Point Barrow. The largest congregation was at the mouth of the Colville River. Ravens were noted on August 27 and 28, 1952, at Driftwood.

Turdus migratorius migratorius Linnaeus: Robin.—From the tops of alder trees at the mouth of Bearpaw Creek on June 27, 1952, three robins sang more frequently in the evening between 6:00 P.M. and 11:00 P.M. than at any other period of the 24 hours of continuous daylight.

At Wahoo Lake on July 3, 1952, a nest held four eggs, on July 6 two eggs and two young, and on July 10 one egg and three young. On July 12 the single egg was determined to be infertile. In the canyon south of Wahoo on July 6 two adults and a single young bird were feeding 50 feet from a recently abandoned nest that was superimposed upon an old nest of a previous year. Other robin nests in high willows in the bottom of this canyon were spaced approximately 1⁄5 of a mile apart. Occasionally robins foraged on the open tundra beyond willow-lined creeks. As compared with robins in the temperate regions, those in the Arctic Life-zone were notably less "fearless"; they came to within three feet of the nest when nestlings were being inspected by an observer. The robins at Wahoo Lake on July 3-12, 1952, generally sang at about 10:00 P.M., a time equivalent to twilight in temperate regions to the south.

Hylocichla minima minima (Lafresnaye): Gray-cheeked thrush.—Specimens, 2; Wahoo Lake, 146°58', 69°08', 2350 ft., 1, No. 31321, ad. female, July 11, 1952; Chandler Lake, 152°45', 68°12', 2900 ft., 1, No. 30755, juv. male, August 23, 1951.

On June 27, 1952, we frequently heard thrushes singing on the side of the valley north of Umiat. Large alder, birch and willow gave adequate protection to these birds.

At Wahoo Lake (July 3-12, 1952) thrushes were seen every day along willow-lined creeks. An adult female on July 11, was 191 mm long and weighed 34 grams. A male from Chandler Lake on August 23, 1951, was 186 mm long and weighed 34 grams. It was caught in a mouse trap on an alluvial outwash at the mouth of a canyon in a willow community in which some willows were as high as nine feet. Fifteen tree sparrows, two white-crowned sparrows, one northern shrike, two wheatears and a few redpolls were noted there.

Oenanthe oenanthe oenanthe (Linnaeus): Wheatear.—Specimens 2: Mount Mary, S end Lake Peters 145°10'02", 69°20'30", 2920 ft., 1, No. 31322, juv. female, August 1, 1952; Chandler Lake, 152°45', 68°12', 2900 ft., 1, No. 30756, ad. male, August 12, 1951.

On the top of Mount Annette (July 17, 1952), which is the highest peak in the valley and the center of several drainage systems, the insects had collected in unusual numbers. There, an adult wheatear was feeding insects to her young, which were three fourths the size of the parent.

From records kept of trap catches at Lake Peters (July 31-Aug. 15, 1952) the wheatears were always caught in those areas that supported the greatest number of red-backed voles (*Clethrionomys rutilus*). On August 10, among rocks at the base of moraines, the wheatear was the second most common species. On August 15, after snow had fallen on the mountain and in the valley and the skies there were cloudy, wheatears moved onto the alluvium but always within at least 150 feet of moraines to which the birds retreated when alarmed. An adult female, shot on August 1, on the lower slopes of Mount Mary at the south end of Lake Peters, was 158 mm long and weighed 26 grams. [Pg 201]

At Chandler Lake (Aug. 9-25, 1951) the wheatear was characteristically a bird of the rock fields and rockslides and in many places was the only bird present. It did not inhabit the glaciated canyons leading west from Chandler Lake, except at their mouths. From August 10-19, wheatears decreased in numbers. On August 25 the two remaining birds noted were among willows and rock ridges. Three adult males, shot on August 14, averaged 24(23-26) grams in weight and their testes averaged 1.2(1.0-1.5) mm long.

Luscinia svecica svecica (Linnaeus): Bluethroat.—Specimens, 7: Gavia Lake, 150°00', 69°35', 460 ft., 2, Nos. 31323 and 31328, males August 22, 23, 1952; 9⁄10 mi. W and 9⁄10 mi. N Umiat, 152°10'58", 69°22'53", 380 ft., 1, No. 31324, ad. female, June 30, 1952; Driftwood, Utukok River, 161°12'10", 68°53'47", 1200 ft., 3 (skins) Nos. 31326 and 32620, ad. females and 31327, ad. male?, August 29, 1952, and 1, No. 31325, ad. female, August 28, 1952.

The average length and weight of six adult males and adult females from Gavia Lake and Driftwood (Aug. 23-29, 1952) are, respectively, as follows: 153(148-165) mm and 19(18-21)

grams. One female from Umiat shot on June 30, 1952, weighed 22 grams. The ovary was 5 mm long and the largest ovum was 1 mm in diameter.

At Umiat (June 30, 1952) a bluethroat was captured in one of 200 traps placed around the edge of a small lake. The trap that held the bird was in a soil fracture 15 centimeters in depth in an area that supported alder, willow, birch and ericaceous shrubs. At Driftwood, a bluethroat was caught on August 28, 1952, in a trap set among willows.

Phylloscopus borealis kennicotti (Baird): Arctic warbler.—On the north side of the valley at Umiat on June 27, 1952, willow warblers sang loudly and continually in accompaniment with white-crowned sparrows, tree sparrows, gray-cheeked thrushes and bluethroats.

Motacilla flava tschutschensis Gmelin: Yellow-wagtail.—Specimens, 2: Kaolak, 160°14'51", 69°56'00", 178 ft., 1, No. 30757, ad. female, July 27, 1951; Umiat, 152°09'30", 67°22'08", 352 ft., 1, No. 31329, ad. female, June 26, 1952.

At Umiat on June 25, 1952, a nest of the wagtail was on the side of a mound of earth three feet high. The nest, 130 mm in diameter and 14 grams in weight, was completely protected overhead. The lower half of the cup, 59 mm in diameter and 35 mm in depth, was lined (3 mm in thickness) with hair of caribou and brown lemming; the upper half was of feathers. Beneath the lining of the cup was 38 mm of moss. The outer nest, 33 mm in thickness, was, of coarse stems of grasses and other material. The nest was not so carefully constructed nor so well insulated as nests of tree sparrows, longspurs and snow buntings; it lacked the fine yellow grasses and symmetrical lamination of the materials and had more large chunks of material thus producing an irregular shape. Both male and female remained in the air directly overhead for 15 minutes as we examined the nest and then followed us for 100 yards as we left the area. An adult male shot on June 26, was incubating four eggs. He was 165 mm in length and weighed 19 grams. [Pg 202]

On July 27, 1951, seven days after our arrival at Kaolak, a male and female were seen for the first time. They flew back and forth overhead and called as if defending a territory but probably were not as we had been through this same area many times without either seeing or hearing these birds; also the female's ovary was undeveloped.

Anthus spinoletta rubescens (Tunstall): Water pipit.—Specimens, 3: Mount Mary, S end Lake Peters, 145°10'02", 69°20'30", 2920 ft., 1, No. 31330, juv. female, August 3, 1952; Wahoo Lake, 146°58', 69°08', 2350 ft., 2, Nos. 31331, female, July 7, 1952 and 31332, ad. male, July 8, 1952.

On July 8, 1952, approximately two miles south of Wahoo Lake on a high divide an adult was feeding a young bird 114 millimeters in total length and just able feebly to fly. On July 17, 1952, an adult female was feeding young on top of Mount Annette south of Porcupine Lake. Numerous insects had converged there—the highest point in the range of mountains. At Porcupine Lake, we observed water pipits on each of the five days July 13 to 18, 1952.

At Lake Peters there was a definite increase in numbers and in movement of water pipits with the approach of winter. This increase was correlated with a decrease in temperature and an increase in rain and snow. The many individuals and family groups, which, prior to our arrival, were generally distributed on the higher slopes and in the canyons of the Brooks Range, left the lower snow-covered slopes and congregated on the lake shore. On July 19, 1952, at the north end of Lake Peters, for example, we did not see water pipits in their usual haunts. On July 31 a single individual was noted at the south end of Lake Peters and on August 3, a single family appeared. On August 10, the water pipits were the most common bird at the edge of the lake, five or six usually being seen in a half hour trip. One flock of 14 bathed in shallow pools along the edge of the lake. These birds in the last few days had been congregating in small and large groups. On August 13, on a trip along the west shore line from the south end to the north end of the lake, the only birds seen were water pipits and these were in great numbers. On the morning of August 15, there was a dramatic increase in the number of pipits along the edge of the lake. Twenty of these birds fed 10 feet in front of our tent and others perched on its top. A juvenile shot on August 3 on Mount Mary was approximately the size of the adults, being 162 mm in length and 17 grams in weight.

At Chandler Lake (Aug. 12, 1951) pipits fed along the sandy edge of the lake and among short sedges. These birds also fed on scraps of food at the entrance of our tent door. From August 10 to 25, water pipits were more commonly found in the east-west canyons whereas other kinds of small birds were almost wholly confined to the north-south valley and were of only accidental occurrence in areas inhabited by water pipits.

Lanius excubitor invictus Grinnell: Northern shrike.—A bird was noted on August 23 and 25, 1951, in an extensive stand of willows at Chandler Lake.

This bird was one of a few birds that had not yet departed from the area with the advent of winter. [Pg 203]

Acanthis flammea holboellii (Brehm): Common redpoll.—Specimens, 12: Topagaruk River, 155°48', 70°34', 10 ft., 1, No. 30767, ad. male, July 9, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., 5, Nos. 30762-30766 including 4 ad. males and 1 ad. male (?), July 12, 14, 16-18, 1951; Kaolak, 160°14'51", 69°56'00", 178 ft., 4, Nos. 30758-30761 including 1 ad. male, 2 ad. females and 1 ad. of unknown sex, July 21, 23, 1951; Umiat, 152°09'30", 69°22'08", 352 ft., 1, No. 31333, ad. female, June 26, 1952; Wahoo Lake, 146°58', 69°08', 2350 ft., 1, No. 31334, ad. male, July 11, 1952.

At Umiat on June 26, 1952, a nest of five eggs (embryos with natal down) was located in a patch of willows that covered approximately two square meters. As these willows had not as yet acquired leaves, the nest was clearly visible. It was 300 millimeters from the ground and so compactly made as to support its own weight. The outer structure was of various plant fibers and other stems of willows. The cup had an inwardly reflected rim, was made of stems of cotton-grass, and was well insulated with 15 mm of down feathers. The measurements of this circular nest were: entire nest, 78 mm in diameter and 50 mm in depth: cup, 42 mm in diameter and 35 mm in depth; weight, 9 grams. Another nest of three eggs from the same area was in a dwarf willow 350 mm from the ground. The leaves of the willow were undeveloped. A third nest of six young approximately three days old, was two feet up in a dwarf willow having no leaves. The young birds in the nest were three days old. One female 123 mm in length shot on June 26 had ova up to two mm in diameter. At Umiat (June 28, 1952) a nest of three young and two eggs was found and on June 30 another nest with one fresh egg.

At Wahoo Lake (July 3-12, 1952) the redpolls were observed every day but we considered them relatively uncommon there.

At Topagaruk (July 5-10, 1951) redpolls were among willows growing on the sides of a creek channel ten feet below the level of the tundra. This creek had overflowed in early spring covering the willows. One of the birds approached us to within five feet and after making a close inspection returned to the willows.

Upon our arrival at Kaolak River (July 12, 1951) most of the redpolls were living among willows and only occasionally flew overhead. On July 15, they were flying in small groups about 100 feet above the ground and were calling continually. On July 15, on a four hour field trip, we counted 28 birds. The young birds on this date could fly well.

At Porcupine Lake these birds were uncommon but a few were seen (July 17, 1952) flying south across divides in the higher mountains.

At Kaolak (July 20-27, 1951) redpolls were associated with willows along creeks that had cut channels 20 feet deep. In late July the flowing water was six feet wide and from a few inches to three or four feet deep. The first erosional bench supported grasses and sedges and the slopes were covered with willows from a few inches to seven feet high. These willows afforded nesting sites for redpolls. In a two-mile stretch along this creek, which drained east into the Kaolak River (July 21), there were approximately 200 redpolls, 100 Lapland longspurs, 80 savannah sparrows, six willow ptarmigans, six pintail ducks and several other smaller unidentified birds. On this same date when I walked four miles on the open tundra, there were, of the smaller birds, only six [Pg 204] redpolls, 20 Lapland longspurs and 13 savannah sparrows. In one interval of 1⁄3 of a mile, I did not see a single individual of any of these three species. In the two miles of creek bottom that I examined, there were several nests that had been used that spring, several that had been used the year before, and one that held four eggs containing embryos nine millimeters in length (no feathers or bone development). Most of the nests were approximately three feet above ground in willows near the creek. The nest of four eggs was three feet above the ground, three feet from the edge of the willows bordering the creek, and 10 feet from the creek proper. The nest was 10 cm in diameter and 55 mm in height. The cup was 5 cm in diameter at the upper rim, six cm in width and 35 mm in depth. The outer base and side were constructed of dry willow sticks, twigs and grass stems; the main body of the nest was fine grass stems, rootlets and a few mosses. This lining was a layer 18 mm thick of white feathers. The weight of this nest was 12 grams. The four eggs measured 19.2 × 12.9, 18.3 × 12.5, 18.3 × 12.8, 17.7 × 12.9. This nest of four eggs was either a second nesting or an interrupted or exceptionally late first nesting of redpoll on the Arctic Slope. Two abandoned nests 200 feet apart were in willows along the edge of an oxbow lake at Gavia Lake (August 23, 1952).

On August 10, 1952, at the south end of Lake Peters, there was only a slight increase in the number of redpolls over the previous week. At Chandler Lake (Aug. 25, 1951) a few redpolls were among willows, this was the first time in 15 days that we had noted these birds. One redpoll was taken in a trap at Umiat on August 30, 1951.

The testes of six adult males (average 14(13-15) grams in body weight and that were shot at several localities on the Arctic Slope from July 9 to July 28, 1951) averaged five mm in length.

Spinus pinus pinus (Wilson): Pine siskin.—An adult male, which weighed 12 grams, was caught in a trap at Chandler Lake on August 14, 1951. The testes were two mm long.

Passerculus sandwichensis anthinus Bonaparte: Savannah sparrow.—Specimens, 19: Kaolak, 160°14'51", 69°56'00", 178 ft., 12, Nos. 30770-30781 including 3 ad. males, 3 juv. males, 4 ad. females, 1 juv. female and 1 ad. female (?), July 21-23, 25, 26, 1951; Gavia Lake, 150°00', 69°35', 460 ft., 1, No. 31336, juv. male, August 22, 1952; Wahoo Lake, 146°58', 69°08', 2350 ft., 1, No. 31337, ad. male, July 5, 1952; Porcupine Lake, 146°29'50", 68°51'57", 3140 ft., 1, No. 31339, ad. female, July 13, 1952; Driftwood, Utukok River, 161°12'10", 68°53'47", 1200 ft., 1 (skin) No. 31338, male and 1, No. 31335, ad. female, August 29, 1952; Chandler Lake, 152°45', 68°12', 2900 ft., 2, Nos. 30768-30769, 1 ad. male and 1 juv. male, August 10, 15, 1951.

Savannah sparrows were caught in traps in the following communities: damp meadow of sedges, Chandler Lake, August 10, 1951; among sedges bordering a lake, Wahoo Lake, July 5, 1952; damp to wet meadow of sedges, grasses, and hummocks of cotton-grass, Porcupine Lake, July 14, 1952; along the edge of a deeply incised stream running through a marsh, Porcupine Lake, July 16, 1952.

At Kaolak (July 21, 1951) on a windy day the greater number of savannah sparrows were in protected valleys of willows along the creeks and not on the open tundra where they are normally found. In a two mile course along one creek there were 80 birds, whereas on the open tundra [Pg 205] there were, in four miles, only 13 birds.

Weights of 10 males and 10 females, shot in the period July 14-August 29, 1951, at several localities on the Arctic Slope were: male 20(17-24), female 18(16-20) grams. In an adult male, shot on July 22 at Kaolak, the testes were two mm long but in other males, shot in the period July 14-August 29, the testes averaged 1.2 mm. The ovaries of adult females for this same period also had receded to normal non-breeding size. Juveniles on July 13 at Porcupine Lake averaged 20 grams in weight; the shortest was 125 mm in total length and the largest 140 mm. Adults in this same period averaged 144 mm in total length. Two adult males collected on July 22 and 24, 1951, at Kaolak, were molting.

Spizella arborea ochracea Brewster: Tree sparrow.—Specimens, 10: Gavia Lake, N White Hills, 150°00', 69°35', 460 ft., 1, No. 31340, juv. male, August 22, 1952; 9⁄10 mi. N and 9⁄10 mi. W Umiat, 152°10'58", 69°22'53", 380 ft., 1, No. 31347, ad. female, July 1, 1952; Umiat, 152°09'30", 69°22'08", 352 ft., 1, No. 31341, ad. male, June 26, 1952; Wahoo Lake, 146°58', 69°08', 2350 ft., Nos. 31342-31343, ad. males, July 6, 8, 1952; Driftwood, Utukok River, 161°12'10", 68°53'47", 1200 ft., 2 (skins) Nos. 31345, ad. male, August 29, 1952, and 31346, ad. female, August 28, 1952, and 1, No. 31344, ad. male, August 28, 1952; Chandler Lake, 152°45', 68°12', 2900 ft., 2, Nos. 30783, juv. male, 30784, a juv. of unknown sex, August 19, 1951.

Four adult males shot in the period July 1-15, at Umiat, Wahoo and Porcupine lakes averaged 158(155-165) mm in total length and 18(16-18) grams in weight whereas 12 adult males (Aug. 14-31) from Chandler Lake, Umiat, Gavia Lake and Driftwood averaged 161(156-165) mm in length and 19(16-21) grams in weight. A male (June 26) from Umiat was 160 mm long, weighed 15 grams, and had testes 4 mm long. Males from Wahoo Lake (July 6 and 8) had testes 9 and 5 mm long. Males (August 19) from Chandler Lake were molting on the entire body.

On June 24, 1952, at Umiat, we examined three nests. One of the three contained incubated eggs; skeletal elements were present in the embryos. This nest, 150 mm in diameter and 52 mm in depth, was on the side of a mound three feet high covered with grass. The cup was 55 mm in diameter. The lining, 14 mm thick, was ptarmigan feathers averaging one inch long mixed with successive layers of stems of fine grass. The cup weighed four grams and rested directly on the ground. The outer part of the nest was coarse stems of a grass and was 30 mm thick. The edge and upper side, away from the mound, had a 40-millimeter thickness of mosses and lichens that may have served primarily as camouflage rather than as insulation. The nest, minus the lining weighed nine grams. The second nest held four eggs containing embryos. The top was flush with the surface of the ground on a slightly elevated bench on a hillside supporting *Ledum*, *Vaccinium*, *Alnus*, mosses and lichens. The greatest width of the nest was 120 mm; the lining, 11-millimeters thick, was of ptarmigan feathers succeeded by 13 mm of alternating layers of new dry grass stems and ptarmigan feathers. The down-slope side of the nest was protected by 29 mm of sphagnum, old grass stems and other dry plant material. The third nest of four eggs was among grasses at the base of a willow. The new leaves on this willow were just visible and the catkins had attained full growth.

The earliest date that juvenal tree sparrows were noted in the field was on July 10, 1952, at [Pg 206] Wahoo Lake. One juvenile shot on this date was 85 mm long and could not fly. The parent bird was still attending the young bird.

Tree sparrows on the Arctic Slope usually live among high dwarf willows at the mouths of canyons. At Porcupine Lake (July 13-18, 1952) however, they inhabited marshes of sedges, grasses and hummocks of cotton-grass. At night they roosted in depressions in the ground or

between hummocks of sedges, where, without overhead protections they endured temperatures of as low as 34 degrees Fahrenheit.

In one mile of a glaciated canyon southwest of the south end of Chandler Lake (Aug. 19, 1951) tree sparrows were the commonest species but there were few birds of any kind there. This canyon extended in an east-west direction and was bordered by high mountains, the sun being excluded in early morning and late afternoon. In the valley of Chandler Lake, on the same day, the tree sparrows were numerous especially among willows on the side of the valley. On this date there was an abrupt increase in numbers of tree sparrows; the number of Lapland longspurs and wheatears was less than a week before. On August 22, we did not see tree sparrows at Chandler Lake whereas three days earlier there were hundreds in the area. On August 23 only 15 were noted and these were in willows. On August 25, only a single bird was noted.

At Umiat (Aug. 30, 1951) a few tree sparrows were present. In this area (Sept. 1) the birches were turning a brilliant red, even more brilliant than on the previous day. The large alders were nearly all yellow. The season was not so far advanced here, however, as at Chandler Lake on August 25. At Driftwood tree sparrows were noted from August 27 to 31 inclusive. On August 28 a flock of 12 was observed.

Zonotrichia leucophrys gambelii (Nuttall): White-crowned sparrow.—Specimens, 3: Mount Mary, S Lake Peters, 145°10'02", 68°20'30", 2920 ft., 1, No. 31348, juv. female, August 3, 1952; Driftwood, Utukok, 161°12'10", 68°53'47", 1200 ft., 1 (skin) No. 31349, ad. male, August 29, 1952; Chandler Lake, 152°45', 68°12', 2900 ft., 1, No. 30786, an ad. of unknown sex, August 19, 1951.

On the north side of the valley at Umiat, the white-crowned sparrows were calling (June 27, 1952) throughout the day. At Wahoo Lake (July 3-11, 1952) singing birds were frequently heard on south-facing slopes of the valley. At Lake Peters (Aug. 3, 1952) one bird was at the base of a moraine some distance from willows or high vegetation. Only two birds were seen at Chandler Lake (Aug. 19 and 25, 1952); they were feeding in a dense growth of willows. The juvenal female shot on August 3, 1952, at Mount Mary was 180 mm long and weighed 26 grams.

Zonotrichia atricapilla (Gmelin): Golden-crowned sparrow.—Specimen, 1: Chandler Lake, 152°45', 68°12', 2900 ft., No. 30787, ad. male, August 19, 1951.

Passerella iliaca zaboria Oberholser: Fox sparrow.—Specimen, 1: Driftwood, Utukok River, 161°12'10", 68°53'47", 1200 ft., No. 31350 (skin), male, August 29, 1952.

At 1⁄10 mile west and 9⁄10 mile east of Umiat (June 30, 1952) a nest the top of which was flush with the ground in a clearing among willows and alders, both bare of leaves, had four young approximately five days old. At Driftwood (Aug. 29, 1952) a male was caught in a mouse trap in the same area where a male was singing on the previous day. At the time the male was trapped a female sat on low vegetation only a few feet from the trap that held the dead bird. [Pg 207]

Calcarius lapponicus alascensis Ridgway: Lapland longspur.—Specimens, 75: NE Teshekpuk Lake, 153°05'40", 70°39'40", 8 ft., 22, Nos. 30827-30848 including 10 ad. males, 9 juv. males, 2 ad. females and 1 juv. female, July 29, 30, August 1, 3, 1951; Topagaruk River, 155°48', 70°34', 10 ft., 13, Nos. 30849-30861 including 9 ad. males and 4 ad. females, July 6, 8, 10, 1951; Kaolak River, 159°47'40", 70°11'15", 30 ft., 18, Nos. 30809-30826 including 2 ad. males, 10 juv. males, 3 ad. females and 3 juv. females, July 12, 14, 17, 1951; Kaolak, 160°14'51", 69°56'00", 178 ft., 13, Nos. 30796-30808 including 4 ad. males, 4 juv. males, 5 juv. females, July 20-27, 1951; Gavia Lake, 150°00', 69°35', 460 ft., 1, No. 31351, female, August 22, 1952; Umiat, 152°09'30", 69°22'08", 352 ft., 1, No. 31352, female, June 26, 1952; Chandler Lake, 152°45', 68°12', 2900 ft., 7, Nos. 30789-30795 including 1 ad. male, 1 juv. male, 1 ad. female, 4 juv. females, August 11, 12, 16, 18, 23, 1951.

The Lapland longspur and snow bunting were two of the early arrivals on the Arctic Slope of northern Alaska. Robert McKinley told us that this species of longspur arrived at Barrow Village shortly after April 20, 1952. On our arrival at Point Barrow on June 14, 1952, longspurs already were established on territories, and many of the birds had full complements of fresh eggs, although snow still covered the lakes and all but a few mounds and high points of the tundra.

On June 17, 1952, on the west side of Salt Water Lagoon, in an area of approximately six acres of raised polygons we located eight nests of the Lapland longspur. The first contained five fresh eggs, and its top was flush with the bare ground in an old excavation made by brown lemmings between three bunches of cotton-grass. Fecal pellets of the brown lemming were beneath the nest. The bulk of the nest was soiled grasses which insulated the bottom and sides of the nest from the damp soil. This supporting bulk was lined first with stems of new yellow grass, and then with white down feathers of the snowy owl. The female repeatedly repelled the male from the

immediate vicinity of the nest. After observing the nest for a few minutes I moved it one foot. The female returned three times to the original site of the nest, ignoring the nest nearby. On the fourth trip, six minutes after the original nest was taken, she returned with feathers in her bill and started to line the original depression.

The second nest, superimposed on a nest of the previous year, held six fresh eggs and was under an overhanging piece of tundra sod. The cup was entirely beneath the sod but the outer rim of the nest was exposed. The nest faced northwest and was 100 centimeters above the general level of the tundra. Measurements, in millimeters, of this nest were: height, 52; width, 120; inside diameter of cup, 50; depth of cup, 30; width of layer of fine grasses and feathers of cup, 16. In cross section successive layers of nest material from outside in were as follows: mosses; old, dry, brownish-gray grasses; new, fine, loosely arranged, yellow grasses; down feathers of the snowy owl. The first two layers were on only one side and did not extend under the cup of the nest. The cup was lined with 12 down feathers of the snowy owl.

The third nest, containing six fresh eggs, was at the edge of a clump of cotton-grass and was exposed from directly above. The lining of the cup of white feathers and dry lichens was against the soil. Two layers of dry brownish-gray grasses and dry mosses were outward extensions from the cup.

The greater part of the third nest was stems of the grass *Dupontia fischeri*; newer yellow [Pg 208] stems were near the cup and the older stems were toward the periphery. The measurements (in millimeters) of this nest were: height, 60; width, 210; width of cup, 50; depth of cup, 40.

A fourth nest of three fresh eggs held four eggs the following day. A fifth nest of six fresh eggs was only 10 centimeters from a well-used trail of a brown lemming and within 1⁄3 of a meter from the underground nest of the lemming. This longspur nest, among polygons of low hummocks, was bordered by mosses and grasses nine inches high. The sixth nest held five fresh eggs. Its top was flush with the ground and the nest was protected by an overhead canopy of *Dupontia fischeri*. A seventh nest, containing six fresh eggs, was among pieces of tundra displaced by a vehicle. Only the outer edge of this nest was exposed from above. The cup was lined with white feathers and with the hair of *Rangifer*. On June 20, an eighth nest of five fresh eggs was located near the above. The nest was 1⁄3 concealed under overhead protection.

At a point 1 2⁄5 miles south and 3⁄5 of a mile east of Barrow Village (June 20, 1952) we examined a ninth nest, containing six fresh eggs, among raised polygons. It was circular and the cup was centrally placed. The entire nest weighed 14 grams; the inner cup of fine stems of grass and white feathers weighed two grams. The nest was 118 mm wide; the cup was 56 mm wide and 38 mm deep. The outer structure of last year's nest, mosses and larger gray stems of grass, was 30 mm wide. Enroute to this locality from Barrow Village we saw only two longspurs (2:00 P.M.) and only three on the return trip.

At a place 9⁄10 mile east and 8⁄10 mile north of Barrow Village (June 23, 1952) a tenth nest, containing five fresh eggs, was noted in a lemming runway that had been enlarged from a soil fracture. The top of the nest was flush with the surface of the ground and there was no overhead protection. This nest had the least nesting material of any nest of this species examined to date; there was no nesting material of any kind on the sides adjoining the walls of the fracture. At Umiat (June 26, 1952) an eleventh nest, containing six eggs, was so placed that its top was flush with the surface of a raised polygon, and closely resembled those at Point Barrow except that the cup was lined with brown and white feathers of the willow ptarmigan. Additional data are as follows: weight of entire nest, 20 grams; weight of inner cup, 7 grams; diameter of cup, 65 mm; depth of cup, 30 mm; width of entire nest, 100 mm. As was usual with other nests of this species, the outer edge of one side was covered with moss.

In the period July 13-August 15, from several localities on the Arctic Slope, Lapland longspurs were caught in traps (20 feet apart) set in linear lines among sedges. The average distance between traps catching longspurs was 1400 feet. Other Lapland longspurs observed in the same period at these same localities averaged one per 400 feet of walking on my part. The greatest number of longspurs trapped was at Kaolak on July 24, 1951; 100 traps yielded 6 longspurs. The greatest number observed—one per 100 feet—was at Topagaruk on July 5, 1951. Although the longspur on the Arctic Slope is the most common bird, it is absent from some areas there. On each of two trips (July 29-30) across one mile of upland plateau between Barrier Lake and Teshekpuk Lake, we did not see longspurs. This plateau is a travel lane maintained by caribou.

Juveniles were first trapped on July 5, 1951, at Topagaruk; others were observed on this date [Pg 209] but they could not fly. The first juvenile noted in flight was on July 9, also at Topagaruk. The increase of juveniles there caused the longspur to be the most common bird in the field (50 per cent in abundance). On July 15 at Kaolak River, most of the longspurs noted were juveniles, but they were able to fly well. The adult males and females, which were molting at this time, were more secretive in their movements than longspurs at Topagaruk on July 5. Adult males were molting as early as July 2 at Kaolak. On July 25 at Kaolak longspurs were mainly in groups of five or six; others were in groups of 18 or more. As late as August 21 (Gavia Lake) longspurs were still in family groups or occurred as singles.

At Chandler Lake, the decrease in numbers of Lapland longspurs was synchronized with autumnal changes in weather. On August 15, 1951, the longspurs were numerous; 40 or 50

individuals were seen in the course of an hour's walk. On August 19 there was a noticeable decrease in numbers of individuals and by August 22, only three were seen. In this period of decreasing numbers, they were more numerous and active in the morning than in the evening or in inclement weather. The behavior pattern of leaving the ground with an audible commotion and flapping of wings on the vegetation also was characteristic of this period of decreasing numbers of the longspur population. At ½ mile south of the Arctic Research Laboratory (Sept. 7, 1952) only a single longspur was noted.

The short-eared owl and especially the pigeon hawk consistently preyed on longspurs.

Only one longspur (an adult female No. 30854) in 75 specimens examined had the bone of the skull damaged by parasites.

Adult males are larger than adult females (July). In the breeding season adult females average 3 grams lighter than males. In the latter part of summer, however, females "catch up" in weight with the males. As early as the middle of July, juveniles are nearly as large as adults in cranial measurements. The increase in weight in juveniles was from 21.5(18-25) in ten juvenal males shot in the period July 12-16, at Kaolak River to 25.2(22-27) grams in nine juvenal males shot in the period July 29-August 2 at Teshekpuk Lake.

The testes of adults gradually decrease in size from July to August; their average length was 7.7(4.0-12.0) mm in nine adult males shot in the period July 6-10 at Topagaruk but only 2.2(1.5-3.0) in six adult males shot in the period July 12-26, at Kaolak and Kaolak River. By August 1, at Teshekpuk Lake the testes of nine adult males averaged 1.4(1.0-1.5) in total length, which is only slightly larger than the average size of the testes 1.2(1.0-2.0) of nine juveniles shot in the period July 29-Aug. 2, at Teshekpuk Lake.

Calcarius pictus (Swainson): Smith's longspur.—Specimens, 2: Wahoo Lake, 146°58', 69°08', 2350 ft., No. 31353, ad. male, July 9 and No. 31354, ad. female, July 7, 1952.

On July 7, 1952, at Wahoo Lake, a single longspur was trapped in one of 200 traps set for small mammals. On July 9, a line of 120 traps set in a community of cotton-grass, other sedges, grasses and dwarf willow also yielded one longspur—an adult male 172 mm long that weighed 28 grams. Smith's longspurs were uncommon at Wahoo Lake from July 3 to July 11, and when seen [Pg 210] were associated with open tundra supporting cotton-grass, generally on flat areas adjacent to the lake. Singing from the air was heard on several occasions. On the alluvial outwash, between Lake Peters and Lake Schrader, two Smith's longspurs were recorded on July 24, 1952, and flocks of 11-16-18-20 were seen there in the damp meadows on August 13, 1952. Those seen on the latter date had moved into the area since July 23, when we first arrived.

Plectrophenax nivalis nivalis (Linnaeus): Snow bunting.—Specimens, 6: Topagaruk, 155°48', 70°34', 10 ft., 5, Nos. 30862-30866 including 4 ad. males and 1 ad. female, July 6, 7, 9, 10, 1951; Mount Mary, S end Lake Peters, 145°10'02", 69°20'30", 2920 ft., 1, No. 31355, August 1, 1952.

Robert McKinley reported to us that snow buntings were at Barrow Village at least as early as April 20, 1952, when snow covered most of the ground. On June 14, 1952, at Birnirk mounds when snow still covered most of the ground, snow buntings were already established on territories.

At Point Barrow (June 21, 1952), the most northerly extension of land on the Arctic Slope of northern Alaska, five pairs of snow bunting were nesting in abandoned subterranean Eskimo houses. The houses were in different stages of deterioration from one almost usable by man to one that was no more than a flattened mound. Sides of some houses were exposed by the sea cliff that was advancing inland. Logs and skulls of baleen whales had been set on end for walls, and mandibles and ribs of whales had been used as rafters. This framework had been covered with tundra sod. Most of the nests were between the roof support and the upper ends of the whale skulls. Each nest contained five fresh eggs and was completely protected from rain, sun and wind. One nest weighed 24 grams and measured (in millimeters) 155 wide, 68 high, 38 in depth of cup, 70 in width of cup, and was in the brain cavity of the cranium. Another nest on top of a skull in the interior room, weighed 24 grams. This nest was built upon material of a nest of the previous year. The old material weighed four grams and the new inner mass weighed 20 grams. The new nest consisted of successive layers of new yellow grass stems and feathers. The lining of the cup had feathers in the 20 mm-thick layer of fine hairlike plant fibers. The feathers were from birds larger than the bunting. The nest was well insulated in comparison with those of the Lapland longspur, but like most of those had the cup offset toward the inner side of the nest, and more nest material of large size outward toward the entrance, than elsewhere. In the same area, especially in grass on and around low mounds, there were approximately 50 brown lemmings (18 lemming nests examined), many of which used the mounds inhabited by the bunting. On August 26, in the same area at Point Barrow, we noted 28 birds feeding and resting but on September 11 found none there.

A nest of five young (July 4, 1951) at a place 1⁄5 mile south of the Arctic Research Laboratory was under an overhanging ledge of an unused burrow of a brown lemming. The burrow had been excavated by lemmings on a mound of earth thrown up by a bulldozer. An adult female snow bunting was carrying insects to the nest and fecal pellets away from it. Another nest of five young (July 4) was in a fifty gallon oil drum. An adult female gained entrance to the nest through a small hole on the side of the container, the only hole present. Other nests on this date were examined that contained both eggs and young, or eggs, or young. Most of these nests were in holes in the ground or under the protection of overhanging ledges of earth. On July 4, snow buntings were in their black and white plumage, but on July 27, were in brown-white plumage. [Pg 211]

At Topagaruk (July 5, 1951) a nest containing young birds fully feathered was noted five feet above the ground in a horizontal pipe six inches in diameter. One dead bird, two to three days old, was in the water and mud at the base of the stack of pipes. Other young birds from other family groups had short tails and were capable of feeble flight. Adults were seen only in the immediate vicinity of the camp.

The average weight of four adult males shot in the period July 6-10, 1951, was 36 grams. The average length of their testes was 9.2(7.0-11.0) mm.

At Kaolak (July 21-27, 1951) we did not see the snow bunting. The camp, however, was built the previous winter and was inhabited (July 10) for the first time in summer. The birds were at Topagaruk, our collecting station next nearest to the eastward in the same general type of environment and we assumed that eventually the birds would become established at Kaolak.

A juvenal female shot on August 1, 1952, at Mount Mary was 183 mm long and weighed 34 grams.

Transmitted November 14, 1957.

[Pg i]

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