JOURNAL 1951

JAMES W. BEE

Museum Natural History, Lawrence, Douglas Co., Kansas.

18 Jan. 1951

Eumeces activie; 18 Lobia curvirostra feeding on conifer cones; several titmouse singing. The pine cone were opening today and could be heard several yards away. Almost spring weather.

1 Feb. 1951

12 Lobia curvirostra on campus. ♂↑ × ♀.

7 Feb. 1951

4 Lobia curvirostra on campus. ♂ + ♀.

8 Feb. 1951

1 male Lobia curvirostra in area, calling continually as if attempting to find other groups. It flew from Lindley Hall to Museum and then back again. Is it possible that these birds are moving south in face of the severe weather.

18 Feb. 1951

Harrison B. Tordoff reports Lobia curvirostra in area but did not see.

22 Feb. 1951

Geese (probably snow or blues) flying directly north and calling at 9:10 P.M. They were not Canadian geese.

4½ mi. N and 3½ mi. W Lawrence (P.O), Douglas Co., Kansas

24 Feb. 1951

Harrison B Tordoff reports 30 Chen caerulescens and 2 Chen hyperborea

25 Feb. 1951

James Finley

~~Robert Findley~~ of museum reports 160 Chen caerulescens and 12 Chen hyperboreus which is a decided increase in numbers since observations in the same area yesterday. There were, however, fewer Anas platyrhynchos (150) and Anas acuta tzitzihoa (250). Findley also reports that a Petipnys nemoralis was taken by his cat (2 mi. N and 3¾ mi. W Lawrene)

Apprx. ½ mi. E and 1¼ mi. S Lawrence, Douglas Co., Kansas

26 Feb. 1951

Harrison B. Tordoff reports apprx 200 Loxia curvirostra feeding in

510226-3

in the pine tree of the city cemetery. These birds have been frequently observed here throughout the winter and represents one of the best supplies of food in the Lawrence area.

museum natural History, Lawrence, Douglas Co., Kansas

27 Feb. 1951

observed flock of Lobia cinereostra on campus. These birds appear to be increasing in number since their depreciation in number beginning Feb 8, 1951. and would suggest a movement to the south and then return during the severe part of our February weather.

29 Feb. 1951

observed two flocks of Lobia cinereostra on campus. one flock of approx. 28 in the morning at 8:00 A.M and one small group of 8 in the afternoon about 3:00 P.M.

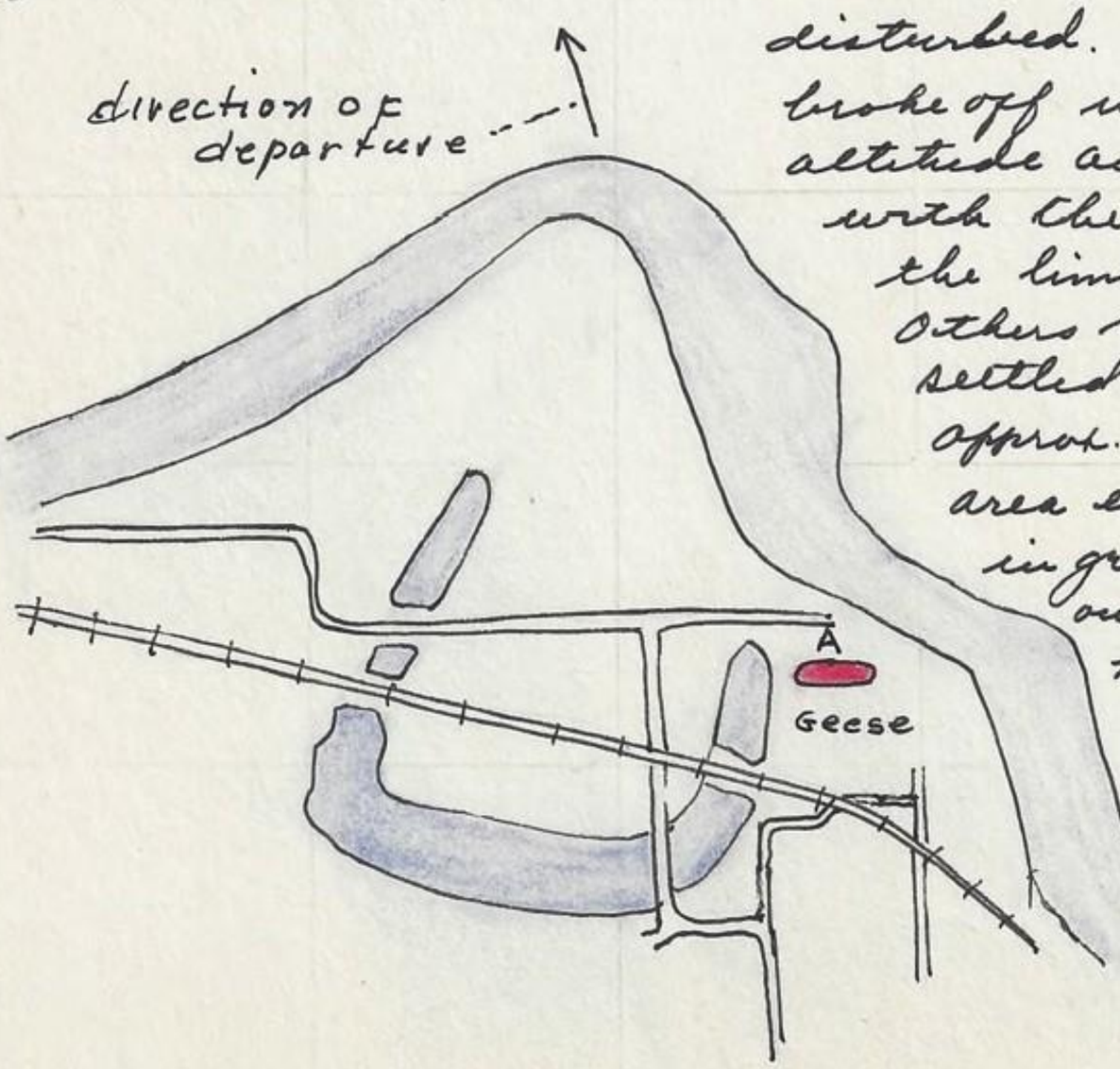
1 March 1951

several groups of geese (probably Blue or Snows) flying north over campus at apprx. 11:00 P.M. at 5:30 P.M 48 geese (probably Blues & Snows) flew N.E. across campus. The wind was from the south and while they were headed east, they were actually traversing N.E. Rain all day, trace at 5:30 P.M.

3 4/10 mi. N and 2 3/4 mi W Lawrence, Douglas Co., Kansas

3 March 1951

At sundown recorded percentages of Chen hyperborea, Chen coerulescens and their hybrids. The geese were first observed in the air circling low over a corn field (A). They had apparently been feeding there during the afternoon. It may have been coincidental that they started to leave the area at sundown or they could have been disturbed. In any event they gradually broke off into groups which gained high altitude and then trended north with the objective of travelling beyond the limits of these resting grounds. Others remained and finally settled back again in corn field. Approx. 3/4 of the birds left the area entirely. As these birds left in groups and forming long continuous lines was able to make a near accurate count as follows:



128 Chen hyperborea
149 (?) hybrids
1,072 Chen coerulescens
1,349 total

Harrison B. Tordoff reports the following birds observed in the same general area this A.M.

30 Chen hyperborea
30-40 hybrids
250 Chen caerulescens.

museum natural History, University of Kansas, Lawrence, Douglas Co., Kansas.

March 7, 1951

observed 6 ♀ and 4 ♂ on campus in one group. this A.M. H.B. Tordoff says that birds collected on the 25th Feb. were fat while those taken march 3, 1951 were without layers of fat. He suggests that probably these birds wintering in Lawrence have exhausted their limited supply of pine seeds.

Lawrence
City Cemetery, Douglas Co., Kansas (see locality of Feb 26, 1951)

March 15, 1951

Harrison B. Tordoff reports 16 Lobia cinereastra from cemetery in S.E. part of Lawrence. One bird (♀) appeared to be a sithensis form. James Findley reports geese still flying over Lakeview area, did not state as to species.

museum of natural History, University of Kansas, Lawrence, Kansas

mar 17, 1951

at 1:30 A.M heard three flocks of snow & blue geese pass northerly over the campus. They were approx. 3 minutes apart in their flight. This morning, mar 16. Last evening has been rain and cool [rain, cloudy, or windy] I have noticed that these geese prefer the less favorable weather conditions for flying. Extremely cold weather seems to hold them back.

3 6/10 mi. N and 2 3/4 mi. W. Lawrence, (P.O), Douglas County, Kansas.

mar 18, 1951

Harrison B. Tordoff reports approx 3,000 Chen hyperboreus and Chen caerulescens in proportions of 4 snows to 6 blues. Feeding in corn fields adjacent river.

museum natural History, Douglas Co., Kansas

mar 21, 1951

Six Lobia cinereastra on campus. 4 ♀ and 2 males.

museum natural History, Lawrence, Douglas Co., Kansas

March 30, 1951

At 1:00 P.M observed 7 Lobia cinereastra 150' SE Commel on campus. They fed exclusively on the north side of 2 pine trees. One female carried a small 1½" pine cone from the distal part of a branch to the inside part of the tree some 2 feet from where the cone was taken from its holdfast. The bird then held the cone on a limb by its feet, whereon it continued to extract the seeds. 3 females and 4 males made up the group. Both of the larger species. Day cool but clear and fair, after 3 previous rainy & cold days good day

museum natural History, Lawrence, Douglas Co., Kansas

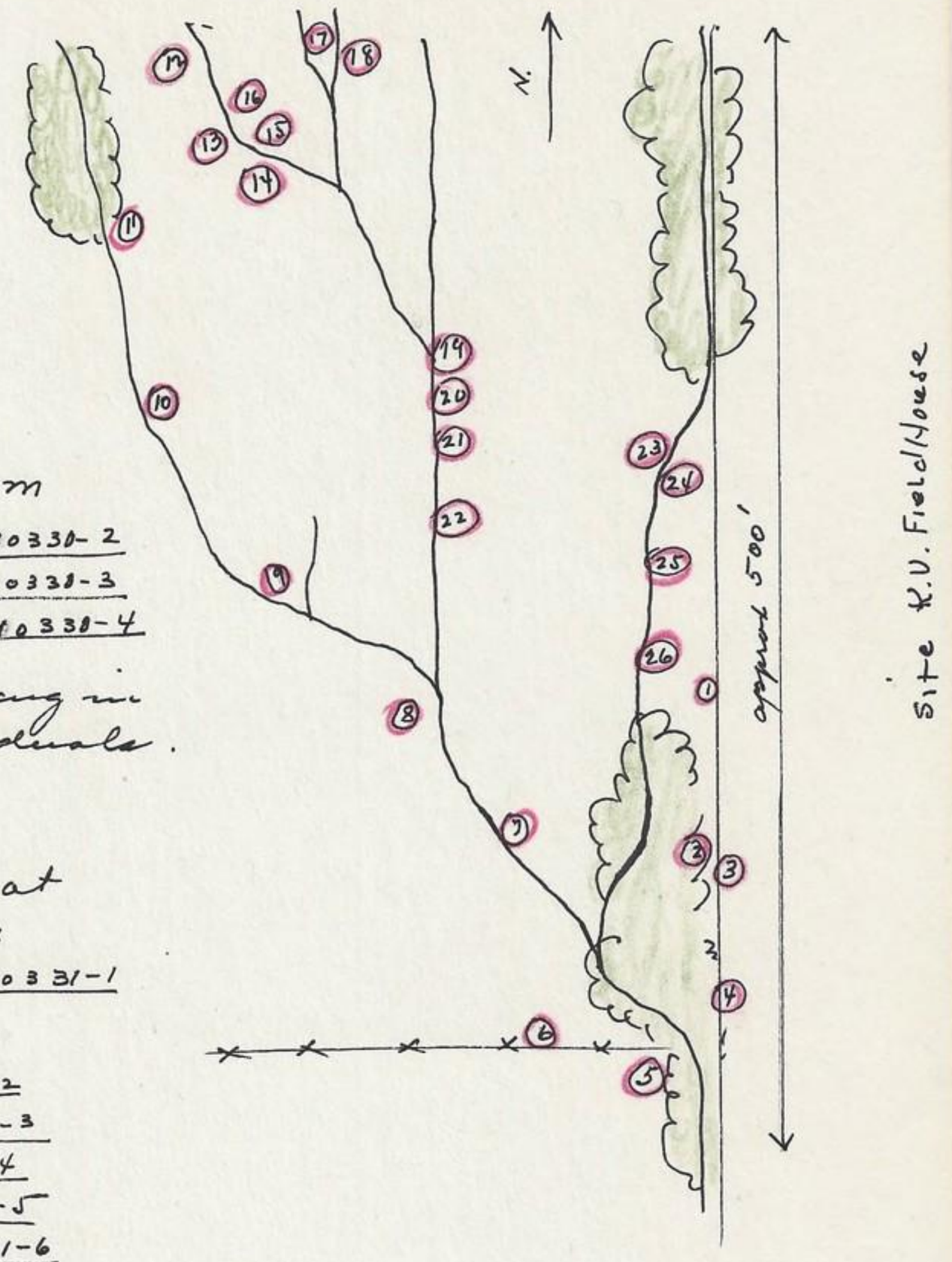
3/4 mi. S and 3/4 mi. W Lawrence (P.O), Douglas County, Kansas. 510330-5

March 30, 1951

Established research area 510330-1 in field 1/2 block west of site of new K.U. field house. Essentially open field of last year cut alfalpha. Stream course with running water. Runways confined to water course except upper S.W corner where old weed and grass field has been allowed to grow wild. Set 26 traps at 4:30 P.M. and reexamined at 5:00 P.M. From line collected following at 5:00 P.M

trap 2. Sigmodon hispidus 510330-2
trap 10. " " 510330-3
trap 14. Microtus ochrogaster 510330-4

Grackles in area. Robins feeding in field in small groups and individuals.



March 31, 1951

Inspected research area 510330-1 at 8:30 A.M and collected the following:

trap 1. Peromyscus maniculatus 510331-1
2. Bad gone
3. sp.
4. Peromyscus leucopus 510331-2
6. " maniculatus 510331-3
7 " leucopus 510331-4
9. microtus ochrogaster 510331-5
10. Sigmodon hispidus 510331-6
11. sp.
13. Microtus ochrogaster 510331-7
14. " " 510331-8
15. " " 510331-9
16 sp.
18. mus musculus 510331-10
19 Sigmodon hispidus 510331-11
20 sp.
21 Peromyscus leucopus 510331-12
22 Sp.
23 Sigmodon hispidus 510331-13
24. sp.
25. bad gone

In the afternoon checked research area 510330-1 as follows:

2 Sigmodon hispidus 510330-14
3 sprung
7 sprung
9 sprung
12. Sigmodon hispidus 510330-15
13. mus. musculus 510331-16
14. sp
15 Sigmodon hispidus 510331-17
17. Sigmodon hispidus 510331-18
18. sp.
21 Sigmodon hispidus 510331-19
23 sp.
26 Sigmodon hispidus. 510331-20

April 1, 1951

at 8:30 A.M checked research area 510330-1 and collected the following

1. Pero. leucopus (510401-1)
3 sprung
4 sprung
5 Pitymys nemoralis (510401-2)
6 Pero. leucopus (510401-3)
7. microtus ochrogaster (510401-4)
9. sp.
10. bird feathers.
11. sp.
12 mus musculus (510401-5)
15. Sigmodon hispidus (510401-6)
16. Mus musculus. (510401-7)
18 sprung
19. Peromyscus maniculatus (510401-8)
21. sprung
22 sprung
23. Peromyscus maniculatus (510401-9)
24. sp.
25. bait gone.

This morning at 1:30 AM heard a flock of snow and blue geese passing north over apartment on Univ. of Kansas Campus. The last flocks flew over at approx the same time several weeks ago and might suggest a departure base where the various groups leave on the flight to the north.

5/6 mi S and 1 1/6 mi E Lawrence (Post office), Douglas Co., Kansas

April 8, 1951

N. B. Tordoff reports approx 12 Lopia curvirostra in cemetery S E of Lawrence. Three birds were collected. This cemetery has been consistently used throughout this winter.

3/4 mi. S and 3/4 mi. W Lawrence, Douglas Co, Kansas

April 14, 1951

(See date mar. 30, 1951) Collected following mammal from trop line 26 traps set last nite in same area as of mar 30, in area of traps 16 and 15 of that date.

510414-1 Microtus ochrogaster ♂ 145-40-20-11-40 gms
510414-2 " " ♀ 152-41-21-11-45 gms

also 4 Sigmodon hispidus, 4 Peromyscus maniculatus, 3 Peromyscus leucopus and 3 Reithrodontomys. Microtus ochro to Robert Rausch.

(see insert april 14, 1951)

museum natural history, Univ. of Kansas, Lawrence, Kansas

April 22, 1951

Observed singles and one group of approx 50 Chaetura pelagica in area.

museum natural history, Univ. of Kansas, Lawrence, Kansas.

May 12, 1951

observed 9 Lopia curvirostra (larger form), males and females approx 150' SSE of the campanel on the Campus. They were not feeding but just making themselves present. This group of a dozen or so pine trees has supported Crossbill at various times all winter where at that time they were generally found feeding.

As I stood at the base of the tree was surprised to see first one and then two and finally a third bird come down to a pool of water where they drank for appox a half a minute. The did not appear frightened while drinking only 8-10 feet away. The three birds left and flew into the pine trees whereupon the ♂ (the other two were ♀'s) proceeded to sing. His song suggests that of a weak house finch song except that instead of the notes sliding from one to another in a tuneful cadence, ~~the~~ each note came more or less to an abrupt stop before the next note was offered. In other words, each note was emphatic instead of gradational from one note to another. One blue jay was very concerned about these birds, in the tree. It would flew into the trees as if like a sharp-shin pursuing its prey. The crossbills would either flog to another tree or readjust themselves in the same tree. The plumage of the males showed less red than the winter birds with a greater admixture of green. These are the first crossbills that I have observed since about a month ago.

This evening at 8:30 P.M observed 3 night hawks flying around lighted tower at the museum. They were feeding on flying insect which were being attracted by the lights.

[INSERT] [INSERT] 510414-8

ARCTIC RESEARCH LABORATORY
BOX 1310 : FAIRBANKS, ALASKA
UNDER CONTRACT WITH
OFFICE OF NAVAL RESEARCH

SEND ALL CORRESPONDENCE

LABORATORY LOCATED AT
POINT BARROW, ALASKA

Via Air Mail

April 14, 1951

Mr. James W. Bee
Department of Zoology
University of Kansas
Lawrence, Kansas

Dear Mr. Bee:

I am attempting to arrange for camp sites and the caching of food and supplies preparatory to the summer field work, and would like to have some information from you if it can be furnished at this time. Can you give me the approximate time that you expect to arrive at Point Barrow and the length of time you will wish to spend in the field? Have you decided as yet whether or not Mr. Jones will accompany you?

So far, I have not had final word from the Washington office of ONR concerning the status of your proposal, but I understand it is being processed and that you should be in the clear before the end of this month. I hope that this is the case.

Sincerely yours,

Ira L. Wiggins
RBB

Ira L. Wiggins
Scientific Director

ILW:RBB

Museum Natural History, University of Kansas, Lawrence, Douglas Co., Kansas

April 21, 1951

Sent the following information to Dr Dra L. Wiggins, Scientific Director, Arctic Research Laboratory, Point Barrow, Box 1310, Fairbanks, Alaska

"your letter of April 14 regarding the proposed field project has been received. Not knowing how our field work is to be intergrated with that of Henry Getzer, I outline below, the plan that we here oregenally made to best understand the mammals of the region. I realize, of course, that the plan is to be adapted according to the practical consideration of logistic support, accessibility, seasonal phases best suited for trapping and integration with the overall plan of the ARL and other related field projects.

The plan for the first summer of work included the sampling of 14 areas, determined as most important for the interpretation of the problems of taxonomy and distribution. These field stations are as follows:

					nautical mi. from previous station
Point Barrow	June 10	to June	13	~~70 08, 162 08~~	" → ~~264~~
Station 1	" 14	"	20	70 08, 162 08	" 264
" 2	" 20	"	26	69 18, 159 16	" 337
Point Barrow	" 26	"	28		270
Station 3	" 28	" July	4	69 48, 151 24	" 290
" 4	July 4	"	10	70 32, 153 02	" 282
Point Barrow	" 10	"	12		" 172
Station 5	" 12	"	18	69 12, 145 00	" 330
" 6	" 18	"	24	70 26, 149 00	" 432
Point Barrow	" 24	"	26		" 320
Station 7	" 26	" Aug	1	68 53, 156 40	" 300
" 8	Aug 1	"	7	70 02, 158 08	" 311
Point Barrow	" 7	"	9		" 170
Station 9	" 9	"	14	68 14, 152 40	" 410
" 10	" 14	"	21	70 02, 154 35	" 410
Point Barrow	" 21	"	23		" 180
Station 11	" 23	"	29	69 22, 154 35	" 254
Station 12	" 29	" Sept	4	70 39, 156 37	" 257
" 13	Sept 4	"	7	71 14, 155 42	" 102
Point Barrow	" 7	"	10		" 40
					5131

It will be noted that the work in the first summer will be entirely in the field except for one full day at Point Barrow every two weeks to replenish supplies and process material. Also the stations are arranged so that air transportation will be kept to a minimum with a maximum number of working hours in the field.

These field stations could be best worked by carrying a tent which could be set up in the immediate vicinity of the area to be investigated. Our equipment needs are few but we shall need an insect proof tent high enough to permit two persons to skin from a seated position. Also there should be room in this tent for stove for drying specimens during periods of inclement weather.

Could you clarify for us the statement from the memorandum to Investigators, March 3, 1951, p. 3, relating to clothing: "all other items of clothing for wear in the field ... should be provided by the investigator". Are the clothes listed in the memorandum suitable for field work. If so are such items as rubber hip boots, insect proof head gear, and gloves included.

According to our latest information, Mr. Knox Jones will be available as the second member of the party.

I trust that the North is gradually awakening and regret that I cannot share with you our delightful spring weather which we are now enjoying in Lawrence.

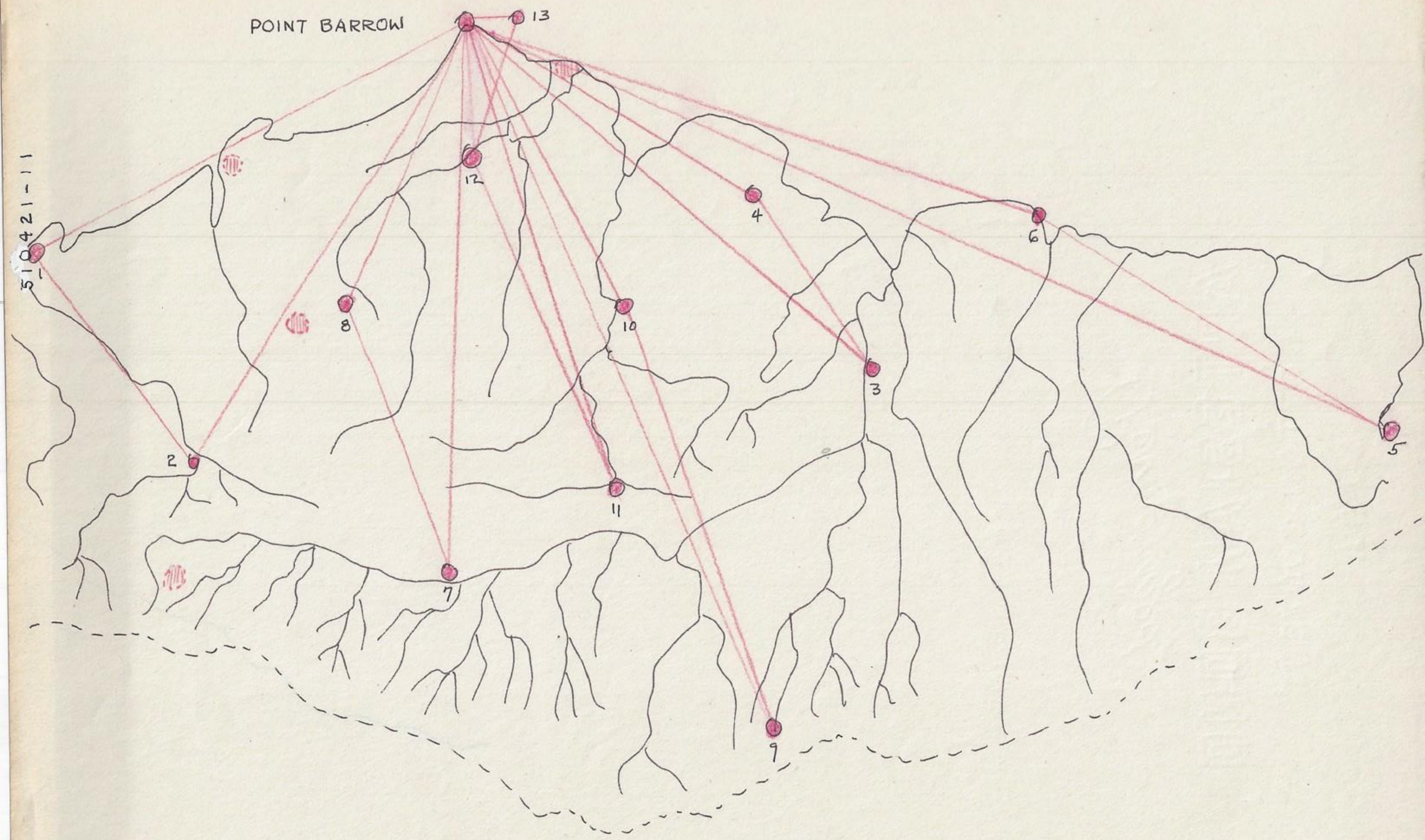
Sincerely James W Bee.

A field station map and itinerary for the first summer work was also included in the note (see following page)

Address of Dr. Ira L. Wiggins is:

Scientific Director
Arctic Research Laboratory
Box 1310, Fairbanks, Alaska.

Mail was relayed from Fairbanks to Pt. Barrow.



Field stations and itinerary for first summer work.

510421-12

ARCTIC RESEARCH LABORATORY
BOX 1310 : FAIRBANKS, ALASKA
UNDER CONTRACT WITH
OFFICE OF NAVAL RESEARCH

SEND ALL CORRESPONDENCE

LABORATORY LOCATED AT
POINT BARROW, ALASKA

Via Air Mail

21 April 1951

Mr. James W. Bee
Natural History Museum
University of Kansas
Larence, Kansas

Dear Mr. Bee:

It has beennecessary for me to work out a schedule for the summer's bush flying that is pretty rigid in the dates of departure and return and the areas to which parties will be flown. Thks firm type of schedule must be made up in order that the proper disposal of planes can be made, and supplies cached at the propper points before the snow disappears and the ice breaks up. So I'm sending you the accomlanying map showing the two "circuits" I've been able to work out for the flights to be made by the field men. There is little chance of doing bush flying in June, because that is the breakup time when there is too little snow and the ice is too rotten for the use of skis, and there is too little open water to permit the use of floats. Wheels are completely out of the question fot bush flying in this country. So the following is the schedule I have planned for you and Mr. Jones.

July 2-12, Kaoloak (Messing at one of the Contractor's camps).
July 12-23 Noluk Lake (You'll be on your own as cook, camping at a previous U. S. G. S. field station. Live in tent.
July 23-29 At Point Barrow
July 30-Aug. 6. Vicinity of Pitt Point, where the Coast and Geodetic Survey people will be working and you can eat at their mess tent.
July 6-11 At Point Barrow
Aug. 11-20 Wainwright region or slightly beyond if advisable. This will be handled as a trip by launch from Barrow to Wainwright. A Skiff with an outboard motor could be used in the estuary of the Kuk River.

If you arrive before the first of July you could get a little work in around the immediate vicinity of Barrow, and after the third week in August you'd probably want to spend a bit of time at Barrow getting your specimens and gear packed for the return to the States.

You should remember, however, that the dates in the schedule above are dependent on the weather. We have to set dates in order to plan an integrated use of the planes by the ArCon, the U. S. C. & G. S., and the ARL. But if we ask for a plane on July 2 and the weather is foul that morning, we wait. We might get our party into the field the next day, or it might take a week. Same situation on picking up a partythat is already in the field. We set a schedule and hold to it as closely as the weather and other factors beyond our control permit. Some modifications of the schedules may be possible later, but not too much.

Sincerely,

Ira L. Wiggins

museum natural history, Univ. Kansas, Lawrence, Douglas Co., Kansas.

April 25, 1951

Sent the following information to Dr. Doa L. Wiggins, Scientific Director, Arctic Research Director, Box 1310, Fairbanks, Alaska.

"your letter of 21 April received. It and mine of the same date to you probably passed in the mails.

The schedule suggested by you for us would place us at Point Barrow for 5-3 days out of a total 90 days leaving only 27 days for productive work. The fauna at Point Barrow is so well known already (specimens are (1) here, (2) Am. Mus. Nat. Hist., (3) U.S.N.M., (4) Phila. Acad. Sci., (5) Mus Vert. Zool., (6) San Diego Soc. Nat. Hist., (7) and elsewhere) that collecting at Point Barrow would yield much if anything of value for the propect. Wainwright also has been worked fairly well.

In the light of my letter of April 24, you may have additional ideas. We know you will do the best you can and we want to help by being cooperative. Sincerely, JWBee.

510504-14

ARCTIC RESEARCH LABORATORY
BOX 1310 : FAIRBANKS, ALASKA
UNDER CONTRACT WITH
OFFICE OF NAVAL RESEARCH

SEND ALL CORRESPONDENCE

LABORATORY LOCATED AT
POINT BARROW, ALASKA

Via Air Mail

May 4, 1951

Mr. James W. Bee
University of Kansas
Museum of Natural History
Lawrence, Kansas

Dear Mr. Bee:

Your two recent letters dated April 21st and 25th arrived one day apart. I realize that you did not have an opportunity to check my bush flight schedule prior to writing the first letter, so it is no wonder that there is a divergence of opinion as to what would constitute proper coverage of the field during the summer of 1951.

I am compelled however to point out certain discrepancies in your estimate involving the amount of bush plane travel needed to get you to the numerous localities outlined on your sketch accompanying the first of your two letters. In the first place, we are authorized to do field work only within the confines of the Petroleum Reserve No. 4. Therefore, your stations 1, 5, 6, and 9 are outside the areas into which we can utilize bush plane travel.

One other point that apparently did not occur to you is that the total flying distance involved is not merely the nautical miles between Point Barrow and Station 1, for example, and between Station 1 and 2. Under the schedule which you have outlined, the total flying time from Point Barrow to Station 1 would be double the time required to fly from Barrow to Point Lay region, since the plane has to be paid for from take-off time at Point Barrow until its landing at Point Barrow on return.

Then, at the end of the following week when you wish to go from your Station 1 to Station 2, the total elapsed time involved would be that required for a plane to fly from Point Barrow to Point Lay, to your Station 2, which appears to be on the headwaters of Carbon Creek, and return to Point Barrow. This same figuring of time would be necessary in each of the

various loops which you have outlined.

Inasmuch as the bush planes do not operate on a nautical mile basis, but on a rate of so much per hour, and since the speed of these planes is figured in land miles instead of nautical miles, the total time required to make the amount of flights you have indicated, would be between 150 and 200 hours. Obviously this is impossible. Such a program would require the caching of gasoline at each one of the more distant stations prior to the commencement of the actual summer's work, for the Norseman does not carry sufficient gas to make the round trip from Point Barrow to any one of your more distant stations with a full pay load. The caching of this of course would have to be paid for at the same rate that the later flights cost, and the ambitious program you have outlined would take more time and money than is available to carry on the bush plane flying program for the entire group of scientists to be stationed at Point Barrow during the summer of 1951.

As you undoubtedly know, Dr. Setzer of the National Museum will also be working in the field during this summer, and it had been a part of my general planning for the two of you to more or less divide the area between you, so that neither would be required to do as much moving from one spot to another as is indicated in your proposed schedule. It may be possible to get each of you to the various parts of the Reserve without exactly duplicating the camps from which you would operate, and do so with less expensive flying programs than you have outlined.

As indicated in my April 21st letter, the chances are better than three to one that you will be unable to do bush flying as early as June 10th. The period between June 1st and July 1st is normally considered the breakup time, when almost no bush flying is feasible. It is possible that if you arrive by June 10th that arrangements can be made for you to spend a couple of weeks in the vicinity of Umiat, at approximately 69 deg. 28 min. N and 152 deg. W. There is a Contractors' camp at this point and if you desire to do so, it is possible that you might work up or down the Colville River a distance of from 50 to 100 miles by using a skiff and an outboard motor. In that way, you could determine the length of your stay at any one point at your own convenience. It is probable that a team of paleontologists will need to be operating in the Umiat area during the same period, and your team and theirs will undoubtedly have to arrange for cooperative alternating use of the skiff and outboard motor, if you wish to work more than a few miles from the Umiat camp.

Another possibility for early season activity would be along the coast just north of your station 4. The U. S. Coast and Geodetic Survey has a party doing work in that area, and if it is possible to land a plane in the vicinity of their camp, you might elect to work in that area prior to the opening of the bush flying season, which will occur some time in late June or early July.

The schedule suggested in my letter of April 21st by no means meant that you must spend 53 days at Point Barrow, for I had not allowed for the counting of the time prior to July 1st, since I had no intimation prior to the arrival of your letter that you would arrive so early in June. The other suggestion concerning Wainwright was made with no intention of compulsion, for if Wainwright is not a suitable place for your field work, there is no need for you to spend time at that area.

Early in the winter Dr. Hall had indicated the desirability of having a 60 gauge shotgun fitted with an auxiliary barrel for the use of .410 gauge shells. He gave me the name of the Creitz Gunsmith Shop in Topeka as an outfit that could supply the auxiliary barrel. A letter of inquiry was addressed to Mr. Creitz on the 29th of March, and we received a reply from him in yesterday's mail. He is unwilling to attempt to make the auxiliary barrel unless the gun in which it is to be used is sent to him, so that proper fit will be assured.

Owing to his long delay in answering my inquiry, it is now impossible to get the gun to him in time to have the auxiliary barrel made and returned prior to your arrival in Alaska. It will take him 30 days to make the barrel after the gun arrives in his shop, with additional time required for the return of the gun.

We have one double barrel 16 gauge shotgun, one single barrel 20 gauge, and a Mossberg bolt action 3-shot .410 gauge shotgun. If you can utilize a combination of any two of these guns, the laboratory will be willing to supply them to you during the collecting season. Such weapons of course are checked out to the individual and he is responsible and accountable for the proper care and return to the laboratory at the end of the season.

If you feel that the combination of, for example, the 16 gauge and the .410 repeating shotgun is more cumbersome than you care to use in the field, the only alternative that I can see would be for you to bring a gun which meets your needs from the Natural History Museum. I hope that this necessary change in the plan for small arms will not greatly inconvenience you.

The items of clothing listed on page 3 of the memorandum to investigators are those which are needed for cold weather field work. In other words, the laboratory attempts to supply all clothing which normally would not be useful to field operators in the States. We do this in order to relieve them of the burden of paying for arctic clothing just for use during their short stay here.

We do not attempt to furnish light underwear, light cotton or silk socks, which many people prefer to wear next to their feet beneath woolen socks, or cotton shirts. You will have to use your own judgment as to what items of field clothing you believe will be necessary to bring with you in order to be comfortably clothed if the heavy gear listed does not suit your preferences.

We do not attempt to furnish head gear in general, but will furnish insect-proof head nets. For the people who spend most of their time in the field, we will supply rubber hip boots. It will be the prerogative then of the individual to wear such boots or not, as he finds conditions necessitating them in the field. Gloves are not included in the gear we furnish. Cotton gloves can be obtained at the local store at about $.35 or $.50 per pair. If heavier hand covering is desired, woolen mittens with the index finger separate and leather mittens to go over the entire woolen mittens, can be obtained at the store also. These are about $2.00 a pair.

It will be appreciated if you will forward clothing sizes for your party, as requested in the memorandum to investigators, at your earliest opportunity.

Let me assure you that everything will be done that is reasonably possible to help you cover as much territory during the summer season as is compatible with the best interests of the Arctic Research Laboratory and of the entire group of investigators stationed here for the summer. Completely detailed plans will be worked out after your arrival.

Sincerely yours,

Ira L. Wiggins
Scientific Director

ILW:RBB

Museum of Natural History, Univ. of Kansas, Lawrence, Douglas Co., Kansas.

May 11, 1951

The following information sent to Dr. Ira L. Wiggins, arctic Research Laboratory, Box 1310, Fairbanks, Alaska. (Point Barrow).

"Thank you for your letter of May 4 which was indeed informative and which clarified many problems at hand.

The four stations outside the Reserve Area were included in the original proposal on the suggestion of one of the ONR officials because visiting these four places would be reconnaisance useful for a second season of field work. It is not clear to me as to how these stations were to be reached and you may feel it unnecessary for the K.U. personnel to visit all four places. We would like to visit at least one and no. 5 would be our ~~first~~ first choice.

As to the itinerary in my letter of April 21, I can see now how the figures on mileage supplied to you were misinterpreted. Those figures are total round trip distances and do not have to be doubled as you supposed for purposes of changing camps. The figures, therefore, were correct, as stated, with a total of approximately 5,131 nautical miles (5,908 statute miles). On the basis of the specifications which we have on the Norseman monoplane (120 gal. fuel capacity, one 145 gal. or two 122 gal. auxilliary fuel tanks under the floor of the cabin, 442 mile range, 55 mph. speed, cruising with 66% power 134 miles per hour) and on the basis of a conservative 120 miles per hour cruising speed, the total mileage for moving the camp from one station to the next (including visits to Point Barrow) would be made in approximately 50 flying hours. On the basis of $40.00 per hour the original estimate of $2200.00 would be ample and leave a margin of $200 ($100.00 of it for weasel) for off-course flying, miscalculations of sound velocity etc. By using auxillary gas tanks we supposed that enough gasoline could be carried for the round trip to the distant stations thus eliminating the need of fuel caches. The longest round trip was 497 statute miles and the next longest was 472 statute miles.

Your proposal to do pre-seasonal work out at Umiat is indeed inviting and while Rausch has done consider-

able collecting there it would be a very profitable locality to tie in with the geographical phase of the problem.

Would you kindly reserve the 16 gauge shot gun for our use during the summer season. We will bring the auxiliary barrel and I can fit it to the gun there.

The clothing sizes, as requested in memorandum of March 31, 1951, are as follows:

	Bee	Jones
shoes	7 1/2 E	10 D
socks	11	11 1/2
waist	41	30
trouser length	27	33
sleeve length	32	34
neck	17	14 1/2
hat	7 5/8	7

Our planning was based upon an ideal arrangement. We know that the provision of actual transportation in the field may be another matter and we have full confidence in your making the best arrangements possible for all concerned. Sincerely James W Bee.

510521-13

BRIGHAM YOUNG UNIVERSITY

CHRISTEN JENSEN, ACTING PRESIDENT

PROVO, UTAH

May 21, 1951

Mr. James Bee
Department of Zoology
University of Kansas
Lawrence, Kansas

Dear James:

The necessity of calling upon you for information probably is the mother for the writing of this letter. Both of us should have written to each other many times before. Nevertheless, I want you to know that I have many occasions to think about you and our associations in the past. We were quite pleased at home to receive word about you through a recent visit by your father. He has been most kind to write to me on many occasions during the past and has helped me keep in contact with you.

The question involved in writing you is this. In 1947 your thesis was selected as the best piece of research work done that year. The Sigma XI club at that time should have provided you with a gold key award. Did you receive a gold key award? The reason I ask the question, is that as president of the chapter for this year, I had to follow through this award. When I went to the jewelers to get the medal and have the name of the winner placed upon it, I discovered a key with your name in the files of the jeweler's shop. Either two keys were made and one was retained or else the key was made and never picked up and presented to you. Will you let me know whether you received this key or not. If you did not I shall send this one to you immediately.

We understand that you have high hopes and aspirations of a visitation of Alaska to do some work. You will be interested to note that Dr. Hayward is quite envious of you in this respect because that is one place he has always wanted to go. Nevertheless, I believe I have weaned him away from the alpine regions for he has taken a great liking to the deserts, the past few years spending most of his field work time in southeastern Utah, especially in the area of Arches National Monument. We have just returned from a week's survey of the region between Bluff, Utah and Moab, collecting a nice series of rodents. You might also be interested to know that yours truly apparently picked up Rocky Mountain spotted fever and Tularemia on that same tour. I had quite a rugged time but with modern medicine I was able to come through without much difficulty. (so far)

I wish~~ed~~ you were with us again while we planned our summer work and field trips for we are retracing the old trails again which you and I travelled and doing it with an eye to the collection of ectoparasites. I am trusting that this letter finds you and the family in the best of health.

Sincerely yours,

Dec.

D Elden Beck
Associate Professor of Zoology

DEB:ej

510522-20

ARCTIC RESEARCH LABORATORY
BOX 1310 : FAIRBANKS, ALASKA
UNDER CONTRACT WITH
OFFICE OF NAVAL RESEARCH

SEND ALL CORRESPONDENCE

LABORATORY LOCATED AT
POINT BARROW, ALASKA

Via Air Mail

May 22, 1951

Mr. James W. Bee
University of Kansas
Museum of Natural History
Lawrence, Kansas

Dear Mr. Bee:

Thank you for your letter of May 11th and the more detailed explanation of your proposed field work. I appreciate your desire to cover as much country as possible, but must reiterate that flying conditions on the Arctic Slope are much grimmer than those in Central United States. I cannot insist that the local bush flyers install auxiliary tanks in their planes in order to take care of our peculiar needs. Bush flying and other field work will be organized in such a manner as to give as much support in the field as possible, but there can be no guarantee concerning the number of flying hours that will be available to any investigator.

Flights outside Petroleum Reserve No. 4 are not permitted under the terms of the contract whereby Transocean Air Lines operates bush planes for the Arctic Contractors. It therefore will be impossible to comply with your very urgent request that you be transported to your Station 5 located a considerable distance beyond the limits of the Reserve. However, as I mentioned in one of my recent letters, every effort will be made to give you adequate time in the field.

It is my personal opinion, and that is backed by those of other people who have had a good many years of field work in mammalogy, that a six or seven day stay at one point is rarely sufficient to permit a collector to adequately sample the mammal population in that area. It is the general consensus of opinion among those to whom I have talked that one can more profitably devote a considerably longer time to

each station, covering a small number of areas during the course of a season, and consequently having a more thorough sampling of the mammals native to each one of the stations selected. The exact number and locations of stations to which you can be transported during the field season of 1951 can be determined through discussions between your group and me after your arrival at Point Barrow.

Sincerely yours,

Ira L. Wiggins

Ira L. Wiggins
Scientific Director

510622-21

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
WASHINGTON 25, D. C.

PERMIT TO TAKE, POSSESS, EXCHANGE AND TRANSPORT FROM ALASKA, MIGRATORY AND NON-MIGRATORY BIRDS, THEIR NESTS AND EGGS, FOR SCIENTIFIC PURPOSES [Entered June 22, 1951]

ISSUED: June 21, 1951

PERMIT NO. 51-1662

EXPIRES: December 31, 1951

* * *

By virtue of the authority conferred upon the Director by the regulations under the Alaska Game Law (57 Stat. 301) and those approved under the Migratory Bird Treaty Act (40 Stat. 755), permission is hereby given to JAMES W. BEE, Museum of Natural History, Lawrence, Kansas, to take during the period from the date hereof to December 31, 1951, in any part of Alaska, for scientific purposes, migratory and non-migratory birds, their nests and eggs, except on national wildlife or bird reservations, national parks, national monuments, or posted national forests, with the following exceptions: trumpeter swans, whooping cranes, Eskimo and bristle-thighed curlews, their nests and eggs, which may not be taken at any time.

The containers in which such birds, their nests and eggs, are transported shall have plainly and clearly marked on the outside thereof, the name and address of the permittee, the number of this permit, and the name and address of the consignee, and be labeled to show that the contents are to be used for scientific purposes.

This permit must be carried on the person of the permittee at all times when exercising the privileges thereunder and must be exhibited to any authorized person requesting to see it. It is subject to discretionary revocation by the Director of Fish and Wildlife Service, and if revoked shall be surrendered immediately to him or his authorized representative.

Specimens taken under this permit are to be placed in the Museum of Natural History, Lawrence, Kansas.

Not later than January 10, 1952, a report must be furnished the Director, Fish and Wildlife Service, Washington 25, D. C., and a copy filed with the Alaska Game Commission, Juneau, Alaska, stating the number of each kind of birds, their nests and eggs taken, and the disposition made of them.

Albert M. Day
Director

COUNTERSIGNED:

C. R. Gutermuth
Chief, Division of Management

510625-22

Museum of Natural History, University of Kansas, Lawrence, Kansas

June 25, 1951

Drove to Olathe Air Base to make final arrangements for air transportation to Tacoma, Washington. Commander Cuenor arranged a special flight to take us to Denver, Colorado where we will make contact with flight to Hill Field, Utah or Great Falls, Montana where we can arrange for regular M.A.T transportation to Point Barrow, Alaska.

June 26, 1951

made final preparations for Alaska trip. Purchased $10,000.00 insurance (extra hazardous coverage) from Clefford D. Dean of the New England Mutal Life Insurance Co. Stemized equipment for feed work to Point Barrow.

thread nos. 8 and 40
m.m. calipers
Huggins eternal ink
dividers
pen holder
pen points
fountain pen
colared pencils
soft lead pencils for traps
H3 pencils
drawing compass
scissors
fleshing knife
scalpel
teasing needles
straight forceps
curved forceps
long-nosed pliers
saw
wire cutters
egg drills
tin snips (small)
transparent mm rule (4)
wire - 5 grades (monel)
file
carborundum

tags
labels
insect box
insect pins, tips, glue
mammal mounting pins
needles
arsenic
max-min. thermometer
syringe - skull and injection.
body cylinders
H_2O thermometer
nails
medical swab sticks
sawdust
hand lens
oil cloth
gram scales
millemeter tape
snake sacks
metal drill
alcohol forceps
skinning trays
vials
brush (toothbrush) for furs
counting desk
50 cc graduated cylinder

alcohal, formolin
cyanide jar (large)
cyanide jar (small)
asperator jar for small insects
notebooks 5 + 3/4 X 3 3/4
wrist pad for feed recording
cotton (Calif. special)
rubber tube
flashlight
reflector mirror
.410 shells (dust and 12)
.22 shells (dust)
compass
first aid
410 gun
22 gun
collecting chest and trays
paper bags for feather of skeletonized birds.
aqueatic strainer
matches
pocket knife
binoculars
camera, film, accessories
altimeter
alarm clock
pocket watch (second hand)
insurance
clothing
paradichlarobenzence
paper towels
evaporator cooler
card table
camp chair and pillow
plant press
hooks, line leader, shot
serological solution
trap bags
pint jars for reptiles
insect net
plankton net
bags for mosses and lichens
mounting board
insect net - sweeping
insect net - dredging
fish gig
gill net
journal paper
correspondence
relative humedity gauge
wind gauge
slide ruler
cheesecloth for wrapping stomachs etc
excelsior
literature
maps
receipt book, stamps, stationary
radio
colored glasses
knapsack
wire loop for snakes
small screw driver
bait
license and permits
lb. scales
boxes for scat, nests, eggs
1 qt. killing jar for herps.
gloves.

The following are methods to be employed for census of animal and plant populations.

Invertebrate sampling. Insect net with sub-circumference diameter of 21.4 cm (367.57 sq. cm) × 100 sweeps = 1 sq. meter of vegetation or 10,000 sq. cm, use for herbs, shrubs, and trees if in area.

Plankton sampling Plankton net with 11.28 cm in diameter (100 sq. cm) x 10 meters trawling = 1/10 cu. meter (100,000 cu cm).

Plant sampling. Entire plant analysis of 1/10 sq. meter of ground surface. Place in muslin bag and dry. Press higher plants of quadrat. Photograph 1/10 sq. meter area. Collect in general area all dominant and subdominant and other representative plants from each community trapped.

Small mammals. 200 traps in line, each trap 20 feet apart (use 6 meter interval).

Small bird count. Quadrat of 5 m x 200 m = 1 hq. hectare. Will vary according to kind of bird being censused.

Aquatic sample. A dip net 20 cm in diameter three 5 meters of surface water = population of surface insects per 1 sq. meter of surface area. Some dip net over 5 meters length of bottom surface = population of bottom forms per 1 sq. meter of surface area.

Temperature etc analysis. max - min; temp every hour; ground - air - subsurface; relative humidity, evaporation; wind velocity; light intensity; precipitation.

Large mammals. Sign per unit area; scat; burrows; mounds; nests.

Check carefully for Pleistocene mammals including: lion; saber-tooth; dire wolf; arclothere; Grant Elk; Antelope; mt sheep; yak; Regal bison; camel; horse; wooly mammoth; mastodon; ground sloth; giant beaver; coyote.

510627-25

museum natural history, University of Kansas, Lawrence, Kansas

June 27, 1951

departed for Olathe Air Base at 7:00 A.M. Dr. Harrison B. Tordoff drove Jones and I to the base. weather conditions did not allow flight to Denver, so at the advise of the Commander, went to Tinker Field in Oklahoma. Lt. Hayes flew us down in a TBM no. 136. Tied luggage in torpedo compartment under plane. Departed 11:00 A.M; arrived Tinker Field 1:00 P.M. Observed one ecological association in general appearance of deciduous trees. At the Douglas Co area the tree ecotone is an advancing border to west with gradation from mature tree in solid stands to small trees in open exposures indicating an advancing of the trees upon the prairie land. These trees were also confined to erosional gullies and wetter situations. This condition continued south to half way point between Olathe and Oklahoma City where the deciduous element became more of a climax with abrupt lines and tree growth covering greater areas outside of river courses and wet to damp situations. In Kansas the country is marked into sections (sq mile) while in Oklahoma in the more extensive deciduous areas, the roads were few in number and ~~were~~ traversed the country in irregular routes according to the configuration of the land. I would say that in the Oklahoma area, the trees occupy approx. 50% or more of the land surface. Most of the rivers were out of bank along the flying route. Considerable evidence of former erosional levels of these meandering rivers that are now being used for agricultural purposes. These two areas, just mentioned should be analyzed ecologically. I am of the opinion that the Oklahoma area is a near climax while the Lawrence area is more rightfully to be considered as prairie with recent invasion of trees, particularly outside of river valleys and damp drainage courses.

Tinker Field, Oklahoma (near Oklahoma City), Oklahoma.

June 28, 1951

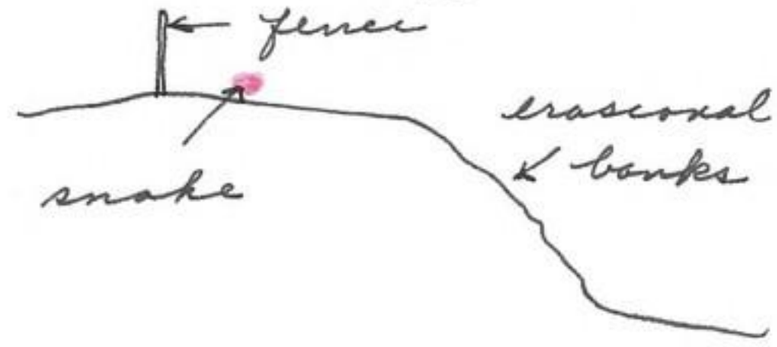
Scheduled to leave for Hill Field and then either to Great Falls, Montana or Tacoma, Washington. This base (Tinker Field) is headquarters for M.A.T.S. and we will use this facility from here to Fairbanks, Alaska. Departed 12:10 P.M. Enroute to Hill Field took the following photographs generally at 500 see and from 3.5 F to 8. The general route included,

Gage, Liberal, La Junta, Colorado Springs, Denver, Loveland, Laramie, Medicine Bow, Rawlins, Rock Springs, Fort Bridger, Odgen, Utah. All shots underexposed. Some correlations of time are: Loveland 3:15 (same time as Tanker); 3:40 P.M Laramie; Snowy Rang, 11,000 ft. 3:45 P.M; At 4:20 P.M beginning of conspicuous circular dotted spots which may be influenced by wind from west. At 4:34 P.M. just beyond red zone, considerable evidence of long tongues of sand dunes that have been covered with vegetation suggesting possibility of wind eroding low pass in this part of Wyoming. (((((. Photo 510628-21 of erosion land at 4:45 P.M. Photo 510628-22 of cuesta at 4:45 P.M also. At 4:46 P.M two large rivers. Photo 510628-23 of cuesta just east of area where green grass is beginning to appear in the landscape. Photo 510628-24 of higher plateau area with snow patches at 5:34 P.M. Photo 510628-25 and 510628-26 just before Wasatch Front. Wasatch Front at 5:43 P.M. Photo 510628-27 and 510628-28 of Great Salt Lake at 5:46 P.M. Arrived Hill Field Army Base at Odgen, Utah at 5:55 P.M. Called home (Provo) while waiting repair of no. 3 motor on our C54 plaine. Good to see the Calif. Gulls again. Departed 8:00 P.M. Arrived Great Falls Army Air Base at 11:10 P.M. Did not have a chance to see Tetons or Yellowstone from air.

Great Falls Army Air Base, Cascade Co., Montana.

June 29, 1951

Jones and I visited immediate vicinity of base at north end of main runway. One crotalus viridens (rattlesnake), approx. 30 inches long, 8 rattles, appeared to be in the process of molting with dull color surface and cloudy eyes. Not too active except when molested at which time would either strike (nearly its full length). Body fat suggesting young. Snake along fence row supporting short grasses with erosional and cut banks approx. 10 feet away. Rodent burrows near. A yellow blooming Opuntia grew along the brink of the cut. A large cardboard fragment was lying 1/2 foot away underwhich was a burrow 2 inches by 18 inches and could possibly have been used by this snake as a waiting point for capture of small mammals. The temperatures have been cool and skies cloudy in morning and at time of discovery of snake the sun had broken thru. Possibly this snake was sunning when



discovered. It responded by rattling at approx 2½ feet away. Photo 510629-1 and 510629-2 of this snake. One Citellus richardsoni along railroad track which had apparently been hit by a passing train. no conspicuous evidence of these squerrels in this area. The following birds observed: Perdix perdix perdix, 2; Sayornis saya, 2; Passer domesticus, 15; Calamospiza melanocorys, 6; Poecetes gramineus, 3; Riparia riparia riparia, 2 (copulating); Cercus cyaneus 1; Agelaius phoeniceus, ♂+♀; Euphagus cyanocephalus, 20, several immatures; Acris ? heard in area. Skunk scat along tracks.

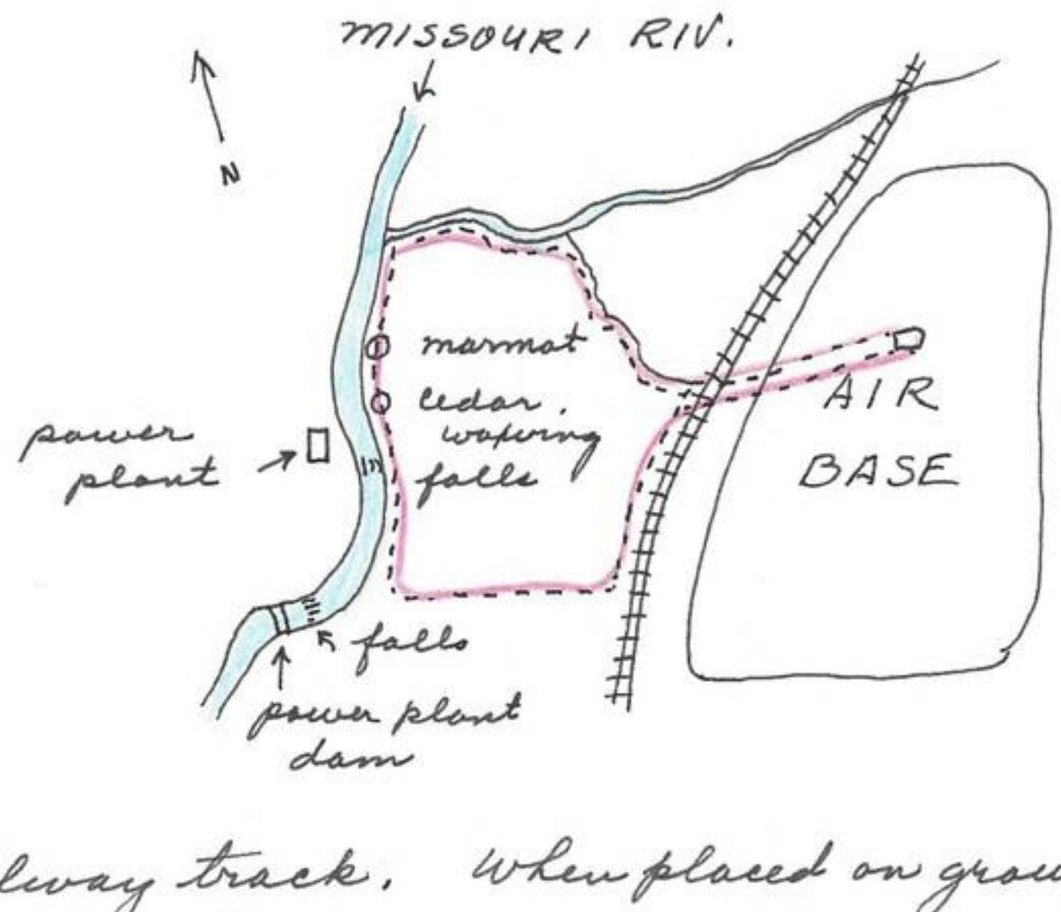
Great Falls Army Air Base, Great Falls, Cascade Co., Montana

June 30, 1951

Jones and I made 4 hour trip near base to check on birds and mammals near base while waiting for transportation to Alaska. The general area is NW of base to east-west canyon, thence west to missouri River, thence south to railway bridge at power plant, thence east to base.

Started 3:20 P.M.

Observed following birds: Otocoris alpestris, 15, generally distributed on prairie area; Agelaius phoeniceus 4; Passer domesticus; Sturnella neglecta, 12; Citellus richardsoni, one captured by Jones. It was under a metal sheet on ground near water course along railway track. When placed on ground remained at base of our feet then ran across a road and then stood up. It did not have a burrow to retreat so played its bluff by stopping and standing on hind feet. no other ground squirrel observed nor evidence of them; Lepus townsendi campanius, 1; Euphagus cyanocephalus, 8; Cercus cyaneus, 1; microtus pennsylvanicus, numerous along creek leading into lateral canyon of the missouri. Soils damp and with grasses and sedges. Less common on slopes of grass above the damp soils. In certain areas cutting and feces almost completely covering surface of ground. Especially numerous under protection of dry tumbleweed like plant. Jones captured one immature. It swam



across 2 feet of water without hesitation but preferred the dryer sides. One using nest placed under cardboard box. One in road dead. This area supported what I would consider an above average population. They were less prone to leave damp creek bottoms, however, they were at one point some 200 ft from the canyon floor. Skunk scat along creek also evidence of Phasianus colchelus, Perdix perdix and Odocoileus tracks (one set only). Jone found one pheasant nest with fragments of egg shells, placed under dry tumbleweed and near water edge. Poaceles gramineus 14; Pica pica hudsonius nest. Neotoma nest, in red sandstone ledge bordered by Prunus melanocarpa in creek. Also wild rose and nine-bark present. Neotoma path well developed along ledge. nest 15 feet from water. Petrophis catenifer skin. Peromyscus maniculatus dislodged from under flat lyeng stone. Reparia reparia, 2. Petrochilodon albifron numerous, especially along Missouri River, 2 nests on cliffs along east side. Chondestes grammacus strigatus, 4. Zenaidura macroura, 1; Larus Californicus ? or delawrensis along river between power plant; Pipilo maculatus, 2; Bombycilla cidrarum, 1 bird opposite power plant on wall of river canyon in Juniperus and associated with shrubs and grasses. Acted as if concerned about immediate area; marmota flovventris nosophora, small in size, ran 60 feet to den under rock near top of river Canyon; Sylvilagus, 1; Tyrannus tyrannus, ♂ + ♀ along utility line; it chased a Calomospiza melanocarys into grass, later the lark bunting chased the flycatcher away. Day overcast with dull lighting. Rained slightly at approx. 7:00 P.M; slight wind. A large Sayis phoebe called from roof top after dark.

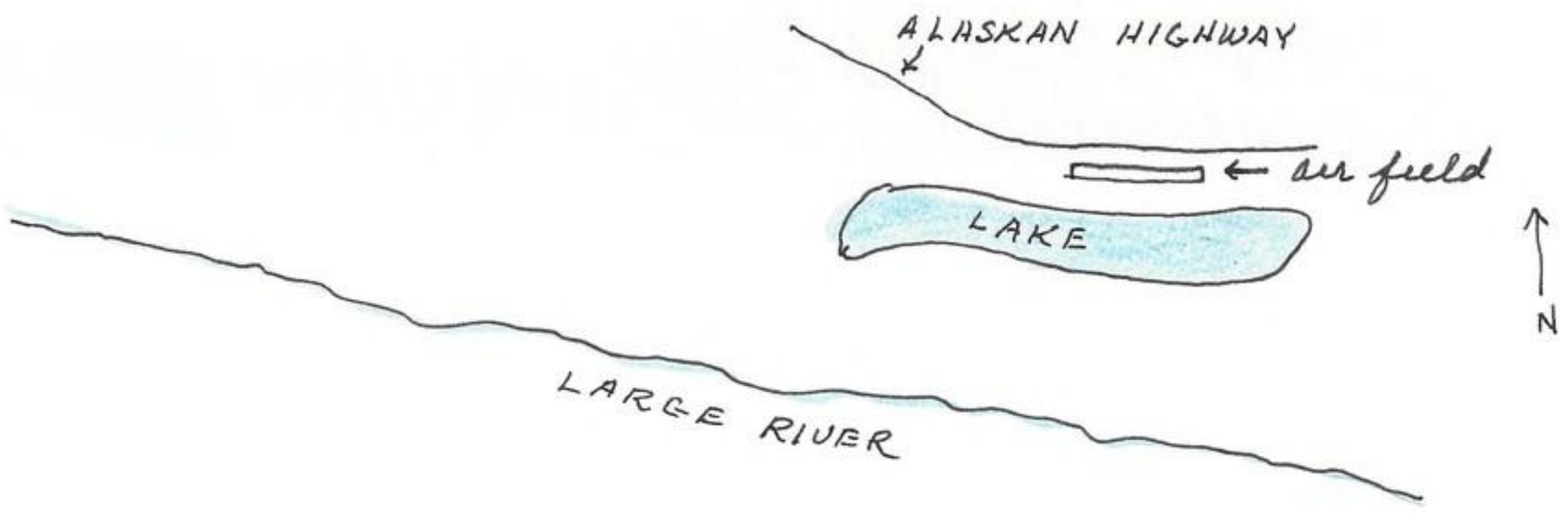
Great Falls Army Air Base, Cascade Co., Montana.

July 1, 1951

Departed Great Falls 9:10 A.M for Fairbanks, Alaska in C54 Military Army Transportation Service plane. Followed along established air route which parallels the Alaskan Highway most of the way. Recorded observations according to time interval with Great Falls time all the way. Air speed to Edmonton 198 miles per hour. Air speed from Fort Nelson to Fairbanks 175 miles per hour. The following observations and pictures were recorded. Photo 510701-1 at 10:21 A.M, 7000 ft. The conifers and aspen appeared first ~~as~~ in unused corners of cultivated areas but at 10:33 were in river drainages on north exposures. Calcary, Canada 10:38 A.M.

10:50 rare to occaseonal group of conifers and aspen or birch in unused areas. By 10:58 the aspen and conifers constituted 30% of trees. 11:05 Photo of river meander 510701-2 just beyond the city showing aspen, few conifers along rivers. 11:10 A.M conifers and aspen covering 40% of land. Photo 510701-3 of Edmenton, Canada. Photo 510701-4 numerous lakes and clouds. Photo 510701-5 same as above with cloud variations. North of Edmonton approx 20 miles, 90% in trees, numerous lakes. Photo 510701-6 and 510701-7 of clouds with forests 100% of land coverage. The vegetation mainly second growth. 12:20 P.M. last 1/2 hr trees logged with old dead trees remaining. 12:30 P.M cut over timber and streams shown in photo 510701-8. Photo 510701-9 as above but with deep canyons and well timbered. Photo 510701-10 with river straightaway, good clouds, typical glacial formation ⟫⟫. 12:45 P.M first cultivated area for some time, large lake directly below, very few deciduous or coniferous trees. 1:05 P.M photo 510701-11 deep entrenched rivers in semi-cultivated areas. 1:10 large entrenched river, 1:30 P.M. fir burns. Topography increasing in complexity, 60% conifers and aspen and 40% green natural open spaces. 1:50 more like secondary growth with 50% shrub open feeld, prominent entrenched river and widely meandering. a fanlike pattern of vegetation along river ⟨⟨. Photo 510701-12 of stream meander and clouds. Photo 510701-13 clouds with ground in distance, many beaver ponds. 2:15 large air base by large river, good stand of timber beyond. Photo 510701-14 of clouds and land below with 50% aspen, 50% conifers and about 30% of area in open natural feelds or meadows. Photo 510701-15 at 2:25 as above. At 2:26 conspicuous cliffs. 2:28 P.M photo 510701-16 of clouds mainly with land below. 2:43 PM crossed large river with a large dry canyon entering. mountains to north with small specks of snow. 2:44 P.M going into mountain ridges trending north-south and more heavily lined with snow cornices. Here 80% trees and 20% clearing. Photo 510701-17 of snow covered mountains at 2:50 P.M. Photo 510701-18 at 2:52 as above with forests 60% and openings 40%. At 3:00 P.M air feeld below, trees 100%. Photo 510701-19 at 3:13 P.M of redges and river. Timber 80%, clearing 20%. 3:25 P.M numerous lakes with 98% forests. 3:27 P.M large landing feeld to south at north end of lake It is apparent that the air routes were layed out to parallet the Alaskan Highway.

510701-30



Followed for many miles along the large river. 3:35 crossed river we have been following for last 8 minutes. Photo 510701-20 of river, 3:36 P.M, to north which is the same one just crossed at 3:35. 3:43 P.M just beginning of mountainous country. Photo 510701-21 of range to south with snow. Photo 510701-22 at 3:50 to south over left motor of plane. Photo 510701-23 of meandering creek and McKenzie Range in background, taken at 3:55 P.M. Photo 510701-24 of lake to north at 4:00 P.M. 4:09 P.M meandering river to north. At 4:10 P.M crossed Alaskan Highway which parallels creek of 4:09 P.M. 4:16 crossed ~~Alaskan Highway~~ large north-south river. At 4:25 P.M flew across north end of largest lake yet observed, from coastal range to south. Alaskan highway passes north of this lake. 4:30 P.M Whitehorse, Yukon. Photo 510701-27 at 4:50 over motor to south with St. Elias Range in background. 5:55 P.M treeless and soil with water on all slopes with small reflective patches every one or 2 feet. Treeless except in protected spots. 5:15 rolling mountains, green throughout and with snow. Has been this way for last 20 miles or so. 5:30 braided river N-S trending. Photo 510701-29 of meandering ponds and lakes. Alaskan Highway in the distance, aspen and Conifers present, river muddy, beyond rolling uplands. This is a valley of low and extensive meanderings. Photo 510701-30 at 5:55 of extensive meandering. Flight parallel this river. Photo 510701-31 at 6:08 P.M of clouds only to north. Photo 510701-32 at 6:28 P.M of clouds and river to north. Photo 510701-33 at 6:40 P.M of clouds. Country less hilly. at 6:48 passed over mile 26. Country flat, highly meandering, aspen or birch nearly everywhere except in old lakes and river courses. Conifers along river and in favorable places. Hilly to north. Photo 510701-24 of Fairbanks, Alaska taken at 6:57 P.M. 6:57 P.M can be considered as arrival time for purposes of travel references. Actually landed at Fairbanks at 7:00 P.M. (Same time all the way from Montana).

Stationed arctic Contractors Camp north of Fairbanks. will leave for Point Barrow tuesday morning by Transoceanic airlines. In recapitulation of flight from Great Falls, Montana to Fairbanks, that aspen parkland originally was farther south than today but has been removed by agricultural pursuits. The first good indication is just beyond Calgary. The transition from prairie to forests is extensive and gradual. Considerable cutting of timber in the early period of mans use. Pure stands of conifers, lacking except in a few instances. most of country is characterized by natural open clearings. From the first mountain range to rolling topography ~~is~~ well populated with trees and appears to be a distinct unit. A second unit includes the area beyond to Fairbanks which culminates in a broad flat valley. The section of the trip including the successive mountain ranges trending north south appeals to me as an area in which I would like to revisit and study. The coast range could be seen including St. Elias, Mt. Logan and Wrangel mountains

Fairbanks, Alaska

July 2, 1951

Trip to Univ. of Alaska, at College, via railroad track route, Walking entire distance. Birds observed from Fairbanks to the University are: Passerculus sandwichensis, Acanthis linaria, Iridoprogne bicolor, Petrochelidon albifrons, Actitis macularea, Turdus migratorius, Bombycilla cedrorum, Zonotrichia leucophrys, Charadrius semipalmatus, Junco, Lopia leucoptera. Photo 510702-3 of Univ. of Alaska. Photo 510702-4 of crashed plane which was downed by cable across river. Photo 510702-5, Fairbanks, Alaska with Knox Jones in foreground. Light at Fairbanks at night about like twilight in States.

July 3, 1951

Departed from Fairbanks at 9:00 A.M for Point Barrow by Transocean Airlines from Ladd Field. Just north of Fairbanks like Wallsburg in Utah with rolling ridges. Slopes and mountains green with 80% forests and 20% natural clearing. River valleys flat and 50% forested. Openings tundralike. 9:37 A.M Yukon River. Photo 510703-1 of Yukon River. Photo 510703-2 same as above. Photo 510703-3 pilot of plane.

Arctic Research Laboratory at 8:00 P.M. Plectophenax n nivalis 35; Calcarius lapponicus alascensis, 50; Arenaria interpres morinella, 1; Eroka melanatos, 2; Peledna alpina sakhalina, 1; Clangula hyemalis, 42; King eider, 1; Phalaropus fulicarius, 13; Erolia bairdii, 14. Sun at midnight approx. 30 minutes from setting position.

Arctic Research Laboratory, Point Barrow, Alaska

July 4, 1951

Investigated SE of ARL 9:30 A.M to 11:30A.M and made the following observations.

Erolia bairdii nest of 4 eggs. Female leaves nest at 20 feet to 50 feet and generally fly toward intruder and then feign crippled act on ground for 50 feet if followed. Male generally in immediate vicinity and follows ♀. ♀ respects ♂ by chasing but ♂ follows close. If 2 ♂♂ approach ♀ the mate of the female will fly at the second male or newcomer. In 3 minutes, 4 other pairs of sandpipers of the same species arrived and remained in vicinity. ♀ returns to nest in about 4 minutes and goes directly to it. At another approach to this nest after a half an hour later, the male was standing beside the ♀ (1 foot away) with head on wing in feathers. When approached it, the ♂, was first to leave, then the ♀ followed and feigned in typical form. The ♂ fly around rather fast while the ♀ flies more slowly.

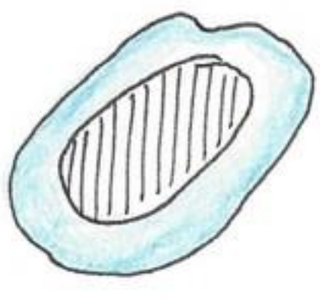
Plectophenax n. nivalis. Nest of 5 young placed on barren soil mound made by tractor wheel; under overhanging ledge of old Lemmus diggings. Another placed in 500 gal. oil or gas drum, making entrance in hole at side. noted other buntings carry insects to nest and carry fecal droppings away from nest.

Gavia adamsi or Gavia arctica pacifica. One bird flew N W calling.

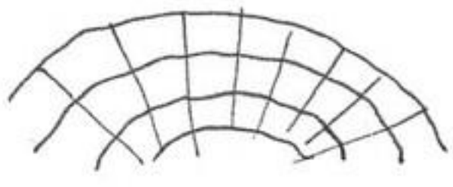
Acanthis sp. Pair on tundra.

The birds observed yesterday were also present. At 8:45 A.M watched all birds passing by Point Barrow as they flew over the lead of ice from 8:45 to 9:45 as follows: (sky overcast, heat waves off ice). From the gravel shoreline, the water was 100 feet open, thence brown dirty rough ice to 3 blocks, thence white ice for 3 blocks to pressure ridge, thence to open Arctic Ocean. The movement of the gulls is not at all natural movement but influenced by Barrow Village & Camp refuge.

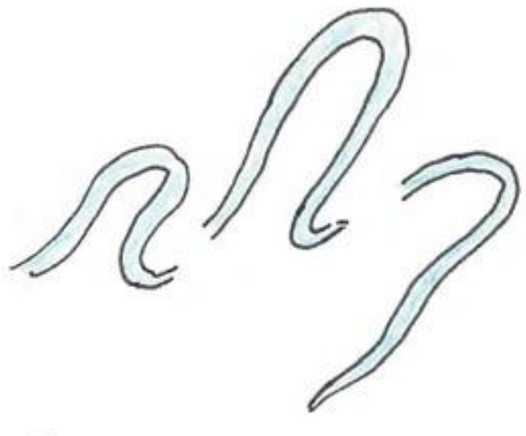
Photo 510703-4 at 10:02 of meandering river to north. Photo 510703-5 at 10:07 near convergence of John and Wild rivers. Photo 510703-16 of Anaktuvuk Pass to northwest at 10:14 A.M. 11:25 hills with scrubbylike vegetation, streams with along edge, ridges green and some barren, few snow patches and cornices. Photo 510703-8 at 10:35 to east. Hills brownish green, practically treeless. 10:44 treeless but greenish brown, low lying hills and river meandering. no trees. Photo 510703-9 at 10:45 to west, very few lakes, deep green in draenages only. Photo 510703-10, 510703-11 of Colville River at 11:00 to east and west respectively. Would suggest Kansas topography. Can see beginning of tundra lakes which start abruptly. most lakes clear of ice. no snow except rarely. Partially entrenched rivers. The gently rolling topography gives rise to a flat one at which point the country turns from ~~one at which~~ near lakeless area to one of numerous lakes. Photo 510703-12 at 11:10 of lakes and tundra to west. Ice in larger lakes (3/4) with water around edges. no snow except rarely. Photo 510703-12 at 11:26 of icy lakes to east.



ice mass in lake



square to hexagonal pattern



interupted meander.

Three-fourths of larger lakes iced, some complete, some incomplete, some entirely free. No snow, color brown, most of smaller lakes free of ice. 11:30 A.M good area of hexagonal to square ice formation in soil. Water in cracks, when saturated in centr of square. Occasionally bare ridges. Most lakes and creeks clear. Large bays to north in ice except around border. no snow. Green water when standing on this years ice. Arctic Ocean clear beyond pressure ridge to west but partially closed in to north and east. Pressure ridge marked coastline. Bay water muddy. Arrived at 11:58 A.M. Landed 12:00 A.M. The most unusual thing about Point Barrow is the narrowness of the projection of gravel + sand mass. Day temperatures invigorating. Observed the following birds just south of the

8:45	A.M	Larus hyperboreus	out	400'	flwng	to	SW.
8:48	"	"	"	400'	"	"	SW
8.58	"	"	"	9 blocks	"	"	SW
9:03	"	"	"	300'	"	"	NE
9:10	"	"	"	800'	"	"	NE.
9:15	"	"	"	800'	"	"	SW
9:25	"	"	"	700'	"	"	SW
9:36	"	"	"	300'	"	"	NE.

Shortly after 9:45 a pair of mergus serrator passed SW flying over ice about 400' from shore. This afternoon went to Barrow Village, some 5 miles SW of ARL. Photo 510704-1 of habitations of Eskimos with dogs in foreground. Conditions of living, and environment rigorous but people remarkably clean and orderly in action. All are healthy except a few eye defects in 200 or so. Eskimos observed.

July 5, 1951

Departed Point Barrow at 9:40 A.M for Topogaruk, Alaska via C47. Arrived 10:06 on sand strip at edge of river. Set 73 museum special traps 30' apart 1/2 block east of Camp. nos 74 to 144 1/2 blocks west of station and 30' apart (in linear line). The tundra and bird life remarkably little effected just beyond the immediate area of the oil well. The recent construction of this camp has not had time to influence surrounding area. Observed Rangifer arctica stonei tracks in sand along river edge and also at one or two points in tundra area. Two Eskimos, employed at this Camp killed 4 caribou just a few miles NE of camp. These animals were presumably the ones in area as no other caribou were noted. From signs and tracks, they are made by only a few caribou. Old sign in area about 1 per 1000 square yards or less. The summer animals (Caribou) have not arrived from the south.

Nest of Phalaropus fulicarius with 4 eggs on bank of tundra 1 foot above water  . It left at four feet. On return 1 hour later this bird left at 20 feet. Citellus parryi not observed but 5 or 6 holes on each mound along sand river bank. no sign of recent activity of Citellus but Eskimos say they are there and can be caught with traps. Examined about 25 mound with each supporting 5 or 6 holes. Ptarmigan holes numerous on lee side of 30 sand dunes along edge of river.

Sand dunes deeply cut by winds from the S.E. This sand

This sand has accumulated from river bottom sands and forms a conspicuous feature of the landscape. Sand can be seen blowing in air as a sand cloud over river systems. main tundra hillocky. Soft to walk

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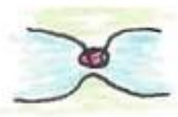
on but not at all difficult or excessively tiring except where hillocky with Ereophorm or deeply rutted. Numerous shallow lakes or ponds between series of hills. most shore birds prefer edge of larger lakes. Ice in large lake to north and few ice piles on south side. Oilwell down 9,000 feet through Cretaceous to near Permean or Carboniferous. Most bird activity in period equal to night. Birds noted to date: Gavia arctica pacifica, 3 pairs; Clangula hyemalis, pairs and few groups; Xema sabini, 6; Sterna paradisaea, 6; Stercorarius parasiticus; Stercorarius longicaudus; Larus hyperboreus barrowensis; Erolia bairdii or Western sandpiper, Calcarius lapponicus alascensis; Plectophenax nivalis nivalis; Phalaropus fulicarius; Erolia melanotos; Lagopus lagopus alascensis; Mergus (sic! serrator) serrator; Squatarola squatarola; Pelidna alpina sakhalina; Arenaria interpres morinella; Ereunetes pusillus.

Topagaruk, 155°55', 70°34', 10 ft.(?), Alaska

July 6, 1951

Collected the following birds from immediate vicinity of camp. Gavia artica pacifica, 1; Clangula hyemalis, 1; Sterna paradisea, 1; Xema sabini, 1; Phalaropus fulicarius, 4; Pelidna alpina sakhalina, 2; Plectophenax n. nivalis, 1; Erolia melanotas, 1; Baird or Western, 1; Ereunetes semipalmatus, 1; Calcarius lapponicus alascensis, 1.

Located nest of Gavia arctica pacifica on promentory  nest shallow and slightly concave  . nest exposed and water on 2 sides 12 inches away. Collected one of the pair (one at nest) and while floating toward shore the male arrived from another lake and alighted 5 feet from dead ♀ then swam to it and made up and down head gyrations

immediately in front of it. When we returned one hour later the ♀ was at shore and the ♂ in an adjacent lake. The ♂ did not show concern of nest. This species call frequently from large lake to north. Young of Pluctophenax n. of nearly full feathers in nest in 6 inch pipe 5 feet above ground (stack of pipe). One young bird, 2 or 3 days old, in water and mud at base of pipe. One small immature Calcarius lapponicus (size of parent) caught in trap line. Trap line this morning with 8 sprung traps. This evening on 2 traps sprung indicating greater bird activity at night. Jones traps indicated same trend - 13 at night and 2 during day.

Topagaruk, 155°55', 70°34', 10ft., Alaska.

July 7, 1951

West trapline (this A.M) with 1 sprung and one Dicrostonyx g. rubricatus 510707-1. Taken in trap 49 along fissure type runway. No sign of recent activity. Trap in exposed situation. Fecal pellets from this animal measured 4. mm in length. East trap line with 2 sprung. At 9:30 A.M photographed 5-10707-1 nest and one egg of Gavia arctica pacifica located yesterday. Female bird collected yesterday from this nest with one egg 8 mm in diameter and others grading to small egg clusters. The photo shows close proximity to water and moisture conditions. At the time the female was taken I placed some mosses and grasses on egg so jaegers would not discover and when examined this morning the male had been incubating the egg and had left without us seeing it. The male was at the east end of lake. In afternoon nest and egg cold and ♂ in adjacent lake 300 yds away. Perhaps it sensed a disturbance or left eggs at a time when it considered the other bird should be at the nest. These birds call frequently and when passing over camp the Eskimos will call back in a near perfect response. Observed 2 young Pluctophenax 3/4 size of parent, short tail and feebley flying. Also one Calcarius lapponicus alascensis young which could just fly. Photographed a nest of 4 eggs of Pelidna alpina alascensis 510707-4. This bird was approached 7 times and at left, on each occasion, at about 80 feet and would fly 150 feet before alighting, at which time it would call as usual. This conservative nature of Pelidna is in contrast to other smaller birds (shorebirds) which leave under foot. The eggs of the red-back sandpiper are about same as Wilson snipe. Flushed

3 Eralia pusellus which nodaubt had a nest or young. 3 Xema sabini flew over lake to west. They seem to remain in area. 18 Larus hyperboreus fed at garbage dump just South of camp. This morning collected one Pelidna alpina sakhalina, 1 Erolia bairdii, 1 Limnodromus griseus, 2 Erolia pusellus and 1 Plectophenax nivalis. This evening shot 1 Xema sabini, 2 Erolia semipalmatus and one arenaria interpres marinella. The large fresh water lake just north of camp is now about free of ice. There has been considerable depreciation of ice in this lake since 3 days ago from about 4/5 open to 1/10 open or less. Some of the men reported drifts of snow some 5 feet during winter. This present time is just between winter and summer. Wolves, foxes, ptarmegan have left and the summer kinds have not started to arrive or become active. Bird life is not considered as abundant as last year. The men are beginning to wonder if geese and ducks will arrive. Eskimo helpers say there are no rabbits or weasels near Topagaruk. One Eskimo has jacket of Citellus skins. Mosquitoes last 2 days not objectionable because of cold weather, can see breath, and winds. Today with sun and moderate they become unbearable if not deterred with head net. These nets are not too satisfactory and must be designed with wide rim support to keep mosquitos from biting ears and face. Also brim of hat should keep sun from shinning of net because if the sun does strike the front, it is difficult to see. The following birds are listed in degree of abundance from greater to lesser degree on tundra proper.

Calcarius lapponicus alascensis (around Camp only) 50%
Plectophenax n. nivalis 25%
Ereunetes pusillus 15%
Eralia bairdii or (western?) 4%
Pelidna alpina sakahalina 3%
Phalaropus fulicarius 2%
Squatarola squatarola, gulls & jaegers less than 1%
Arenaria interpres marmella, Eralia melanata, "
Sterna paradisaea, Xema sabini, clangula hyemalis, "
mergus stellata, Gavia arctica pacificus, Lagopus "

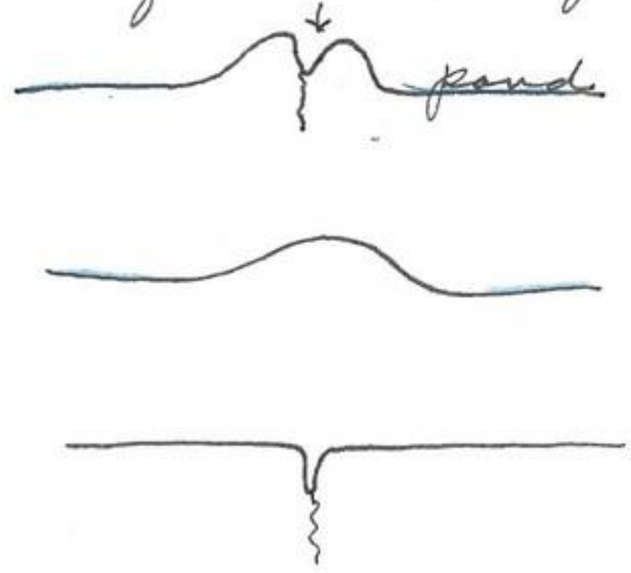
Rained very hard between 9:00 P.M & 10:00 P.M.

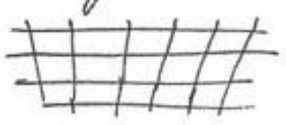
5107 09-38

Topagaruk, Alaska

July 9, 1951

Wind this A.m to 40 miles per hour but pleasant as far as Tem. Temperature is concerned. Occasional blue sky above. Birds uncommon in areas where formerly numerous because of high wind. They could either be in grasses or sedges or out of area. Collected 1 Baird sandpiper?; 2 a. Longspur. and one red-backed sandpiper Examined river bank with appros 15 foot heighth. Sections had collapsed because of undercutting and lateral drainage. In cross-section of river bank mosses and lichens four feet thick and resting on sand. Other sections alternating sand and tundra indicating rever overflow. The sands were moving along river and clouds of sand moving across horizon of tundra. Some dunes 20-30 feet high along river. Hexagonal and square ponds had ridges of the following profile. The fracture crevasses are higher than ponds. Some ridges have lost their fracture crevasses and are rounded ridges. Some fractures are just opening. The ponds and dikes remind one of the oriental paddy fields with irregation canals built to carry water. From the air they are squarelike in outline.





This afternoon from 1:00 P.m to 5:30 P.m made cruise across tundra, traversing all varied vegetational and physealogical communities. Cruised at about 1 ~~miles~~ mile per hour. Climax tundra in two ~~physiographical~~ physiographical situations, one on the broad flat uplands in which the tundra vegetation occupied the flat surface like gramma grasses of the prairies of temperature regions; the second a hilly or hummocky situation in which the vegetation was protected from supersaturation and from the high level and overflow of lakes. The relief is as follows:

The deeper drainage channel (2 to 4 feet) drain water from hummocks. This climax support best vegetation and greatest variety of bird life. The flat climax tundra did not support

support much bird life in contrast and may represent true climax. Fracture redges and ponds adjacent lakes, if lakes were more or less permanent, were second best in supporting bird numbers, particularly red-backed and pectoral sandpipers. Areas undergoing complete inundation with drainage to rivers were the least populated by birds. It is characterized by dried stems in mat formation which have accumulated at shoreline and also the presence of greenish-yellow grasses and sedges instead of the drab lichens and masses of the climax. Rivers are successional or edaphic and suffer considerable overflow. Willows (some 3 and 4 feet high) are generally associated with these rivers and shifting sand dunes. Few birds are along rivers, at least at this time of year. A good many shorebirds are on slopes in vicinity of larger lakes. In successional areas of periodic inundation, one walks for miles without seeing many birds. Photo 510709-1 of white flowers and sky pasture of last 12 hours. Black-bellied plover call like long-billed curlew except more plaintative. The red-backed sandpiper calls like a western grebe, the semipalmated is characterized by vibrating wings and flycatcherlike call. Jones shot a male black-bellied plover and the ♀ returned to dead bird in face of Jones' approach to the dead bird. Ordinarily they keep out of shotgun range. Jones caught 1 small ptarmigan near the one I caught several days ago which might indicate they do not move about to any extent. Snow buntings and alaskan longspur (young) are capable of flight. Examined small colony of gulls and terns. The Sabine gulls and arctic tern are compatible with nests 20 feet from each other and young circulating through each others territory. Parent birds approach at 150 feet and then return and hover or fly directly over nests. One Sabine gull nest on mound about size of gallon jug with water on all sides. Tern nest on islands about 1 sq. yard. Due Continual use makes a greenlike lawn of vegetation. This condition of lawnlike grass also occurs where geese and ducks use drainage channel from one lake to another, an effect of trampling and fertilization with fecal matter. 22 glaucous gulls in area. Noted 13 Arctic tern in grass on standing water of lake as if nesting. Two pairs of Canadian geese in area. One eider nest of 5 eggs in climax tundra (hummocky type), Semipalmated sandpiper with newly born young. Arctic loon ♂ still incubating egg of last few days of observation.

collected 18 birds today including an Acanthis linaria (sp?) in willows of successional area. I am now convenced that the bird that flew out to meet me along river edge yesterday was this species. At that time it flew directly to me and inspected me while in the air not further than 6 or 7 feet. Approx. number of birds observed from 1:00 P.M to 5:30 P.M on continuous cruise: 4 Arenaria i. morinella, 18 Peledna alpina sakhalina, 25 Phalaropus fulicarius, 60 Calcarius l. alascensis, 48 Ereuneles pusilus, 5 Xema sabini, 13 Eralia melanotas, 8 Pleetophenax n, 9 Stercorarius parasticus, 3 Lobipes hilabes, 14 Squatarola squatarola, 18 Sterna paradisaea, 20 Larus hyperboreus, 9 Clangula hyemalis, 1 acanthis linaria (sp.?), 5 Gavia arcticus pacificus. Lemming activity of last year in evidence on all sides but no lemming now. Most recent evidence along immediate edge of permanent lakes. 13 instances of fox excavating lemming. Observed evidence of community formation in shorebirds.

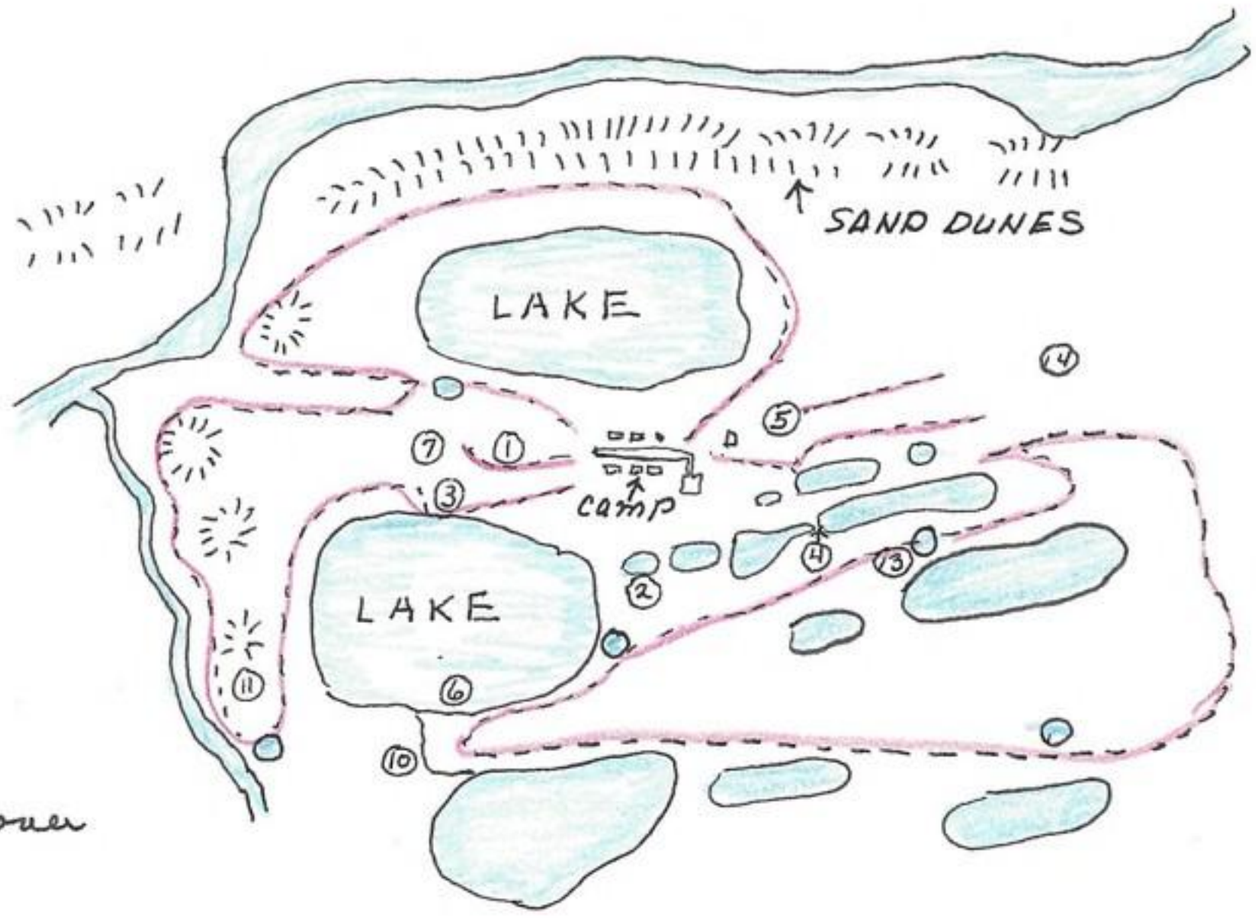
Topagaruk, Alaska

July 10, 1951

Photo 510710-1 of Baird sandpiper nest and four eggs approx. 150 feet from derrick. Collected this bird no 510710-2. This bird showed considerable feigning display around nest. Above photo taken at 3:00 P.M. Photo 510710-4 of derrick from the north showing radio hut where we did our skinning and preparation of bird skeletons. The LVT rests against the side of the dock. Photo 510710-5 of Steller's eider nest and 5 eggs. Lining of nest of black down from bird. Bird left at six feet on approach. Collected this bird 510710-6. Photo 510710-7 of sandunes along river to the north. Ice now gone from lake north of camp. Examined one willow tree 4 feet high and 2 inches in diameter at base. Approx 4 gulls passed over while waiting for plane to arrive. Departed Point Barrow at 4:40 P.M. Many of the larger lakes are now freeer of ice than a week ago. The area surrounding camp is rutted with bulldozer track, most of them 1½ feet deep and impassable to traverse except with knee boots. Tracks beyond camp are generally confined to single tracks or 2 or 3 series of tracks, each about a foot or so deep and filled with mud. Permafrost about 4 to 8 inches below surface and supports bulldozers. Romp to elevate walk above drifting snow of winter.

510710-41

ITINERARY AT TOPAGARUK



① nest of Polysticta
②. Xema sabini and Sterna parasiticaea nest.
③ Red phalarope nest
④ Gavia arctica pacificus nest.
⑤ Erolia bairdii nest.
⑥ Sterna parasiticaea nest and colony.
⑦ Lagopus and young.
⑧ black-bellied plover pair.
⑨ area of greatest bird congregation.
⑩ willow growths
⑪ Redpolls
⑫ upland flat climax tundra
⑬ Hummocky low climax tundra
⑭ Grass and sedge tundra.

Direction at Topagaruk on basis of sand dunes and sand blowouts from NE prevailing winds. There is possibility that directions at this camp are reverse (check map)

Arctic Research Laboratory, Point Barrow, Alaska

July 11, 1951

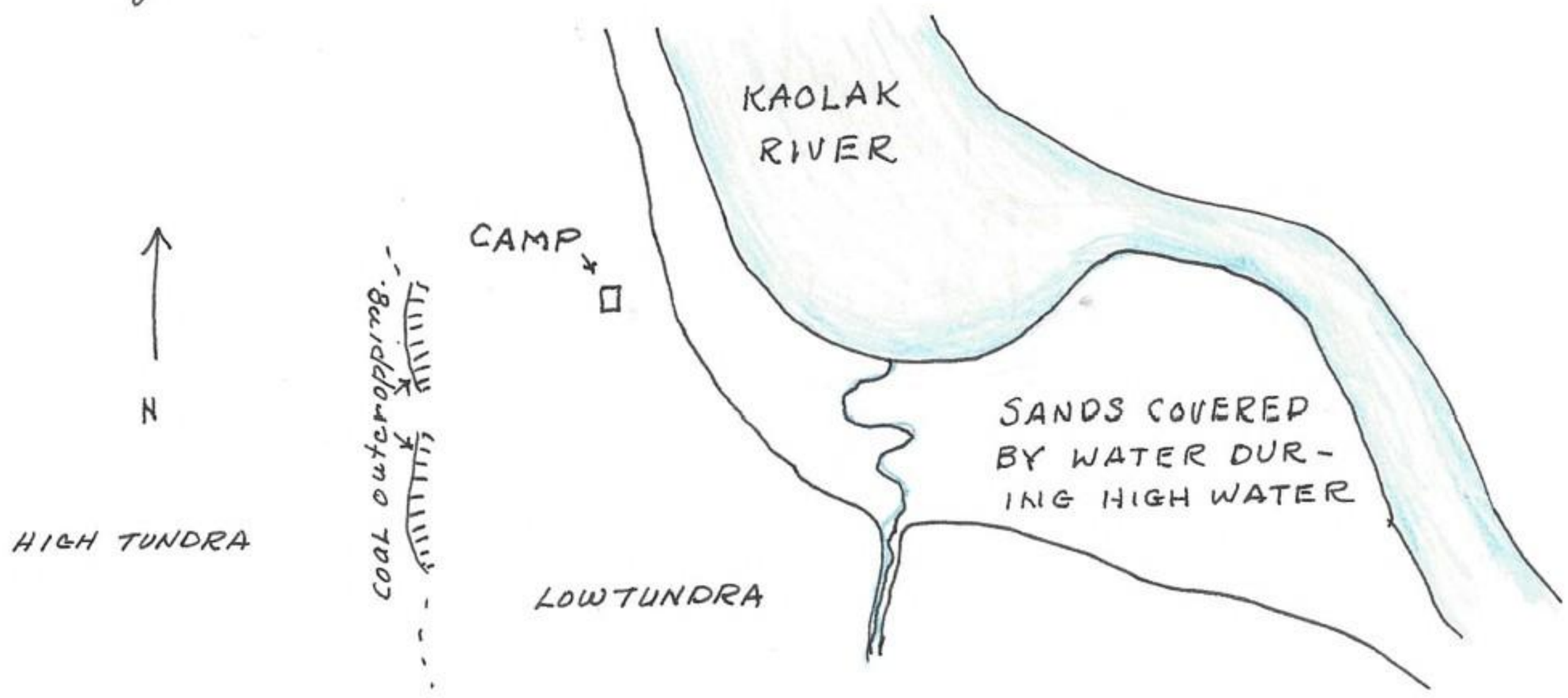
Photographed ice moving out from Point Barrow in nos 510711-1, 510711-2 and 510711-3. The dark ice started to move between 1:00 and 2:00 A.M Sunday July 8. Now the water is open as a lead and new or fracture or pressure ice fragments moving NE along the coast. This new situation brings more ducks and seals near shore. Photo 510711-4 of tree stumps on shore, having drifted from several hundred miles to south, possibly from Russia. Photo 510711-5 of Jones on ice mass on beach. At 6:00 P.M and for 10 minutes observed 2 flocks (80) of old squaw ducks passing NE, 2 smaller groups of 5 and 22 passing SW. Today is the first sunny day we have had in a week. Dr. Ira L. Wiggins reports from Meade River, 40 miles south of Point Barrow: 100 caribou; flowers in height of blossoming; + Citellus parryi; 1 red fox; Lemmus cuttings in used trail; no evidence of weasels; weasel will enter Lemmus community and destroy entire population and then remain in preempted burrow, one generally can tell by few patches of hair near entrance to burrow; snowy owl used to patrol antenna line just south ARL, these

owls hunt from high ridges or mounds by sight and after getting their prey return to perch. Dr. Petelka and party returned from Umiat after spending 3 days in the field. They report many different kinds of birds at Umiat such as yellow wagtail and green warbler. The wagtail fly overhead and call continually for several hundred feet. Petelka claims birds at Point Barrow are much like those at Topagaruk with the exception of dowitcher and nesting Sabine gulls and Arctic tern. The red phalarope are perhaps as common here as at Topagaruk. It is Petelkas opinion that birds on the tundra, except for an occasional exception do not lay a second set of eggs. It has been my own observation in skinning birds at Topagaruk that they are now showing signs of molting, especially in primary feathers.

Kaolak River, 70°11'15", 159°47'40", ft., Alaska.

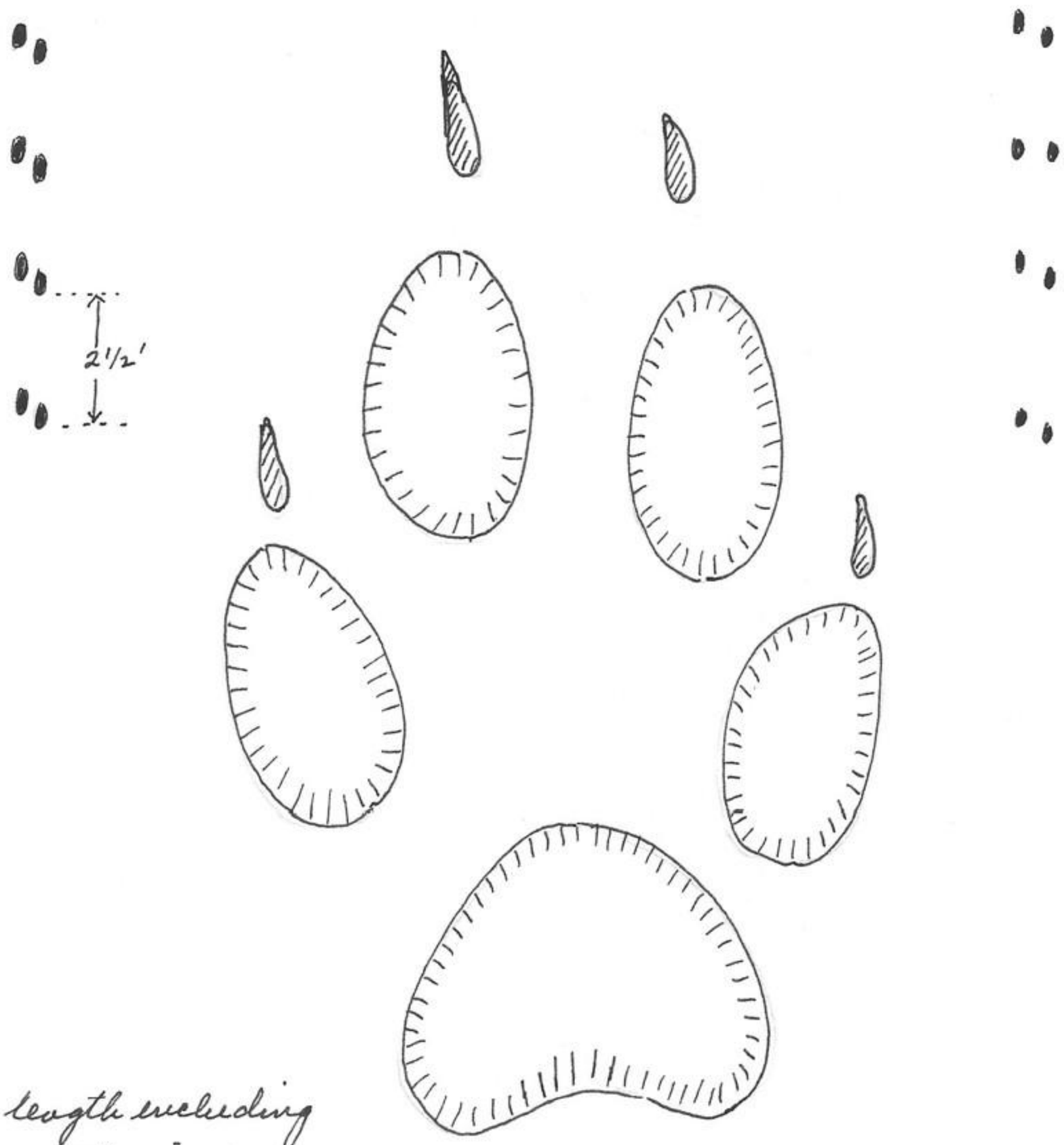
July 12, 1951

Departed from Point Barrow at 9:00 A.M by Widgeon plane and flew directly to position of above. Camped on west side of river along beach just below the conspicuous outcropping of coal (?). This camp places us in close propimity to a variety of good trapping area.



Set up camp and Jones joined me on second trip which arrived in afternoon. Before plane arrived made reconnaissance walk adjacent camp. Upon return to camp in about 45 minutes noted a track of ~~Lupus~~ Canis lupus tundrarum had been superimposed on one of my own tracks made in sand not over an hour ago. This wolf passed by within 50 feet of camp. This wolf had apparently been among large willow patch to the SE and as I worked thru

willows the waef left area by least conspicuous route along edge of river. noted another set of waef tracks of same size in sand and trending in same direction. This second set of tracks came from the same willow patch. These two wolves may have been a pair with den in saudunes. One river soudune had 5 or 6 large holes which could have been used by waef or fox. One of the waef tracks in sand (front foot) measured as follows:



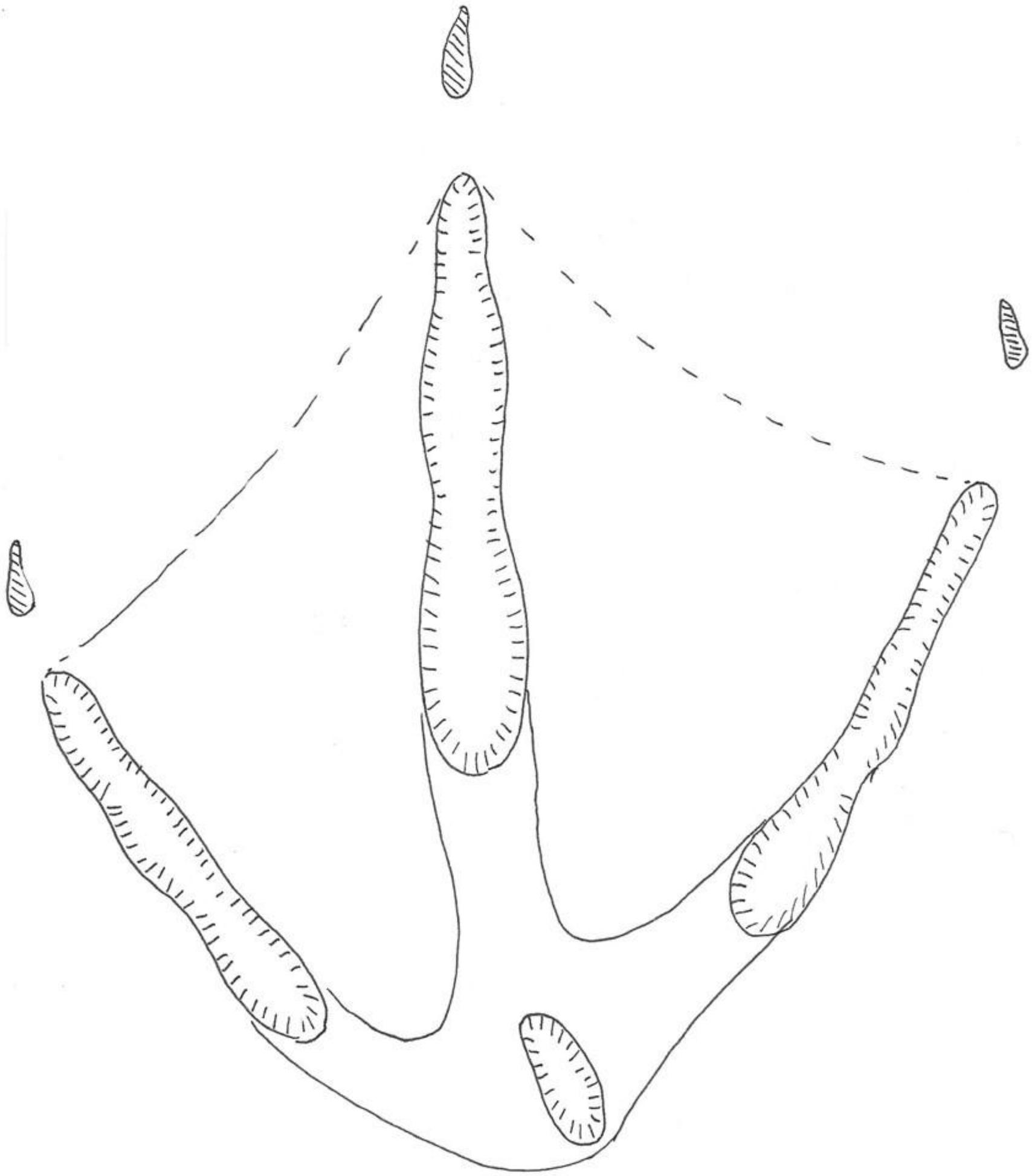
total length including claw - 5 1/4 inches

NATURAL SIZE

associated with the waef tracks on bare sands were several sets of the tracks of the whistling swan, Cygnus columbianus. The following track was traced in natural size from the sand, about 50' from camp.

5107 12-44

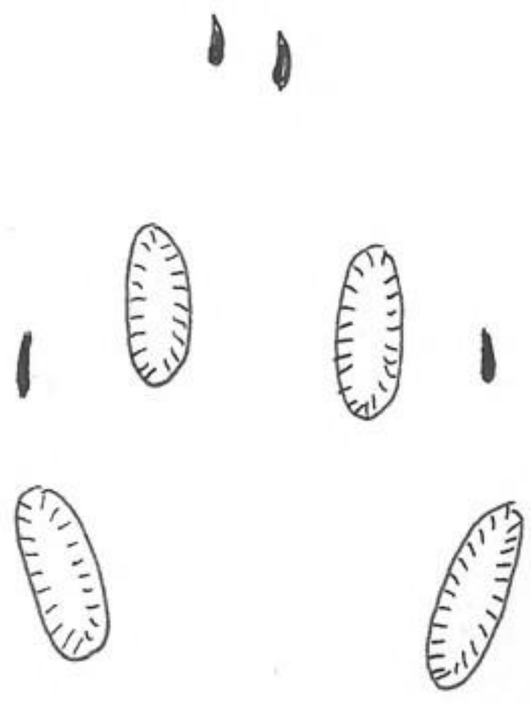
CYGNUS COLUMBIANUS



NATURAL SIZE

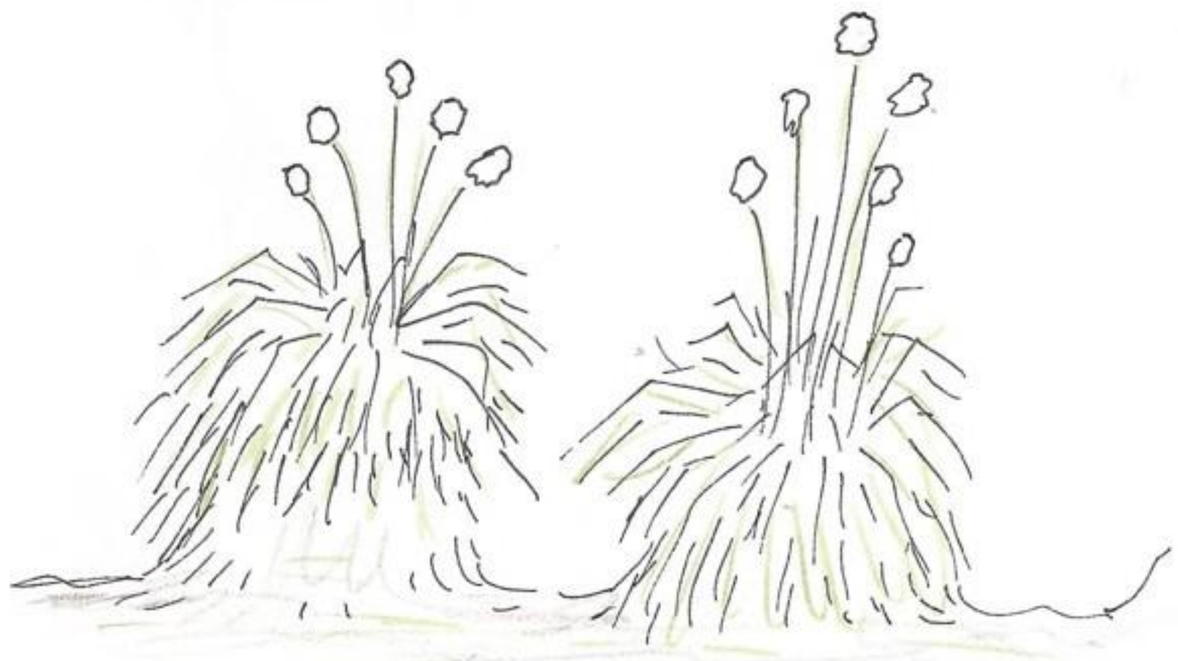
These swan tracks wandered over sands at mouth of small creek that drains lakes in river bottom for some 1/2 mile to south on west side of Kaalak River. Also on sands were tracks of the red fox and are recorded by tracing directly over imprint, as was done in the case of the swan and gull. They were the most numerous of the tracks on the sand. On beach photographed Indian soop from sands with tent in background, 510712-1

RED FOX



NATURAL SIZE

The Sterna parasiticaea was hunting in the area at mouth of Creek, mentioned above, and then returned to sts young on a nesting island about a block or so to the south. From the hill above coal outcrop photographed the cotton-grass (Ereophorum) nos. 510712-2, no. 510712-3 and 510712-4. The white flowers are the most conspicuous ones in the entire landscape and give it the appearance (at a distance) of newly fallen snow on a springtime ground surface. The cottongrass is continually moving and is like a trailing head of hair in a strong blowing breeze. This sedge is the principle food of Dicrostonyx in winter when the ground is covered with snow. Its natural form is thus:



As winter food is required the plant is eaten around the base where it is most readely available or eaten in its enterely. As a result of this coaction the life form of Ereophorum is produced by the pruning action of dicrostonyx during winter, causing the sedge to grow upward in such a way that it became hummocky. This life form is like a cow pasture with hummocky caused by trompling of cattle. Caribou could have produced the same effect on these arctic pastures. It is difficult to walk on tundra of cottongrass because one is forced to lift foot and leg high before it can be placed down again between the islands of grass. The clumps are too high and unstable to support ones weight and ones feet slips down between the hummocks. It is among these sedges where the greatest number of Dicrostonyx sign were observed. A typical cross-section of this grass thus:

Photo 510712-5 of Eriophorum reflecting in small pond. Characteristic sign in this type of community. This evening set 144 museum special traps in Eriophorum on higher plateau above coal or slate bearing outcrops. Collected the birds listed in catalogue to this date. Pluvialis dominicus is more confiding to man than Squatarola squatarola and can be approached to within 80 feet. When one bird is shot the mate remains along side as is the case with the black-bellied plover no black-bellied plover in area. The golden plover has excellent feigning by fluttering wings and moving on bellied which is offered by the ♀ (♂ always near by) at 40' and less. Young observed. Most common sandpiper is Erolia melanotas and is always overhead calling. This sandpiper takes place of Ereunetes pusillus of Topagaruk in being most conspicuous shorebird. Northern phalarope more numerous here than at Topagaruk. Young birds size of parent. In addition to birds listed in catalogue collected Lagopus lagopus alascensis ♀ with six young about 7" in length. The ♂ called as it left first and flew across the lake, then the ♀ feigned for 10 feet at 10 feet away and then started to fly across lake. The young left in opposite direction to adjacent hillslope of cottongrass and willow swale leads. They left at about 3 second intervals peeping as they made their get-away. One bird was observed to leave camp area upon first arrival of plane. One male in willows running under the protection of the thicket. It ran to opening among willows where it remained until flushed. It flew 50' and then settled down.

July 13, 1951

Examined trap line of 144 traps – 1 Lemmus, 2 sprung, 2 Calcarius lapponicus young. This evening set six steel traps and caught one Citellus parryi barroweanus. 2 others observed at this point. They apparently do not live in communities but are widely separated. They exhibit the sandy areas which have a certain amount of relief above the surrounding country or along ridge of coal outcropping. They have been observed to have used the upland tundra but are not in this area now. Lemmus is in the damper part of the upland tundra of Eriophorum. Made 5 mile trip to S and E along old river that now is formed by a series of lakes on west side of river. In addition to birds collected on the

12th observed Clangula hyemalis which was collected, Stercorarius pomerinus, Stercorarius longicaudus and maybe S. parasiticus, red-throated loon which was collected. The latter was nesting as usual around edges of ponds, some of them about 100'x40' or less, much smaller than those at Topagaruk. Examined 2 nests with 2 eggs each, eggs about 1/2 incubated. This loon could enter territory of arctic tern (nesting) without the loon being molested. We were always approached at 300' or so whenever entering the terns territory. Set 77 mus traps in lowlands of supersaturated grasses and sedges this evening in an area where winters' runways were common. Caught another Citellus p. barrowensis (claws only) this P.M. Day hotest yet and mosquetos terrific. There were 86 on 1 square foot of white tent (outside). When in feed they make so much noise one cannot hear normal sounds.

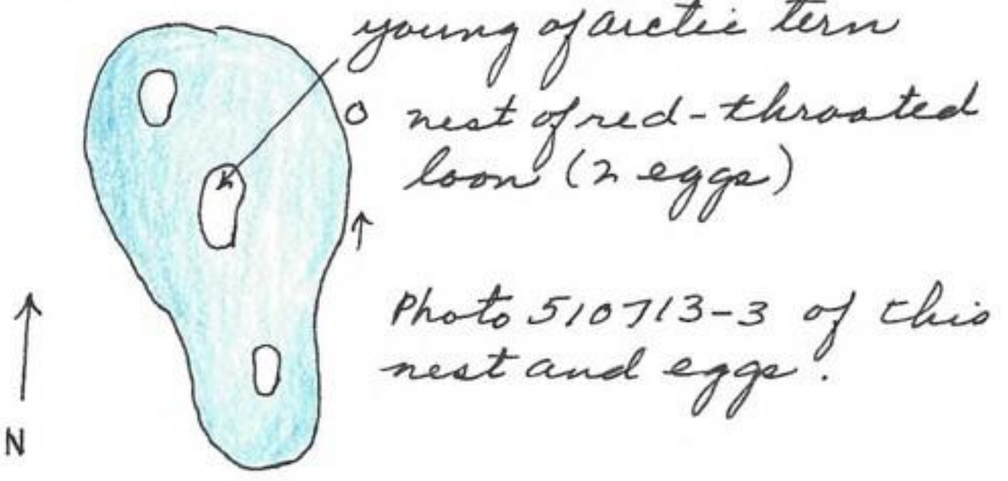


Photo 510713-3 of this nest and eggs.

Kaolak River, 70°11'15", 159°47'40", _____ ft., Alaska.

July 14, 1951

Inspected trap line of 214 traps. 2 Dicrostonyx, 1 immature Baird sandpiper, 1 immature long-billed dowitcher, 1 immature northern phalarope. Caught on Lemmus at 12:00 P.M as it was moving thru grasses and sedges. 2 traps sprung in addition. All Dicrostonyx from Eriophorum upland tundra both dry and wet situations but in every case so far from established runways. These runways did not look like they had been used recently and with litter of dry leaves and grasses with many obstructions. It is my opinion that all traps should be set in runways. Tonight at midnight heard many weird calls from across river to east, some like wolf or fox more like young wolf pups. Also thought I heard snowy owl call. It would appear that greatest activity is during day, however, arctic tern noted to be feeding and carrying food at 1:00 A.M. Weird calls mainly at night.

July 15, 1951

At 8:00 A.M mosquetos 82 per sq. foot of white tent (outside) and greatest concentration so far. While asleep hand rested

against canvas of tent and mosquitoes were able to bite. As a result hand was swollen almost a 1/3 its original size. Acanthis linaria flew over tent and called like Redpoll. They have changed their habits and are now flying about 100 feet from ground and are calling continuously. Loon calling with wolflike call. It is this bird that confused me with the wolf call. Examined trap line in lowlands of wet soils and grasses.

trap 146 - 1 immature pectoral sandpiper.

" 148 - 1 immature ptarmigan. The male and female were at traps with captured young. At approach ♀ left low and feigning, then ♂ followed. At about 40 feet distance they flew. Four young left area. Collected ♂ 510715-1 of this family group.

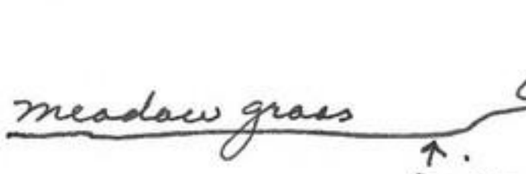
trap 161 and 162 sprung.

trap 173 ~~148~~ Calcarius lapponicus 510715-2

trap 175 " " 510715-3

traps 176 sprung, 181 sprung, 199 sprung.

trap 205 Lemmus trimucronatus 510715-4 in 1½ foot at transition between grass swale and Eriophorum hillside



This animal was not in runway. Checked upland line as follows:

trap 23 Calcarius lapponicus 510715-5

trap 36 " " 510715-6

trap 45 sprung; trap 55 Acanthis linaria 510715-7; trap 100 Lemmus trimucronatus from hole at edge of grassy flat near top of ridge; 102 sprung; trap 111 sprung; trap 119 Calcarius lapponicus no. 510715-9; trap 121 microtus oeconomus no. 510715-10 from runway in damp meadow ~~swale~~ on uplands, Eriophorum dominant in area. At 4:00 P.M temp in shade at tent 82°F. Skies almost clear today and represents the first typical summer day of the season. Flowers show signs of wilting. This may mean an increase in mammals. The condition is just as would be in temperate climate. A wool shirt and head net are uncomfortable to wear and one perspires freely when in the field. But one must wear both to protect from mosquitoes. Collected an old squaw 510715-11 and while it was only wounded made a photo 510715-12a of it. For the last few days the drainage from the lake area to south has been intermittent as it flowed over bare sand at point where the creek enters Kaolak River (at camp). Thus during the day there are many small fish the size of minnows

(approx 1 mch long) which are trapped in isolated ponds and as the water evaporates and sinks into the sand, are killed. At night the stream reestablishes itself. The arctic tern takes advantage of this natural fish trap and feeds here both day and night - carrying fish to young about 2 block away to south. I have seen it feeding at 12:00 P.M and 1 A.M as well as during the day. This bird dove at me some 300 yards away from water and high on tundra where it was seldomed seen before. Found caribou antlers on ground which had been completely grown over with masses of lichens and only part of skull above ground suggesting continual growth of vegetation mat. This presents a problem as to how Lemmus maintains permanent runways. Cetellus formerly inhabited upland tundra but none observed. The tundra has grown over these deggings, others used by ptarmigan as ~~dust~~ dusting pits. At one time this area supported high numbers of Cetellus and were here because of population pressure or at a time the river valley was flooded and forced the squirrels to higher ground. At 11:55 P.M heard ptarmigan calling as if being annoyed by some passing fox or wolf. Also sandpipers and tern were concerned and reacted by calling. This afternoon pulled upland traps. Placed 146 traps at 20' intervals in damp draws, dry cotton-grass area and willow-grass situations on uplands. This set was selective in every instance and should produce much better results than the first set. Birds observed to date (4 hrs cruise through all associations represented)

Gavia stellata. 3 pairs. Two nesting at edges of lakes with 2 eggs each, and about 1/2 incubated. Occasionally noted flying in area and in river. They called most frequently from 11:00 P.M to 2:00 A.M.

Gavia arctica pacifica. 2 birds flying in area.

Calcarius lapponicus alascensis. 80 birds mostly young capable of flight. Males and female adults less conspicuous in their flight than at Topagaruk.

Ereunetes pusillus. 14 young flying short distances of 15-40 feet. Mainly in large willow stands among sand dunes of river valley. Less in numbers than at Topagaruk.

Erolia bairdii 4 birds and young.

Larus hyperboreus 4 birds, sporadically present and probably use river as crusing lane between coast & inland.

Sterna parasticaea. 2 nesting pair and young, 1 transient

Eroiia melanotas most conspicuous and numerous of shorebirds. Approx 45. they are almost continually accompanying us overhead and calling. Young birds not yet capable of flight. Greater numbers than at Topagaruk.

Labipes labatus 24 birds. young almost ready for flight.

Clangula hyemalis. 4

Lagopus lagopus 3 pairs with families of 4 to 6 young.

Cygnus columbianus. Tracks only and made by one bird.

Acanthis linaria (maybe hornemanni). Numerous and apprx 28 pairs. young flying.

Limnodromus griseus. 8 pairs with young 1/2 grown.

Stercorarius longicaudus, 6 birds

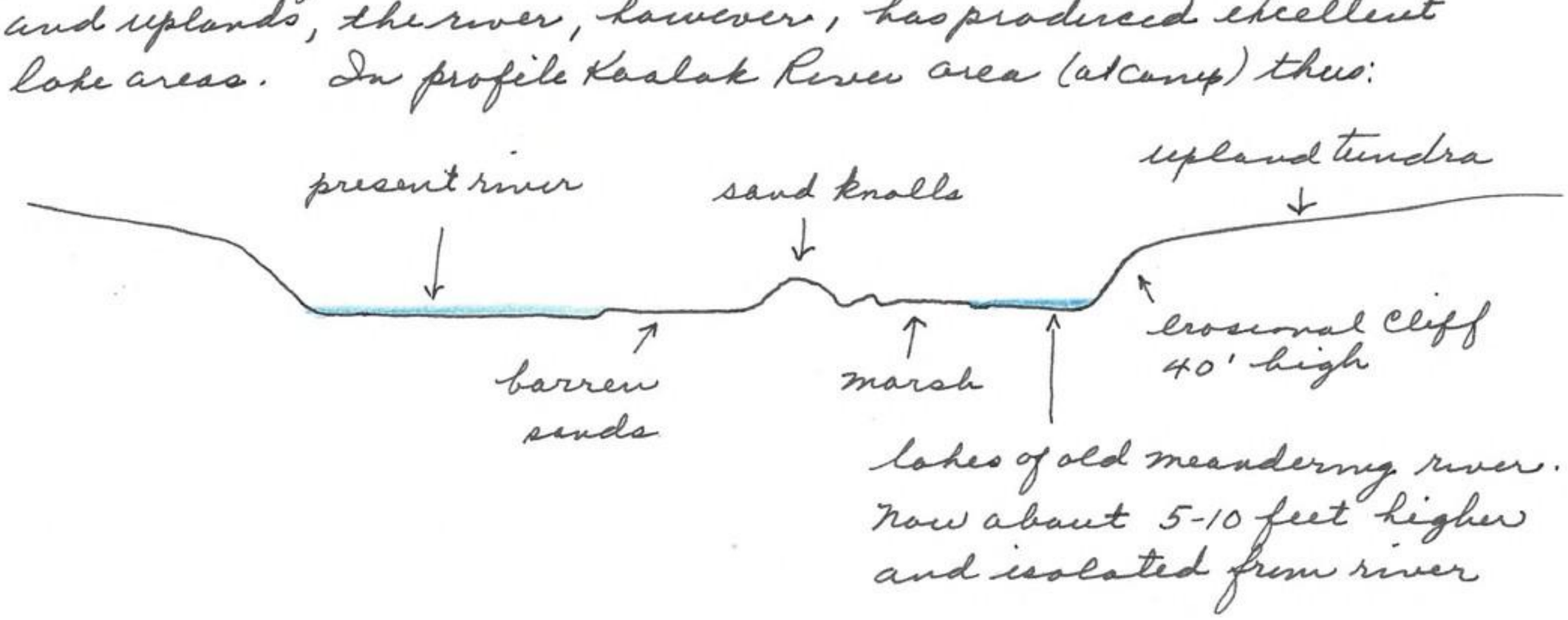
Stercorarius pomarinus 2 pairs

Phalaropus fulicarius. 1 ♀ not defending territory.

Pluvialis dominicus. 6 pairs with young. Always seen together, more confiding than black-bellied plover and call 2 distinct curlewlike notes instead of slurred call of black-bellied Plover. no black-bellied plovers in area.

Anas acuta tzitzihoa. one ♀ molting. Complete in wing with few primaries coming in about 1 inch long.

no Sabine gulls, ruddy turnstones, snow bunting, yellow-billed loon in area investigated at camp & south of camp in lake area. Topagarik differs from Koalak River in that Topagaruk is low relief, extensive marsh while Koalok is river bottom and uplands, the river, however, has produced excellent lake areas. In profile Kaalak River area (at camp) thus:



This afternoon made trip to S.E up river to end of old abandoned river now lakes. Photographed a red-throated loon nest of 2 eggs, 510715-12 to. Also photo 510715-13 of Jones and arctic tern defending territory. Photo 510715-14 of a long-tailed jaeger.

Kaalak River, 70°11'15", 159°47'40", _____ ft., Alaska

July 16, 1951

Rained gently since 4:00 A.M. Mosquitoes uneffected by rain. High winds are the only elements that will send them to the vegetation and ground. Took reading at 8:00 A.M (first since 8:00 A.M yesterday) as 52° min - 82° max. F. Reading at noon 62°F. Still raining slightly and shows sign of clearing in all directions. Will check traps when it stops. Larus hyperboreus in river at camp. At noon checked upland trapline as follows:

1. sprung; 5. redpoll 510716-1; 19. Calcarius lapponicus 510716-2; 25. Calcarius lapponicus 510716-3; 38. Lemmus trimucronatus 510716-6; 42. droppings on sprung trap; 44. Calcarius lapponicus 510716-7; 64. Calcarius l. 510716-7a; 97. Lemmus trimucronatus 510716-8 from damp swale of Eriophorum hummocks, 1 foot willows sparcely placed and caught in runway; 139. Calcarius l. 510716-7; In the lowland trapline caught one northern phalarope 510716-10. In the lowland trapline pulled all traps and continued upland trapline to number 216 now set in dominant Eriophorum Observed pectoral sandpiper bathing in water on beach at 5:00 P.M. Checked red-throated loon nest and 2 eggs of first days observation. Loon had left nest unnoticed by us and had come up about 6 feet from where I was standing. It swam away with head turned toward me and when about 25 feet away dove again. From upland 15 minutes later could see bird on pond. This bird gave one single gluttoral note of surprise when first it saw me at 6 feet. There are 3 islands of about 3 square yards in area (lake) that are about 4 feet higher than the area surrounding the lake; one of them being used by the Arctic tern. These small island have been elevated by increase fertilization and growth of plants. On beach near camp (on Kaalak River) one family of semipalmated ~~plovers~~ sandpipers feeding on barren sands. One of the young flew with wind but when it attempted to return to shore was forced into water. The traps of last night were sprung by rain by 90%. Reset at 12:00 A.M inspection and will recheck tomorrow morning. Evening northeast wind and skies clearing with prospects of a clear still night and constant sunlight. Will see how this effects trapping of Lemmus. High temp. today 70°F. (Umiak) At 10:00 P.M heard 4 shots down river and later a boat driven by a 5 horse motor and 3 Eskimos appeared. At about a mile down river they approached a point of land and 2 Cygnus columbianus left the shoreline. One of these birds feigned

a crippled wing and escaped by flapping on the water. The other, presumably the male, flew away but returned in a few minutes. The female continued swimming up river in normal manner. The Eskimos inspected the shore and immediate area of land where swans had left. The Eskimos then returned to their boat and continued up river, directing their boat in the direction of the ♀ swan which was now about 200 yards away. As the boat approached the bird fluttered out of the way of the boat and let the Eskimos pass with 30' or 40' of it. By this time the Eskimos had spotted our tent and guided their boat over to our camp. This was the first people we had seen since our stay at this camp. They were from Wainwright and were going on a three day hunt. The 4 shots we had heard were at 2 shot caribou at 159°47', 70°13, which they will pick up on their return trip. They saw one caribou on the other side of our camp. Their Umiak was made from walrus hides. They wore no mosquito nets and seemed to tolerate the insects without objections. They may have had repellent on. They had left their home at 10:00 A.M just 12 hours ago and expected to camp up river. At 12:00 midnight all calm, temp 43°F and mosquitos by the millions outside tent. The sunny side of the tent just dancing with their shadows. Sometimes while sleeping one hand rests on canvas wall of tent and mosquitoes will feed until one awakens by pain and swelling of hand. Noise of these insects continually singing like bees around a beehive. Water in river slightly higher. weird call of loon from across the river. It seems to always call at about midnight; a call sounding like a wolf, at least part of its initial call. To bed at 1:00 A.M with north end of tent reflecting full intensity of the sun which is now about 25 minutes above the horizon. Perfectly calm outside with mosquitoes letting tent like a mild rain falling on tent roof.

July 17, 1951

Inspected upland trapline this A.M. Last night sunshine and mild which may have unfavorable effects upon mammals It is my opinion that Microtonys and Lemmus are most active on cloudy still nights. Result of trapline on upland Ereophorum as follows: Trapline 1-216.

Trap no 6 Calcarius lapponicus 510717-1; 32. Calcarius lapponicus 510717-2; 61 sprung, hair in trap; 82 sprung; 86 sprung; 91 Calcarius

lapponicus 510717-3; 102 Lemmus trimucronatus 510717-4 in damp swale among cotton-grass (Eriophorum), 1 foot high willows and in established runway; 130 Calcarius lapponicus 510717-5.

On return through wet meadows flushed family of ♂ and ♀ and 4 small ptarmigan about 150 mm long. The ♀ crawled along for 30' and then flew at about the same time the 4 young left the ground. The ♀ wheeled around and alighted in the vicinity of where the young ones alighted. At Koolak River on bare sands and newly inundated zones created by high wind observed one red-backed sandpiper (dunlin) and 4 semipalmated sandpipers. They flew around together in one flock. This P.M. made census of fecal pellets of Dicrostonyx on the upland tundra of Eriophorum above the river valley. Count made of small quadrats 10 cm x 10 cm or 100 sq cm of area every 2 meters distance for 220 meters distance across the tundra. At each 2 meter interval chose the first open area between the individual hummocks of Eriophorum nearest the 2 meter mark. On this basis was randomed. The arrangement was like this 

The number of pellets in each 100 sq. cm were counted and in no instance were counts made at entrances of winter nests or holes where there were great numbers. The pellets were those in areas away from nests and trails.

25	60	18	18	6	18	18
130	32	8	2	50	1	19
32	18	15	12	4	3	18
8	16	10	46	15	10	17
26	8	8	13	12	17	7
42	6	7	17	10	20	14
21	103	9	8	18	12	23
24	86	6	2	3	26	8
1	15	27	12	19	13	16
22	8	3	60	0	17	average of 20 (0-130)
24	7	36	30	8	20	
7	17	8	7	20	30	Area covered 220
12	12	18	80	17	40	meters at 2 meter
6	4	12	60	10	19	intervals. In only
10	6	4	40	15	27	one instance were
11	20	10	28	10	4	there no pellets
44 ↑	26	10	19	8	12	in a 10x10 cm test
						plot.

5107.17-54

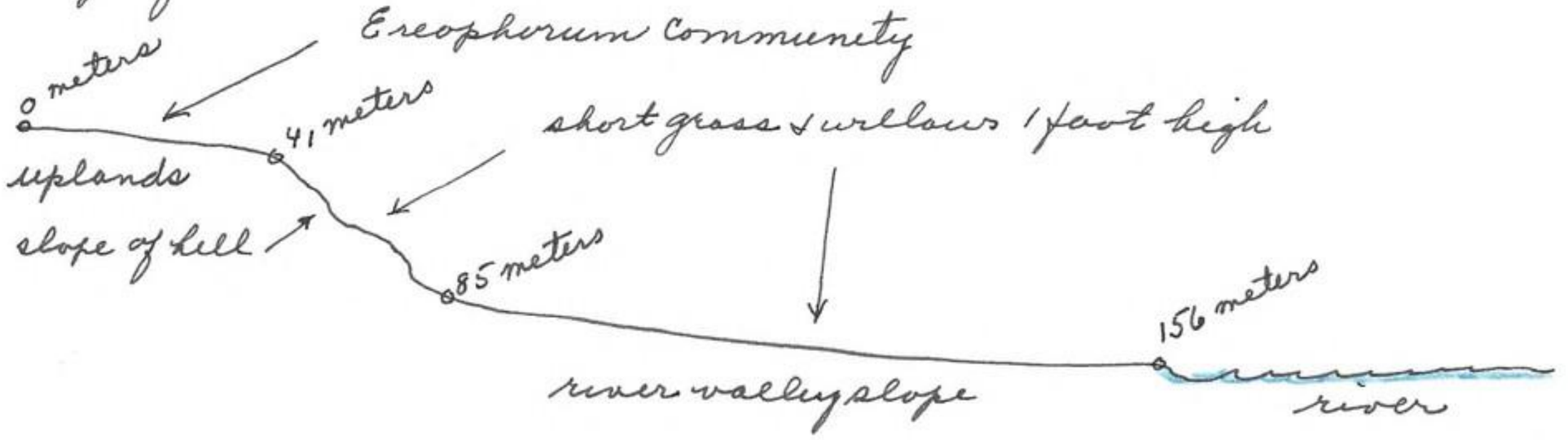
From the census would conclude that there is use by Dicrostonyx of every square inch of land surface between Eriophorum hummocks. It seems incredible that there should not be more mammals at present in these areas that have at one time been so extensively used. These pellets are probably made in winter or at a population high. Most of them were of a light brown color - not one green or fresh.

Made survey of fecal accumulations at mouth of winter holes. This survey was in contrast to droppings of general distribution in foraging areas. This count was made in a linear transect of 1000 meters long x 1 meter wide on uplands of Eriophorum west of camp. willow swales and non-typical grass (Eriophorum) hummocks excluded. nest and droppings at entrance are indicated by number of meter along transect. (first 2 in column means nest at 2nd meter mark, etc)

2	156	380	540	703	866
8	160	384	549	705	880
21	172	401	560	710	887
22	181	409	563	722	894
30	197	412	566	724	901
38	206	420	567	726	915
46	210	423	574	730	931
51	224	433	575	737	938
53	227	440	576	752	941
58	238	442	584	767	949
63	243	453	587	770	953
68	253	456	588	776	960
75	259	467	594	779	971
88	265	458	597	784	978
89	270	460	599	785	985
90	276	470	612	787	988
93	283	477	628	799	990
100	293	480	630	806	998
109	309	487	635	817	1000 end of transect.
122	310	488	652	821	
127	318	498	653	833	154 total ground holes and fecal accumulations. These front porch pellet piles were generally at entrance of holes
131	335	501	654	836	
135	345	505	662	842	
141	360	517	664	847	
145	363	525	666	854	
146	367	531	676	863	
150	369	538	687	864	

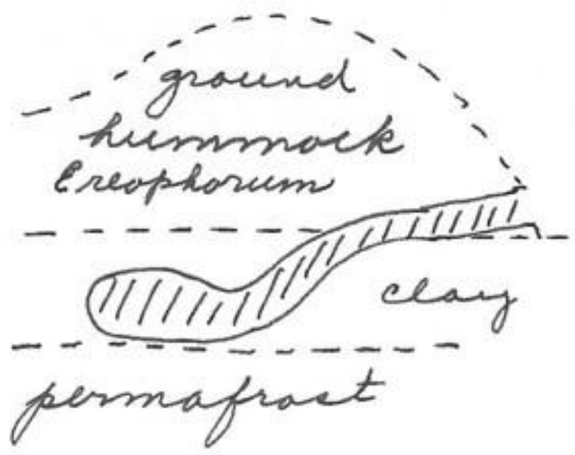
and averaged 300 pellets each. One pile had 890 pellets. most light brown and of an age of at least 2 years ago.

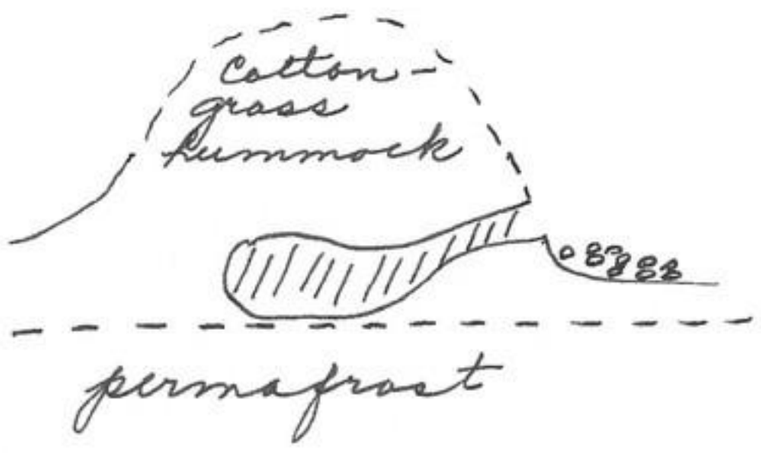
Made another count of fecal droppings (at entrance to holes) from upland tundra, down slope of hill, across river valley slope to edge of river thus:



From 0 meters to 41 meters of typical Eriophorum Community of hummocks and used by Dicrostonyx. Nest (holes in ground) and pile of pellets at 2, 5, 15, 23, 27, 38 meters. Few runways of Lemmus invading upland tundra of Eriophorum along damp swales of short grasses & sedges and dwarf willow or short or long grasses and sedge alone. From meter no. 41 to 85 no Dicrostonyx but signs of runways of Lemmus and surface nest of dried grass & sedge stems and no holes in ground. From 85 to 156 meters on slope to river, more runways and no holes, but surface nests (of Lemmus). With many exceptions of course, and without trapping data sufficient for positive statement can say that the Dicrostonyx are in greatest number in Eriophorum uplands, especially where hummocks are best developed and where areas between hummocks are dry and without much moss. They become less numerous as bare areas become covered with green moss or become damp or where the hummocks tend to flatten and other types of vegetation mixes with the Eriophorum. The willows and wet swales are the least desirable. The evidence from scat count would suggest a special requirement of vegetation conditions in a tundra that looks much the same in general appearance. There is evidence of community or aggregation of Dicrostonyx and Lemmus. Examined several winter nesting holes and found considerable variation (it is not sure but surface nests may be winter nests and ground nests are used in summer). The hummocky nature of Eriophorum is caused by Dicrostonyx and counteracted by Lemmus. Design of some of the nest (ground) are as follows:

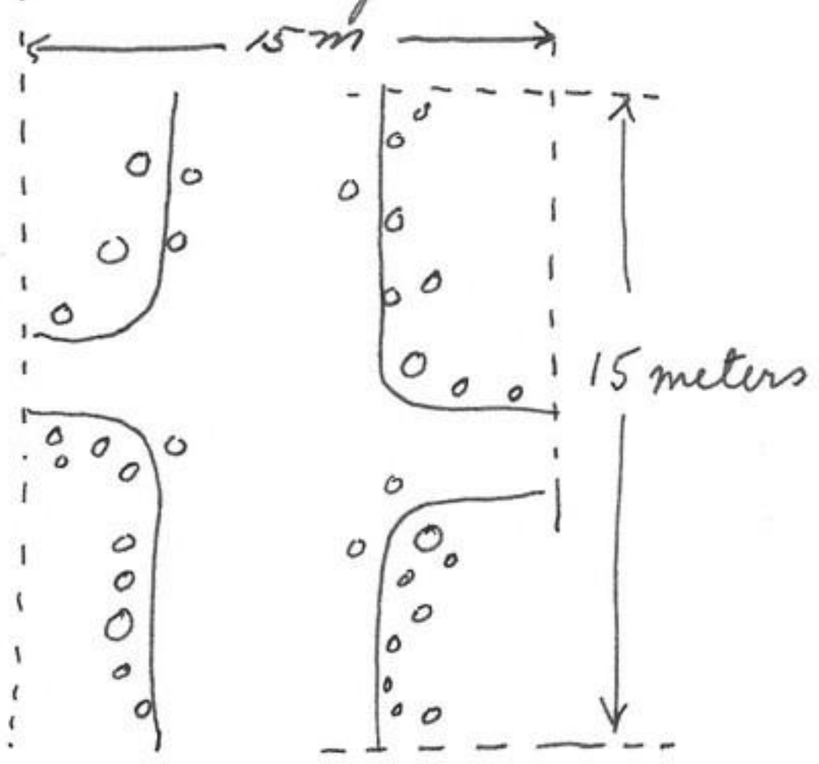
5107 17-56





nest between
2 hummocks

Permafrost approx. 250 mm
below insulating surface.
Some nests in clay below moss
and cotton-grass accumulations and they are not lined. Most
lemming use hummocks for nests in contrast to Lemmus
which uses a grass nest placed without reference to vegetation
(these ground nests could be nests used in summer by Lemmus and
the surface grass nests used by Lemmus in winter because in winter
it requires more insulation to protect the animal than can be
supplied in a small hole underground or grass surface nests are
made in winter as demanded by population pressure - all ground
holes being occupied). Examined results of winter foraging of
Eriophorum by Lemmus.

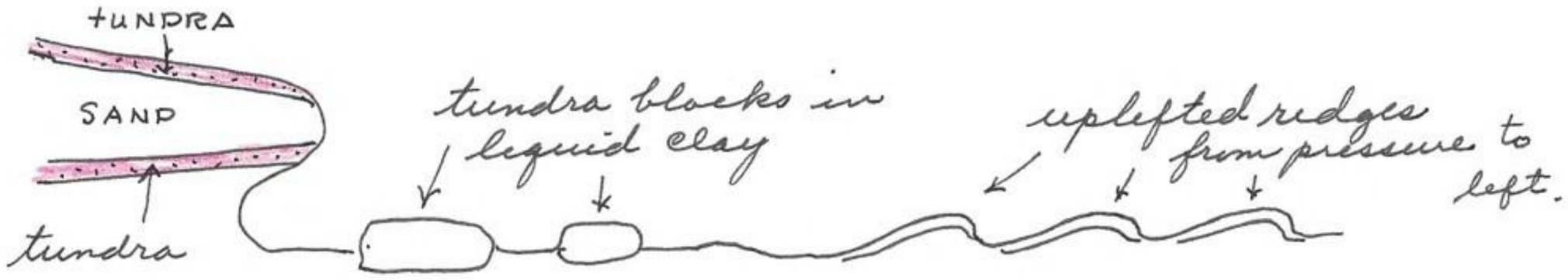


In an area 15 meters x 15 meters with
a swale running down center, there
were 34 hummocks bordering the
damp willow swale. These
hummocks were all immediately
adjacent to the swale and in no
instance beyond the border of the
swale. Most of the hummocks
eaten were associated with swale
which is the community of Lemmus.
Most of the surface grass nests were

associated with Lemmus Community and not Dicrostonyx.

This evening at 7:30 P.M walked about 1/2 mile N to investigate swans seen last night when Eskmos passed by in boat. One old swan nest 20 feet from river in willows and grasses. Probably last years. Found 4 primary feathers of swan at the point where they were observed to leave shore when disturbed by the Eskmos. These feathers are no. 510717-7. A Xema sabini in river and flew to east beyond 5 abandoned Eskimo dugouts on east side of river and probably nesting. Collected Acanthis linaria 510717-6 from group of 7. Numerous caribou tracks and all trending north-south along slopes of river valley and indicated movement with long distances in mind. Tracks on sands, edge of lakes, rivers and slopes bllow river valley cleffs. Appropimately 30 antlers observed in last 6 days. Several fresh Cetellus parryi diggings bringing up damp sands. Golden plover approached 15 to 30 feet when decayed by imitating their call. Female smaller if judged on actions. Examined slipping of slope below uplands.

The entire area below uplands have suffered from soil creep or slipping at one time or another, some having been checked and tundra recovered, others eroded to reddish sandstone-like rocks.



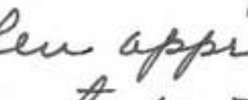
Max. temp today 64°F, min last night 44°F. Temp 9:30 P.M 54°F. At midnight sleght rain to 2:00 A.M at which time I went to bed. Wind slight. Mosquitoes 23 per 100 square cm of tent surface & hum like bees.

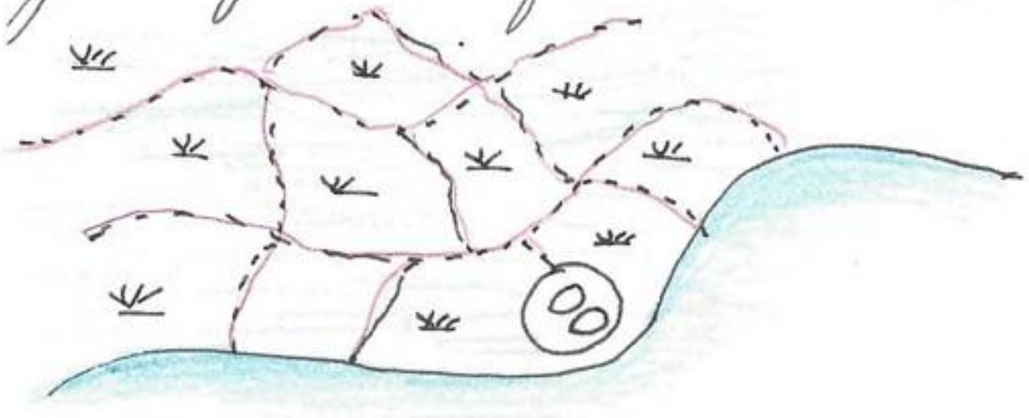
510718-58

Koalak River, 70°11'15", 159°47'40", ____ ft., Alaska

July 18, 1951

Collected 3 primary feathers of Cygnus columbianus from edge of river about 20 feet from water and among willows. It was at this point where Eskimos dislodged them from their nesting spot. Examined upland trapline as follows: (pulled traps): trap 22 Calcarius lapponicus 510718-1; 27 Calcarius lapponicus 510718-2; 35 sprung; 37 Calcarius lapponicus 510718-3; 39 sprung; 40 Calcarius lapponicus 510718-4; 51 sprung; 52 sprung; 63 Calcarius lapponicus 510718-5; 64 Calcarius lapponicus 510718-6; 88 Lemmus trimucronatus, foot only 510718-7 {20 droppings deposited during night; 77 sprung; 98 Calcarius lapponicus 510718-8; 100 Calcarius lapponicus 510718-9; 115 Calcarius lapponicus; 159 hair of Lemmus trimucronatus. No results from steel traps (6) or line of 11 traps. Observed male Anas acuta tzitzihoa and Clangula hyemalis flying up and down willow swale from uplands. Six Stercorarius longicaudus and one Stercorarius pomarinus. Temp room 57°F, river H_2O, near shore, 55°F; minimum temp last night 46°F. The long-tailed jaeger from 1 to 4 in group and when 3 or more are always chasing and calling vigorously. Pomarine jaeger generally alone. The three Eskimos, which passed camp on their way up river about 3 days ago returned and stopped at our camp. Prepared a meal for these Eskimos and during conversation recorded the following information: One bear (Ursus richardsoni) 7 miles up Koalak River from junction of Avalik and Ketik rivers. This bear was killed last year by Mr. Atonak and hunting party from Wainwright. Tracks were also observed six miles up the Avalik River. Canis lupus generally distributed throughout area of the Koalak drainage. The observed tracks at edge of river at above named junction. On this trip (July 16-17, 1951) they observed 12 Aquilus chrysaetus (golden eagle) along river from the junction of the Avalik-Ketik junction to 7 miles up Koalak River. None were observed below this point. Cygnus columbianus up river as far as they went (7 miles above junction). During June they observed 12 pairs of Cygnus Columbianus between Wainwright and our camp along the Kuk River. No sandhill cranes in area. Just as they entered our camp area, saw a spotted seal in river but did not have a chance to shoot it. Four caribou were observed across the river from our camp. Had killed 2 caribou about 2 miles down river from camp. They had collected 2 Gavia adamsi near our camp of which one of them 510718-11

was green to us. (See catalogue number + measurements). Examination of stomach of this loon produced 12 pebbles ○○ of this size in gizzard, otherwise stomach empty. They had also collected one ♀ old squaw duck. Appently they had been eating from the leg of a caribou (raw ?) as I saw nothing they could have eaten in the boat. A wolverine was taken by this party last year, 2 miles up the Avalik River. The most numerous reports of wolvernes and bear are on the Utukok drainage. Their boat was made of oolak or bearded seal skin (big seal) not walrus as I has assumed when the Eskmos first visited us on their trip up the river. They classified two artifacts which I found on sand dunes as sleegh runners  and kyak supports  . Fox and weasels numerous here at our Koalok Coupe a few years ago but no weasels this year. Polar bear at Wainwright this year. When asked if the whitemen has provided them with a better living and hunting, the response was questionable. Better hunting years ago. As Eskmos left gave them several cans of food. Photographed 510818-11 of Koalak River valley slope showing coal seam, snow bank, loon, tern nesting lake and caribou antlers. This P.M. jones reported 2 of ptarmigan. Red-throated loon calls with mechanical frog-like sound. Yellow-billed loon across river calls with considerable variation of wolflike, birdlike, humanlike sounds. On a short trip down to river to dunes south of camp observed 1 Limosa lapponica (sp.?) associated with a pair of golden plovers on dunes. It flew 150' and alighted when approached and flew another 150' and then flew down lake to south end some black away. On return collected ♂ red-throated loon incubating eggs on nest, 510718-12 (see photo 510713-3) of the nest of this bird) and examined one egg which held feathered young. This egg sank when put in water for testing and indicated it as fresh. The eggs measured 73 x 42, 69 x 43.5 mm. Collected Arctic tern 510718-13 at largest lake. Also redpoll 510718-14, pectoral sandpiper 510718-15. One Citellus parryi tale in sand and at edge in use. Eroliа melanatos still most common shorebird and still feigning by fluttering wings as it fumbled over the ground. Many loon trails were observed around and beyond nest in sedges.



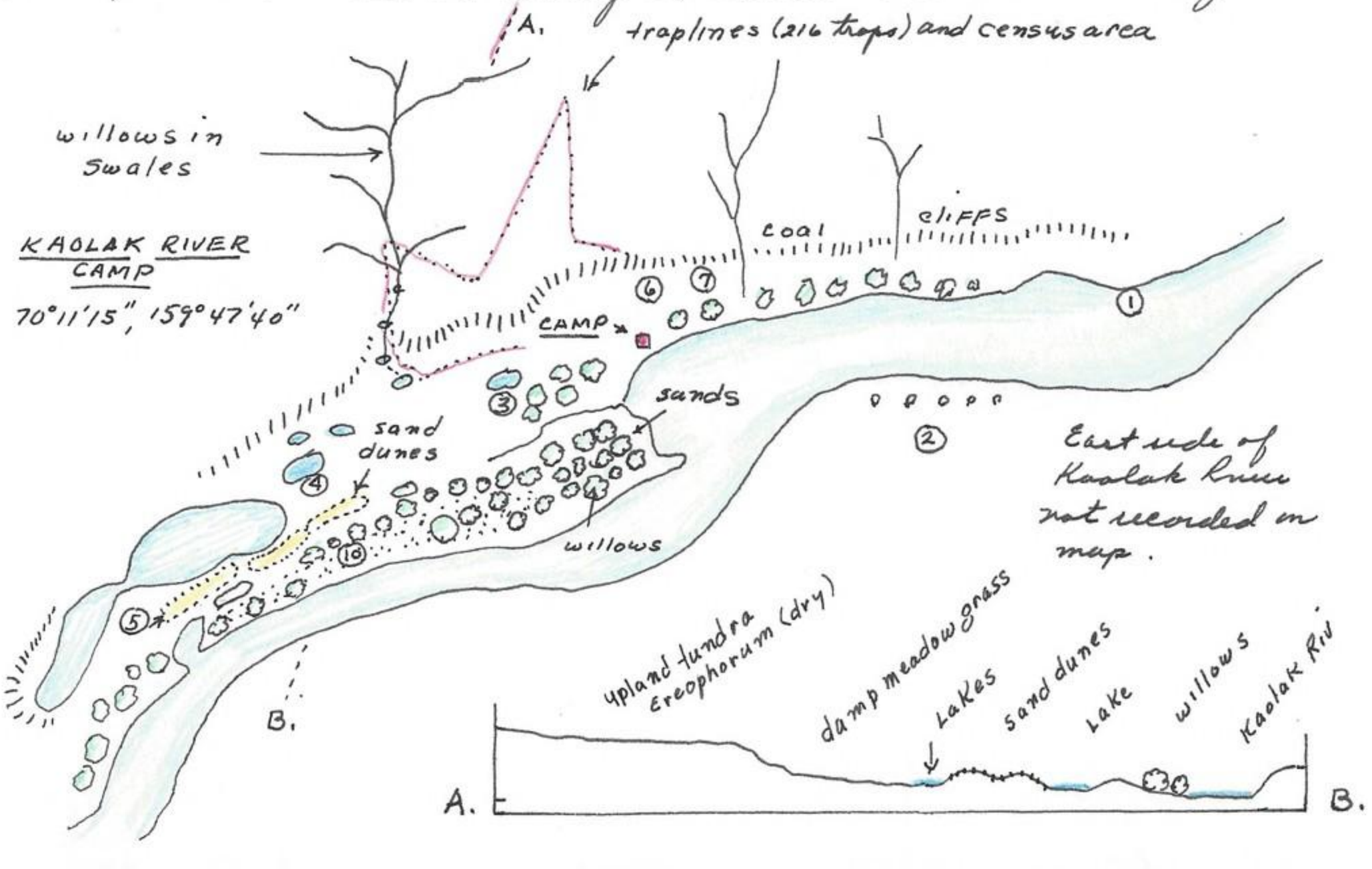
Before Eskimos left had them write their names on this page as follows:

Eyak, Tarzuk, Atanak

17 years 18 years 20 years

Eyak printed with least confidence and talked the second to most. Tarzuk talked the least but printed with trained confidence. Atanak could not write so printed it for him as Eyak spelled it out. Atanak conversed in English more than the other two boys. Their ages did not indicate their maturity by 7 to 10 years. Atanak for instance looked to be about 30 years. Photos 510718-16 and 510718-17 of their departure.

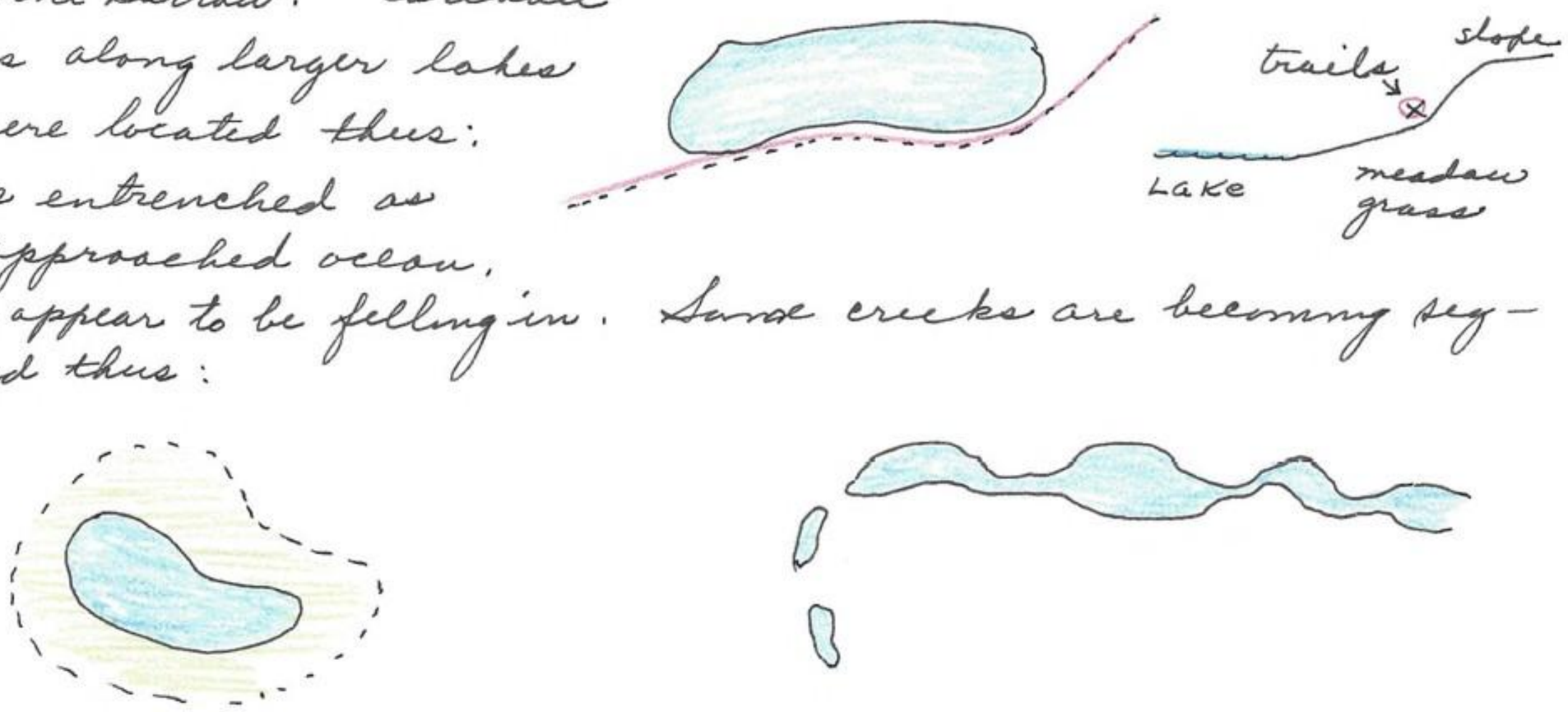
In recommending this station for future use can say that it could not be more ideally situated. Good landing area, close approach to shore, nearness to all ecological situations. Water for drinking, unless carried 1/4 mile must be used from river and thus must be boiled. The other alternative is just south of the last large lake, but in this instance the slopes below the upland tundra are lacking in typical form. The 5 Eskimo houses across the river to the NE (Anaktuk) have not been used recently but if used may be a factor in the capture of large animal forms. If one could get across river, there would be many excellent areas to investigate.



Information of above map:

1. Cygnus columbianus ♂ & ♀ and 3 cygnets
2. Anatak village and 5 abandoned earth huts ⌒□⌒.
3. Red-throated loon nest (see photos) and tern island in lake.
4. Red-throated loon nest of 2 eggs (collected)
5. Sand dunes and Citellus parryi holes, many shorebirds on elevated dunes.
6. and 7. Citellus parryi burrows and traps.
8. (yellow) Dicrostonyx-Eriophorum (dry) Community.
9. (green) Lemmus-wet sedge & grass Community
10. Limosa lapponicus.

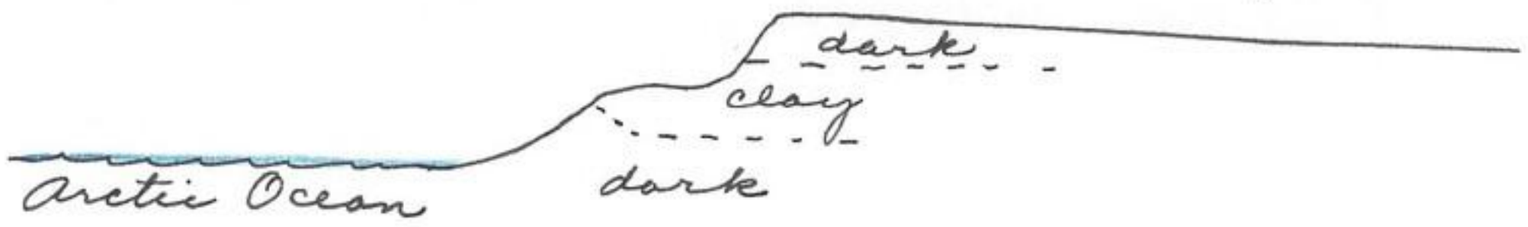
Departed Kaalak River camp this evening. Mr-Ira L. Wiggins and pilots transported us back to Point Barrow in norseman (monoplane), landing with pontoons in river. Carried approx. 1000 lbs of camping gear. Enroute noted muddy tundra lakes that had white foam on beaches while clear lakes had no foam when wind agitated surface. 2 Nyclea nyctea, one 20 minutes from Will Rogers Monument SW of Barrow Village, 1 halfway between monument and Point Barrow. Caribou tracks along larger lakes and were located thus: Creeks entrenched as they approached ocean. Lakes appear to be filling in. Some creeks are becoming segmented thus:



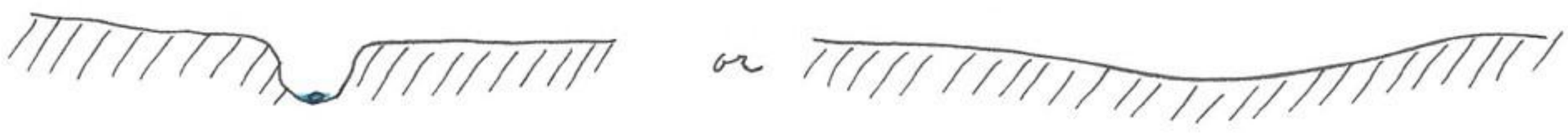
Good trapping area and climax upland tundra about Will Rogers Monument, thence north to Barrow Village. Low lying tundra to south of monument. This climax tundra is probably associated with elevated beachlands and former human habitation or result of mans herds. 275 Larus hyperboreus at mouth of stream entering ocean near monument. Snow now in gullies and in protected spots on beach. All ice gone from ocean. Considerable driftwood, particularly in bays leading out to ocean.

5107 18-62

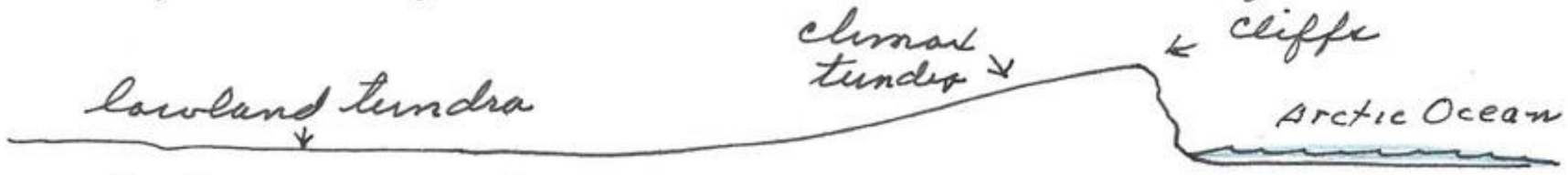
Profile of ocean - beach - cliff - uplands near Rogers Monument:



Creeks entering ocean thru ocean cliffs

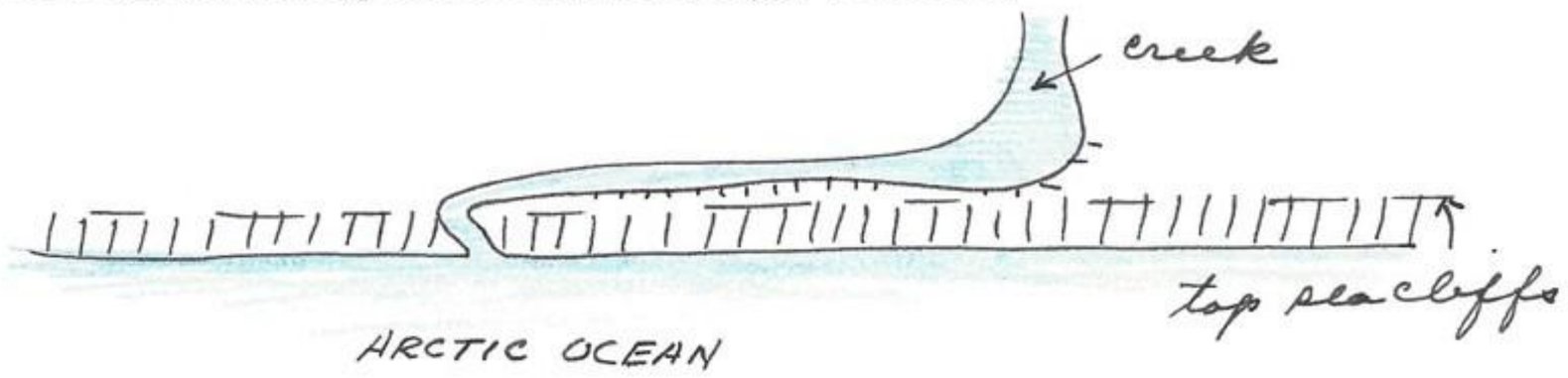


from deeply entrenched rivers at ocean front the entrenchment becomes progressively less to the east suggesting upleft of cliffs



lakes and streams graded to ocean

One creek which enters ocean thus:

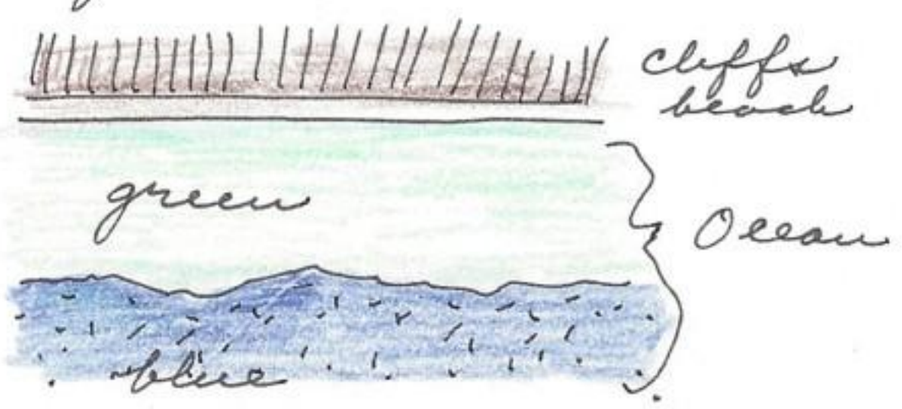


This shows progressive erosion of tundra by the ocean. Waters muddy near shore to about 100 meters into ocean, thence clear greenish blue waters. Apparently there is considerable wave erosion and portage of eroded soils to north along beach. Cliffs from air about 100 feet high.

Arctic Research Laboratory, Point Barrow, Alaska

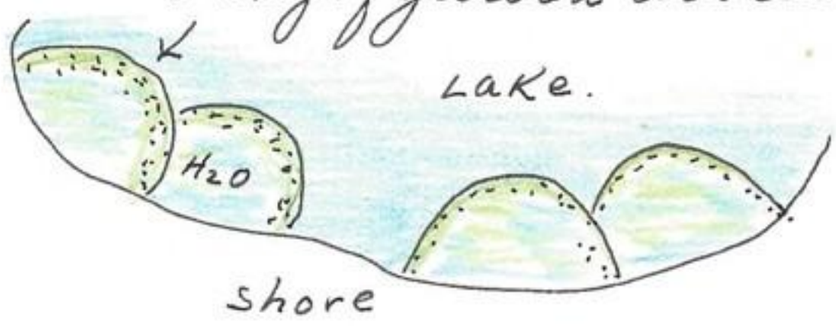
July 20, 1951

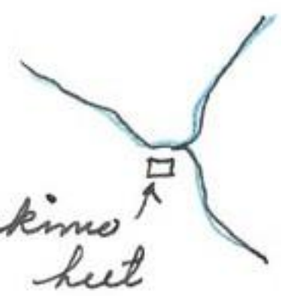
Departed Koalak (oil camp) at 2:41 P.M. 400 glaucous gulls at Point Barrow. At 10 miles down coast from Barrow Village the subsurface colors of ocean are:
Left ocean to land at 3:00 P.M.
Beach water to 200 feet out muddy and streaming out into green and blue area of ocean.



570720-63

3:10 P.M 12 Larus hyperboreus flew out over water at that Point. 3:26 P.M first meandering river. 4:30 P.M second meandering stream. 3:40 P.M 12 white-fronted geese together, 2 caribou. 3:44 P.M Sabine's gull, loons and arctic tern at one lake. Lake vegetation pattern in some lakes as if growing from facal pam to near shore thus: at 3:45 at junction of 2 main rivers:





Arrived 3:50 P.M. while coming from Point Barrow flew about 30' above ground Was surprised to find so few large birds on the tundra and almost total lack of caribou.

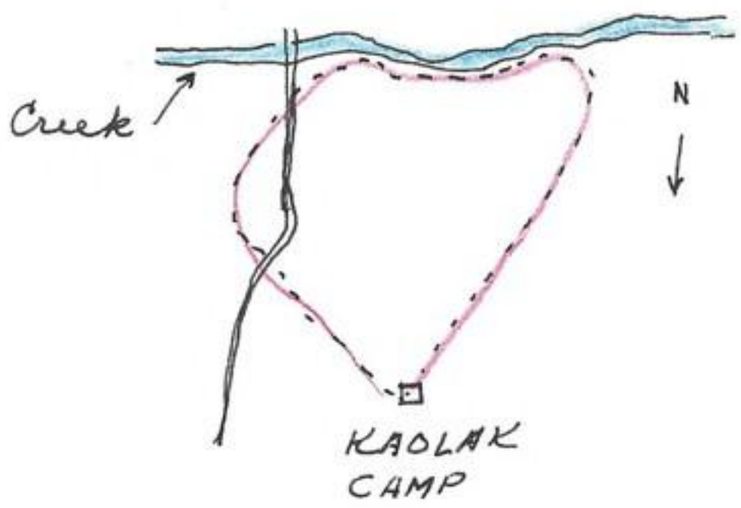
Koolak, 69°56'00", 160°14'51", 178ft alt., Alaska

July 20, 1961

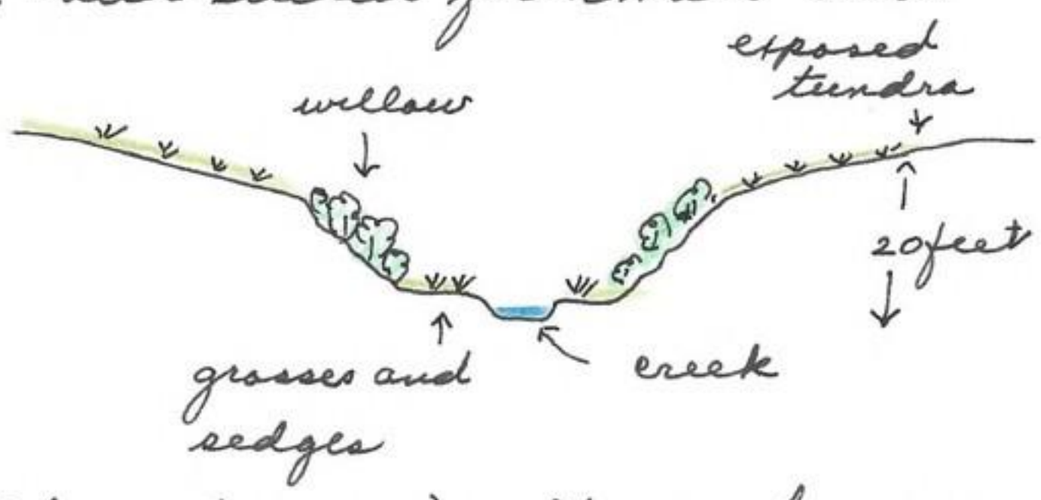
Set 214 traps around Koolak to west and north from 8:00 P.M to 11:00 P.M. Set mainly in cottongrass with few in wet grass-willow Community. Merry Christmas.

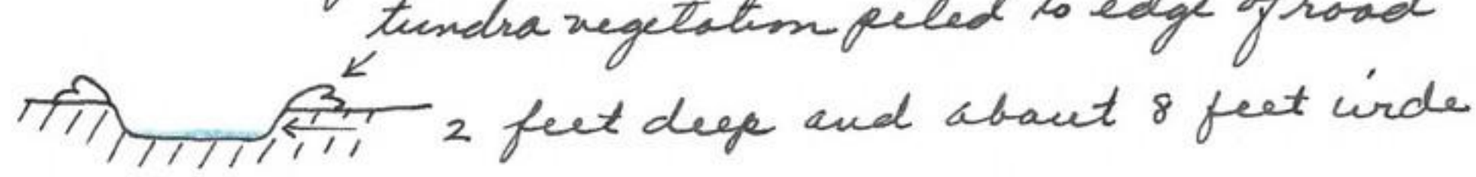
July 21, 1961

Inspected trapline this A.M and found the following: trap 28 Calcarius lapponicus (released); 32 sprung; 57 calcarius lapponicus (released); 92 sprung; 106 Lemmus trimucronatus 510721-22; 128 sprung; 174 Lemmus trimucronatus 510721-21. The first Lemmus taken in wet 1 foot high grass and not associated with Eriophorum The second Lemmus in damp area among cottongrass. From 1:00 P.M to 7: P.M made cruise (walking) over tundra to south, thence west up creek, thence north to Koolak. The tundra quite barren of birds, sometimes not a single bird in + blocks. In contrast, heavy concentration of small birds in creek to south of camp including the Lincoln sparrow (?), savanna sparrow, common redpoll and Alaskan longspur. In this creek the following kinds and percentages of birds were noted. Acanthis (sp?) 200; Calcarius lapponicus 100; Passerculus sandwichensis 80; melo-

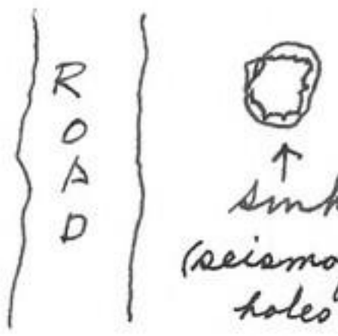


spiza lincolni (Sp?) 8. On the open tundra the redpolls were represented by 6 birds, Calcarius lapponicus 20, Lincoln sparrow (?) 2, and savanna by 13. It would appear that the protected creeks lined with willows are best suited for small bird populations. The creek in profile is as follows: The willows were protected from winds. A large tusk of a mastodon was taken from this creek (photo 510721-23 of this tusk taken at camp). It was lying in the creek bed when discovered. One caribou observed in field. Other birds observed while on trip. Pluvealis dominicus, 2 pairs on upland; Stercorarius longicaudus, 13, some may be duplication; Lagopus lagopus 10 adult birds but mainly in groups, 2 lone males, 3 groups of ♀ + ♂ and young, one group of one ♂ and 2 females. Of the above one male and 2 ♀♀ were together with 4 young. The male flew after the 2 females feigned 30 feet before young left. Other groups had 9, 4, 6 young; Anas acuta tzitzihoa, 2 birds, one lone ♀ with 5 young about 3 inches long; Erolia melanotos, 6 pairs only. Followed Canis lupus tracks along creek for 1½ miles. They measured 88 mm from heel to end or tip of claw. Several fox tracks were observed also. The caribou tracks crossed the permafrost road at about every 100 feet or so. The road had eroded as follows (these roads are made by scraping off surface of tundra down to permafrost):



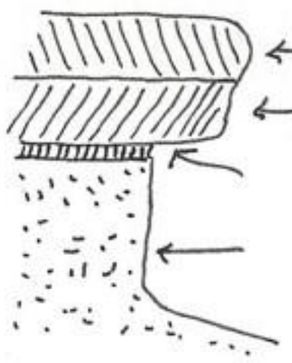


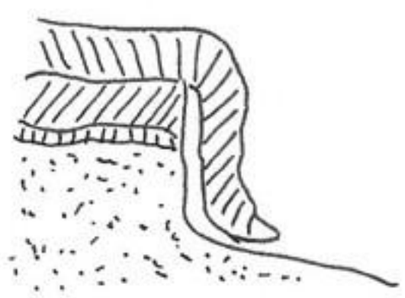
Some erosional channels (from original road bed) now 15 feet below the original surface of the tundra. Some sinks, adjacent to eroded road with complete collapse of side walls. In places permafrost of solid ice (100% water) line the edge of the eraded roads as old lake beds or ice wedges.



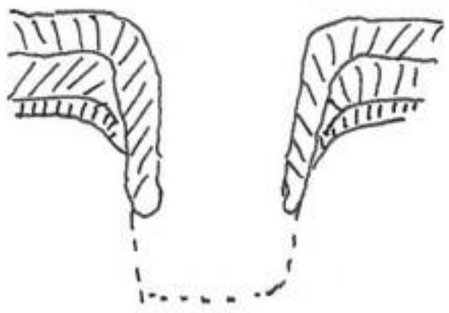
water running or forming ponds in road bed.

510721-65



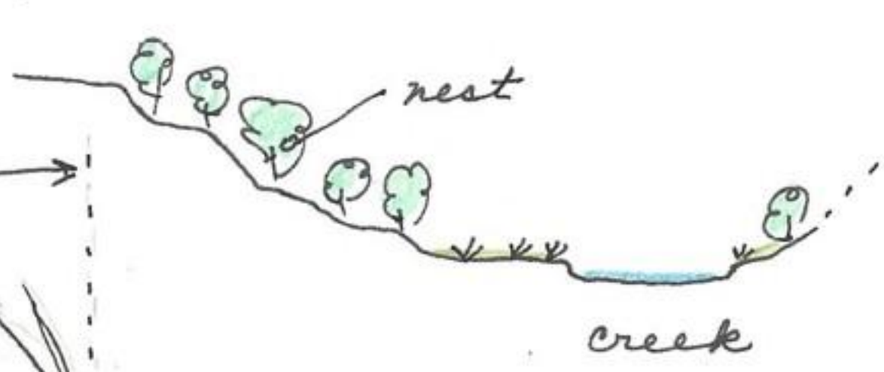


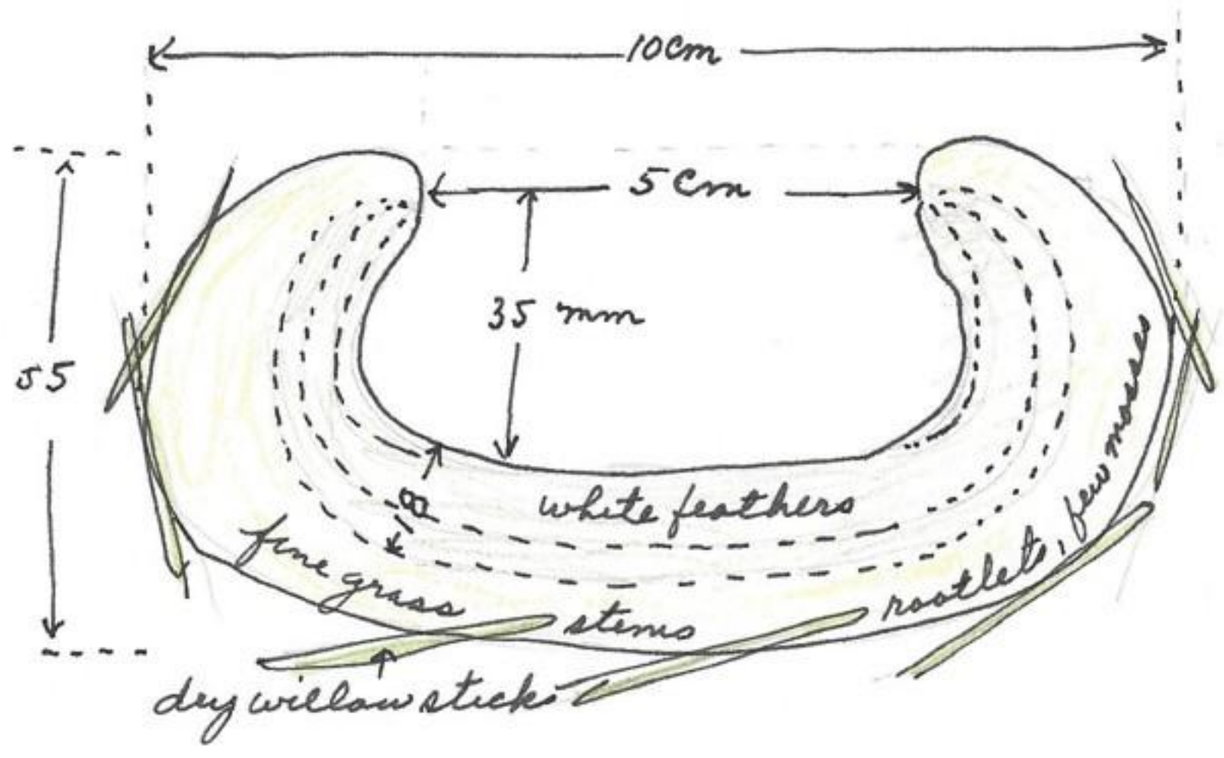
lateral erasion undermines tundra which drops and lines side of eroded road.



sink adjacent to edge of eroded road which may or maynat have been produced by the deepening of the road (produced by subterranean drainage to newly created road channel). Such sink holes could easily trap and preserve mastodons in permanent ice cellars. Some of these sinks are deep, 20 feet, and with narrow necks at upper edge of sink. These sinks could only be made on slopes where sinks have drainage to lower elevations.

Three nests of redpoll (Acanthis linaria) in willows in creek. 2 nests used this spring, the third with 4 eggs. nest placed as follows:





about 3 feet from front edge of willows and 10 feet from creek. they nest on the outer border of willows bordering the creek. Eggs measured 19.2 x 12.9; 18.3 x 12.5; 18.3 x 12.8; 17.7 x 12.9, 4 eggs 7gms, embryos 9mm, no feathers or bones, nest 12gms. Photo 510721-23 of nest & eggs of above, Outer edge

INSERT 5 10/21-66

ARCTIC RESEARCH LABORATORY
BOX 1310 : FAIRBANKS, ALASKA
UNDER CONTRACT WITH
OFFICE OF NAVAL RESEARCH

SEND ALL CORRESPONDENCE

LABORATORY LOCATED AT
POINT BARROW, ALASKA

Via Air Mail

20 July 1951

CAMP FOREMAN AT KAOLAK

This note will introduce Mr. James Bee and Mr. J. Knox Jones, both attached to the Arctic Research Laboratory at Point Barrow.

Arrangements have been made with Mr. Jack Adams to quarter these two men at Kaolak for approximately one week in order that they may collect small mammals and birds in that region. Messing and billetting at Kaolak will be greatly appreciated by the men themselves and by the ARL. No request for tra nspor-ta tion other than that from the landing lake to Kaolak camp and return to the lanking lake on departure is anticipated, since the men will be working within a comparatively short distance of the camp. If a weasel is going away from the camp on regular ARCON business and there is room for one or both of t he men to "hitch hike" a ride with the driver, such additional transportation would be appreciated, but it is understood that there is no obligation on the part of t he Camp Foreman or anyone else at Kaolak to furnish such facilities.

The schedule calls for t he r eturn of these men to Pt Barrow on July 27th, transportation f acilities being available. If any change in this date is advisable or necessary a message will be sent over t he regular daily radio conversation or by sending a message courtesy of one of Transocean pilots.

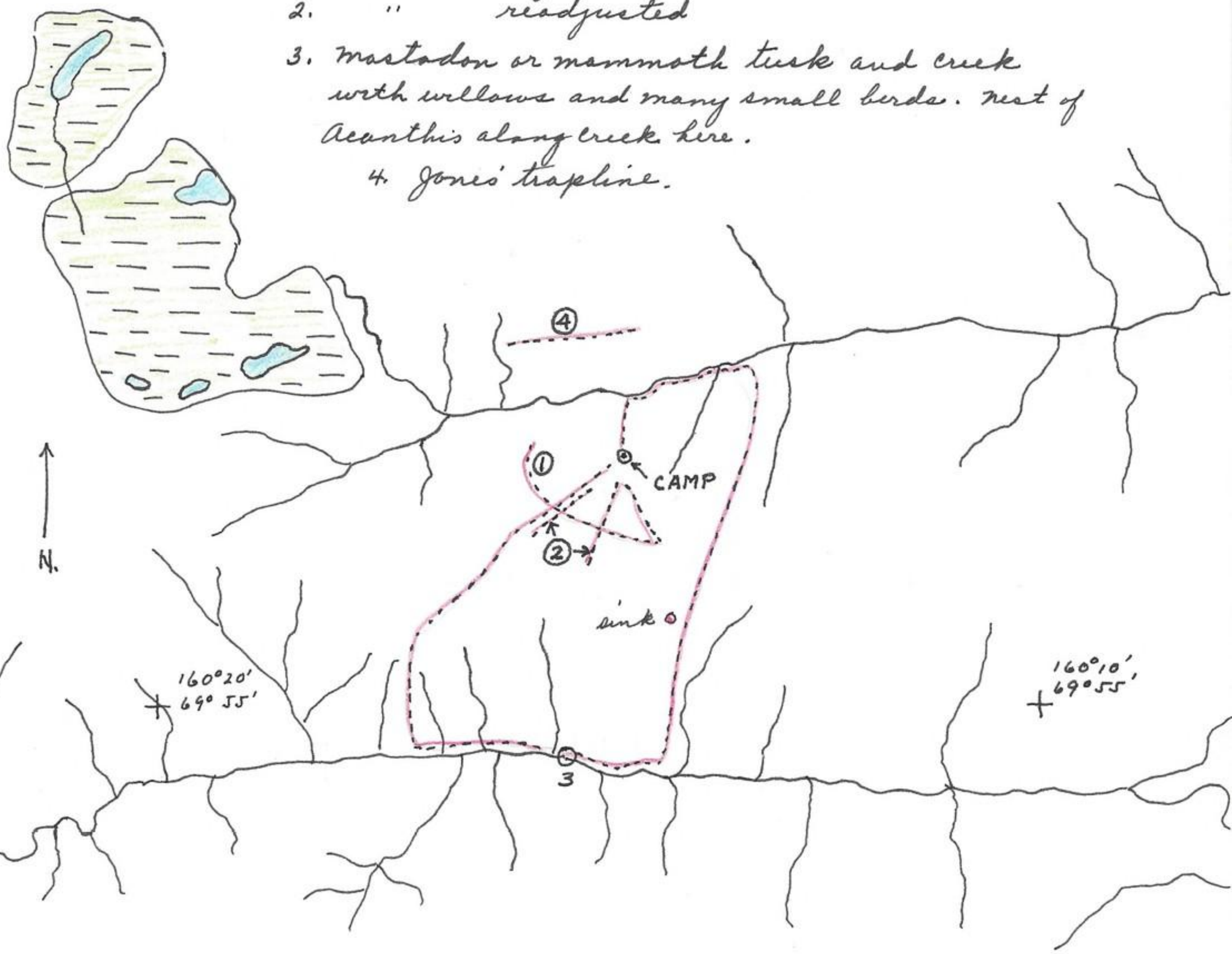
Ira L. Wiggins
Scientific Director

cc: Bee & Jones
Jack Adams, Supt.

of nest of twigs and coarse grass stems, then layers of dried grasses and lined with white feathers. These nest are well insulated against cold temps. and winds.

Koolak, 69°56'00", 160°14'51", 178 feet elev., Alaska.
July 22, 1951

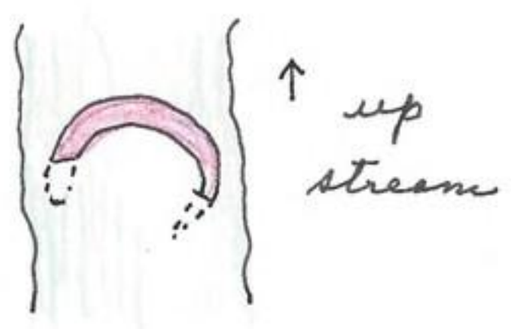
1. trapline, original 76 to 214.
2. " readjusted
3. mastadon or mammoth tusk and creek with willows and many small birds. nest of Acanthis along creek here.
4. Jones' trapline.



Inspected trap line of 214 traps as follows: trap 4 calcarius lapponicus 510722-1; 26 Calcarius lapponicus 510722-2; 31 sprung; 38 sprung; 55 sprung; 92 Lemmus trimucronatus 510722-3 in 1½ high meadow grasses & sedges, damp, depression, not in runway. Only one mammal in 214 trap. On dark nights when sun is excluded by clouds, lemming become active beyond runways. It is possible that Dicrostonyx is underground during sunlit nights in summer and only come above during periods when sun goes below horizon. This evening took a short trip (walking) of 2 hours SE of Camp

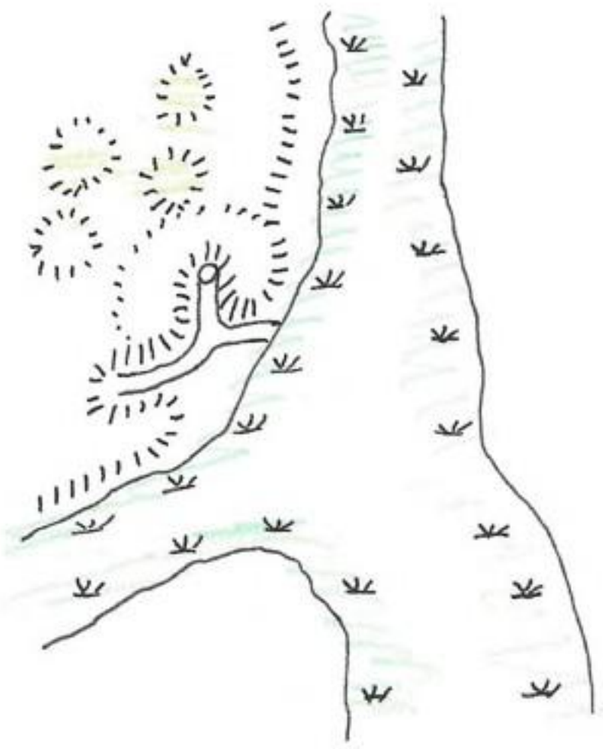
to erasional roadway. Collected one male Pluvialis dominicus and ♂ Acanthis linaria. The male is more aggressive than the ♀ Pluvialis. Lagopus with 14 young. Another ♂ & ♀ with 9 young. Recorded number of birds in 2 hour period which shows a scarcity of avian life. Most birds in protected areas along prominent relief. Birds on flat, open and or gently rolling surface # in 2 hour walk: 3 Passerculus sandwichensis; 2 Pluvialis dominicus; 3 Erolia melanotos, 1 Phalaropus fulicarius; 35 Calcarius lapponicus in groups of 5 and 6 and probably family units; 1 Larus hyperboreus; 2 Stercorarius longicaudus; 3 Acanthis linaria. Such a list would indicate scarcity of bird life on tundra (open + extensive).

The cook at Koalak reports 2 wolves at garbage dump on July 15, 1951. Most wolves noted at night about 2 or 3 o'clock A.M. Caribou come into this area after mosquitoes leave which is after in about 2 weeks from now. From that time (frost time) on the country becomes enjoyable up to October the first when the ice starts to cover lakes. measured antlers 1100 mm long. Mr. Melby has a tusk of a mammoth collected by driver of caterpillar from creek south of camp. It was lying in creek with both ends in sands and gravels and main body exposed above creek bed but entire tusk under water. This tusk was not over a mile from the sink along tundra road. no erosional walls in creek, at least at present but vegetation sealing all exposures. no other skeletal fragments observed.



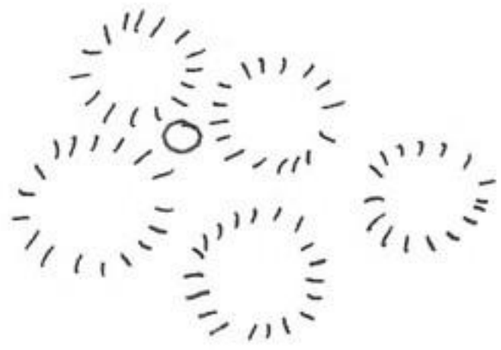
July 23, 1951

Inspected trapline of 214 traps in original setting: trap 8 Calcarius lapponicus 510723-1; 15 ♀ sprung; 16 sprung; 23 Calcarius lapponicus 510723-2 taken in same trap as pectoral sandpiper; 24 sprung; 31 Dicrostonyx 510723-3, ground brownish and bare, no feces, febrous and appears used (ground area). Lined on one side by water sedges and grasses and other by Eriophorum hummocks. 15 fecal pellets in rectum The one runway may have been used to gain access to water; the other trail led to typical Dicrostonyx vegetation; 38 Calcarius lapponicus 510723-4; 45 Calcarius

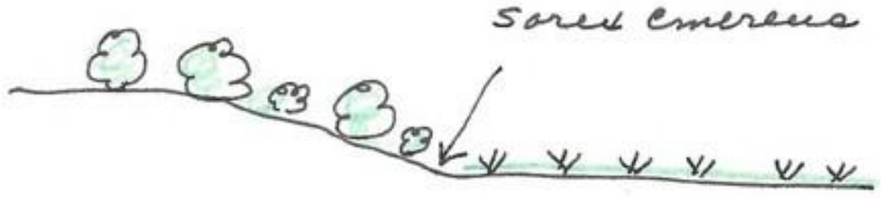


510723-69

lapponicus 510723-5; 46 Melospiza lincoln (sp.?) 510723-6; 50 Lemmus trimucronatus 510723-7 taken from community of vegetation typical of Dicrostonyx.



Overhead protection between hummocks of Creopharum. Adjacent meadow grasses. Few dwarf willow. Area between hummocks with dry leaves; 71 sprung; 81 Sorex cinereus 510723-8 taken at contact zone between dry willow hummock and lower wet meadow grasses. Ground bare, damp but with sparse overhead protection of ground and willow. Appeared as if it might have been eating the oatmeal. no runways used; 93 Lemmus trimucronatus 510723-9 from 400 mm high meadow grass, near willow stand, from runway; 95 Lemmus trimucronatus 510723-10, same as above, no trail, soil supersaturated, 115 Lemmus trimucronatus 510723-11, grassy ditch with 400 mm high grasses, protected above, from trail, soil supersaturated; 183 Calcarius lapponicus 510723-12; 200 Calcarius lapponicus 510723-13.



From 1/2 mile SE Camp collected Pluvialis dominicus 510723-15 and Acanthis linaria 510723-16. This evening pulled traps 76-214 and reset as indicated on map. From line which I pulled collected one Lemmus trimucronatus 510723-17 from 2 feet high grasses, soil damp. Reset from 8:00 P.m to 12:00 A.m in typical meadow grasses, damp, 500 mm high, partially exposed ground, bare, not too thickly matted. Noted 4 sites of grass clippings. This area has good overhead protection but may be too high in grass length. Observed ♂ + ♀ ptarmigan and 9 young. 14 caribou pass SE camp 1/2 mile to south, following same trend and direction of single animal noted a few days ago.

Koalak, 69°56'00", 160°14'40", 178 ft., Alaska

July 24, 1951

Inspected trap lines. Original set (1-75) New set 1-139. From new set; trap no 120 Lemmus trimucronatus 510724-1; 37 Lemmus trimucronatus 510724-2; 49 Lemmus trimucronatus 510724-3. Four Stercorarius flew by trap area 52. Also one Stercorarius parasiticus; 87 Lemmus trimucronatus 510724-4 runway used.

from first original trap line 1-75 traps (first part of 214 traps). 3 Lemmus trimucronatus 510723-5, area looked like good Dicrostonyx community; 55 Lemmus trimucronatus 510723-6 set for Dicrostonyx and shows overlap of communities. It was adjacent damp meadow grass community; 65 Lemmus trimucronatus 510723-7 set at entrance of hole going into Eriophorum, fecal pellets at entrance typical of Dicrostonyx. At 11:00 A.M left for landing lake about 8 miles NE of camp and arrived at 11:55 A.M. Made census of birds in 30 meter lane x 8 miles as follows (from weasel vehicle): Calcarius lapponicus, 16 (singles except 2 groups of 3); Pluvialis dominicus, 2, feigning; Erolia melanotos, 1, feigning. Day cloudy and occasional rain. Jones caught ♂ micratus oeconomus & among meadow grasses south of camp.

July 25, 1951

Rain this A.M. will not inspect trapline until about noon. Mr. Hudson, foreman of this camp, reports that a brown bear came into Titaluk camp yesterday and left by willow thicket near that camps. The radio report wanted a gun to kill this animal. Also he reports a barren-ground grizzly killed about June 1949 at Oumalik (no.1). The pelt was retained by the tool regger but the skull was sent to Point Barrow. Hudson reports successive layers of ice and tundra in some drillings. The electrician of camp and a trapper in Alaska, says shrews get into martin furs on trapline causing damage by furrowing of fur. They are also destructive to sleeping bags. He reports 6 mustela erminea at Fish Creek Camp near mouth of Colville River delta at approx. 151° 30', and 70° 18'. He also reports 5 mustela erminea at Titaluk camp. The only mustela rixosa was the one Thompson showed him at Point Barrow. 5 or 6 Mustela rixosa were also observed at Fish Camp in the fall of 1950. Following birds observed in this area since we arrived July 20.

Stercorarius longicaudus One nesting pair in brood grassy meadow. Male and female, especially female very demonstrative and calling continually immediately over either nest or, more likely young. The ♂ was less demonstrative but came into area when ♀ began calling. An average of 6 birds per day noted at camp while on a four hour trip beyond camp would see as many as 14. They generally fly in groups of 3 and

routine flights either over meadows or along ridges. Single birds seem to be hunting by hovering overhead and end in an upward swing. Have never seen them pick up prey. After collecting birds in area found few birds in evidence which would indicate a certain territorial range, however, an occasional one or group will fly through area.

Stercorarius parasiticus. Two birds continually in area. Others pass through. Generally single to pairs and not in groups of 4 or 5 as is sometimes found with long-tailed jaegers. These birds are not as vociferous and do not chase either other as much as the long-tailed jaegers. They are, however, magnificent and powerful flyers.

Anas acuta tzitzihoa. One ♀ and 4 young, one ♀ with young, one ♀ with 6 young. not generally observed on trips around camp.

Clangula hyemalis Pair with young, 2 singles.

Limnodromus griseus. 2 adults and 4 immatures in area. young always alone and size of adult.

Lagopus lagopus. Approx. 23 adults with broods over-agung 1-3-4-6-8-9-11. One group of 9 young about 3/4 size of parent, others only 1/3 size. Prefer damp swales and dwarf willows near lakes or creeks.

Larus hyperboreus. 5-8 birds always at garbage dump at camp. While at creek S of camp found 2 lone birds flying up creek at interval of 2 hours. They were flying up creek and probably working in from ocean.

Erolia melanotos. Approx. 8 birds in area with young. not conspicuous birds as at river camp on Koolak. Apparently they prefer open sand dunes or river beach for young.

Passerculus sandwichensis. Scarcely distributed on tundra, generally in dwarf willow, but not too uncommon along creek edge S of camp.

Acanthis (Sp.) prob. hornemanni. Rarely on tundra but common in creeks S of Camp.

Lobipes bilobatus 5 or 6 in area and with young about size of adult.

Calcarius lapponicus. most numerous bird and poorly represented on tundra (See census in 6 miles) Most common along road where tundra has been pushed up into 4 foot piles at edge of road. They may be here because of protection from predatory such as falcons or fast flying owls etc.

also more numerous along creeks and willows. Most common in climax Eriophorum - Dicrostonyx association, rarely in wet meadow grass community. Flocks now in family size to 18 or more individuals.

Pluvialis dominicus 1 pair at camp, 3 pairs beyond a mile from camp, not found together as at Koalak River camp but generally male approach a block away while ♀ remains in area of young. One yound 3/4 size parent.

Canis lupus One at camp. Tracks along edge of creek.

Rangifer arcticus group of 12-20, 1, 1,

Vulpes fulva tracks only.

Lemmus trimucronatus. near normal population numbers

Dicrostonyx groenlandicus. Population low.

Sorex tundrensis probably normal.

Microtus oeconomus. Pisbobly on limits of range and might suggest. normal numbers.

The Dicrostonyx would be form to vary in greatest numbers as evidenced by former activity which is preserved today. I am wondering if possibly it is not this animal which is responsible for high populations experienced in this part of the country. Most evidence of Lemmus comes as runways in conspicuous areas when used in winter under snow. In summer they are not used.

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

July 25, 1951

Checked trapline this A.M. Rained last night and periodically this A.M so did not check or recod traps which were sprung. From line of 1-135 in wet meadow of grass: 9 Lemmus trimucronatus 510725-1 from runway; 74 Lemmus t. 510725-2 from runway; 87 Lemmus t. 510725-3 from runway; 96 Dicrostonyx groenlandicus 510725-4 on small island of cottongrass.

From original 75 traps in cottongrass: 1 Calcarius lapponicus 510725-5; 16 Calcarius l. 510725-6; 21 Calcarius l. 510725-7; 22 Calcarius l. 510725-8; 24 Calcarius l. 510725-9; 29 Calcarius l. 510725-10; 42 Calcarius l. 510725-11. Pulled this line and placed in damp and wet meadow grass as 136-210. The Calcarius lapponicus are definitely associated with the Eriophorum community and in damp wet grass and sedge only at margins and contact with well drained cottongrass areas. Willows may be an ecotone between upland cottongrass & wet meadow grasses and

sedges. The willows are in damp swales which penetrate uplands or as islands in wet meadow grasses & sedges. The thought just came to me that wolves are associated with river and creek courses where from my experience the greater number of small mammals and birds are found. From censuses of bird life on the flat or gently rolling tundra is scarse and only found in normal or greater numbers (particularly small birds) in creek bottoms. Ptarmigan generally associated with dwarf willow in poorly drained places where soils are damp to supersaturated and dominated by grass and dwarf willow and a plant with this type of leaf  .

Mr. Harry L Newman of Eau Claire, Wisconsin reports the following. Newman is a good informant and has had professional experience in Alaska for several years.

1. no grizzly bears observed n of Brooks Range.
2. no brown bear observed n of Brooks Range, however, has heard reports (may not have proper identity of bears in mind).
3. no moose observed but reports at Umiat and Kobuk of moose interfering with telephone posts by pushing them over. Found mainly around rivers and stream course.
4. no mink observed beyond (north) of Brooks Range.
5. 6 mustela erminea at Fish Creek
6. no otter n of Brooks Range.
7. Observed 6 arctic fox during winter at Topagaruk.
8. 2 Red fox at Topagaruk up to 1st of May.
9. One or two red fox at Fish Creek.
10. No shrew observed north of Brooks Range.
11. Wolverines travelling by at East Oumalik. They have a habit of traveling widely over tundra.
12. Caribou move into Brooks Range in October where they remain all winter, feeding upon wind blown ridges of mosses. By middle of may migrate back to low tundra for the summer.
13. Approx. 1500 east of Fish Creek Camp in early September of 1950. Have lateral migration along coast.
14. In early spring Caribou have calves and remain in small groups in localized area.
15. July 20, 1951, ♂ & ♀ Lagopus lagopus with 8 young along in front of a LVT vehicle in established tracks on tundra. The driver of the vehicle frequently slows down to allow the young to escape from the tracks

16. waterfowl arrive on tundra area as soon as spring

arrives which may be very abrupt. At that time 50% of ground covered with snow. Lakes always frozen but they use rivers and creeks. They arrive middle of may. It is a period of loud calling and nuptial performances. Geese and brant call all night. Noise and activity break up at nesting time. In fall birds return to ocean where they flock. Birds leave the country as they come. Cold weather and freezing lakes seem to initiate departure. Lakes freeze about 1st September. Ducks tarry but small song birds leave suddenly.

17. 80 miles NNE Fairbanks at Beaver Creek, trees mainly spruce and birch with few poplar. martin in rugged slopes in timber from 10 - 12 feet high. The colder it gets the hegher they go. Owls get them in open country and as a result martin shun openings as the weasel does and when forced to journey across such clearings run rapidly.

18. young timber wolves taken at Lovengood mine about 50 miles north of Fairbanks.

19. Beaver common at 85 miles N Fairbanks on Beaver Creek. Approx. 500 in 60 miles and in groups of 5 or 6 per pond.

20. 7 wolves fed on one moose and cleaned it up overnite.

21. Good number of mink and lynx at Minto Lakes about 45 miles north of Fairbanks.

22. Martin nacturnal.

23. Lynx migrate across country as they follow game and food. It is common experience to catch 5 or 6 in one night and then not see or catch another one for a week or month.

Kaolak, 49°56'00", 160°14'51", 178 ft., Alaska

July 26, 1951

Last night cloudy with trace of rain. no wind. mosquitoes at their best. This A.M collected following grasses and sedges from damp areas assacuated with climax Dicrostonyx - Eriopharum association. all taken from hummocks of cottongrass and all weakly subdominant.

510726-1 Arctagrostis latifolia (R.Br.) Griseb.
510726-2 Carex lugens Holm.
510726-3 Poa arctica R.Br.
510726-4 Carex aquatilis Wahl.
510726-5 Carex lugens Holm.
510726-6 Arctagrostis latifolia (R.Br.) Griseb.
510726-7 Calamagrostis canadensis (michnx.) Beauv.

From Dicrostonyx - Eriopharum association collected the dominant

plant 510726-8 Eriophorum which constitutes 99% of the grass and sedge population.

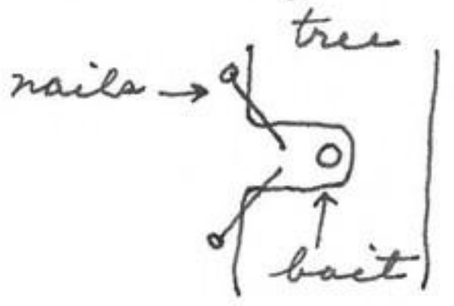
Inspected trapline of 210 traps at noon. 1-135 trapline. 67 sprung; 94 sprung; 95 Calcarius lapponicus 510726-10; 104 Limnodromus griseus 510726-12 found dead with deflected bill, 10' from trap.

From new trapline 136-210: 144 Lemmus t. 510726-13 from well established runway in dominant meadow grass 13/4 feet high on slightly elevated grass ridge; 152 sprung and dragged 6 feet; 161 sprung and trap dragged 3 feet; 174 Lemmus t. 510726-14 in trail among dominant grass. Dwarf willow overhead; 193 Lemmus t. 510726-15 in trail among dominant grass. From this morning's observation would say that Lemmus prefers adequate overhead protection of grasses from 1 to 1½ feet and matted enough to give almost complete overhead protection. Lemmus rarely taken in short grasses + sedges. Lemmus have a very precise ecological requirement and inhabit only certain situations in a tundra that at first glance might appear homogeneous; it cannot be too wet, vegetation must not be too sparse or dry. Established runways produce mammals while traps set outside of trails catch lemming only by chance. Runways do not appear used in the same way as those in the States. Jones caught a Lemmus t. at 1:00 P.M which had just been caught. Mr. Harry Newman reports:

1. Wolves travel in circuits of 2 weeks duration and follow the same trails and sometimes even the same foot impressions. They prefer ridges, creeks and river edges. A captured wolf puts up no fight in a trap while a lynx will make jumps at one when caught.

2. Lynx follow established man-made trails and subjects itself to being shot.

3. Martin numbers determined by number of tracks on first snow. If trapped to heavily one year will take 5 or 6 years to recuperate. He improvised trap in trees which allowed the marten to put head in between nail but not able to retract.



4. Otter travel 100 miles in a night and prefers lakes with outlets. When an otter swims by one on land, the otter will stop and hiss before moving on.

Mr. Norman Oie of Spokane and cat driver on winter and

summer freight hauls reports the following.

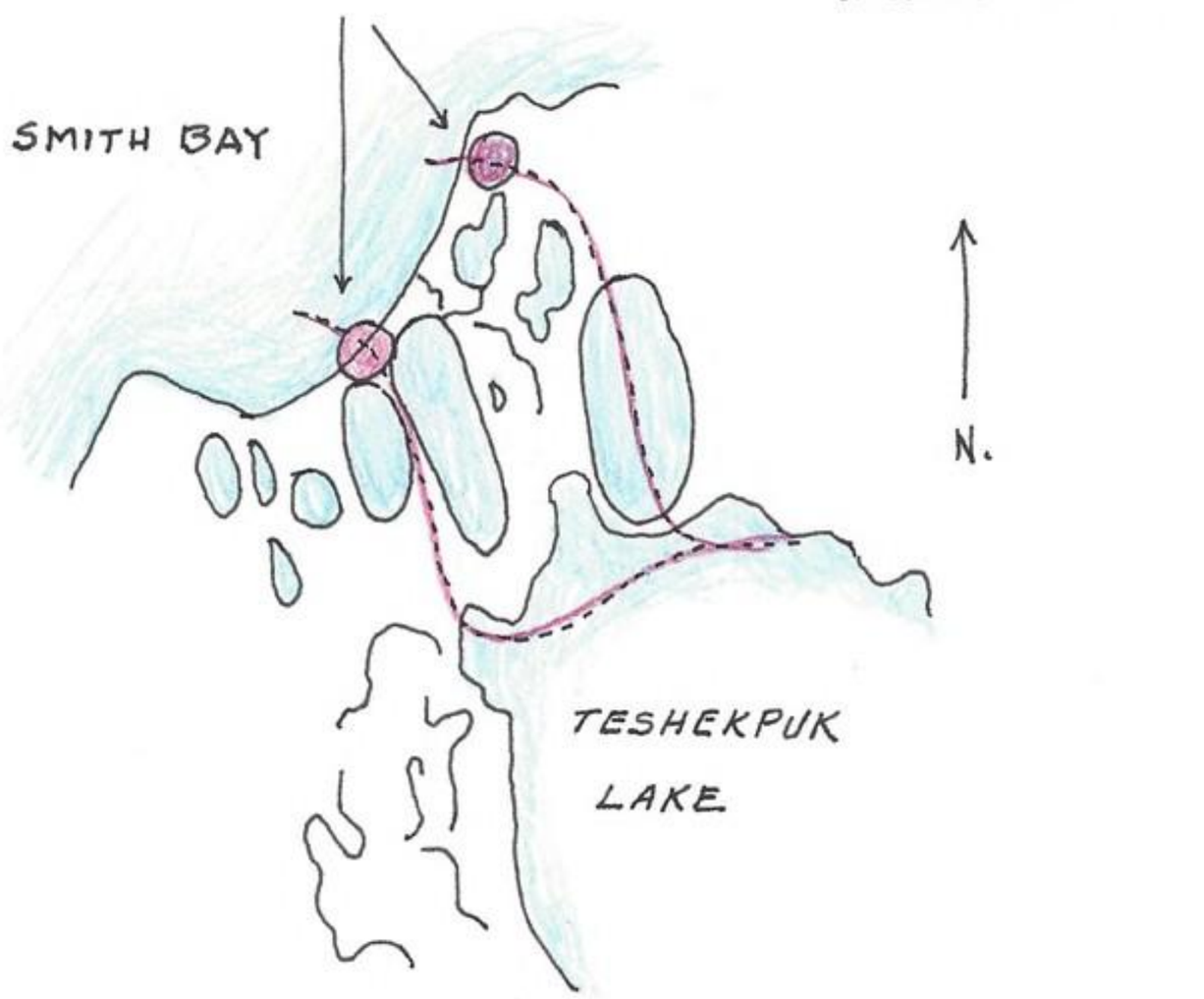
1. During winter freight haul from Point Barrow to Umiat via Colville River noted the best Lemmus area at Jonas Eskimo Camp at the south end of Smith's Bay. The area in immediate vicinity of this camp supported hundreds of Lemmus. They would run down freight wagon tracks in rear of train as they were dislodged from their retreats in the tundra by pushing off the tundra from permafrost by bull dozer. High populations in 1946-1947, 1948-1949! Oie was not through area in 1950-1951.

2. Wolverine at East Oumalik.

3. There were no wolves during freight hauls from Point Barrow, Smith Bay, Teshekpuk Lake, mouth Colville River, thence up Colville River to Umiat, except as one approaches Umiat beyond Sentinel Hill when they become in evidence.

Mr. Oie reports Eskimos gave him a large pike 3½ feet long) to him to cook enroute. This fish, if it is a pike is an exceptional record for this area. Mr. Oie considers area just east of Teshekpuk Lake as favorable for Lemmus as the Jonas Camp area. This evening at 9:00-10:30 P.M checked trap line of 210 traps.

Jonas Eskimo Camp (may be either area indicated).



Rained this afternoon about as hard as it has rained since I have been on the Arctic Slope. Waves of clouds dropped rain most of the afternoon and late evening. As a result of rain, 70% of traps sprung. 50% of traps under 2 to 4 inches of water. 25% floating and 25% above water level. While Lemmus were taken in the inundated area caught most of them in traps slightly supporting water and especially those above water level and adjacent the better drained areas. Left all traps standing in water and replaced submerged traps a foot or so away in area not covered with water. Collected the dominant and subdominant grasses of this trap line in the lowlands:

510726-16 dominant sedge, Carex (sterile specimen) in more permanent water zones and wetter areas of community. Has no flower and grows as high as 3 feet but bent at lower part of stem.

510726-17 Equally dominant to above and in well watered areas. Carex aquatilis x Carex lugens. This plant grows among the dominant sedge (510726-16) and in places makes the entire sedge community. This sedge also is found in various conditions where the growth of this plant is small, especially in lake bed that has been extinct but catches water and holds when raining. It is the only sedge in this situation.

510726-18 Carex physocarpa Presl. associated with above two dominant sedges but irregularly distributed and in considerably lesser in number.

510726-19 Carex aquatilis Wahl. dominant with 510726-16, may in some well watered lones be nearly entire plant present. Does not make mat as does 510726-17 and exposes bare ground beneath. Sedge 510726-17 offers grass for permanent Lemmus runways and many of these mammals in this sedge complex.

Made fecal pellet count of Dicrostonyx in Eriophorum community. Transect 1 meter wide and 1000 meters long (each meter reading represents one hole used by Dicrostonyx (?) with fecal pellets at entrance:

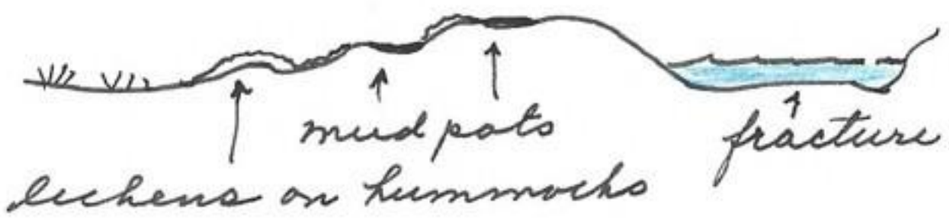
11	162	320	441	596	766	899
17	179	326	452	607	768	907
20	186	334	461	615	773	911
37	195	340	482	619	784	923
48	205	343	488	626	796	933
52	213	344	493	638	801	938
60	226	350	507	642	807	947
66	236	363	512	650	821	952
76	239	376	518	663	836	956
85	252	387	526	689	838	971
90	261	396	537	692	842	975
99	284	405	542	698	843	983
111	288	412	557	713	853	986
117	298	418	560	720	866	988
130	303	420	568	738	876	993
141	305	436	572	743	887	997
161	311	440	590	750	890	

or 118 holes.

510727-78

July 27, 1951

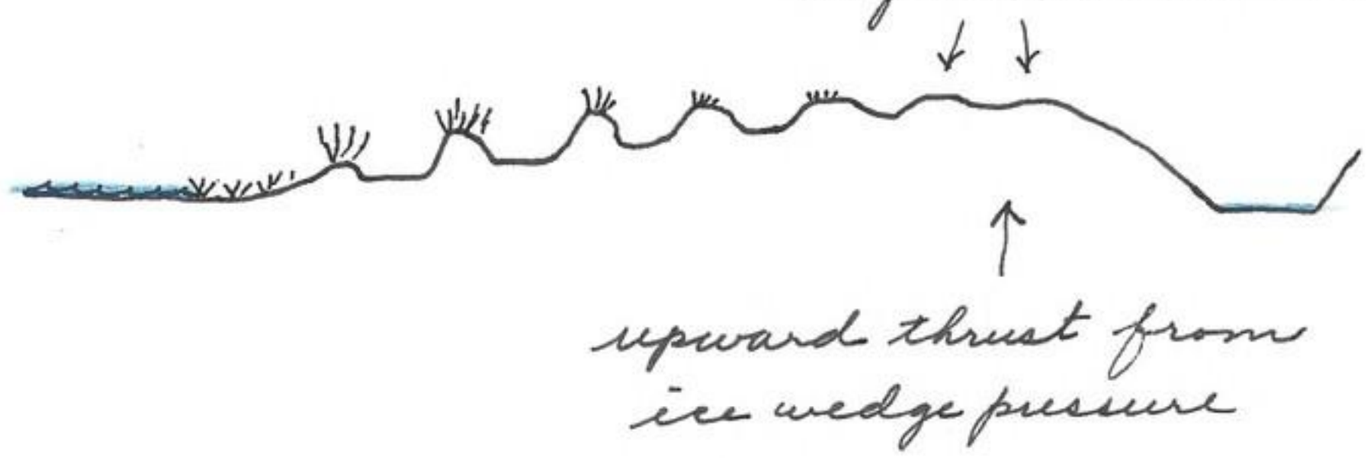
Last night occasional rain. Inspected trapline. Last night up to 12:00 midnight reset all traps and placed submerged traps on drier areas. Only on Lemmus caught 510727-1. This number would indicate either a limited territorial range for Lemmus and when captured in an area others do not move in or it may indicate a period of inactivity during rainy nights. Inspected mud pots adjacent to fracture zones. They were generally higher than the water level and near fracture depressions.



Some near edges of swamp. They are hard to step on and represent forcing clay and mud up through tundra from pressure zone below.

The profile of elevated ridge adjacent fracture as indicated above. The moss seem to have covered cottongrass and while the hummocks are still present the grass is lacking.

The dry surface on top of elevated ridge adjacent to ice wedge depression is of dry masses and lichens. The elevated ridges has drainage to either side and is pushed up above water level so that plants cannot get moisture.



Albert Burke, prospector in Alaska since 1902 reports:

1. Ptarmigan numerous in Yukon to 1920 afterwhich they became greatly reduced.

2. Large hare also suffered same fate as ptarmigan.

3. Citellus parryi a colony dweller and numerous wherever found, generally along sandy rivers. Intervening areas lacking these animals.

4. Worked with Merty, Brooks, Turner and other early geologists of Alaska. Merty travelled by canoe from lake to lake.

5 Glacier bear mean.

At camp I met Bud Tanayurak, age 44 and Oliver James, age 45. of Point Barrow (Barrow Village). They Brower well. Bud has 13 children. He shot caribou of our collection (antlers)

Photo 510727-5 of mammath or mastodon tusk.

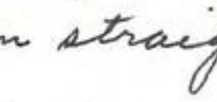
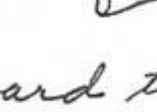
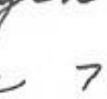
circumference at base, 500 mm; length greatest curvature, 2750 mm  ; length tusk in straight line, 1410  ; upward twist or tore 700  ; cross section  .

Photo 510727-6 Koalak drill with yellow oil or fuel cans in foreground.

Photo 510727-7 Permafrost layer at erosional road 1/2 mile SE of camp at Koalak. Ice of unknown depth.

Photo 510727-8 General erosion of old road showing permafrost ice to left. may be either wide ice wedge or lake.

Photo 510727-9. Ibid with original base of road indicated.

Two wagtails approached us as we entered camp. They flew back and forth calling. In general, this area good for Lemmus but not for birds (as compared to Pitaguruk).

Enroute to landing lake made census of 60 meter swde x 6 miles long. Started 4:20 P.M. Day clear but clouds: Calcarius lapponicus 12; Erolia melanatos 3; Limnodromus griseus 1; Pluvialis dominicus 1; Labipes bilobes 2; Passerculus sandwichensis 1; Xema sabini 1 at lake. Arrived lake 4:45 P.M. at Koalak collected the following mosses and lichens from camp area:

510727-12 Ochrolechia frigida (SW.,) Lynge S 2032 by E. Dahl.
510727-13 Peltigera aphthosa (L.) Willd.
510727-15 Sphaerophorus globosus (Huds.) Vainio by Dahl.
510727-16 Dactylina arctica (Hook.) Nyl. S 2027
510727-17 Cladonia rangiferina (L.) Web.
510727-18 Nephroma arcticum (L.) Torss. S 2029.

At landing lake more shorebirds than at Koalak but fewer longspur. Leaves of some willow & gooseberrylike plant yellow and red as if turning color. Departed for Point Barrow at 5:15 P.M. in norseman plane. Enroute shot 50 feet of color movies (16 mm) of tundra, coastline and plane at Point Barrow upon landing. Photo 510727-10 of tundra and lakes. Observed 1 caribou resting on sand bar along river. Jones reports another caribou. Xema sabini generally distributed. Pacific loon, geese (4 fronted), glaucous gull old squaw duck, sandpiper observed from plane. About 500 glaucous gulls at different points along ocean front.

Arctic Research Laboratory, Point Barrow, Alaska
July 28, 1951

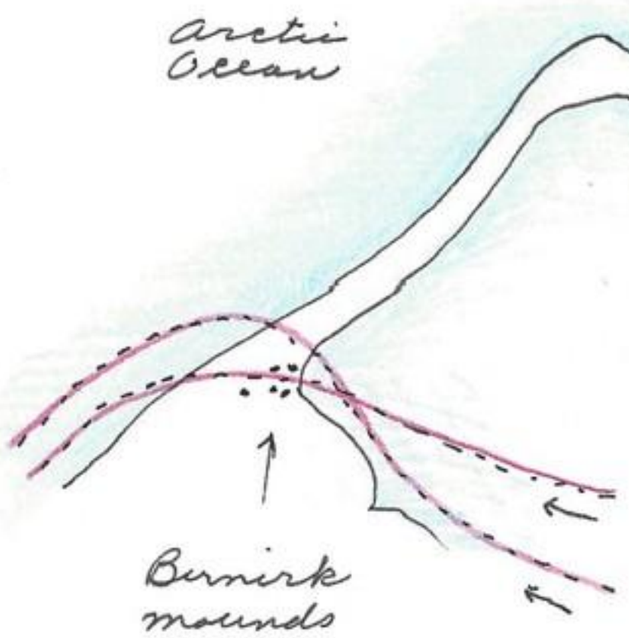
Fog all day. In afternoon went to Barrow Village where Mr. Cain was excavating one of the archeological mounds. Cain

gave me a pola bear upper canine tooth (female according to Eskimos) and an adult and immature tooth of walrus. He gave us permission to collect any mammal fragments from the piles at the site. The pit was now down to permafrost and beyond The Eskimo site was considered to be 1200 years old. From this level collected:

Thalarctos maritimus, 510728-1, lower right ramus.
Rangifer arcticus, 510728-2, lower left ramus
Canis familiaris, 510728-3, skull and incomplete tooth row.
Rangifer arcticus 510728-4, frogments of antler.
Thalarctos maritimus, 510728-5 (from surface of mound)
Phoca 510728-6 (" " ")

Associated with this material were gull, duck, whale, seal one skull ( ) with narrow construction and other large skulls, ribs, bones of other large marine mammals. Old dwellings being excavated supported logs 10 inches or so in diameter. It was interesting to note that in the fog and when wind flew from east, the eiders flew directly over site (Barnark) instead of flying across peninsula to ocean at a point further to the east when wind blows from the NW.

Today during the fog 10 flocks of approx 300-500 (each flock) eider(?) passed by which is only a fraction of birds passing during clear days.



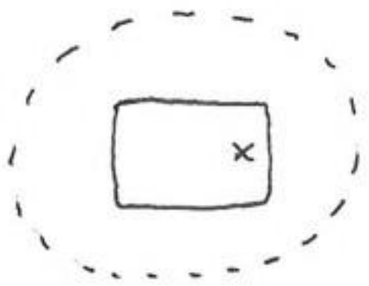
flight when wind from east and foggy
flight when wind from NW & clear day.

From the archeological site at Barnerk, 71° 20' 35"; 156° 36' 10", House Q collected the following grasses from the edge of the mound and flat saturated soils immediately adjacent to the mound.

510728-5 Arctophila fulva (Trin.) Anderss.
510728-6 " " " "
510728-7 Alopecurus alpinus J. E. Smith
510728-8 Poa Arctica R. Br.
510728-9 Alopecurus alpinus J. E. Smith

510728-81

From the bone pile (used for fuel) at east end of House Q at Bernirk mounds, and with permission of Cain, collected a representative sample of bone fragments. This collection 510728-5 (nos 510728-20 to unlimited number can be used for this series) in addition to the 4 previous numbers, taken from the sample and position will constitute a series for determination of present frequency of various mammals and birds used for food.



Thes pile of bones was lying against a wall of horizontal logs which formed either the corridor walls or a separate annex to main room. It bordered the room. Considerable fat material associated indicating that these bones were saturated for fuel purpose. Several large polar bears bones associated. Included in samples are: 2 species of seals, walrus, polar bear, Caribou, whale, small domestic eating dogs, eider and other unidentified species of birds and mammals. Cain also presented me with a collection of bone fragments 510728-11 from Bernirk House N, section 4 from several test trenches from the surface to 27 inches. This house is about 40' north of House Q. Its composite can be used to determine percent frequency of food eaten.

Inspected an Ovibus moschatus skull from A.R.L. Information as follows: "in bank on the east side of lake located at 70°18' N lat. and 151°38' W long approximately. There were no other bones showing ... near Fish Creek, Aug 18, 1949". Collected by Steve Roberts and John C. Ballenbocker.

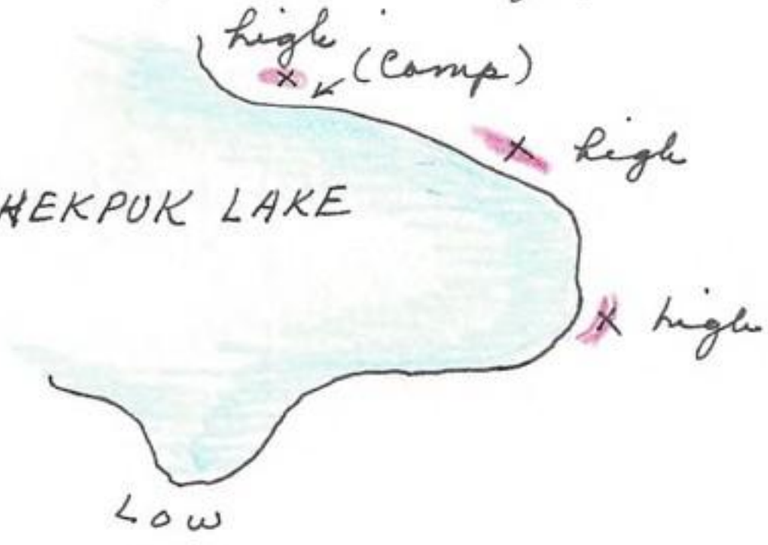
Prepared to leave for Teshekpuk Lake tomarrow.

Point Barrow, A.R.L., Alaska

July 29, 1951

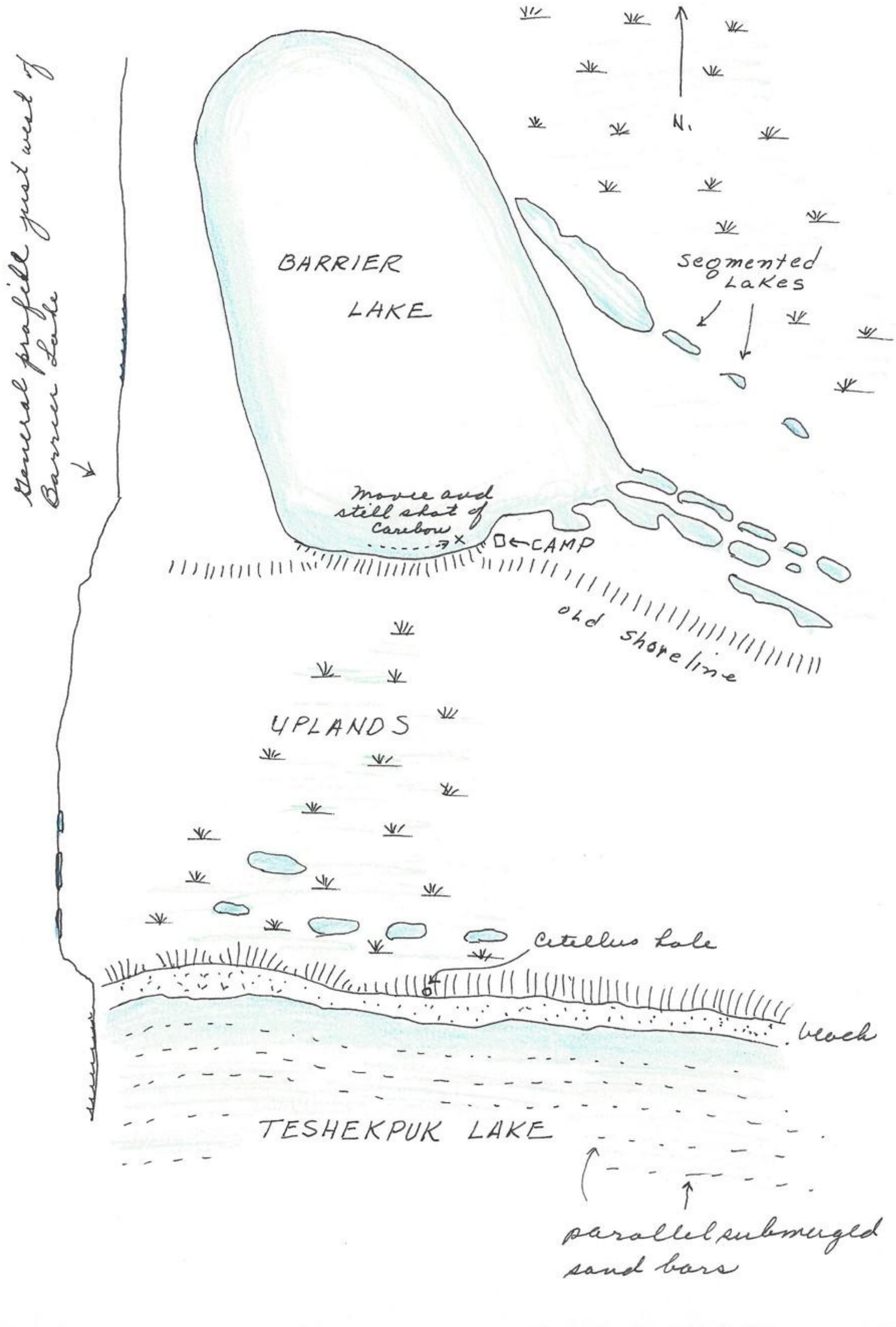
Departed Teshekpuk Lake at 2:10 P.M from Point Barrow after 5 hours delay while props were changed on the "Wedgeon" plane. Michell fled us ~~out~~ out in two trips. Jones followed on second trip. Enroute observed the following: 2:15 Sabine's gull; 2:18 15 eider (?); 2:23 2 glaucous (Larus hyperboreus); 2:37 15 ducks or eider; 2:40 one Larus hyperboreus; 2:41 7 Larus hyperboreus; 2:48 Sabine's gull; 2:51 flock 40 black-bellied plover (?); 2:51 edge of Smith Bay. First caribou (2). Numerous caribou between Smith Bay and Teshekpuk Lake. One group at NW edge of lake of about 150 with 8 white ones. Tracks covering all sand and

in some areas the sands (edge of lakes & bays, some extensive) were almost completely covered. They like to travel on flat sandy areas, particularly at edge of land mass between tundra and ocean bays. They collect at edge of large lakes as if building up their group numbers before moving on. Would estimate approx. 320 caribou in area NW Teshekpuk Lake. Arrived NE edge of lake at 3:05 P.M after inspecting south side (from air) for a suitable camp. No high areas along south side. One high shore on east side, and 2 before reaching present site at NE end of lake. Set down on lake just north of Teshekpuk because of its deeper bottom for landing Wedgeon plane. There were several parallel sub-merged bars in Teshekpuk Lake near shore which would have given us a bad time in approaching the beach, however, this beach area would be considered a betterplace to camp. Set up camp and made reconnaissance before Jones arrived about 2 hours later. 12 white-fronted geese and 2 Pacific loon were on lake at our arrival. The geese had used the south (east) shore of this lake as evidenced by the great amount of droppings. Also a ♂ & ♀ and 2 young of Gavia arctica pacifica at the south end of lake. The general orientation of this lake (Barrier Lake) and Teshekpuk lake thus: (see next two pages). This lake (our camping lake, Barrier Lake) is at the NE end of Teshekpuk Lake and is about 1 mile from the larger lake (Teshekpuk) and separated by a plateau of about 15-20 feet in elevation. It slopes in both directions N & S ending in abrupt cliffs (erosional soils) The difference in shoreline is mainly width of beach - at Teshekpuk 30' wide and with sand and flat water worn pebles, at S end of Comp lake, no beach and water at foot of cliffs (eroded soils 20' high). The Teshekpuk beach is used as a highway by caribou but only occasionally as highways (S end of Comp lake) in shallow (1) water. The intervening plateau between the lakes is nearly flat or gently sloping from middle or north crest (see profile on map). The vegetation shows difference in slope change. The southern half is a series of sedge lakes and cottongrass high with numerous lakes at the region adjacent Teshekpuk Lake. These lakes are at varying elevations and do not



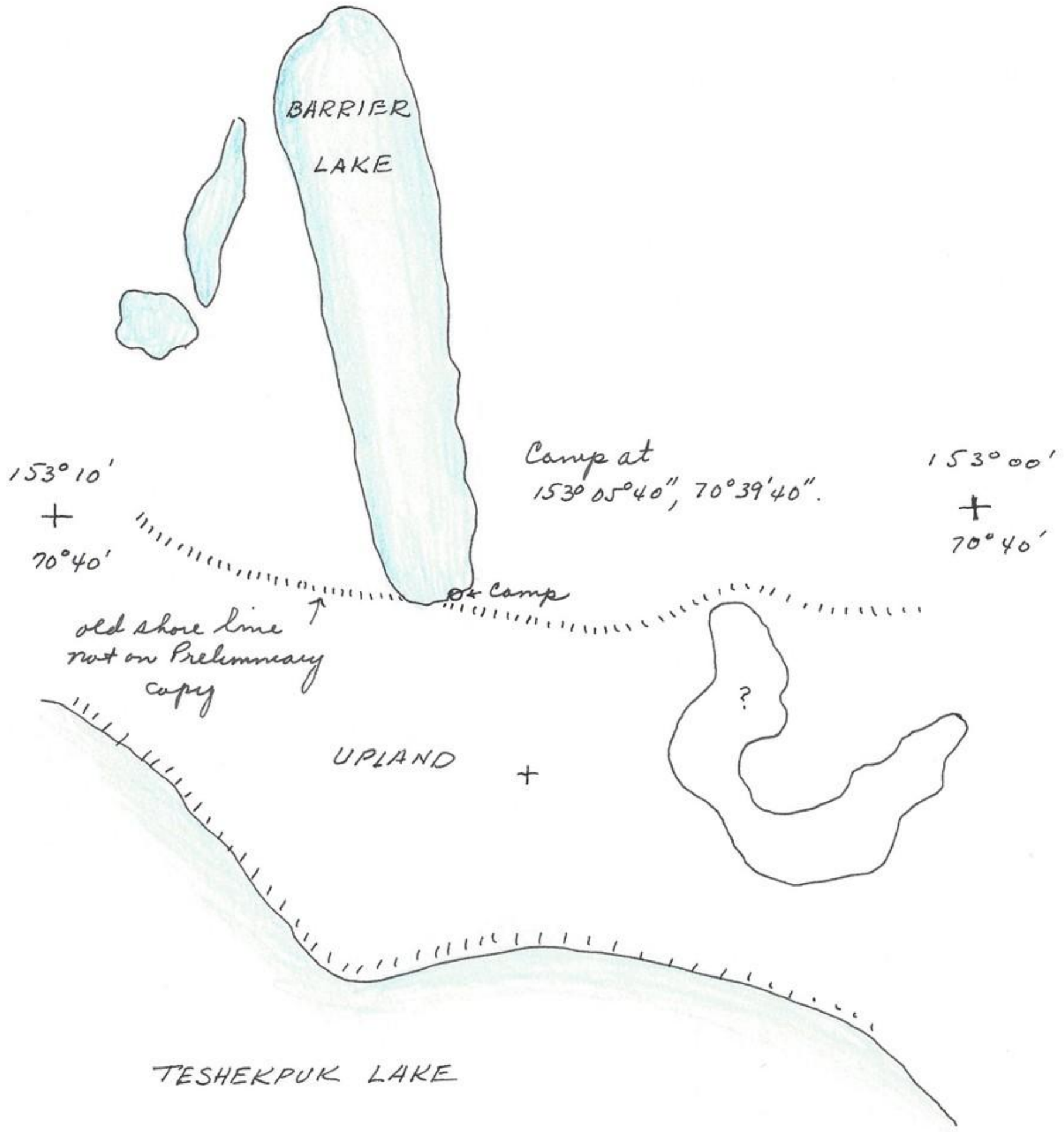
510729-83

TESHEKPUK LAKE 153° 05'40", 70° 37'40", 8FT.



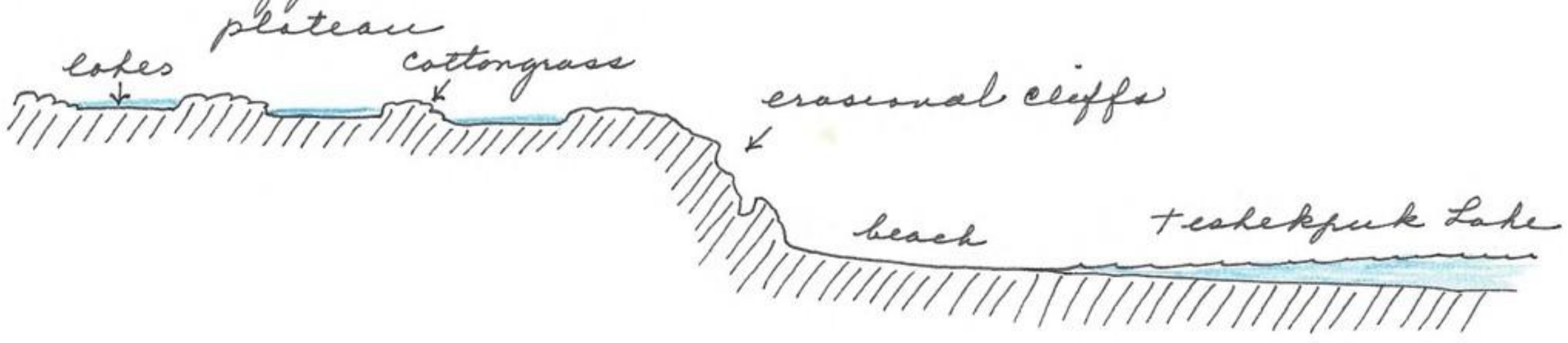
510729-84

From: Geological Survey - Preliminary Copy, Noval Petroleum Reserve, No. 4 Scale 1=48,000 ft.



(NOTE). There may be a question as to the accuracy of this map as our lake, which we named Barrier Lake because of the influence it had in East-West movement of caribou, is a much smaller lake than the one indicated.

drain into the Teshekpuk Lake or find underground seepage to the south. Several erosional gullies do send a small amount of water down to the beach but these are probably from rain runoff.



at places, there is a series of grass or sedge filled lakes which extend from ridge of plateau south to edge of Lake Teshekpuk. The north slope is more gentle and leads down to lowlands of large lake (at comp), smaller lakes separated by hexagonal ridges and grass lakes. To the east beyond camp is a large grass marsh that is perhaps 4 times area of Barrier Lake. This is an old lake now filled with sedges in standing water. The general color of landscape of old lake green and uniform and gives one the idea of an African savanna marsh, particularly when single caribou are feeding or running about throughout its extent. Some days many caribou are there while other days there are none. They prefer the drier ground between lakes for movement but will use water and marsh if necessary. This afternoon made reconnaissance after putting up tent and while waiting for second load of equipment and Jones. In lake chain 300 feet NE of camp found ♂ & ♀ Sterna parasitica with young on island in lake opening into Barrier Lake. These birds were feeding along south end of lake but mainly in lakes at S.E end in their immediate nesting vicinity. They would catch fish without much hunting as the lakes were heavely populated, especially the small ones around the borders. They would drift downward in descending levels and when about 10 feet above water dive for the fish. Many more birds could be supported by the numerous fish on all hands. A family of 2 Gavia arctica pacifica had 2 young about 200 mm long, 300' east of camp. They were using the 3 small bays or lakes that opened into the main lake. They preferred one lake and would always return when disturbed from their original nesting area. They were never

in lakes inland, although connected by channels, but preferred the security of the large lake (Barrier Lake). Late in the evening the ♀ would be on the SE edge of Barrier Lake, resting on land with her two young while the ♂ would be about 200' away or in the lake and nearby. Observed it to carry a fish across upland from Teshekpuk Lake to Barrier Lake. 3 Pelecdna sahalma alascensis feeding in area but did not show territorial behavior. A flock of 5 Erolia melanotas in area but may be passing through. One bird showed signs of concern by flying from one position to another. Tracks of red fox (?) and wolf in area. The fox, (could be arctic fox) had on 4 occasions dug the nest of either Lemmus or Dicrostonyx. If the hole happened to be in solid vegetation it would dig out, either in one or in 5 or 6 holes in an area of 1 square meter. Most of the excavations were directly downward to abrupt terminal but on occasion would follow along ground for a foot or so. If the nest is beneath a moss hummock, the fox would tear the moss away with mouth and such mouthfuls of moss would be scattered in all directions within 2 feet of the hole. Jones arrived 3 hrs later and after organizing camp made recon. to Teshekpuk Lake to south. The country between camp and Teshekpuk holds very little possibilities for trapping because of lack of overhead protection and because of caribou trampling. Calcarius lapponicus at both contacts of lakes among drosenal cliffs but only 2 birds (Calcarius) in intervening area. The only other birds were 1 pair of Gavia stellata which Jones collected and one Clangula hyemalis. This is a remarkably poor record for nearly one mile of tundra. The red-throated loon made themselves known by low guttural calls. When approached they refused to leave the lake (200' long and 40' wide and partially segmented with sedges and grasses) but remained within 30' of us until collected one by one. They would dive under with a splash, like a beaver, and a loud shriek call just as they started their dive. They surfaced in 20 seconds to repeat the same act. They had a chance to leave but preferred to remain and protect their young which must surely be in the area. An egg of this loon was on a grassy point of lake where birds were first observed. This lake is about 200 feet from N edge of Teshekpuk which is a good fishing lake for

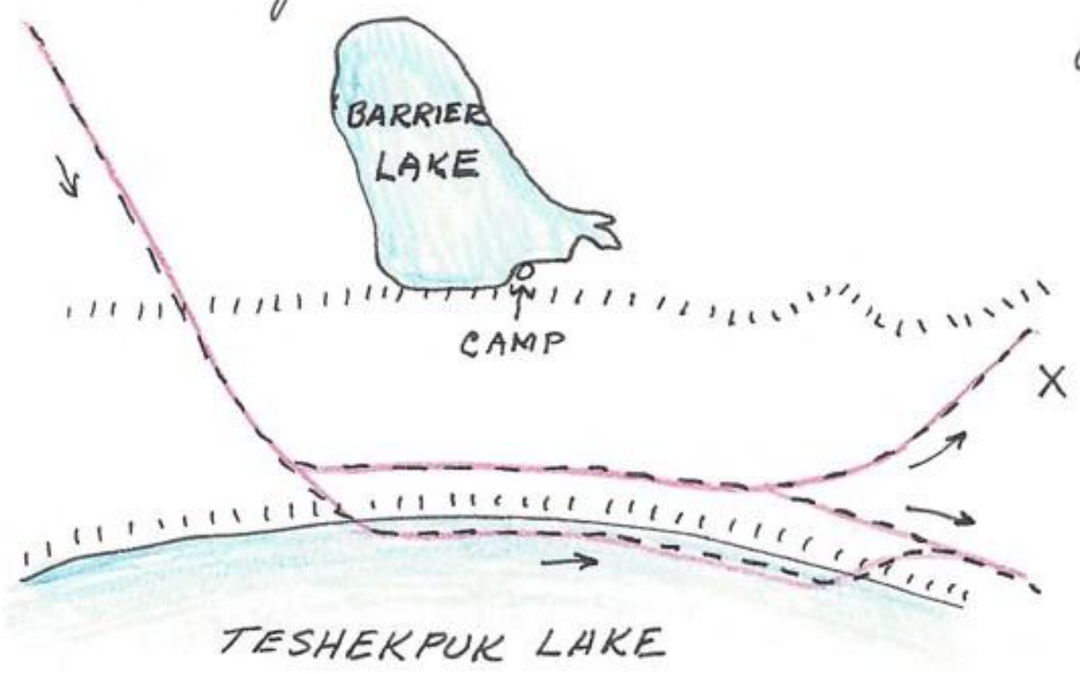
loons. Teshekpuk lake has about 30 small 3/4 inch fish per square foot around edge. These and larger fish remain at the immediate edge of lake (out to 3 feet in shallow water) as if searching protection from larger fish that live in the deeper parts of the lake. Returned to camp.

n E Teshekpuk Lake, 153°05'40", 70°39'40", 8 ft., Alaska

July 30, 1951

Set 150 traps this A.M., 68 on erosional cliffs at south end of lake and 70 on brink of plateau south of camp among cotton-grass and moss covered fracture ridges. While setting traps observed about 105 Rangifer arcticus stonei moving east and south from lowlands to west of our camp lake. They continued south across plateau toward Teshekpuk Lake, thence east along edge of Teshekpuk and slightly inland. They travelled in a fairly compact group and in a line-a-breast formation across the tundra. As the bodies moved beyond the horizon, could see only the marching of elevated antlers giving somewhat of an nostalgic feeling of oriental ceremonys or moving camels across the desert sands.

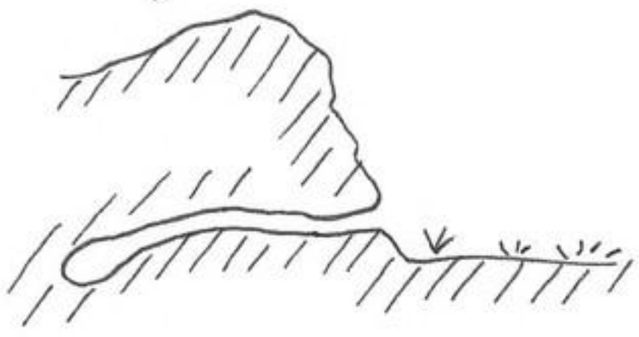
most of the caribou moved on a trot. Their movement across the country thus:



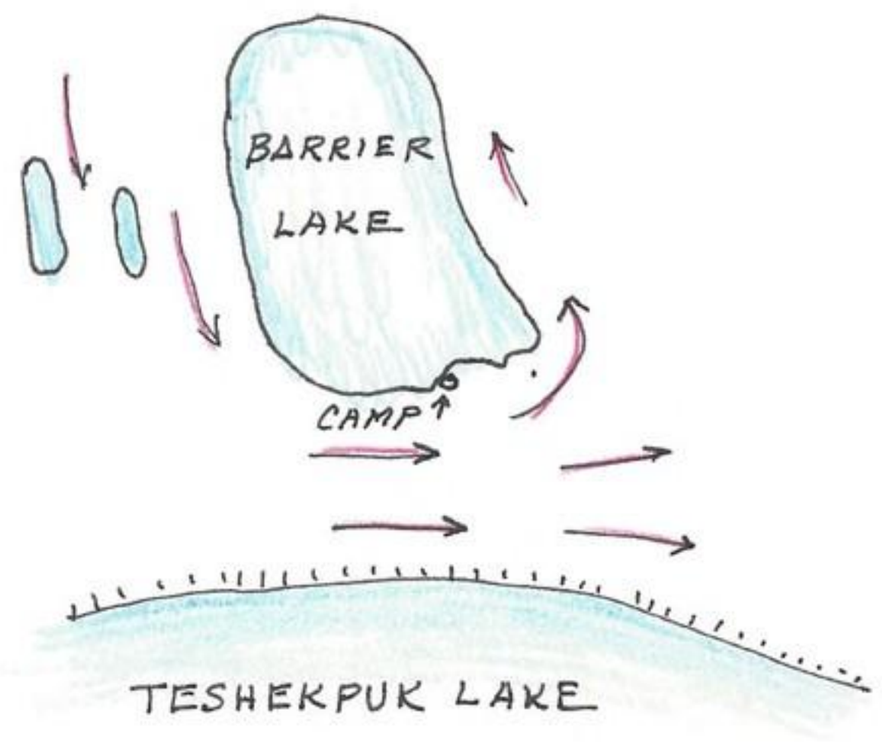
The group broke up into two groups, one going to east out of sight while the other to area marked X where caribou were proned to remain as center of aggregation. Three of the largest caribou remained in the rear about 1000 meters and were more concerned with inspection of the country about them. On tundra examined excavations of Lemmus or Microstonyx with 5 inches of solid moss removed by teeth. Observed a ♀ and ♂ Govia arctica pacifica with young. Their calls are characteristic and thus:

Common call when approached the sound of a tomcat growling

before the fight. The ♂ offers this call alone but the ♀ in addition has a final high pitched note that concludes with a call. The both have a low guttural note when not disturbed much. These calls are offered continually when in area of nesting or young, especially when young were present. The ♂ is more nervous and less prone to come as close to an intruder as the ♀. There is an attempt to try to attract ♀ and young away from source of danger. Observed 2 Stercorarius parasiticus harassing a Larus hyperboreus. The gull was reacting in earnest to the plunging attacks of the jaegers. It was driven 100 meters or so before it was finally given freedom. Examined a Dicrastonyx (?) chamber with 13 pieces of grass about 40 mm in length. It was not used as nesting material but as a storage chamber. 5 fecal pellets also in chamber which is unusual for the number of nests examined. 12 mouth fulls of hair in chamber of this nest.



Made short 2 hour trip NE of camp and noted the following: group 8 Pluvialis dominicus (sp.?); one single Pluvialis dominicus; 1 Stercorarius parasiticus. These birds, (jaegers) hover or cruise along the south edge of Barrier Lake, following precisely the edge of the water. They have been seen to follow this route on several occasions. Stercorarius longicaudus are commonly observed hunting ridges to south and marsh areas. Observed long-tailed jaegers (3) chasing a Larus hyperboreus. One old squaw duck flew by at SE end of camp lake. On basis of loaf imprints, nearly all caribou trend in easterly direction. The tundra of entire area of upland is marked by foot trampling of about 1 every meter. In the lowlands between small lakes and especially where 2 lakes come together with 15 feet or so of land, the trails are deeply embedded to



depths of 1½ feet and 3 or 4 lanes. Some moss fracture ridges are pulverized. Most of the usable Lemmus grass and sedge communities in ice fractured zones, are destroyed by caribou trampling. These are the areas of steeptonal trampling and are at constriction of land between lakes or passage from one land type to another. The erosional cliffs, while at gravetational reprose are used by caribou as if they possessed were mountain sheep. Here their trails and trampling is most noticeable and play a most important role in the mantenance of plants and animal communities. On the broad upland grasslands the effect is less concentrated but coverage nearly complete. Occasional single file trails cross grassy lakes but movement in a wide front of wheeling manuvering. Except at lookout points and along brink of Teshekpuk Lake shoreline where trampling is to bare sod from constant use, the trampling effect is only general from animals that are on a constant move. Feces of caribou has little effect upon the plant community because it is seldom in concentrated amounts. There are many caribou on the tundra but there are also great expanses without caribou. On areas of great sand exposures at the mouth of rivers or bays, the tracks are everywhere and about a yard apart.

July 31, 1951

Made trip to Teshekpuk Lake from camp at south end of lake just north of Teshekpuk shoreline. First made 2 hour reconnaissance of camp to inspect trapping possibilities. At SW end of Barrier Lake observed a Falco rusticolus obsoletus sitting on erosional cliff 10 feet above edge of lake. It apparently was resting or inspecting the terraine for food. 30 meters beyond was a dead arctic tern lying on the beach and clearly visible from the gyrfalcon. The tern looked to be about 12 hours dead. Made the following photographs. No. 510731-21 of camp and 510731-22 of Falcofer arctinus just standing up from resting on exposed lake bed in a mud or silt filled bay. This caribou was ~~stalked~~ stalked for about 1 block. Photo 510731-23, same as above and duplicate.

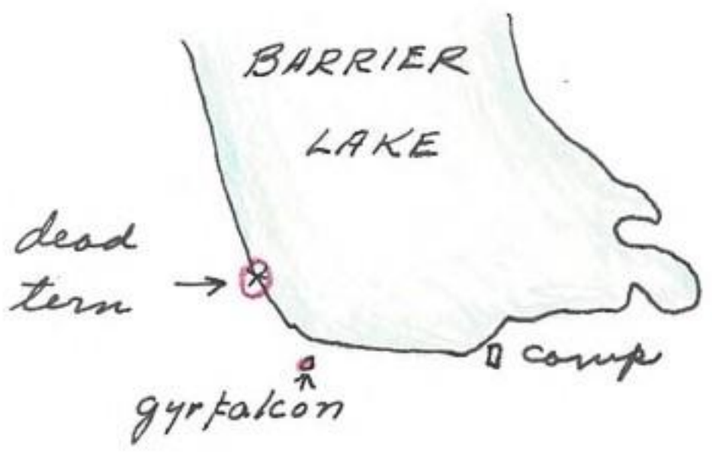
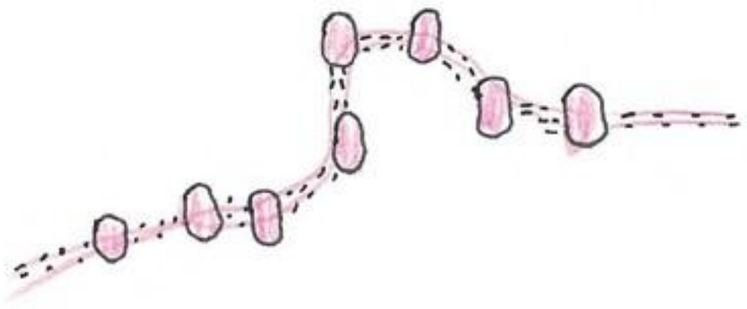


Photo 510731-24 of silted bay where caribou was resting. This caribou had a limp and was using the damp soft lake bed for curative and soothing medium. The signs indicated that it had used the lake bed 9 different times at 5 foot intervals, standing up for about a minute between each resting spot



At the time I approached the caribou, it stood up twice and then readjusted itself. After it left, made 3 attempts to get started in three different directions and finally settled for a north route and on a gallop. Fox den in foreground. Photo 510731-25 of antlers placed on one of the red lake beds. Tracks in these lakes included, caribou, fox, wolf, geese (white-fronted) and smaller shorebird size.

2 species of butterflies noted, about 6 in number, this A.M. Mosquitoes not as numerous as at Kaolak areas or Topagaruk and not as potent a bite. Appears to be a different species. Caribou generally distributed. Pacific loon has a call like a cat and one like a raven. Photo 510731-26 of lichens; Photo 510731-26a of Knot Jones; Photo 510731-27 to 510731-31 of caribou on tundra south of camp. These caribou, numbering approx 500 approached as a long line with abreast formation. most of them diverted to south but some passed north of us. Took several shots in color movie at ~~about~~ about 3 blocks south of camp. Caribou come from east.

Photo 510731-32 of dominant moss in wet areas, some subsurface stems exposed on top (artificially displaced) to show form. Occasionally this moss is torn apart by hooves of caribou and diggings of foxes. A parasitic jaeger chased a Larus hyperboreus for 1/4 mile and finally caught up with it. It gave the gull several almost contact hits. Shot at pectoral sandpiper which climbed up into the sky until almost out of sight, much like an instance in Assam, India where a falconlike bird chased a sandpiper into the sky until almost out of sight before capturing it. This was a lone sandpiper in both cases. Heard Pacific Loon call like a cackling chicken. The caribou are now being troubled by a Tabanidlike fly which follows the herds and individual animals. The caribou will stop and with head low, listen for the fly, then shake their bodies, antlers and

hide and listen again, afterwhich they will either jump forward and run for 100 meters or so or continue to graze. This fly approaches me at times and after buzzing 2 or 3 times flys off in an easterly direction. It seldom remains for more than 3 or 4 seconds and always at above head heighth. Sometimes this fly is seen flying by with no caribou in sight. When one caribou joins 2 or 3 other caribou, the fly that has been following the lone caribou is introduced to the other caribou and, although the caribou may have been peacefully grazing before the fly was introduced, will run at great speed. This A.M caribou are running in all directions, generally as individuals or small groups. They form large groups to dilute the effect of one fly. Even within a herd of caribou moving at a constant speed, there will be some animals with erratic movements which are concerned with diptera. When a caribou approaches one on the tundra, by surprise, it snorts and then dashes away for 30 meters or so and stops to survey the land. In running they have no regard for the irregularities of tundra and pass over hummocks, mounds, and wet to open water (shallow ponds) without deveation from their course. This, in contrast to what I had imagined, of placing feet in selective positions and selecting their course through the difficult running surface of the tundra. The tundra shows the effect of such unselective trampling, however, in slow grazing gait they may be more cautious with their foot placement. I have seldomed seen caribou travelling on an easy graceful feeding pattern (like cattle) but they are always moving around the country. In a group of 500 caribou counted 8 young of this year and about 1/2 heighth of parent. 3 adults without antlers. One of the smallest caribou observed did not have escort but followed the herd at some destance back. This P.M made trip to Teshekpuk Lake to south. Made 1000 meter (1000 x 1 meter) count of Dicrostonyx fecal piles at entrance to burrow in as typical cottongrass community as I could find on the upland plateau between Barrier and Teshekpuk Lakes. Counted 8 piles and in each case they were within 7 to 8 meters from what I would consider as typical Lemmus community. Observed no Calcarius except at the erosional cliffs on the shores of the two lakes (Barrier & Teshekpuk). The only other bird was a pair of Pacific loons flying over the tundra. At Teshekpuk Lake

58 caribou were standing in water belly high some 30 meters from shore. They faced the shore and remained for 1/2 hour afterwhich they walked to shore and started to graze and move about the tundra. These animals were noted at 6:00 P.M. At the erosional cliffs or shoreline at the north end of Teshekpuk Lake collected representatives of grasses:

510731-1 Arctagrostis latifolia (R. Br.) Gresib.
510731-2 Hierochloe alpina (Swartz) Roem & Schult.
510731-3 Carex misandra R. Br.
510731-4 Festuca ovina var. brachyphylla (schult.) Piper
510731-5 Carex misandra R. Br.
510731-6
510731-7 Trisetum spicatum (L.) Richt.
510731-8 Arctagrostis latifolia (R. Br.) Gresib.
510731-9 Trisetum spicatum (L.) Richt
510731-10 Festuca ovina var. brachyphylla (Schult) Piper
510731-11 Hierochloe alpina (Swartz) Roem and Schult
510731-12 " " " " " "
510731-13

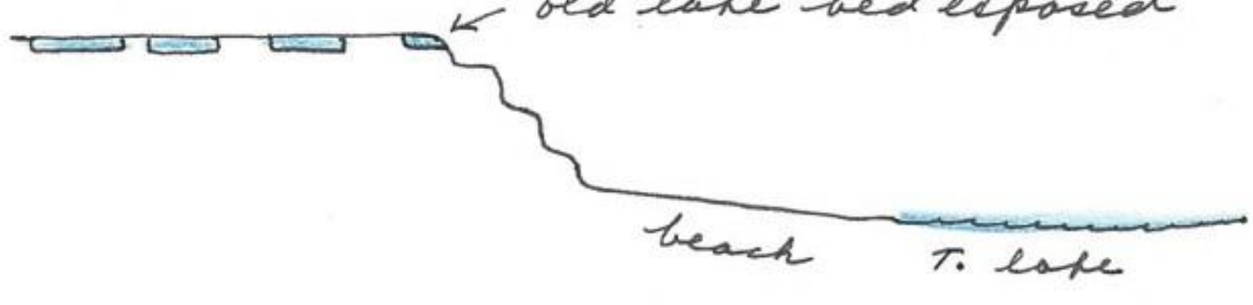
These grasses were from displaced blocks of tundra which were collapsing onto beach below. The soils were dryier than grasses on tundra beyond (typical), however, the grasses of the same species were distributed throughout the tundra in semi-damp situations.

Photo 510731-33 of yellow buttercuplike flower from edge of caribou trails along sandy shorelines. The trails & tracks led in an eastern direction.

Photo 510731-33a of yellow flower as above.

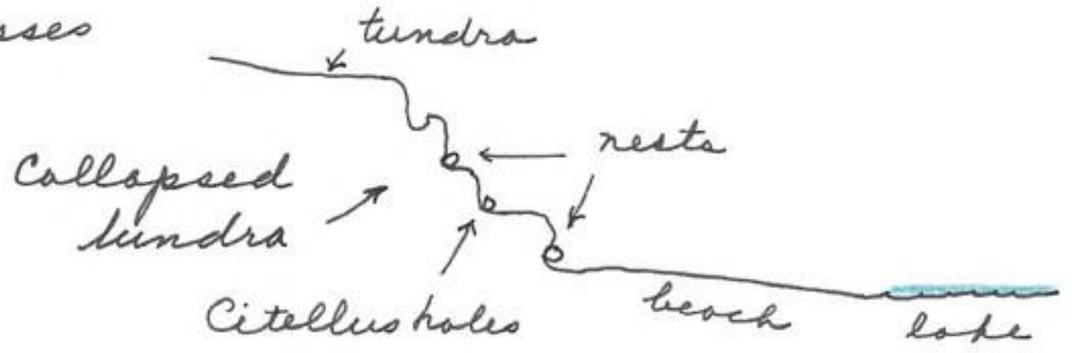
Photo 510731-33b of purple plant~~like~~, light not strong for pictures. Returned to camp across tundra at 8:00 P.M. No birds in one mile between Teshekpuk Lake and Barrier Lake, except a few long-spurs at the shorelines of each lake. Caribou at 10:00 P.M quiet and resting. Sun below horizon at 11:30 P.M but light a Continuous sunset. Photo 510731-34 of sunset from camp. Photo 510731-35 same as above.

After arriving at camp recalled other observations made earlier in the day. At Teshekpuk Lake on north shoreline noted an old lake profile exposed on the

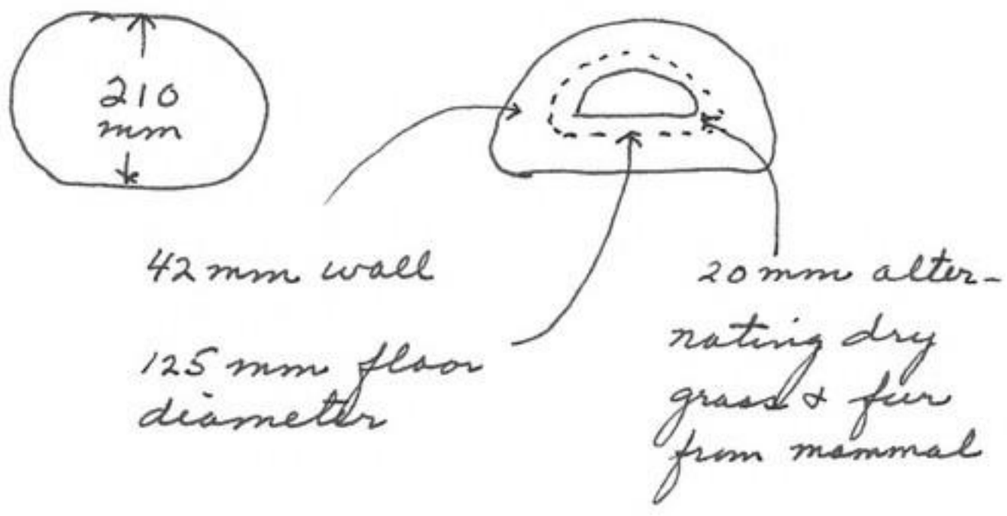


brink of the erosional bank of the shoreline. no seepage or drainage from this old lake bed.

Examined several nests of Lemmus on the same shoreline as above, placed in protected crevasses and erosional fractures. These nests were about every 30 meters along the shoreline. This condition of Lemmus nests in erosional bank applies also to shoreline on south end of Barrier Lake and would indicate a lack of preference for exposures which may be due to nest being undersnow at the time they were used and exposure would have very little influence. Measurement of one nest:



Area below floor more solid and miped with hair from mammal. Aperture elliptical ⬭ with threshold with an elevated ridge → ⊃. Section



of nest across bottom: 13 mm hair and dry strawlike material; 25 mm fine strawlike material and fur; 50 mm of long length dry grass.

N. E. Teshekpuk Lake, 153°05'40", 70°39'40", 8ft., Alaska

Aug. 1, 1951

Trapline 1. 2 traps set off by caribou. Photo 510801-1 of Gavia arctica pacifica and Gavia stellata. Photo 510801-2 of Gavia arctica pacifica. Photo 510801-3 Sterna paradisaea. Photo 510801-4 Rangifer arcticus along shoreline at camp. Photo this caribou with movie and still as it followed along the shore in the water. These caribou are now passing camp in both directions and disregarding tent at 5 meters. Their main concern today is the fly. at 1:00 P.M caribou beginning to move in singles and by night most of the caribou have moved out of sight. At noon observed 3 longtail jaegers, 1 parasitic jaeger, 4 pectoral sandpipers, 4 Pacific loon and 15 Calcarius lapponicus at Camp. 35 white-fronted geese, flew for first time since we arrived, from north end of lake to lake to west. Three flocks of ducks in distance and first observed in area.

Spring ice sheet had gouged tundra on south-east end of lake and along east sede of lake with no evedence of previous action. This must be an eseptional situation or the tundra is subject to ready deterioration. Set 50 traps this P. M at 10:00 P.M west of camp in a typical Eriophorum community.

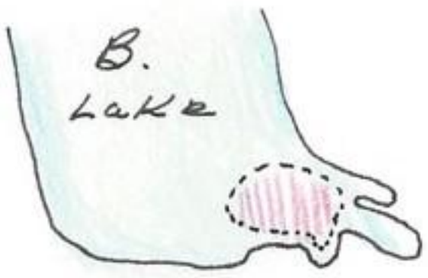
Lowlands between lakes chewed by caribou hooves particularly between lakes on elevated ridges and pressure ridges of ice wedges. At 11:00 P.M white-fronted geese 35, golden plover 1, long-tailed jaegerl, 1 pair Pacific loons. At 11:30 P.M 5 carebou in seght in marsh to east. Abaut 20 single carebou in immedeate area today and on continual run with mouths open and breathing rapidly. Yesterday they appeared to be all over the tundra both in herds and as singles. 45 singles at any time as compared to abaut 8 today at one time. High temperature seems to increase fly activity which in turn influences carebou madness. 3 days ago herds moved to east in groups during foggy weather, next day hat and moving back again in opposite direction and now today quiet and movement of only a few individuals

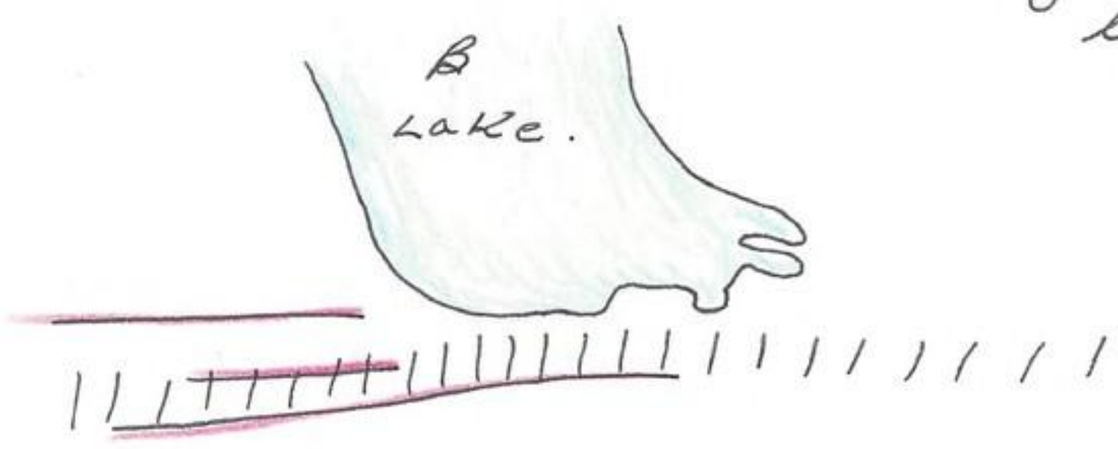
Aug. 2, 1951

2 carebou in view only. young Pacific loon dove under water as it left shore on my approach. Inspected 50 traps and only one sprung. Jones had no luck in setting in similar situation. Inspected 136 traps of original line as: trap 29. Carebou sprung; 86 carebou sprung; 131 Lemmus trimucronatus 510802-1; 132 Calcarius lapponicus 510802-2. Lemmus from open, no overhead, wet draw. Cottongrass adjacent on slope. Collected one Calcarius at camp 510802-3. Pulled traps 1-36. Up to 2:00 P.M large rain clouds overhead with occasional rains. 2 carebou in sight.

3:30 P.M 4 Pomarine jaegers flew by and using erosional bank at south end of Barren Lake for foraging. At east end

end of lake they continued east over marsh as dispersed singles. No caribou in sight for first time. The Pacific loon ♂ and young have remained in same area since our arrival, even since having taken the ♀ on the first day. This represents the original territory of these pair of loons and are now maintaining the original territory. They use, at times, the entire lake to north. The loons are now (3:35 P.M) 75 meters from shore and riding on water with heads tucked underwing, young occasionally rest but mainly swim around adult ♂. This loon keeps oriented into wind and only occasionally turns around while sleeping. This evening set 131 traps on ridge at 4 meter intervals. The 50 traps set is 1/2 way up slope and the bottom slope set is Jones' line so all slopes are covered. Two pectoral sandpipers reacting as if ♂ ♂ young in territary. From lowlands between lakes collected the conspicuous grasses and sedges. These occur as dominants and subdominants and are associated mainly with damp situations.





Carex aquatilis Wahl. 510802-4 dominant in standing water. Complete except occasionally in standing water water holes continuously supplied with water where a red leafed grass and a large sedge (?) is dominant. Profile

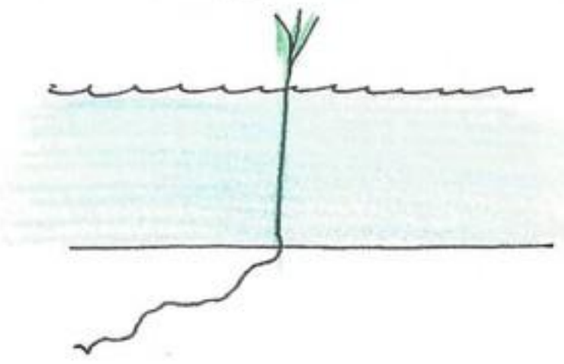
Carex aquatilis wahl. # 510802-5, dominant grass in wet to supersaturated grasses between the dry elevated ridges and flats and the above dominant grass (sedge). May be same but has more older blades as matting and gives lighter color to landscape

Carex aquatilis × C. lugens 510802-6, dominant grass, except where cottongrass occurs in which case is subdominant and sparsely arranged and light in color.

The above three may be same species but assume different heights and water tolerance.

Other sedges are: 510802-7 Carex misandra R. Br. associated with grass on dry tundra. 510802-8 Carex lugens Holm.

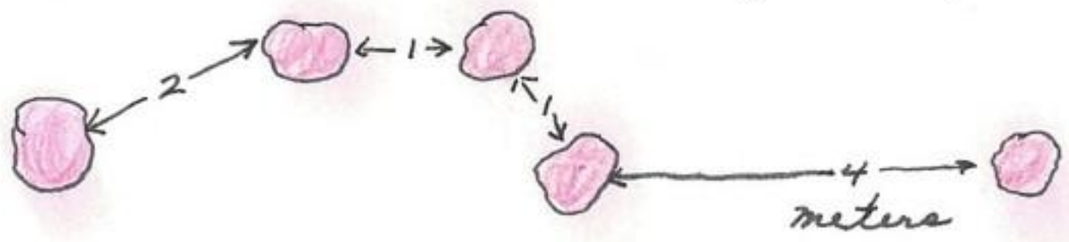
in dry areas. 510802-9 Carex misandra R. Br in wet situations. 510802-10 Juncus in semi wet situations. 510802-11 Arctophila fulva (Trin.) Anderss. dominant grass in open ponds in 12 inches of water. 6 inches of blade above water and 6 inches of root below bottom of pond. This grass has a distinct red colored blade and is more frequently in center of pond in deeper water.



Jones reported Alopex lagopus east of camp. It was playful and rolled over several times. It left to north. A second one noted in same general area. This fox was observed within 10 meters at one time The diggings for Lemmus or Dicrostonyx may be initiated by the white fox instead of the red fox which was originally assumed.

NE Teshekpuk Lake, 153°05'40", 70°39'40", 8 ft., Alaska.
Aug. 3, 1951

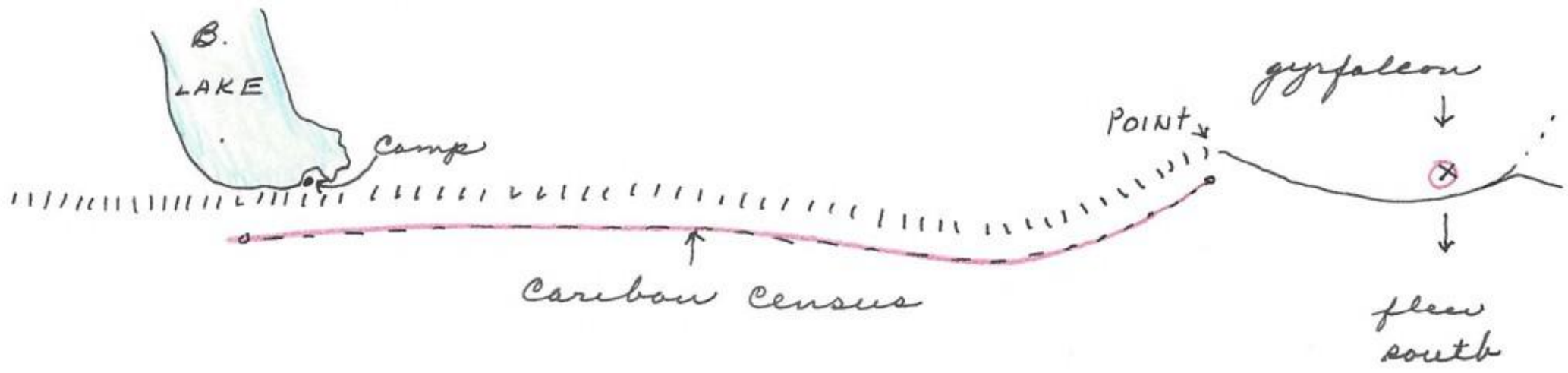
Rained most of last night and wind eroded 2 feet of fallen tundra and soil at south end of Barrier Lake. Inspected 131 trap west of Camp: trap no. 2 Calcarius lapponicus 510803-1 and trap no. 128 Calcarius lapponicus 510803-2. 10 traps sprung by rain. 2 white-fronted geese flew south over camp. Counted 5 nests of Lemmus in various degrees of decomposition:



This shows nest accumulation for last 5 years (?) as indicated by relative rates of decomposition. All traps set in either runways, logical passage corridors and in drainage channels ——————. Counted 72 grass nests along trapline, most of them of varying degrees of decomposition and ranging in size from 220 mm to 75 mm. all collapsed. Excavated 12 more likely holes of Lemmus or Dicrostonyx. The 50 traps set on sedehill along runways. 4 sprung by rain. This set has lack of overhead

510803-97

protection. 2 Pomarine jaegers flying in general area of traps. 2 caribou this A.M only and to the far north. Have observed only one northern phalarope and this bird along erosional bank of lake. moder trip by foot to east point from 2 to 6:00 P.M.



On trip observed: 6 white-fronted geese; approx 150 Erolia melanotos; 3 Calcarius lapponicus; 3 Pomarine jaegers; 2 Larus hyperboreus; 3 Limnodromus griseus; 1 Pluvialis dominicus; 1 Sterna parodisaea; no caribou; heard Gavia arctica pacifica; 1 Falco rusticolus obsoletus. Caribou travel between lowland marsh and upland.

Lemming nests concentrated between marsh flat and slope and on trip from camp to point counted 98 in approximately 1300 meters along bottom of slope drop-off.

Gyrfalcon eating Sabine's gull in marsh. It was resting at site of kill when observed, then flew 150 yards to south and alighted on upland tundra. The gull had been plucked of feathers and all parts eaten except stomach and intestines. The feathers of this gull, Xema sabini, 510803-3. Collected snowy owl pellets, one showing radius-ulna of the white fox and feet of ptarmegan. Collected skull of Alopex 510803-4 from ridge above where gyrfalcon observed. Collected 20 Erolia melanotas, 510803-5 to 510803-24 at point as they flew by in small groups. Photo 510803-24a of an injured Erolia melanotas. These birds are curious and always fly overhead to inspect me, generally within 30 meters and occasionally alighting near by. When one is shot the group flies over to it and circle over it. One can collect all of a flock by this method, however, shot only

large ones as most of them were immatures. On route back to camp made census of caribou droppings as indicated on map in a 1 meter x 1000 meter quadrat. All age fecal deposits counted but only main mass (not individual pellets scattered over ground):

first 100 meters	-	18	
200 "	-	17	Also 18 pellets of snowy owls in same transect or quadrat. These and others collected from near camp numbered as 510803-25. At 8:45 P.M 15 white-fronted geese flew S from lake to west of camps. One Larus hyperboreus inspected a dead pectoral sandpiper in water on three occasions and then left without eating it.
300 "	-	20	
400 "	-	18	
500 "	-	22	
600 "	-	21	
700 "	-	19	
800 "	-	23	
900 "	-	24	
1000 "	-	20	

Aug. 4, 1951

This A.M, 200 caribou moving east beyond north end of our camp lake. 12 in green marsh to east before herd moved in. Minimum temperature last night 40°F. Max. today 60°F. Trap-line on brink of hill of 131 traps: Trap no 41 Microtus gronlandicus 510804-1 in damp swale, protected, cotton-grass, more dwarf willows than other sets, poorly defined runway; 128 Calcarius lapponicus.

Photo 510804-2 of Coniferlike plant (Cassiopia)

Photo 510804-3 flowers bordering lake

Photo 510804-4 caribou skull and growth of lichens and mosses covering.

Photo 510804-5 of green expanse to n (old lake bed) and caribou corridor.

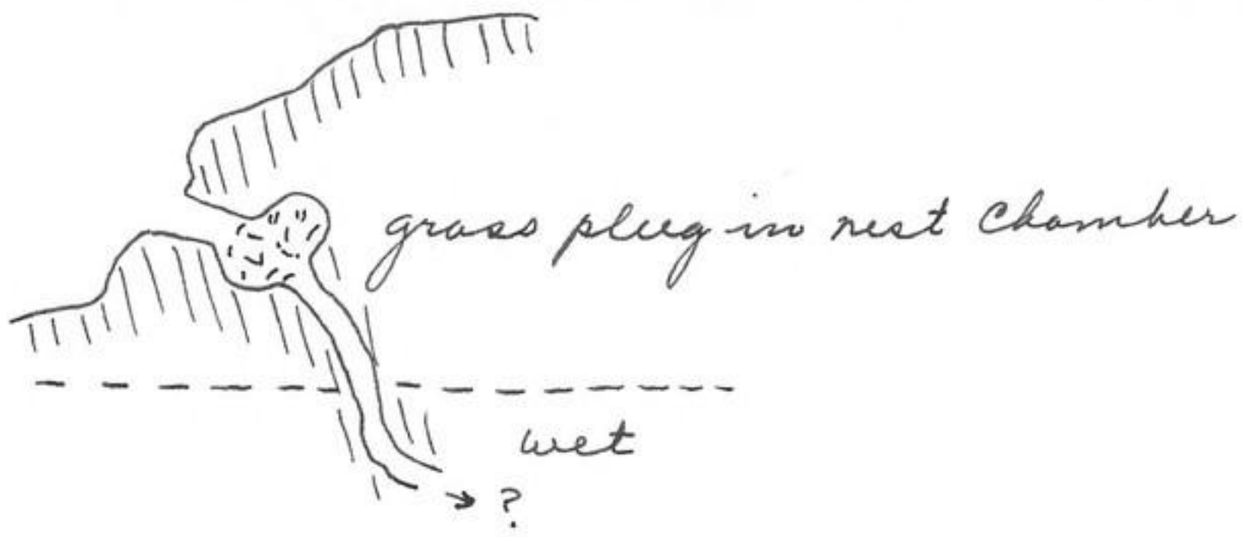
Photo 510804-6 same marsh (sedge) as above with Lemmus nest in foreground. This nest is at the marsh-slope contact. Caribou frequently use this green marsh of standing water for either feeding or fly protection.

Photo 510804-7 moss hummock and lemming nest in marsh of above.

Photo 510804-8 moss covered hummock alone.

2 black-bellied plovers on caribou corridor (together). Pectoral sandpipers numerous today and appeared as an abrupt migration, flying to east. Few caribou at camp. Examined on Lemmus nest thus: (next page).

510804-99



At 5:00 P.m gyrfalcon at camp on ridge to south (100 feet). It flew south over tundra. This bird has been seen 3 times within a distance of 1 1/2 miles along the ridge overlooking the lowlands to north. Lemmus trail with bark eaten off willow at point where root crosses trail, old. Pomarine jaeger chasing Gavia arcticus 70 meters behind. The loon was returning from the south (probably from Teshekpuk Lake). By the time the loon reached the south edge of Barrier Lake the jaeger was almost on the tail of the loon. At the edge of the lake the loon dropped down over the crescent bank and splashed into the water with jaeger almost making contact. The jaeger did not attack loon but confused the loon. This is the third attempt by jaegers to prey upon either property of other birds or birds themselves. The loon remained under water for about a minute and then swam to east side of lake. The jaeger left in 30 seconds from overhead, after the loon dove into water. This loon is the ♂ of the original family of loons inhabiting the SE part of lake. Pulled traps as plane arrived. We had been scheduled to remain two days longer and plans were interupted.

Birds and mammals observed at Barrier Lake and surrounding country or (NE Teshekpuk Lake, 153°05'40", 70°39'40", Alaska):

Alopex lagopus innuitus
Canis lupus tundrarum (tracks)
Rangifer arcticus stonei
Lemmus trimucronatus alascensis
Dicrostonyx groenlandicus rubricatus
Falco rusticolus obsoletus

Squatarola squatarola
Pluvialis dominicus
Erolia melanotas
Ereunetes pusillus
Lagopus lagopus
Sterna paradisaea
Anser albifrons
Larus hyperboreus
Xema sabini
Pelidna alpina sakhalina
Limnodromus griseus
Gavia stellata
Gavia arcticus pacificus
Calcarius lapponicus
Clangula hyemalis
Stercorarius pomarinus
Stercorarius parasiticus
Stercorarius longicaudus ?
Lobipes bilabatus
Citellus parryi - (holes only).

In conclusion Lemmus trimucronatus has been common in the past as evedenced by runways, nests and holes, especially in damp and wet grassey (and sedges) that lead through tundra between drier adjacent highlands of Eriophorum. Dicrostonyx groenlandicus may be considered uncommon as based on few signs and holes in their typical cottongrass community.

Comita inherited camp, tent, cooking equip etc. and expected to do limnological work in Lake Teshekpuk. I do not envy his job of portaging his boat to the lake. Departed 8:27P.M for Point Barrow. Ice on north shore Teshekpuk Lake SSW of camp. will probably disappear in a few days or a week. Returning by widgeon plane at 100-600 ft elevation and on a near straight flight to Point Barrow (2.1 miles per minute).

8:32 1 caribou, 18 old squaws; 8:35 2 caribou; 8:37 loons, Sabines' gulls (2), arctic tern, caribou tracks generally distributed; 8:38 caribou tracks most numerous; 8:47 5 caribou; 8:48 oil drilling camp; 8:49 1 Larus hyperboreus; 8:49 over area of exceptionally small, round, closely packed lakes; 8:50 plover; 8:52 1 gull; 8:66 pectoral sandpiper ?; 8:57 2 Pacific loons, 8 58 2 Sabine's gulls; 9:00 jaeger; 9:04 4 Larus hyperboreus, 2 loon, 2 loon, 18 ducks; 9:06 over shoreline of Arctic Ocean, 23 Larus hyperboreus, considerable driftwood; 9:10 arrived over Point Barrow (ARL), land a few minutes later.

Arctic Research Laboratory, Point Barrow, Alaska
Aug. 5, 1951

Arranged and organized trip to Lake Chandler.

510806-101

Arctic Research Laboratory, Point Barrow, Alaska
Aug. 6, 1951

Henry Setzler told me:

1. all Eskimos have native owned stores in their communities but are obligated to feed families not capable of supplying their own food.

2. One family of 5 Eskmos will kill as many as 80 caribou for their years meat and will eat it green. Seal meat for dogs only. Utilize meat completely, eyes, brain, bone marrow etc.

3. Eskimo immunized against common diseases except cold and tuberculosis.

4. Brower charges 65¢ per pound for caribou and reindeer meat to Eskimos. He is a millionaire and at the expense of the Eskimos.

Dr. Frank Pitelka reports:

1. Rissa tridactyla pallicaris collect at Point Barrow yesterday.

2. Most Eskimos use eider and ducks shooting as a sport rather than for serious food objective.

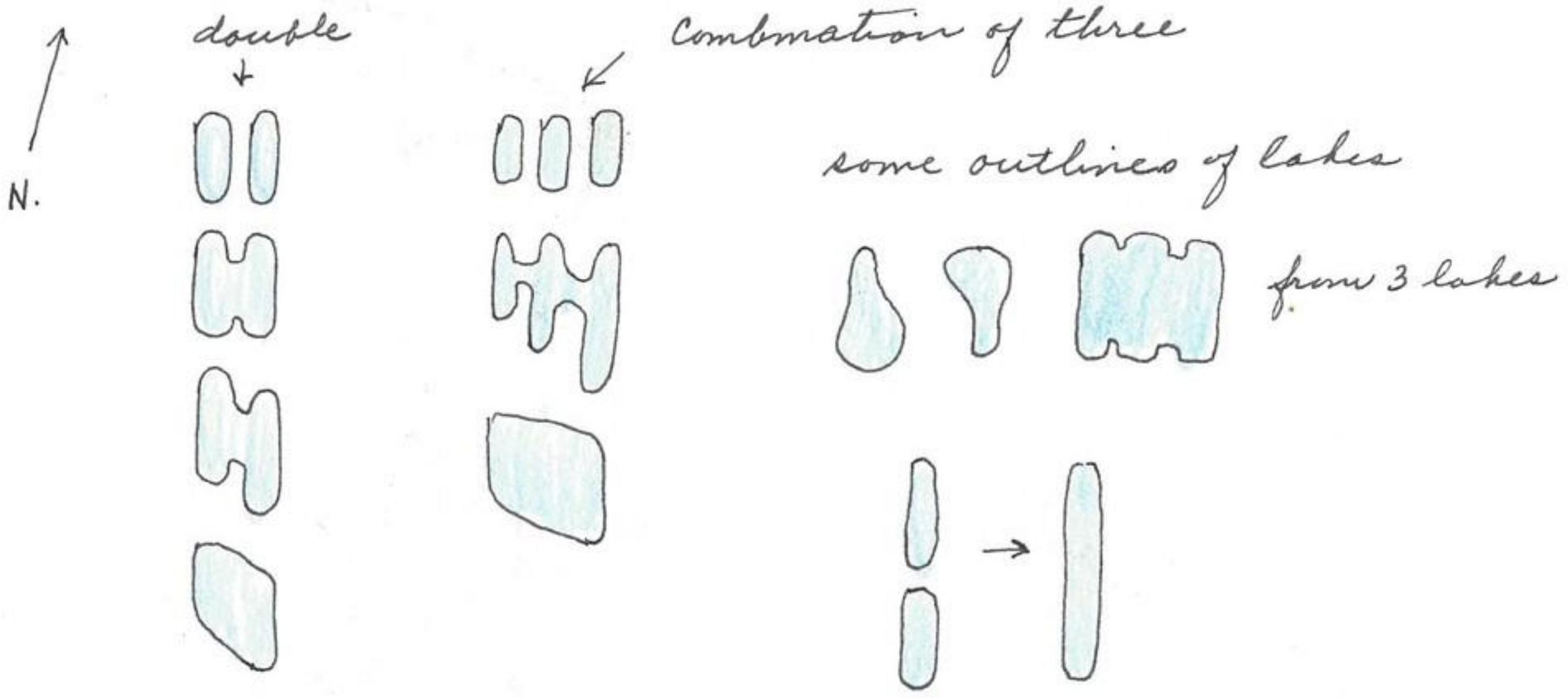
3. Will represent ARL at Alaskan Sceentific meeting at Mc Kinley national Park.

At noon photographed one of the 7 ships that landed at ARL area for resupplying. They have been here for several days and were preceded by an ice cutter. Photos 510806-1, 510806-2, and 510806-3 of these ships and waves on beach nearby. Also movie.

Arctic Research Laboratory, Point Barrow, Alaska
Aug. 7, 1951

Departed this A.M for Bettles by C 47. En route (via Umiat) noted peculiarities of lakes on tundra in direct line from Point Barrow to Umiat. It was noticed that in an east or west direction the lakes were aligned. In any other direction the alignment was without order, indicating a state condition of lake in a general N S direction. When observing these lakes the northern ends were in a recognizable line: The following sequence of lake development might suggest formation

of obliquee lakes, most lakes are oriented (otis) in a general north-south direction according to the direction of the erosional winds which are not necessarily prevailing winds:



Some observations may have bearing on these oriented lakes:

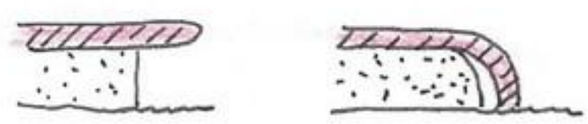
1. Damaging winds from north and not from N.N.E. as is generally considered the prevailing winds.

2. Wind has erosional effect for only short period from about June 1 to Sept. 1. For the remaining period of the year the lakes are frozen and are not influenced by winds.

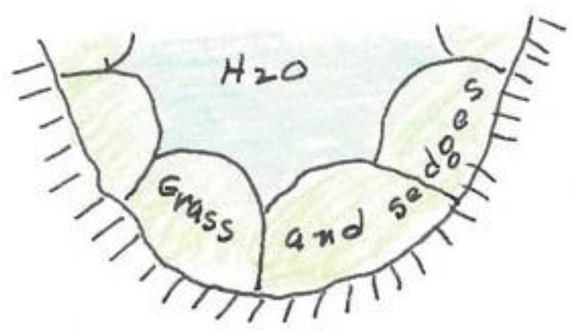
3. Wind has greatest effect in forming, or at least perpetuating oriented lakes.

4. One damaging wind every other year has greater effect than continuous prevailing winds.

5. Undercutting of water in permafrost zone allows tundra to slough-off to completely seal the erosional surface. This checking and resealing of naked surface of erosional wall checks further erosion.

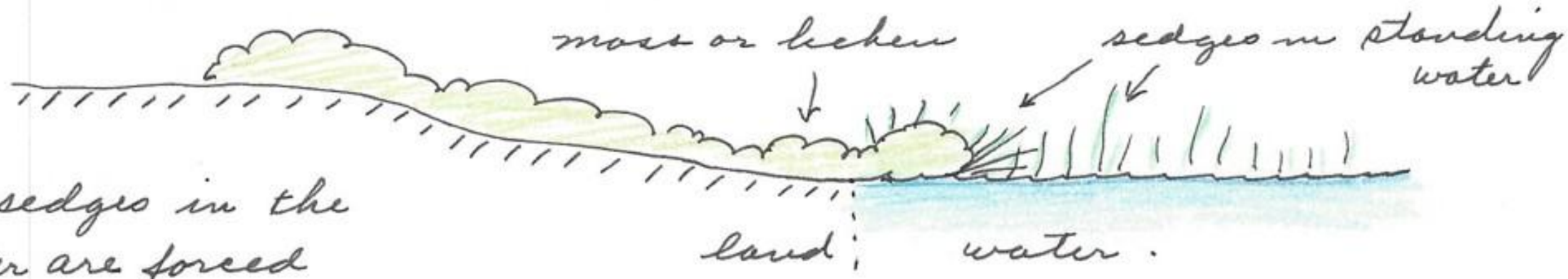


6. Vegetation has great effect upon lake formation and hinders development. Lakes are being invaded by aquatic grass and sedges. The crescent development has a leading edge above the surface of the water while the trailing sedges and grasses are submerged. One



land.

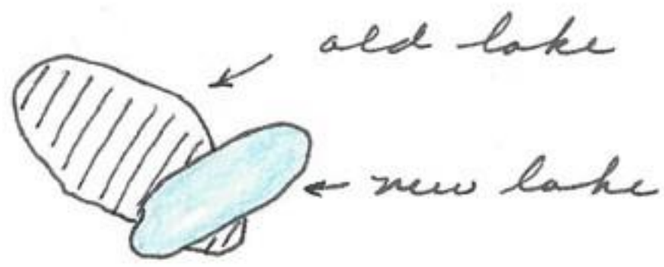
of the mosses or lichens has an advance growth which invades wet areas:



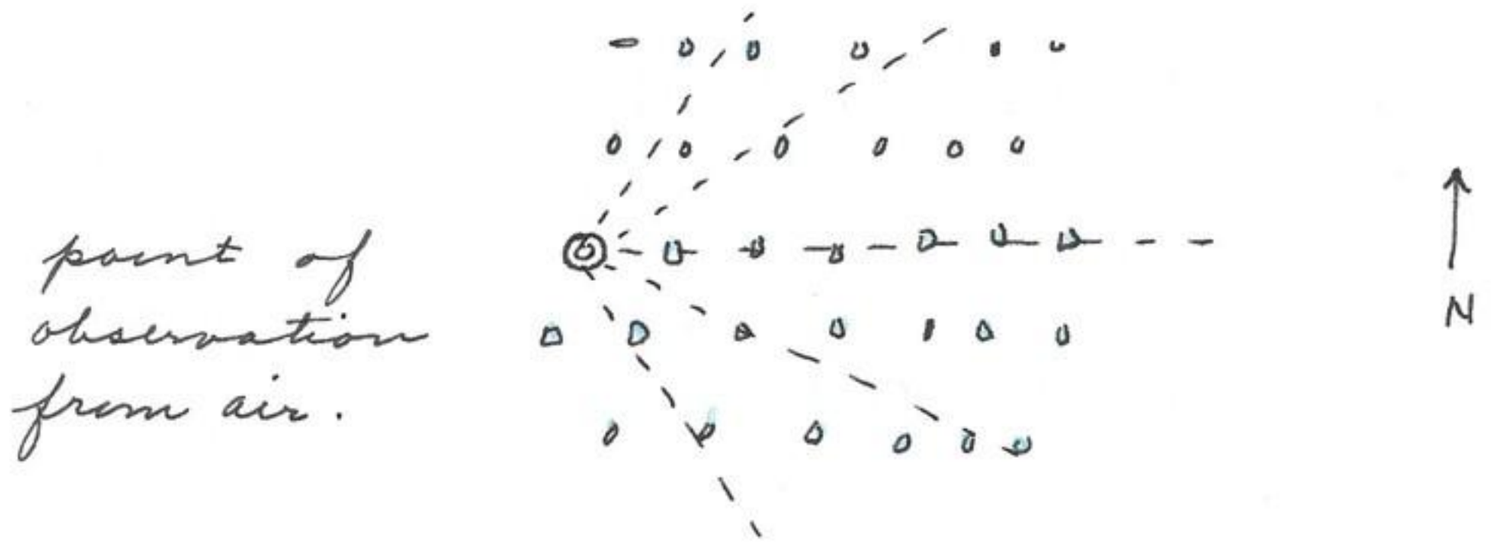
The sedges in the water are forced forward and finally pushed to a horizontal position.

8. Some lakes completely choked with grasses and sedges, others free of vegetation depending on depth of lake and stage of degeneration

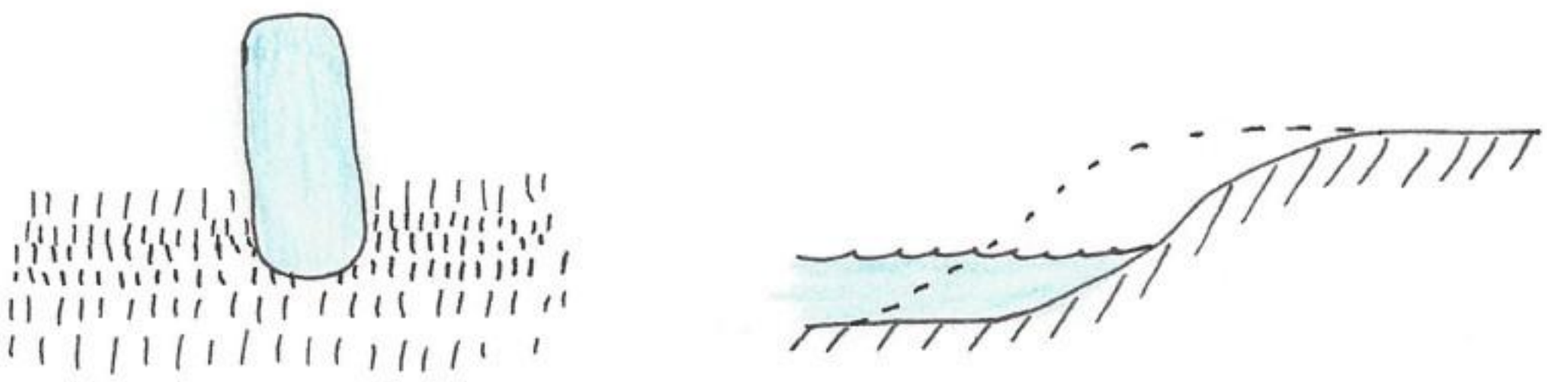
8. all stages of lakes are represented, some new lakes are formed across extinct lakes:



9. Lakes aligned east-west and in no other direction;



10. Some lakes have eroded into ridges thus:

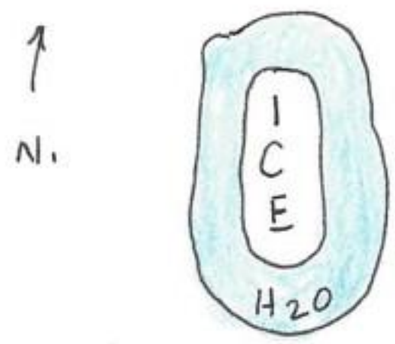


11. See erosion on south end (and slightly east) of lakes:

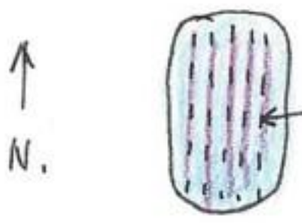
The ends of lakes have masses and lichens of tundra and earth forced upon shoreline by broad surfaces of ice on lakes forced landward by wind. In some areas, during early seasons, ice masses pile on banks of lakes which are 3 feet higher than the water of the lake:

12. Ice remnants in lakes shift from one side of the lake to the other side in all directions.

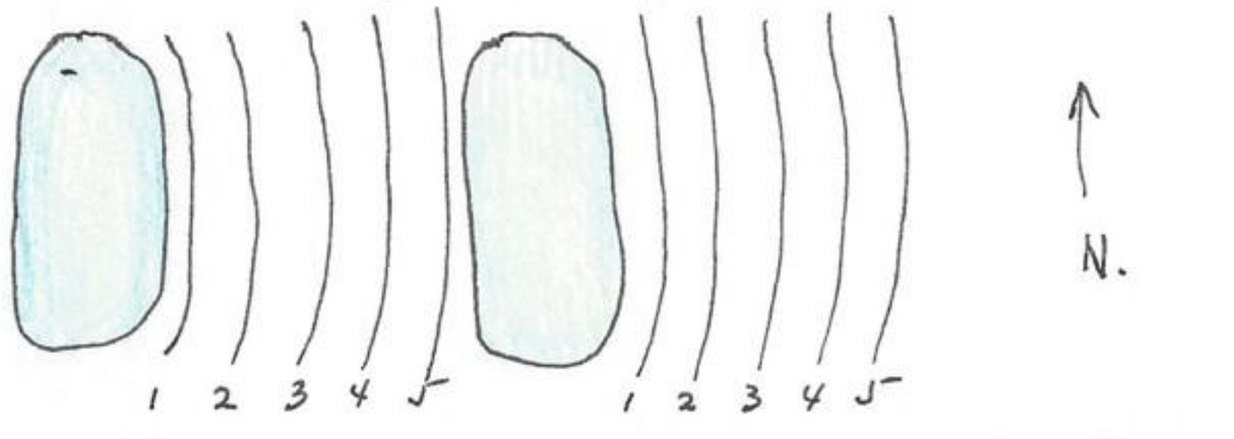
13. Large lake support ice much longer than small lakes. Some lakes are completely frozen as late as July 4, and even later.

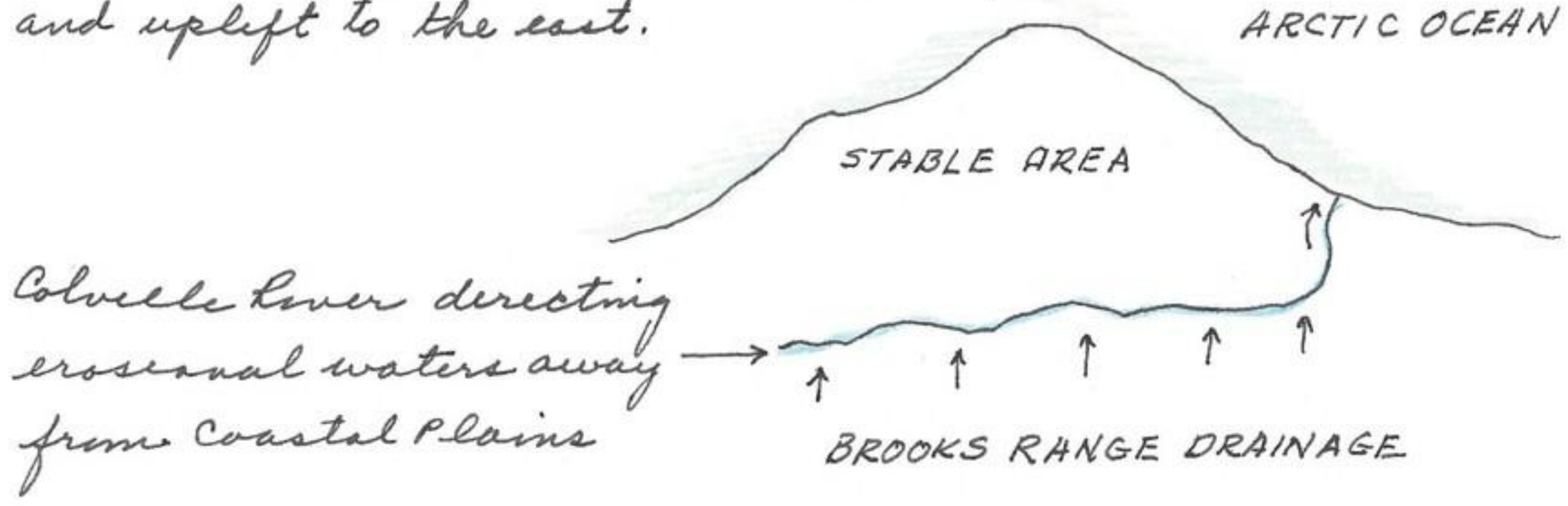


14. Foam streamers parallel lake edges. Those lakes with muddy waters have white foam on shorelines. Lakes adjacent and of same size may be absolutely clear during the same period of wind erosion.



15. Successional vegetation lines (no. 1 youngest, no. 5 oldest) indicate a shifting of lakes from east to west with lakes over-riding the successional lines of the adjacent lake. There is a question at this time as to the exact orientation of these lakes in relation to north. A subsiding land or uplift in one direction might explain the forward shifting of these lakes. According to my observations there is a shifting to the west of rivers and drainage systems which would indicate and uplift to the east.



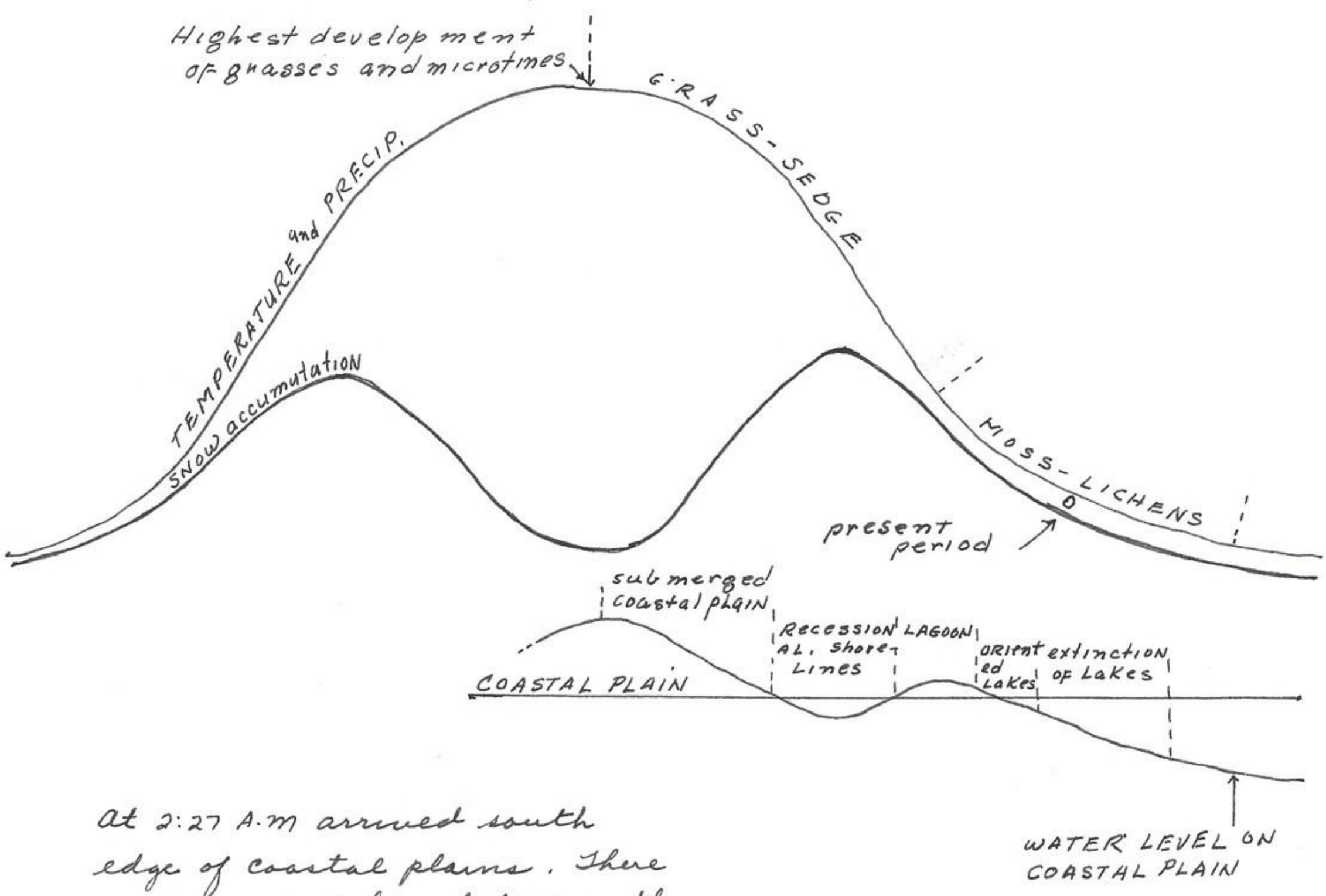


16. The Colville River directs waters from the Brooks Range

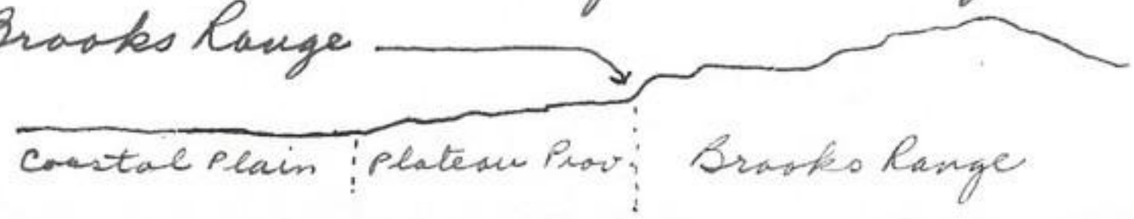
to the east and away from the loco coastal plain thus perpetuating the delicately balanced lake formations from river action and river deposition.

17. When wind blows surf and water on gravel beach at Point Barrow (wind from N or NNE), the waters move as a continual stream along or parallel the beach and on the beach in the same direction as the wind. In other words the beach supports a discontinuous stream of water flowing in 90° to the axis of the ocean - beach contact.

The following is a hypothetical interpretation of the climatic and vegetational changes during the last two major cycle of glaciation. Based on a gradual increase of solar radiation and subsequent ~~dec~~ decrease. This would represent the last half of the Pleistocene



At 2:27 A.M arrived south edge of coastal plains. There is a marked line between the lakes and the rolling uplands of the Plateau Province. At 2:39 A.M over Colville River which is oriented E-W and has carved a broad valley by shifting meandering of the river. 2:54 A.M over middle outlier of Brooks Range. 3:00 A.M at front range of the Brooks Range Arrived Bettles air strip.

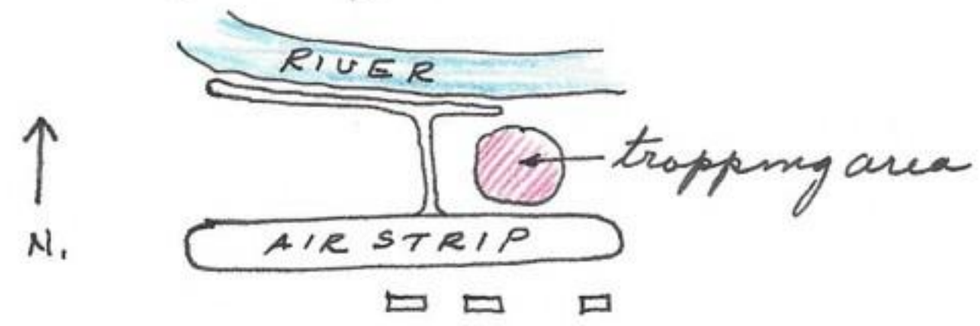


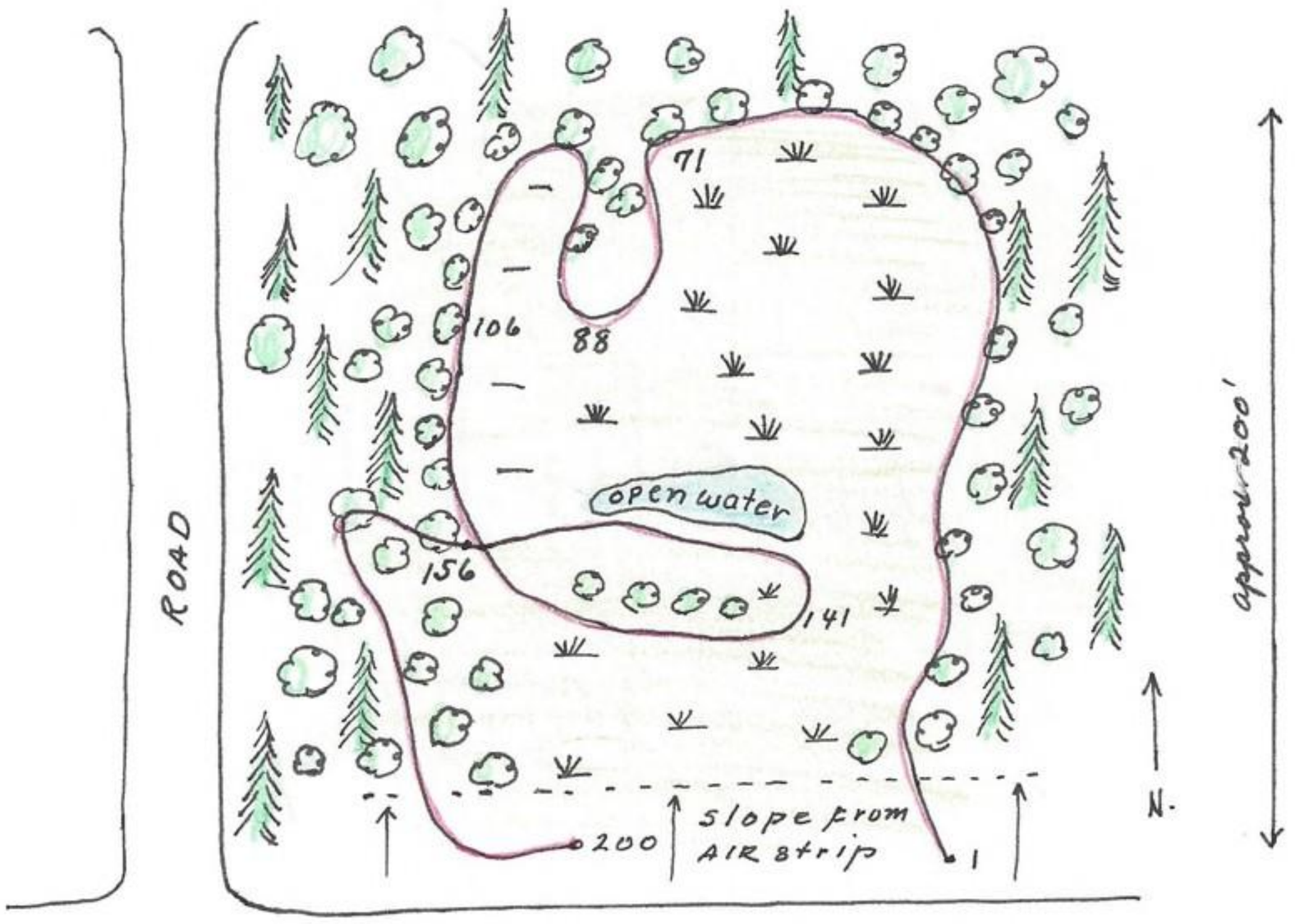
510807-106

Bettles (CAA. Air Port), Alaska

Aug. 7, 1951

at Bettles set 200 traps at about 5:30 A.M in marsh north of airstrip. Jones set 200 in same area but to the east. Plan to leave traps in same setting for 3 days or until we can be transported to Chandler Lake. Traps around outside edge of marsh at the contact with low willow, alder and poplar growth. Beyond spruce felled in with sparse overhead protection. This area is characterized by rank and matted grasses and lechen-masses covering ground. The highest grasses in south part of marsh where gravels were pulled up to form airstrip. This slope was gravels and a little dirt. In the area where considerable mammal activity was evident the vegetation was high successional grasses but soil bare beneath.





the grasses. areas of relief supported greatest microtine activity. The mat grass in center of trapping area was used but only rarely compared with peripheral areas (contact area), where runways were almost everywhere. Traps placed 10 feet apart and in runways. Most runways with overhead protection, some passed from one protected area to another without overhead protection. Runways on bare soil but mainly on vegetation. Our

approach to this marsh observed 3 horned owls flying away from this concentration of small mammal activity. This marsh receives protection on all sides from large predators because of man made roads and airstrip and habitation. Mr. James Ralph Anderson, who operates a roadhouse and pilot for Weins airlines, permitted us to use a board walled tent for skinning quarters. We were housed in roadhouse which was just being completed for travellers use. Dogs and cats were at the buildings and only 300' from the trapping marsh. Airplanes landed directly to south of marsh or on river to north. While setting traps saw 5 running in grass. One adult in gravel area at a digging in dirt and using successional grass areas. Recorded the following results of trapline. All traps remained in same position for 3 days. 200 traps 10 feet apart in runways. bait of oatmeal

Aug. 7, 1951 checked 8:30 A.M completed 9:30 A.M (traps have been set only three hours)	Aug. 7, 1951 checked 3:00 P.M (for field numbers add 200 to trap number)	Aug. 8, 1951 checked 9:00 A.M (trained all night and has influenced condition of traps sprung.)	Aug. 9, 1951 checked 8:00 A.M and pulled all traps)
1. microtus ochrogaster ♂	.....	microtus ochrogaster ♀	.....
2. microtus ochrogaster ♂	.....	microtus ochrogaster ♀	.....
3.	.....	.....	microtus ochrogaster ♀
4. sprung	.....	sprung	sprung .....
5. microtus ochrogaster ♂	microtus ochrogaster ♂	microtus ochrogaster ♀	microtus ochrogaster ♂
6.	microtus ochrogaster ♂	sprung	.....
7.	.....	.....	.....
8. microtus ochrogaster ♀	.....	.....	.....
9.	.....	.....	.....
10. sprung	.....	.....	.....
11. microtus ochrogaster ♂	.....	microtus ochrogaster ♂	.....
12. sprung ...	.....	.....	.....
13.	.....	microtus ochrogaster ♂	.....
14.	.....	microtus ochrogaster ♂	microtus ochrogaster ♀
15.	microtus ochrogaster ♂	microtus ochrogaster ♂	.....
16.	.....	.....	.....
17. microtus ochrogaster ♀	microtus ochrogaster ♀	microtus ochrogaster ♂	.....
18. microtus ochrogaster ♀	microtus ochrogaster ♀	.....	.....

510807-108

19	microtus oecon ♂	. . . .	. . . .	microtus oeconomus ♂
20	. . . .	microtus oecon. ♂	microtus oecon ♀	. . . .
21	. . . .	. . . .	. . . .	. . . .
22	. . . .	. . . .	. . . .	. . . .
23	sprung	. . . .	. . . .	. . . .
24	microtus oecon ♂	. . . .	. . . .	. . . .
25	. . . .	. . . .	. . . .	. . . . .
26	microtus oecon ♂	microtus oecon ♂	microtus oecon ♂	. . . .
27	. . . .	. . . . .	microtus oecon ♀	. . . . .
28	. . . .	. . . . .	. . . . .	. . . . .
29	. . . .	. . . . .	sprung . .	. . . . .
30	. . . . .	. . . . .	sprung . .	microtus oeconomus ♀
31	sprung	. . . . .	. . . . .	. . . . .
32	. . . . .	. . . . .	sprung . .	. . . . .
33	. . . . .	. . . . .	. . . . .	microtus oecon. ♂
34	. . . . .	. . . . .	. . . . .	. . . . .
35	. . . . .	. . . . .	sprung . . .	. . . . .
36	. . . . .	. . . . .	. . . . .	. . . . .
37	. . . . .	. . . . .	microtus oecon ♀	sprung . . . .
38	. . . . .	. . . . .	. . . . .	. . . . .
39	. . . . .	. . . . .	. . . . .	. . . . .
40	microtus oecon ♀	. . . . .	microtus oecon ♀	. . . . .
41	. . . . .	. . . . .	sprung . . .	microtus oecon. ♂
42	. . . . .	. . . . .	sprung . . .	. . . . .
43	. . . . .	. . . . .	microtus oecon ♂	. . . . .
44	. . . . .	. . . . .	sprung . .	. . . . .
45	microtus oecon ♂	. . . . .	. . . . .	. . . . .
46	. . . . .	. . . . .	microtus oecon. ♂	. . . . .
47	microtus oecon ♀	. . . . .	microtus oecon ♀	. . . . .
48	. . . . .	. . . . .	. . . . .	. . . . .
49	. . . . .	. . . . .	. . . . .	. . . . .
50	. . . . .	. . . . .	. . . . .	. . . . .
51	. . . . .	. . . . .	. . . . .	. . . . .
52	. . . . .	microtus oecon. ♀	microtus oecon. ♀	. . . . .
53	. . . . .	. . . . .	. . . . .	microtus oecon. ♀
54	sprung . . .	. . . . .	microtus oecon ♂	. . . . .
55	. . . . .	microtus oecon ♀	. . . . .	. . . . .
56	. . . . .	. . . . .	. . . . .	. . . . .
57	. . . . .	. . . . .	. . . . .	. . . . .
58	. . . . .	. . . . .	sprung . . .	. . . . .
59	sprung		sprung	microtus oecon. ♂

510807-109

60	. . . . .	. . . . .	. . . . .	. . . . .
61	. . . . .	sprung . . .	microtus occon. ♀	sprung . . .
62	microtus occon. ♀	microtus occon ♀	sprung . .	. . . . .
63	. . . . .	. . . . .	microtus occon ♂	. . . . .
64	. . . . .	microtus occon ♂	microtus occon ♂	. . . . .
65	. . . . .	microtus occon ♀	sprung ~~microtus occon~~	. . . . .
66	. . . . .	. . . . .	~~sp~~	. . . . .
67	. . . . .	. . . . .	sprung . . .	. . . . .
68	. . . . .	microtus occon ♀	microtus occon ♂	. . . . .
69	microtus occon. ♀	microtus occon ♀	microtus occon. ♀	sprung . . . .
70	microtus occon ♀	microtus occon ♀	. . . . .	microtus occon. ♀
71	. . . . .	. . . . .	. . . . .	. . . . .
72	sprung . .	. . . . .	microtus occon ♀	. . . . .
73	. . . . .	. . . . .	. . . . .	. . . . .
74	. . . . .	. . . . .	microtus occon ♀	. . . . .
75	. . . . .	. . . . .	microtus occon ♂	. . . . .
76	. . . . .	. . . . .	. . . . .	. . . . .
77	. . . . .	. . . . .	. . . . .	. . . . .
78	. . . . .	. . . . .	. . . . .	. . . . .
79	. . . . .	. . . . .	sprung . .	. . . . .
80	. . . . .	sprung . . .	. . . . .	. . . . .
81	. . . . .	microtus occon. ♂	sprung . . .	microtus pennsylvanicus ♂
82	. . . . .	microtus occon.	microtus occon. ♂	. . . . .
83	. . . . .	. . . . .	. . . . .	. . . . .
84	. . . . .	. . . . .	. . . . .	. . . . .
85	. . . . .	. . . . .	. . . . .	. . . . .
86	. . . . .	. . . . .	. . . . .	. . . . .
87	. . . . .	microtus occon. ♂	microtus occon ♂	. . . . .
88	. . . . .	microtus occon. ♂	. . . . .	. . . . .
89	. . . . .	. . . . .	microtus occon ♂	microtus occon. ♂
90	. . . . .	. . . . .	. . . . .	. . . . .
91	. . . . .	. . . . .	. . . . .	. . . . .
92	. . . . .	. . . . .	. . . . .	. . . . .
93	. . . . .	sprung . . .	. . . . .	. . . . .
94	microtus occon. ♂	. . . . .	. . . . .	. . . . .
95	. . . . .	. . . . .	. . . . .	. . . . .
96	. . . . .	. . . . .	microtus occon ♂	Clethrionomys r. ♂
97	. . . . .	. . . . .	. . . . .	sprung . . .
98	. . . . .	. . . . .	. . . . .	microtus occon. ♀
99	. . . . .	. . . . .	. . . . .	. . . . .
100				

510807-110

101	microtus occon ♂			
102	microtus occon ♀		microtus occon. ♂	
103		sprung		microtus occon ♂
104				microtus occon ♀
105		sprung	microtus occon ♂ (eaten by weasel).	microtus occon ♂
106			microtus occon. ♂	
107		microtus occon. ♂	Zonotrichia	sprung
108		microtus occon. ♂		
109				
110			microtus occon ♂	
111		microtus occon ♂	microtus occon ♂	
112			microtus occon ♂	sprung
113			Sorex cinereus ♂	
114				
115			sprung	
116		Zonotrichia		
117			microtus occon. ♀	
118				
119				
120				
121	microtus occon ♀		microtus occon ♂	
122			microtus occon. ♀	
123	microtus occon. ♂		sprung	
124				
125		sprung		
126	microtus occon. ♂	microtus occon ♀		
127	microtus occon ♂			
128				
129			Passerculus sandwich-ensis ♂	microtus occon. ♂
130			microtus occon. ♂	
131				
132			sprung	sprung
133			microtus occon ♂	
134		microtus occon. ♂	microtus occon ♀	sprung
135			sprung	~~Microtus occon~~
136			sprung	microtus occon. ♀
137				
138			sprung	
139				
140				
141				

510807-111

142				
143			microtus pennsylvanicus ♂♀	
144				
145		~~Microtus occon.~~		microtus occon ♀
146		microtus. occon ♂	microtus pennsylvanicus ♂	
147				
148		microtus pennsylvanicus ♀		microtus occon. ♂
149				
150			microtus pennsylvanicus ♀	
151				microtus occon ♀
152				
153				
154		microtus pennsylvanicus ♀	microtus occon. ♂	sprung
155			Clethrionomys ♂	
156				
157				
158	microtus occon ♀		microtus economus (?)	
159			sprung	
160				
161				
162		sprung		
163				
164	microtus occon ♀		sprung	
165				
166				
167				
168	microtus occon ♂		microtus occon. ♂	
169				
170				
171				
172				
173			sprung	
174				
175			sprung	microtus occon ♂
176	sprung		sprung	
177				
178				
179			microtus occon ♂	
180	microtus occon ♂		sprung	
181	microtus occon ♀	Sorex cinereus ♀		microtus occon ♂
182		microtus occon. ♂		

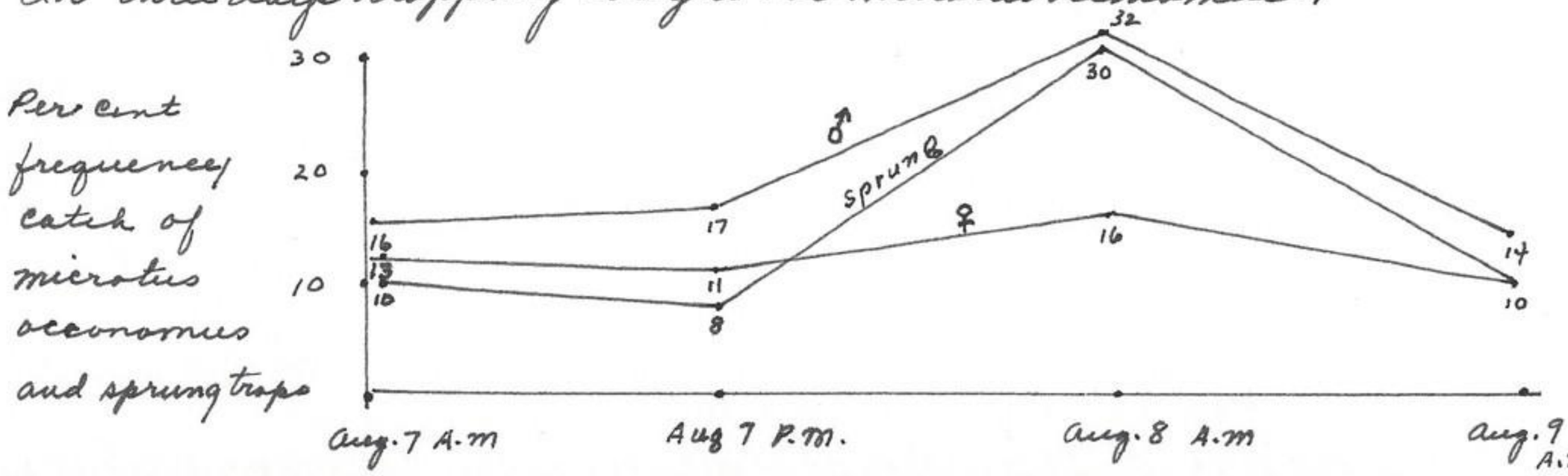
510807-112

183	. . . . .	. . . . .	Passerculus sandwichensis ~~melospiza melodia~~	microtus oecon. ♂
184	sprung . .	microtus oecon ♂	. . . . .	. . . . .
185	. . . . .	. . . . .	sprung . . .	. . . . .
186	. . . . .	. . . . .	microtus oecon ♂	. . . . .
187	. . . . .	microtus oecon ♂	. . . . .	~~microtus oecon~~
188	. . . . .	. . . . .	. . . . .	. . . . .
189	microtus oecon ♂	. . . . .	. . . . .	. . . . .
190	. . . . .	. . . . .	. . . . .	. . . . .
191	. . . . .	. . . . .	. . . . .	. . . . .
192	. . . . .	. . . . .	. . . . .	. . . . .
193	. . . . .	. . . . .	. . . . .	. . . . .
194	. . . . .	. . . . .	. . . . .	. . . . .
195	. . . . .	. . . . .	. . . . .	microtus oecon ♂
196	. . . . .	. . . . .	microtus oecon ♂	. . . . .
197	. . . . .	. . . . .	. . . . .	. . . . .
198	. . . . .	. . . . .	. . . . .	. . . . .
199	. . . . .	sprung	microtus oecon. ♂	. . . . .
200		microtus oecon ♀	sprung	

Summation of above

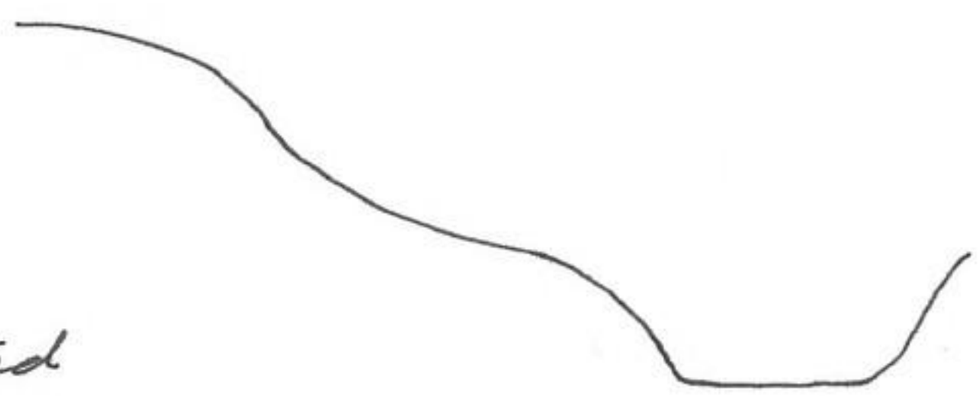
	sprung	10	8	30 10
♂	microtus oecon.	16	17	32 14
	microtus oecon (Sev?)	1		
♀	microtus oecon.	13	11	16 10
♂	microtus penn.	. . . . .	. . . . .	2 1
♀	microtus penn.	. . . . .	2	1 . . . . .
♂	Sorex cinereus	. . . . .	. . . . .	1 . . . . .
♀	Sorex cinereus	. . . . .	1	. . . . .
♂	Clethrionomys	. . . . .	. . . . .	1 1
	Zonotrichia	. . . . .	1	1 . . . . .
♂	Passerculus	. . . . .	. . . . .	1 . . . . .
	Passerculus	. . . . .	. . . . .	1 . . . . .

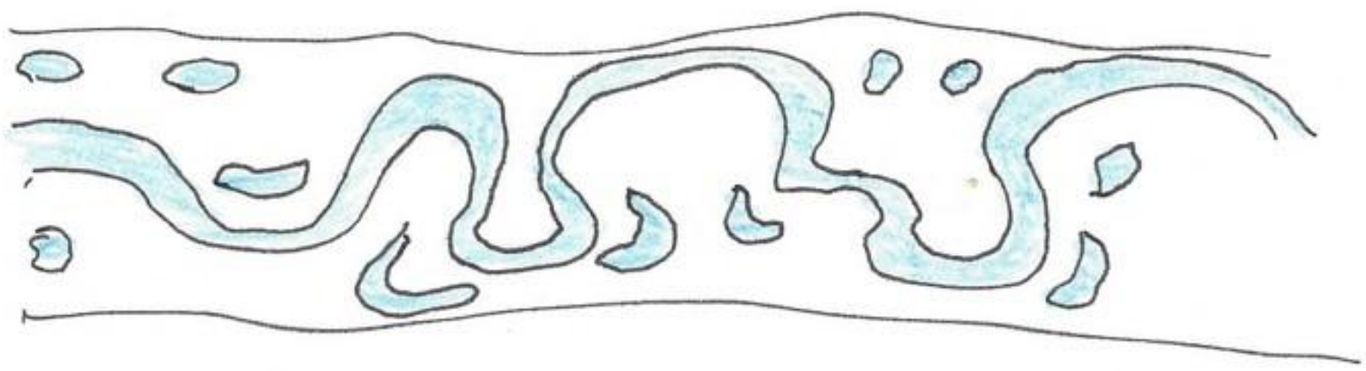
In three days trapping caught 130 microtus oeconomus.



Rana sylvaticus cantabregensis common in trapping area. A specimen 510808-105 was eaten by a weasel and was turn inside out in the following manner:

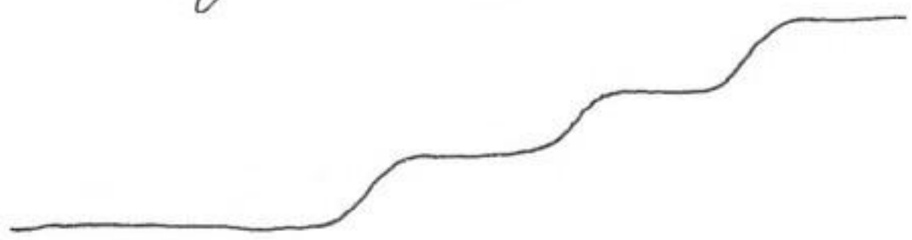
Examined a dirt core ramifying over the surface of mat grass as if a snow chamber had been filled with debris indicating chamber construction when snow covered ground. Also considerable hole excavation in the slope of runway on bare ground. Heard sandhill crane calling about 1/2 mile to west. It was observed flying to south over west end of runway. Family of great-horned owl called frequently and nearly always on peripheral edge of camp. This afternoon ~~prepared~~ (Aug 9, 1951) for Chandler Lake at 3:10 P.M. I left with tent, sleeping bags and some food in Cessna 170 piloted by Anderson. Gone came by Army plane (Beaver). This arrangement by mutual agreement between Anderson and the pilot of the Beaver. Followed John River to upper reaches, thence west through divide to Chandler Lake (divide and canyon about midpoint on east side lake). Flew low most of way. John canyon is next in beauty to Alatna River to west, the most beautiful canyon in the Brooks Range. John Canyon is bordered by steep precipitious slopes of two major erosional levels. The bottom of the canyon, particularly in lower reaches is filled with numerous lakes created by various Pleistocene agencies and many lakes formed by ox-bows. The floor of the canyon would appear thus from the air.





The canyon floor and slopes are covered with coniferous and deciduous trees. The upper slopes are bare of arborescent vegetation, or for that matter bare of any vegetation. From Bettles to Chandler Lake the vegetation changes from forests to complete lack of arborescent vegetation except willow and

alder along creeks and in protected spots. Cenifer trees along creeks only to about 30 to 50 miles south of Chandler Lake. Departed Bettles 3:10 P.M. (Aug. 9). At 2:23 a moose feeding at edge of lake. 3:25 P.M beave dams numerous, moose tracks in sand all along river. 3:30 P.M over Crevise Creek. 3:31 Good rack outcroppings. Floating trees in river and on sands. many moose tracks along river in sands. 3:40 P.M Timber Creek. Timber along creek and mainly in gullies on mountains only. 3:46 P.M Hunt's Fork now trending to west. Can see toward Anaktuvuk Pass.
Profile now thus:

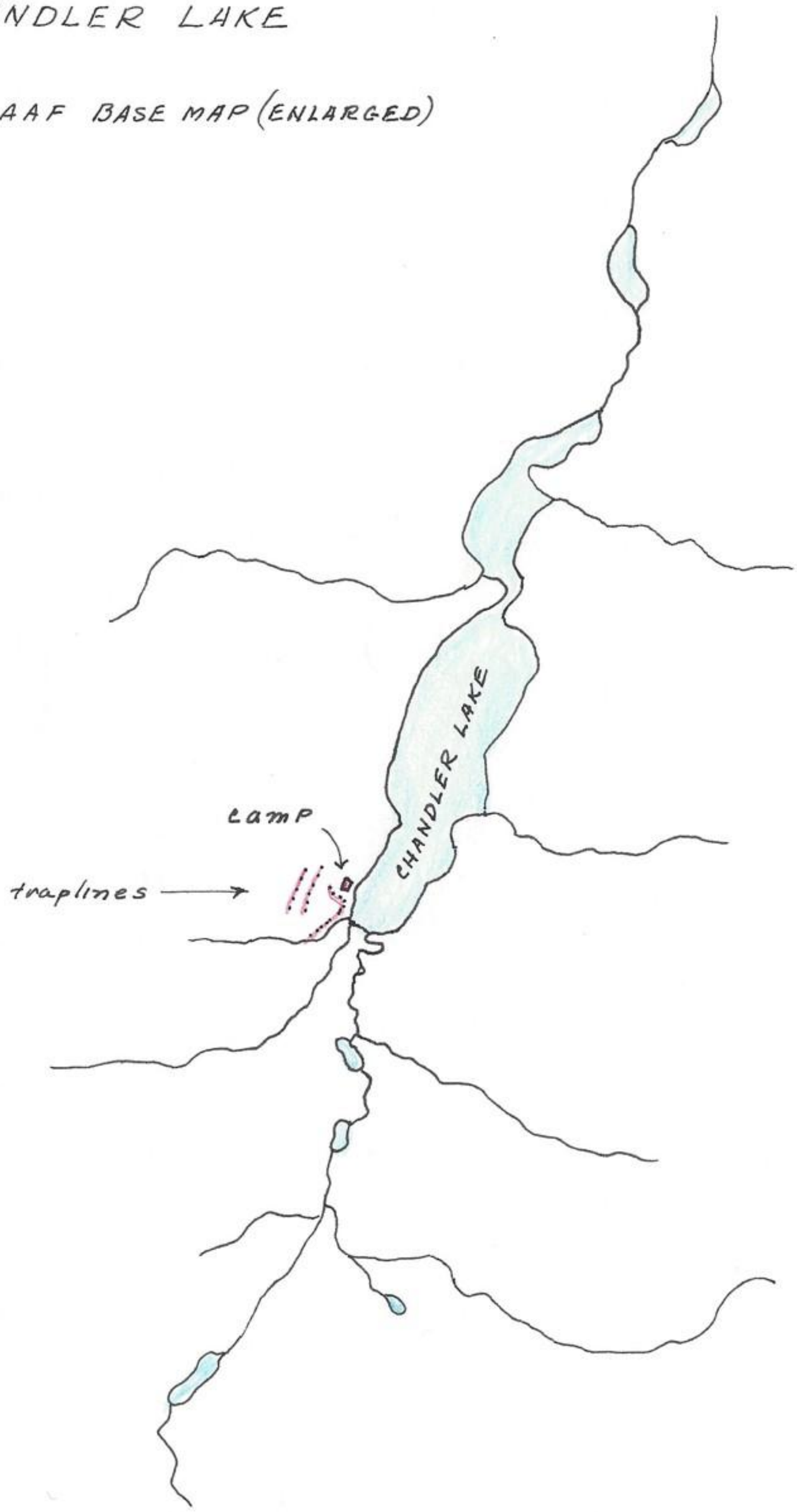


3:55 P.M. Timber has disappeared. This is an interesting open valley in that 4 canyons enter at 4 different directions. Numbraus caribou trails in canyon on both sides. 4:05 P.M Snow remnant to south. 4:09 P.M Pass into Chandler Lake. This pass was so windy that Anderson lost control of the plane. Even with safety belts we hit the ceiling and both sides. The phone become dislodged and everything that was not secured shifted position or floated about the cabin. Anderson had never experienced such rough winds. His response to my question as to whether this was a normal down draft and flying conditions was indeed amusing. An alternate route is north beyond Anaktuvuk Pass, thence west to north end of Chandler Lake Canyon. Arrived Chandler Lake 4:12 P.M. Established base camp on SW side of lake about 5 feet from edge of lake in area judged most suitable for mammal trapping. Chandler Lake is near north side of Brooks Range, the canyon proper running directly out onto the coastal plains. It is, however, surrounded by high precipitous slopes on both sides. The lake is a very young one with clear rocky bottoms and shorelines. The valley is filled in with sediment, particularly south of lake. About a mile to south are numerous morained lakes which again are young in age. The side canyons have been glaciated. This evening set 152 traps in damp to wet grasses and sedges at camp on slopes immediately above lake and beyond the grass meadows on the level ground adjacent the lake. This grass meadow receives water from drainage of benchland to west between the lake and the mountain. (see profile on next page two removed). The greater

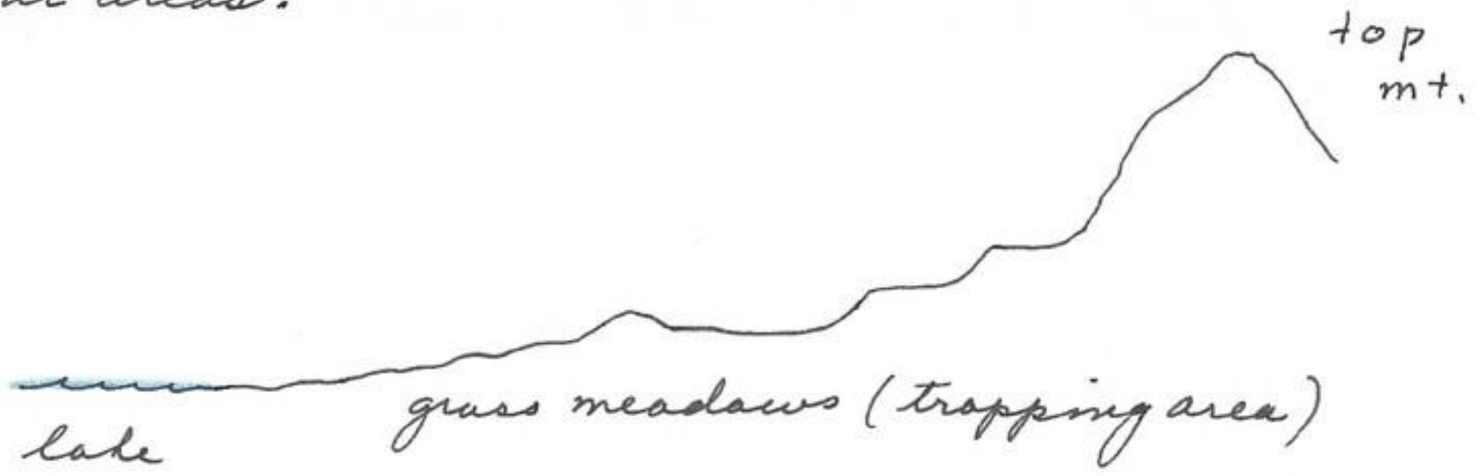
510809-115

CHANDLER LAKE

From AAF BASE MAP (ENLARGED)



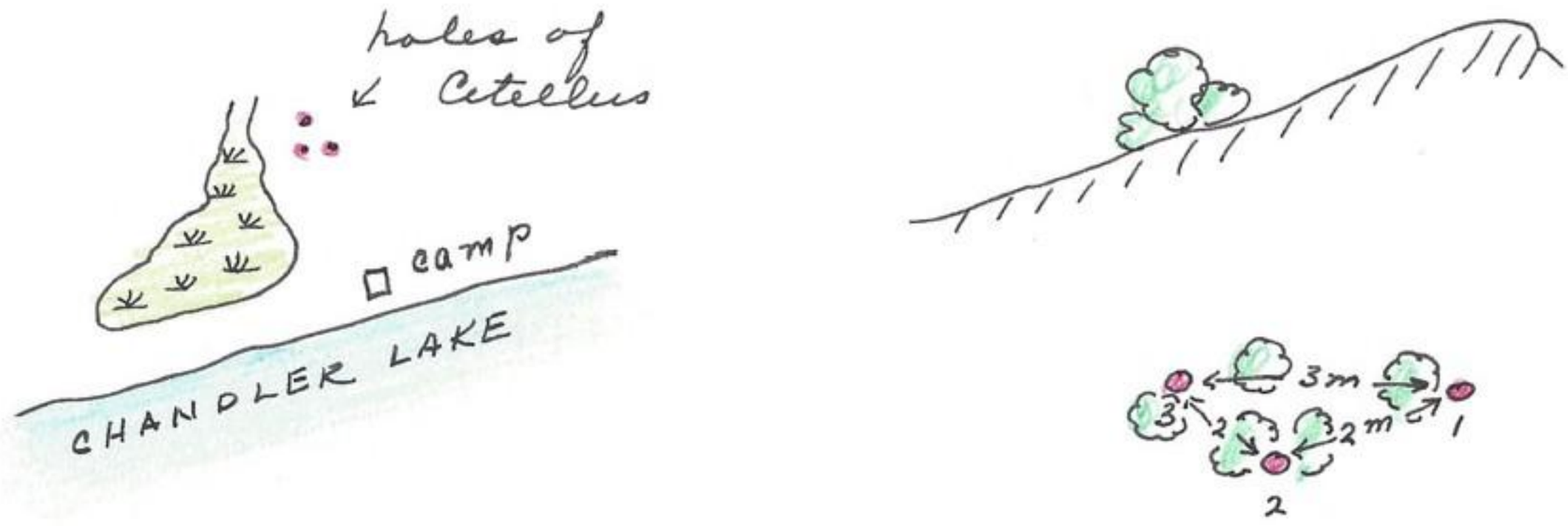
part of the ground surface covered with water but grass islands and drier adjacent areas.



One water stream following an ill defined channel. The permafrost produces an unusual ground (surface) condition. The non-absorbant tundra soil's is most evident after rains when ground and vegetation in meadows become supersaturated. This condition plays an interesting part in destribution of mammals.

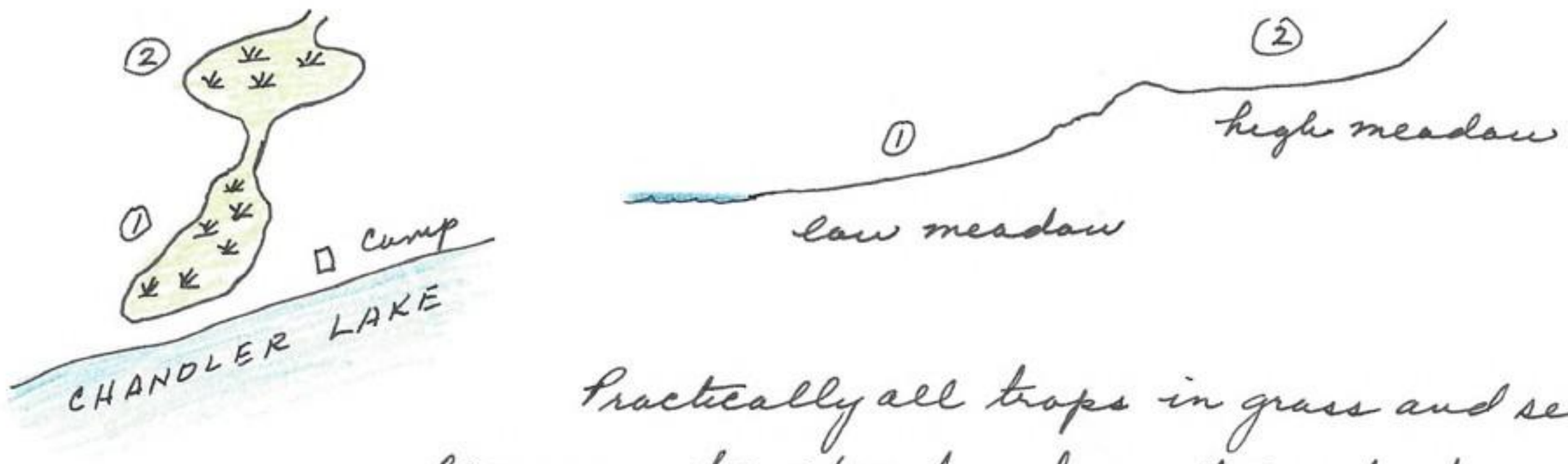
Lake Chandler, 68° 12', 152° 45', 2900 ft., Brooks Range, Alaska
Aug. 10, 1951

From trapline of 152 traps caught: 4 3 microtus oeconomus; 5 microtus miurus; 4 Clethrionomys rutilus; 1 Sorex cinereus; 1 Passerculus sandwichensis. From a trap set at entrance of Citellus hole on hillside immediately west of camp caught one Citellus parryi. This mammal was from one of three holes placed 2 meters apart.



Small 3 foot high willows surrounded these holes and were created by the squirrels. Rest of hillside bare of willows or large shrub growth but covered with lichens and mosses. Today observed 2 Pomarine jaegers, 1 raven, 3 arctic tern, numerous longspurs and wheatears and one one year old caribou. The caribou crossed the south end of lake and followed north along east side of lake. and Daniel Livingstone and Byron reported this same animals as it passed their

on east sede of lake at about 3:00 P.M. Perns showed considerable curiosity of plane and tent yesterday. This evening continued trapline up slope to bench meadow directly above and continuous with trapping area of last night. First 150 as of last night with 50 more above!



Practically all traps in grass and sedge community except a few at constriction between the two meadows. The constriction was a rock-shrub zone. The upper meadow was drier and completely streated with caribou trails trending north-south. These trails were approx. 200 cm deep and divided by a ridge of grass between trails. most of the traps were set in these trails. It is interesting to speculate as to affect the caribou have on the establishment of these grass communities and associated mammals. Without these trails the community would take on an entirely different aspect.

Chandler Lake, 68° 12', 152° 45', 2900 ft., Brooks Range, Alaska
Aug. 11, 1951

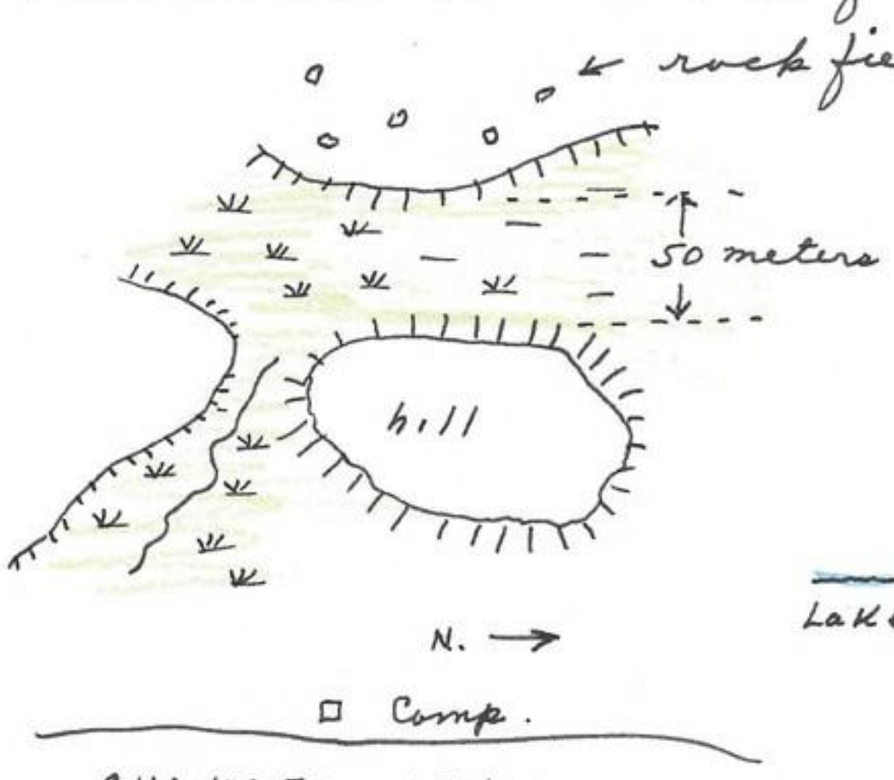
Rained periodically (light) last night to 8:00 A.M. Temp. 42 to 56 during day. Inspected 200 traps set last night and caught; 17 microtus mucus; 9 Clethrionomys rutilus; 1 Calcarius lapponicus; 1 Sorex ~~cinereus~~ arcticus ♂ (this shrew was caught in the same trap as caught a shrew the night before, a ♂ cinereus); 1 Lemmus trimucronatus. From hole 1 of Citellus set caught on mustela ermnea. Later in the day caught another Citellus parryi from the same trap and hole. There is a definite relationship between mustela and Citellus in sharing some set of ground holes. I question much the capacity of the weasel to kill a ground squirrel and the searching of Citellus holes is for their young or some other kinds of small mammals other than adult squirrels. Trapline will be retained in same position as last night. Known no area today.

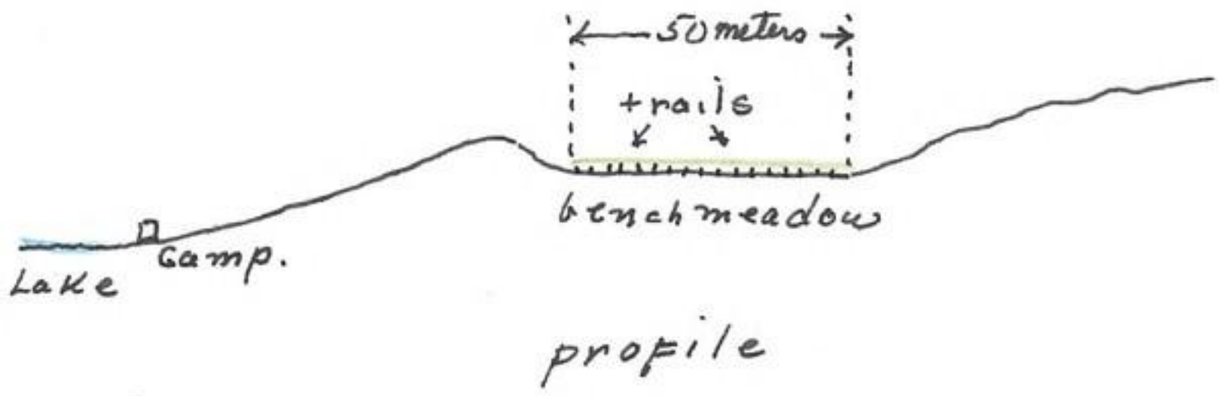
510812-118

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

Aug 12, 1951

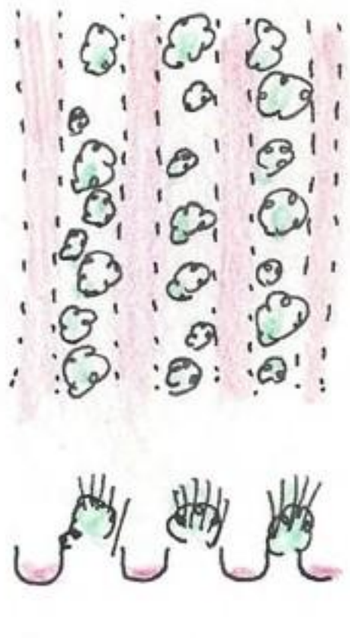
Inspected trapline as follows: 5 Clethrionomys rutilus; 1 microtus oeconomus; 10 microtus mucus; 1 Lemmus trimucronatus; 2 Passerculus sandwichensis; 10 enanthe oenanthe; 1 Calcarius lapponicus. Also took one mustela ermnea from hole number 1 of Citellus set. From this groups of three holes have now taken 2 citellus and 2 mustela ermnea from same trap. Will keep these traps in position for a few more days. Photo 510812-1 of a Betula nana in red color with Chandler Lake in distance. This red patch of Betula nana was one of a limited number of red patches in the area. It was so outstanding as an isolated patch that I made special effort to photograph it. The surrounding vegetation on all slopes are green. This photo shows first change of summer to fall colors. Low lying clouds in distance typical of this day. The elevated bench in meddle distance appears as a an old river or valley floor. Green immediately to rear of Betula a species of willow. Boulders covered with moss and lichens with mixture of willow & Betula was best suited for Clethrionomys and occasionally microtus mucus. M. mucus is there because of willows. Have observed wolf tracks in several places in sw part of lake area. Three sets of wolf tracks along sands at edge of lake, others in trails at various levels on mt. slope and tracks about a week or so old. One caribou carcass cleaned by wolves. Single caribou at SE end of lake as it crossed eastern most river. It continued east and north along edge of lake. Livingston & Byrn also reported seeing this caribou pass their camp on east side (meddle) of lake. This caribou was about 2 years old. Livingston reported bear tracks on east side of lakes. In an area of benchland meadow grass and sedge west of camp and about



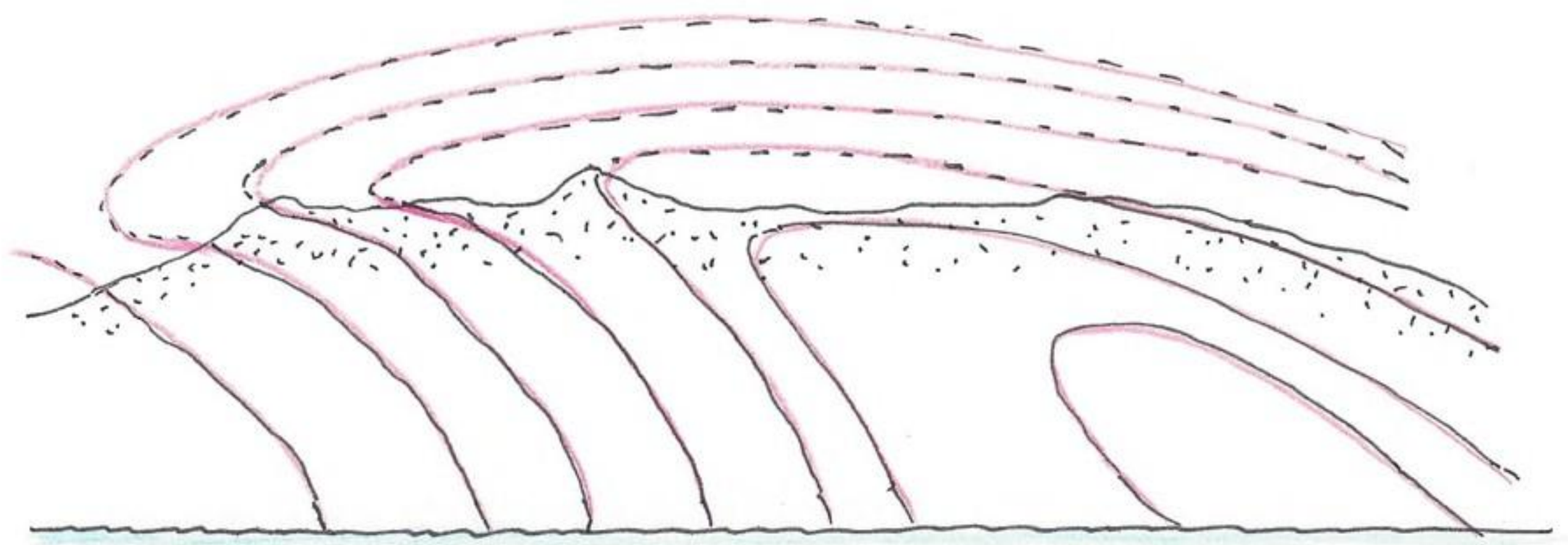


5, 0812-114

about 300 yards from edge of lake counted 70 parallel caribou trails in a meadow 50 meters wide These trails were as close together as they could be and still leave an intervening ridge or growth of grass. These trails have a profound influence on the life form of the grass and its associated mammal community. The space between trails ridges is bare of plant growth. These trails influence drainage and the degree of saturation ~~which these~~ with laws and highs might saturated and highs dry. The runoff of rain is abrupt as contrasted to the holding of water by the solid compact fields of grasses and sedges. Caribou trails are from edge of lake to upper slope of mt. with greatest concentration on alluvial plain or gently sloping areas beyond the base of the mountain. At convergence of trails the trampling is considerable. all trails have NS trend. This evening when lights were fading, made short reconnaissance trip west of camp to determine states of Ochotona. no haystacks or calls but saw a small animal, probably a weasel, run across rocks and at one point stopping on a rock. To date from the same Citellus lole have caught the following mammals in the following order; Citellus, Mustela, Citellus, mustela. Microtus mucrus on slopes and among rocks where associated with willow & damp stream courses and their in unusually large numbers - definite community formation. In one isolated area of 20 x 1 meters set 10 traps and left for three days. The first night caught, the only mammal, one adult microtus mucrus. The area showed considerable use with well established trails and fecal piles with accumulations of willow leaves. The general picture of microtus mucrus is one of gregariousness but this one example was the exceptional. 2 seen in area also longspur, pipit and wheatear. The wheatear is most conspicuous but longspur in greater numbers. 5 or 6 wheaters average number noted around camp. Pipit remains along edge of lake and sand and in grass along same. It feeds on food we throw from tent. Observed lightening and heard thunder for first time while on the arctic slope. Mountain slopes of rock are dark when wet and lighter when dry. Some arcticus pacificus



in SE part of lake and has territorial limits. It may, however, be there because of good fishing at mouth of rivers. Three or four arctic tern are occasionally observed generally coming from area to south. One pigeon hawk foraged back and forth across benchland meadow grasses + sedges (east to west + west to east). It had no fear of me and would examine me at 20 feet It darted twice at a Calcarius lapponicus but without success. It continued south, searching those areas where the longspur were most common. Photo 510812-2 of benchland grass + sedge meadow. The water among grass + sedge is moving and at center of flow; on either side remains until evaporated or absorbed by plants. Soaking into ground is minimal. It requires very little water to change a relatively dry mammal habitat to one of standing water. The extremes are usual. Traps set in stable area (in reference to water level fluctuation) and especially were associated with willow, yield greatest percentage of Microtus mucrus per trap unit. Microtus oeconomus are on lower slopes in marshes bordering the lake. Photo 510812-3 of Chandler Lake and bordering mountain to east. A small patch of red Betula nana in foreground. Surface of lake shows effect of windy day. The structure of mt (Ordovician or Devonian) is typical of the Brooks Range which is a series of overthrusts to south to north. The mountain in the picture is interpreted as follows:



This range is actively eroding. Boulders are frequently rolling down the active slides. Photo 510812-4 from slope to west showing south end of Chandler Lake and successional shorelines. Three creeks enter the lake. The greener area along west edge of lake is best area for Microtus oeconomus. The large boulder in right foreground is about 10 meters wide.

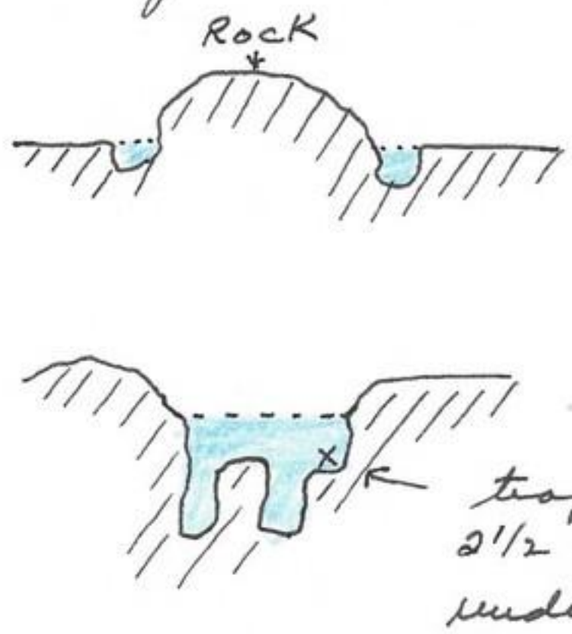
The surrounding boulder field is sealed with masses, lichens and dwarf birch. The east limb of the range can be seen to the left.

Photo 510812-5 of caribou antler lying on red Betula nana. This animal had been as part of the skull remained on the antlers. The antlers were high on mt west of camp and were largest found so far. Trails indicate use of mt at least 1/2 way to top. These trails are shared by mt. sheep in late fall and winter as numerous droppings of sheep were in the area. The antlers measured 1141 mm from base at skull to tip. Photo 510812-6 of south end of Chandler Lake showing successional growth lines. The three meandering rivers are near grade to lake. Degree of meandering is correlated with size of river rather than by age. Sedge and grass community of Arctophila fulva is green and associated with immediate influence of river and lake. Photo 510812-7 of masses, lichens and Betula nana from slope of west mountain. North end of Chandler Lake to north. The white lichen is dominant in protected areas of rock slide and rock fields as a solid mat of vegetation. Most of them grow on rocks instead of soils. The orange plant is also in protected parts of rock slides and rock deposits. While investigating rock slopes found no evidence of pika or marmot, although I heard a marmot from the extensive rock slide areas. The wheatear appears to be the only bird in rock fields. Cetellers and hales low on slopes. Wind uncomfortable on exposed ridges but comfortable in protected swales.

Chandler Lake, 68°12', 152°45', 2900 ft., Brooks Range, Alaska
Aug. 13, 1951

Last night and today the major seasonal change at Chandler Lake. Most significant is change of wind from prevailing south wind to strong wind from north. Yesterday evening a lull which represented change of wind directions. Early this A.M it started to rain and continued to 8:00 A.M. Rain followed by fog clouds forming in valley south of lake and moving in from the north, perhaps from Coastal or Plateau Provinces. Photo 510813-24 and 510813-25 showing fog clouds at a later period, now about 1/2 way down slope of mountain. Rain influenced trapping and plant communities. All marsh grass & sedges now in standing water covering traps and trails from a fraction of an inch to as much as 12 inches.

The mammals in the marsh areas adjacent lake and on low slopes must either move on to drier places or perish. If they remain in territories they perish and is a factor in mammal fluctuations. Grass islands, polygon ridges and ridge caused by caribou trail formation may be refugia. This situation is a delicate one in which mammal adaptation, caribou trails, life form of grass, and natural physical conditions are closely related. The caribou may play a very important part in this mammal-plant community by creating islands of refugia, drainage of rain etc. The Microtus oeconomus community suffered the most of all animal communities. These areas, where many M. oeconomus lived, were completely inundated. because of rise of level of lake and rivers. On slopes the water collected around larger rocks as deep pools. In a deep entrenched water channel among boulders a trap that had held a Clethrionomys was now under 2½ feet of water as the channel become a small creek. Captured a Clethrionomys in a microtus oeconomus community which was some distance from its normal hillside community. Found a dead Sorex in depression among grass which could have resulted from either being stepped upon or injured by trap. It was, however, in a curled position as if it had died a natural death. Checked steel trap but no result. Temperatures 45°F this morning. 47°F at 9:00 P.M. Day windy and cold, low fog. At about 9:00 P.M it subsided slightly. At this time checked steel traps and collected one Citellus from hole. At this point heard a snort which I presumed was a caribou or a bear. The Pacific loons which were commonly heard and observed near camp at south end of lake are absent and suggests a change of feeding area according to change of wind. Ptarmigan droppings, commonly observed in area, are probably deposited in winter as I have not seen them since arrival at camp. Result of last nights trapping: 5 Clethrionomys rutelus, 6 microtus muurus; 6 microtus oeconomus; 2 Lemmus trimucronatus; 3 Sorex cinereus; 1 Citellus parryi.



510814-123

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

Aug. 14, 1951

Calm last night. Temp - 31° F. This morning clear and without clouds in sky. Fog to north now dissipated. Slight wind from north. Five Dall sheep feeding on mt. to west. many trap now free of water of rains of ~~last day~~ yesterday morning. most of these traps were in natural drainages. From traps in meadow grasses and sedges: 2 Lemmus trimucronatus; 3 Clethrionomys rutilus; 1 microtus oeconomus; 2 Citellus parryi. Because of sunny day photographed several scenes around camp. Photo 510814-2 at south end of lake from rocky hillside. willows beginning to change color. Camp along shore at left in distance. Grass meadows bordering west side of lake and river used mainly by microtus oeconomus. Rocks and willows dominated by ~~mo~~ Clethrionomys. Microtus miurus in same area but associated with damp drainage courses. The sharp peak in middle distance an alluvion and belongs to ridge beyond front mountain. Area in extreme right one of converging caribou corridors. Photo 510814-3 of mise. mosses and lichens among boulder field directly west of camp. The white lichen in foreground dominant among rocks and completely covers ground, especially on north exposures. Photo 510814-4 from slope showing south end of lake. Typical glacial cirque in distant range. The shinning lake in distance is associated with several other smaller moraine lakes. Sky exceptionally clear today. Photo 510814-5 of repeat of colored Betula nana among rock field; green willow associated. An elevated shoreline on range to east. The bench meadow in middle distance is where caribou trails were examined and counted and where recent trapline lies. The main canyon on east side of lake is the canyon leading into lake area from the east. Clethrionomys, microtus miurus and Sorex cinereus taken from traps in immediate foreground. Photo 510814-6 of shoreline at camp shooting south; composed mainly of bare rocks and sand. Eriophorum in foreground. At a later date this plant as well as other grasses and sedges become almost completely inundated by the rising level of the lake, but still remained alive. Note elevated valley floor just below peak to right. Dall sheep observed on this peak bordering the valley. Waves played continually on shoreline and when directed against shore in

certain direction created an interesting symphony. On quiet days the lake trout and grayling swam by just off shore. They could be seen because of the smooth surface. Photo 510814-7 from camp shooting west. One can see a group of dall sheep on extreme right hand side of photo. This range was the favorite one for these animals. Occasionally sheep on slope to left but here the slope was too rocky or rather lacking grazing meadow as on right hand slopes. Upper reaches of mt to left has greater percentage of surface covered with rock talus. Lower limits alternating terminal rock accumulations and benchlands. These lower slopes were completely populated with Clethrionomys rutilus, especially among rocks. Microtus confined more to swales and especially where water or damp courses traverse the area. A typical spot would be a damp water soaked slope with dry lateral or adjacent sides and populated with willows which they utilized for food and storage piles. It is willows and not water that determines the community of M. miurus although water and willows are normally the usual association. This slope shows former glacial activity with benchlands at various levels originating from the mouth of the high valley canyons. Rocks dipping to north at about 45°. Sedges and grasses in foreground now without mammals but evidence of former use in trails. The lake, during high waters in spring, covers this grass area. Considerable depth of coarse sand adjacent lake. The grass and sedge of this periodically inundated area has its own peculiar composition, beyond which, the grass has a different character as it ascends the hill slope. Citellus atop on slightly red colored hill to right. This parade of clouds has been moving north just beyond peaks. Photo 510814-8 of camp on west side of Chandler Lake. Photo 510814-9 of willow cuttings made by Microtus miurus; runways and droppings associated. Sphagnum and masses sealing ground. There has not been a concentrated attempt at haystack development. Yellow leaves as well as green leaves were chosen. Photo 510814-10 of lake and east range taken from doorway of tent. Good view of structural features of overturned thrust. Active slide on west exposure, others sealed. A raven was observed flying along crest of this mountain. There have been no dall sheep on this mountain. Several lake trout have been taken from this point at about 15' from shore in front of tent. Photo 510814-15

of Citellus parryi from set of three traps. The total catch to date is 4 Citellus and 2 mustela, all from same set. Photo 510814-16 of Cristavomer namaycush the lake trout and the arctic grayling. Thymallus signifer The trout measured 640 mm standard length ♀, 3½ lbs weight. The grayling measured 305 mm standard length (upper tip of jaw to last vertbra of tail) and weeghed 1 lb. Photo 510814-17 of above. note red pectoral pelvic and anal fins. The dorsal fin of the grayling is continuous. The ♀ Cristavomer had many eggs. Photo 510814-18 of the head of above Cristavomer namaycush. This species differs from ordenary Salmo by possession of vomer teeth. Flesh excellent as food. Livingston reported Eskimo fish traps at north end of lake outlet.

Set 63 traps on hillside in willow-rock community at 8:30 P.M. At 9:00 P.M rechecked and collected:

trap 3, 1 Clethrionomys
" 18, 1 microtus miurus
" 48, 1 Clethrionomys.

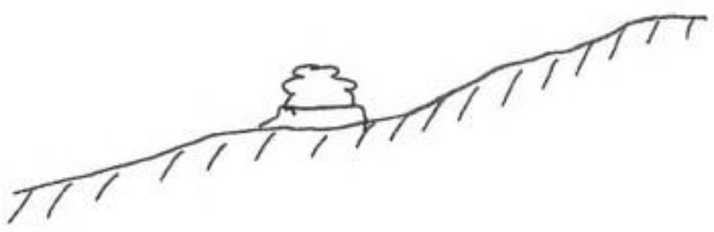
These 63 traps are, in addition to the 100 traps already in position. Fog beginning to form in valley south of lake at 9:00 P.M and by 9:30 P.M had already enveloped that part of the area. Slight wind from south. Caught a Cristavomer namaycush ♂ this evening which measured 501 mm length and weighed 1287 grams. Also one Thymallus signifer which measured 325 mm long (standard measurements) and weeghed 461 gms.

Chandler Lake, 68°12', 152°45', 2900 ft., Brooks Range, Alaska
Aug. 15, 1961

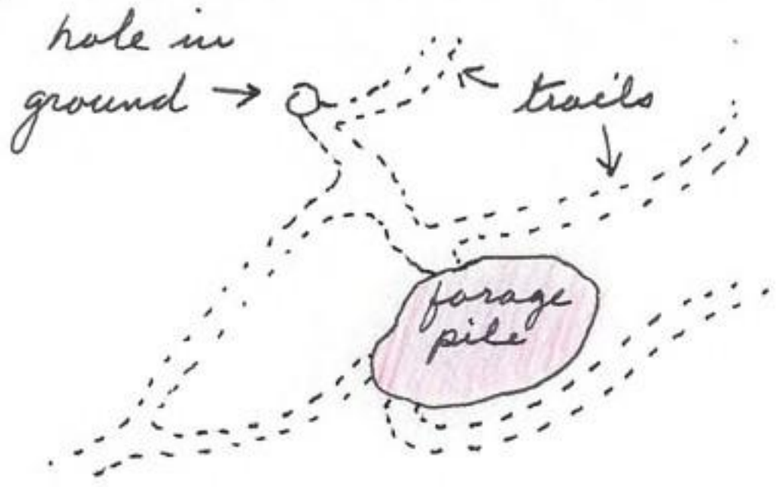
At 9:00 A.M Cristavomer and Thymallus feeding in 8 inches of water and only 4 feet from shore. in front of our tent. When approached they would swim away with considerable agitation of water. This morning hazy and partly cloudy. Slight wind from the south. Temp. last night 33°F. Examined trapline in marsh area of original setting of 100 traps and 63 set yesterday. This set of 63 traps is what I considered typical for microtus miurus. This series of traps (63) will remain in same area and position for several days to test use of identical spots and runways by the several species that might inhabit the area. From a distance this trapping area appears as 2 springs issuing from side of mountain and flowing down relatively steep slope for about 80 meters (slope about 20-30 degrees) They are green in contrast to rocky slopes adjacent. There is a continuous connection with the trapping area below. The running

water, confined to a channel about 300 deep x 400 wide mm, flowed down slope becomming intermittent in places. Grasses and willows grew along edge of stream and throughout meadow area. The water has changed it course frequently. In addition to wet to damp condetion of marsh the adjecent sides of swale was dry with elpased soils created by squrrels, mice and caribou. This condition of dry socls bordering the damp meadow swale is the best for microtus miurus. While M. miurus has been tobe away from willow, it prefers this plant for food storagepiles. Beyond limits of these meadow swales were rocks and typical hillside vegetation. From this trapline of 63 traps, all placed in runways, collected the following: 3 (trap number) microtus miurus, 510815-1; 4 sprung; 5 clethrionomys rutelus, 510815-2 (caught before rain); 8 microtus miurus 510815-3; 10 sprung; 11 microtus miurus 510815-3a; 12 sprung; 13 clethrionomys rutelus 510815-4; 14 clethrionomys rutelus 510815-5; 15 sprung; 20 clethrionomys rutelus 510815-6; 21 sprung; 22 sprung; 24 microtus miurus 510815-7; 27 sprung; 30 sprung; 31 clethrionomys 510815-8; 32 sprung; 33 clethrionomys 510815-9 caught before rain; 36 clethrionomys 510815-10; 38 clethrionomys 510815-11; 40 cleth - ronomys 510815-12; 41 clethrionomys 510815-13 before rain, feces on this mammals body; 42 clethrionomys 510815-14. Photo 510815-13 of south end Chandler Lake from trapping area; 43 clethrionomys rutelus 510815-15; 45 clethrionomys rutelus 510815-16; 47 microtus miurus 510815-17; 48 clethrionomys r. 510815-18; 50 clethrionomys rutelus 510815-19; 53 microtus miurus 510815-20; 54 microtus miurus 510815-21; 55 microtus miurus 510815-22; 56 microtus miurus 510815-23; 57 microtus miurus 510815-24; 58 sprung;

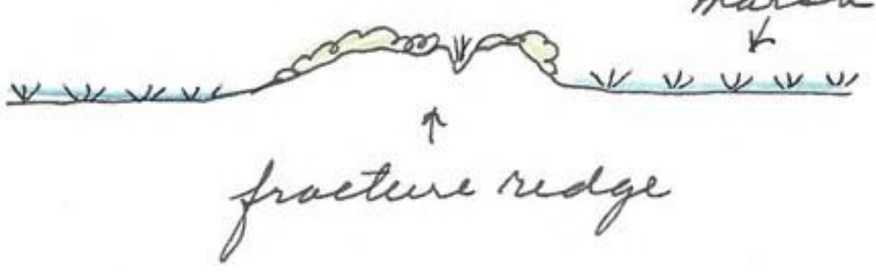
Photographed nest or more appropriately food storagepile of microtus miurus 510815-25 associated with trap no. 58 of above. The pile of willow leaves is 280 mm high and 400 mm wide. The pile has been started on ground below the limbs of the dwarfed birch. It is constructed in and around this birch limb. The leaves are added so that they dry and retain their yellowish green color. The leaves are added gradually and regularly so that the leaves dry but not completely dried and brown as are leaves outside the forage pile nearby. The green leaves are placed on top. A hole of this mouse was 1½ feet from forage



pile and was connected by runways to the pile. Grasses and sphagnum associated with this pile. Leaves of willow were the only kinds of leaves in pile. Photo 510815-26 of the nest accumulation of microtus muurus, associated with trap 59, showing placement of willow leaves under partial protection of a rock. Size of pile can be compared with M. muurus along side of pile. Fresh leaves of willow have been recently placed on pile. The forage pile definitely associated with nesting hole. The main trail or approach to forage pile was up right hand side. Sphagnum, grass and Betula nana and other plants near by; 60 clethrionomys 510815-27; 61 sprung by Citellus which used this area and only about 8 meters away from forage pile of microtus muurus; 62 sprung by Citellus; 63 sprung by Citellus. Examined several nest piles of microtus muurus. 5 piles in an area of 6 x 9 meters among dwarf willow and grasses. Volume varied from one pint to 3/5 of a bushel. One pile had been started on an old pile of previous year. In two instances pile supported by a branch with 30 mm clearing beneith. The singing voles would gain forage pile by climbing limb of willow. The unused leaves of last years forage piles are dark brown and without chlorophyll and generally matted. Most nests were built by approach from one direction, in some instances, the vole approach top of pile from several different directions. To date, nesting or foraging piles of a few isolated leave cuttings to well developed piles and would judge that they have been only recently building their winter supply. They ~~have~~ started their foraging piles at the time of the recent change of climate from summer to autumn which took place about Aug. 5th. Maximum effect about august 14th. I have found, from inspection of area, very few instances of resting grounds of caribou (cleared areas on the ground to house the body of the caribou) The condition of the ground may exclude preparing resting spots; 2 such resting spots, however, were on a sedehill and one on an old unused trail among dwarfed willow. Hair of the caribou remained on the ground. Collected one Citellus parryi 510815-28 from rock pile hole some 30 meters from 3 hole set near camp. The mammal had cleverly taken bait (baited with flesh for a weasel)



from the trigger of the trap.) I was prompted to set here because of trapline depredation (sprung traps) of small traps in the immediate area of the hole among the rocks. One Lemmus was taken from one of the traps. While there was very little evidence of tracks or droppings of the squirrel, recognized its runways among the rocks. These trails can be recognized by squirrel size opening leading in and out of rocks. Checked the low marsh trapline. Lemmus on fracture ridges in marsh where well established trails are formed. Other trails lead from ridge to marsh area proper but it is these trails in marsh that have become inundated, thus forcing the lemming to high fracture ridge retreats.



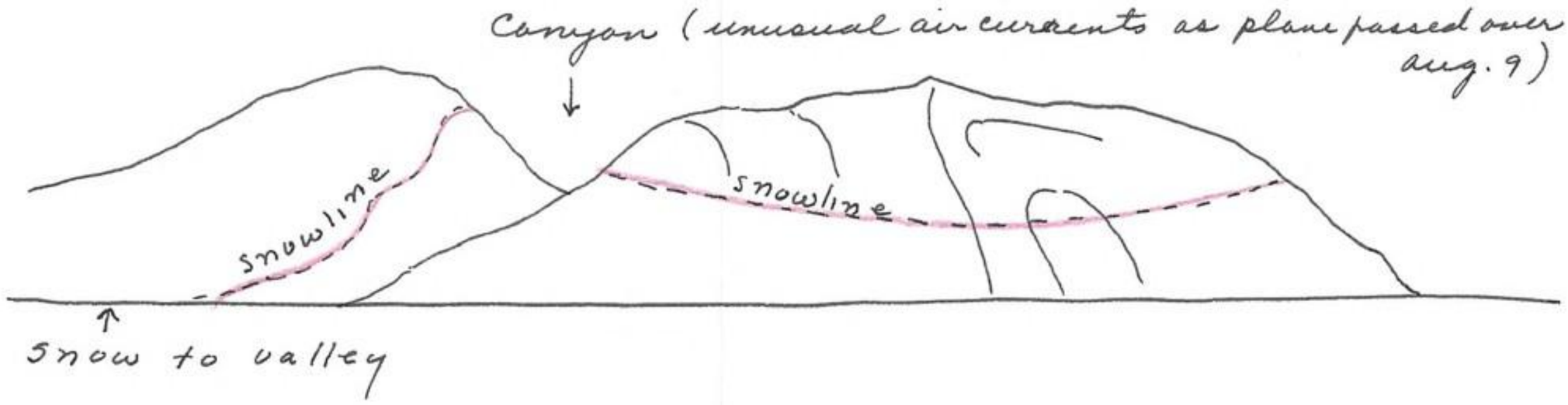
Microtus oeconomus is mainly in the lowest marshes bordering the lake and in the wettest grass and sedge community. They have well established trails in grass and at intersection of trails there are fecal piles. Frequently these marsh areas are inundated during high water from lakes & rivers after rain or driving wind (in case of lake) and cause the vole to leave the area for drier grounds. It returns to marsh area after subsidence of inundation. Microtus minus in lower marsh but trails not well formed and are probably only temporarily there. Photographed a brilliant red flower (5-10817-116 of later date) living in bare slopes or on windy ridge where soils are exposed. These plants are not generally recognized at a distance but when one is near, are in compact or loosely compact communities. Caught foot of Citellus parryi in 3 hole set near camp, making the number 5 from same trap. Mammals collected today are: 18 Clethrionomys; 10 microtus minus; 1 microtus oeconomus; 1 Passerculus sandwichensis; 1 Citellus parryi; 1 Lemmus trimucronatus; 1 Sorex cinereus.

Chandler Lake, 68° 12'; 152° 45'; 2900 ft., Brooks Range, Alaska

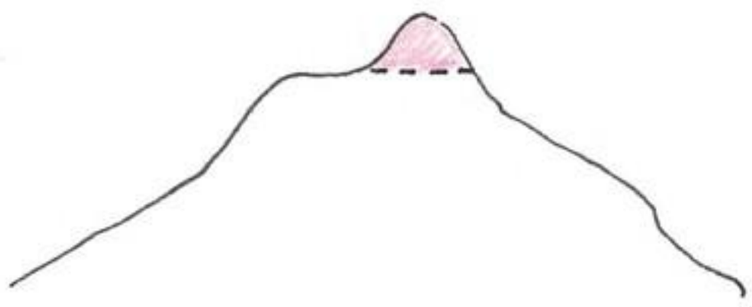
Aug. 16, 1951

Rained last night from dark to early morning at tent but on higher elevations it snowed. Temp. this A.M. 35°F. Snow pattern (lower edge of snow line) irregular and would indicate influence of circulating winds and currents on the deposition of snow, a circumstance that might influence the distribution of mammals and birds on mt. slopes.

The range of mountains on east side of Chandler Lake thus:

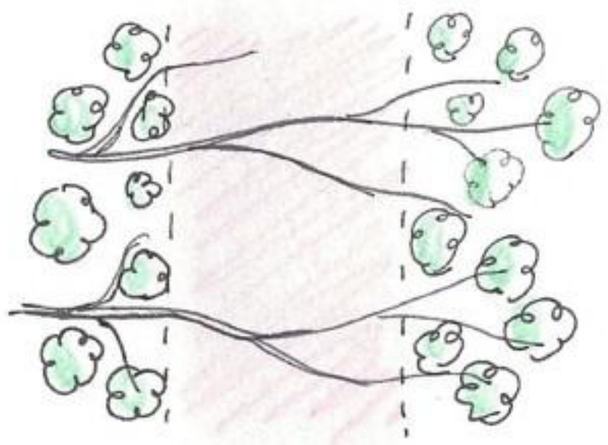


The snow line is probably conforming to temperature or wind currents from the canyon to the east. Here the snowline is high but beyond on either side the snowline becomes lower and at the north side of the canyon the ~~sl~~ snowline is to the valley and actually in valley (the snow). At the time we crossed the divide (Aug. 9) at the head of the canyon there was a terrific down draft on the west side of divide as we flew across divide from east to west. The mountain peak west of camp was covered with snow. Examined trapline of 63 traps in willows and rock set (see previous record). All traps will remain in same position for several days (all mice captured

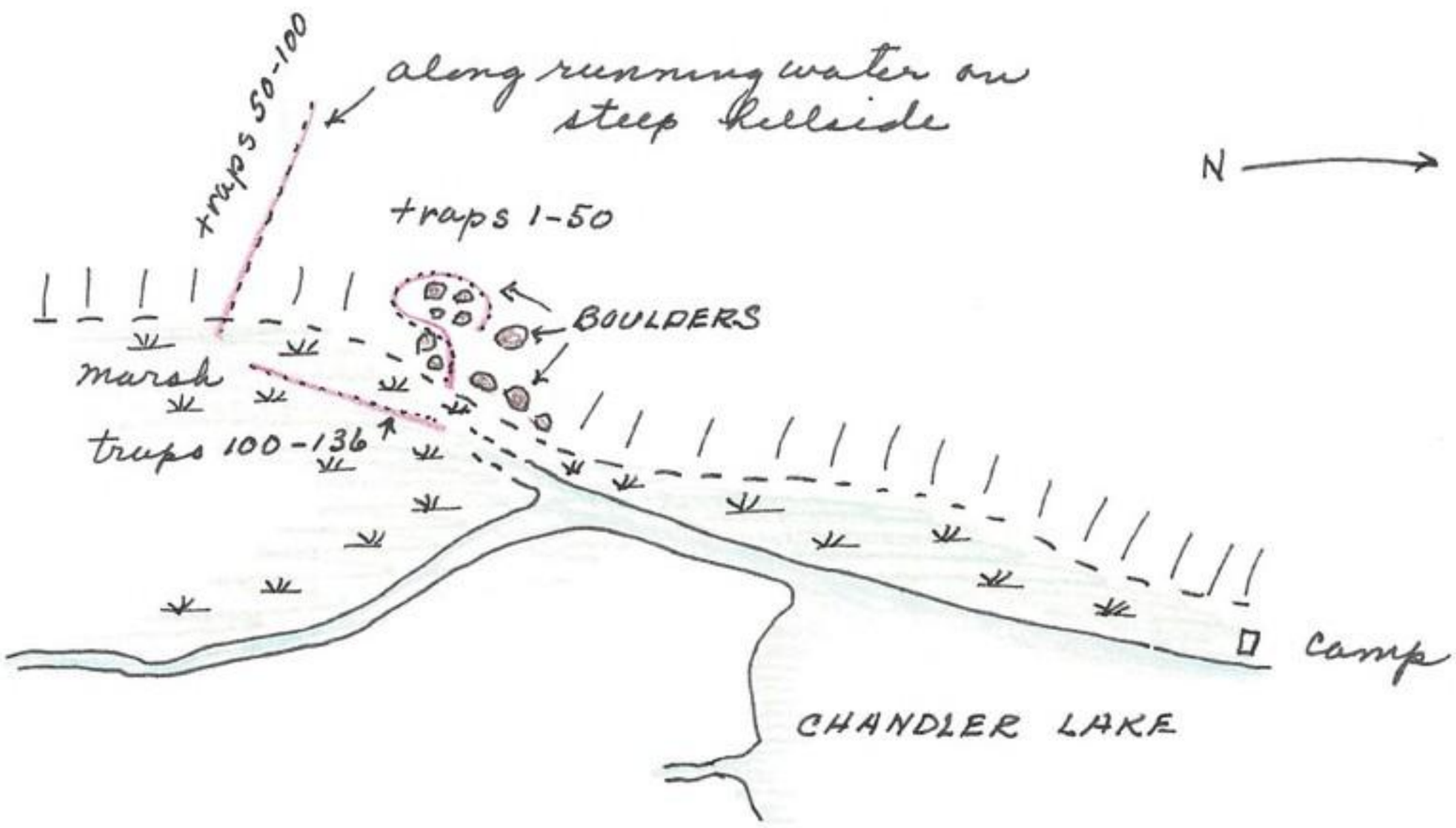


before rain of last night: Trap number 1 Clethrionomys rutelus 510816-1; 11 Microtus muurus 510816-2; 13 Microtus muurus 510816-3; 20 Microtus muurus 510816-4; 23 Clethrionomys rutelus 510816-5; 28 Clethrionomys rutelus 510816-6; 29 Sorex cinereus 510816-7; 34 Clethrionomys rutelus 510816-8; 44 Clethrionomys rutelus 510816-9; 48 Clethrionomys rutelus 510816-10 from entrance of hole and vole caught as it was leaving hole. Water now rushing out of this hole with hydrostatic pressure. This hole was dry yesterday but rains caused increase in water flow in stream channel; 61 Calcarius. Examined one forage pile of microtus muurus of about 4 quarts with nearly all leaves collected in the last two days. This pile was built upon the foundation of dry dead leaves of last years pile and was supported by branches. Some traps inundated where voles were taken. Collected a Citellus parryi from three traps set near camp. This mammal was the one in which I caught the foot only, yesterday. One of the interesting coactions between caribou and willow was

nated on slope immediately above camp where several trails of caribou were crossing Betula nana patches where limbs were growing prone and stripped of their leaves where trails crossed. The low lying plants were still alive but the intervening sections across the trail were bare of leaves and limbs were trampled and scarred. These caribou trails have a decided



effect upon the formation and composition of annual-plant community. Today collected 5 Clethrionomys rutilus; 3 microtus muurus; 1 Sorex Cinereus; 1 calcarius and 1 Citellus parryi. This evening set 138 traps in area about 2 blocks south of camp to test community preference of small mammals.



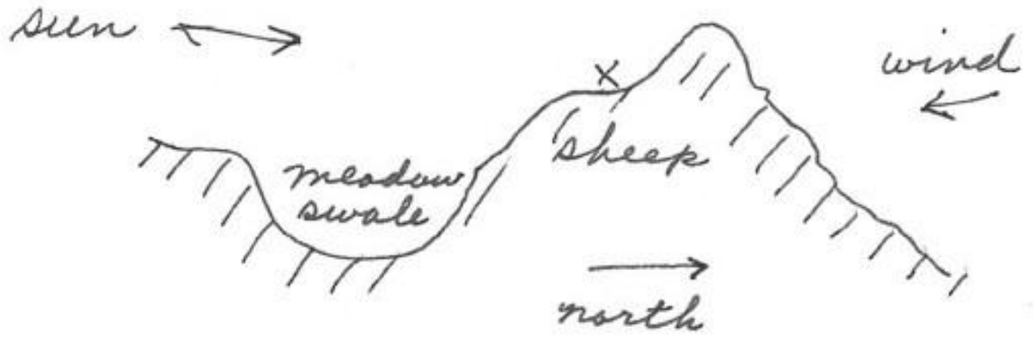
Traps 1-50 among rocks and boulders as large as 8 feet on steep sidehill with large, willows as high as 5 feet associated. The area was dominated by sealed in boulder (lichens and mosses). Extensive subterranean rock chambers characteristic of this area. Traps 51-100 begunning at base of mountain and extending up slope for 180 meters. all traps in these lines set 10' apart. This line followed a damp to running stream of water and was, except at upper end of line, associated with water and stream side vegetation. The stream was only about a foot or so wide. This line was to get idea of preference of M. muurus to water and associated willow and grass and running water as well as to altitudinal preference. Traps 101 to 138 in marsh sedges and grasses on valley floor

will be set tomarrow.

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

Aug. 17, 1951

Temp. last night 32°F (Minimum). at 8:00 A.M, 39°F. no rain last night. Less wind today than yesterday. Chandler Lake 4 inches higher than yesterday as result of increase rain and decrease evaporation. Sky blue in places. At 9:00 A.M 7 Dall sheep on bench in sky meadow to west and north of camp. They were in an area about 9 x 9 meters and resting. Sun from south and wind from north. At 9:00 A.M a pigeon hawk hunted grass meadows and slopes at base of mountain. It alighted 30 feet away to inspect me more closely



and then flew back and forth across the meadow, stopping each time to take a closer inspection. It finally left and continued south in its systematic search across the meadows and slope. This herd new no fear, as compared to those in the United States. Inspected trap line of last night and will record by trap number as specimen number for the next 2 days. Traps will remain in same line and same position:

trap number 2	Clethrionomys rutelus		510817-2
13	"	"	510817-13
14	"	"	510817-14
16	sprung		
23	Lemmus trimucronatus		510817-23
27	Clethrionomys rutelus		510817-27
28	sprung		
30	Clethrionomys rutelus		510817-30
31	"	"	510817-31
32	"	"	510817-32
34	"	"	510817-34
35	"	"	510817-35
37	sprung		
40	Clethrionomys rutelus		510817-40
43	"	"	510817-43
45	"	"	510817-45
46	"	"	510817-46

This line would indicate a definite Clethrionomys preference

and because of overhead protection, in this case, of boulders and rocks. In many cases there is no definite overhead protection but lateral protection nearby. This rock protection is equivalent to matted grumboltz community of alpine areas in the States where Clethrionomys are most numerous. Overhead protection is one of the prerequisites for these mammals, however, I have caught them far from their preferred community and in short wet grass and sedges which is the preferred by Microtus oeconomus. Clethrionomys occur in these marshes only by chance.

Examination of trapline of 50-100 traps in linear transect up slope where traps were placed in a zone of few boulders but mainly on soils supporting grasses and willows:

51	Clethrionomys rutilus	510817-51
52	sprung	
53	microtus miurus	510817-53
54	sprung	
55	Clethrionomys rutilus	510817-55
56	" "	510817-56
57	microtus miurus	510817-57
59	sprung	
61	microtus miurus	510817-61
73	sprung	
74	Clethrionomys rutilus	510817-74
75	" "	510817-75
78	microtus miurus	510817-78
79	Clethrionomys rutilus	510817-79
85	Sorex Cinereus	510817-85
86	Clethrionomys rutilus	510817-86
87	" "	510817-87
90	" "	510817-90
98	" "	510817-98
99	" "	510817-99
100	sprung	

On basis of about catch, microtus miurus is associated with willows near water. The last 15 traps (85-100) among rocks and high lush vegetation, as contrasted to dwarf willow and water, caught almost exclusively Clethrionomys. Clethrionomys has a wider tolerance of community and has penetrated community of microtus miurus. Pulled all traps in marsh and meadows near camp and reset as 101 to 138 in marsh at base of mountain below other two sets. This will give an indication of community

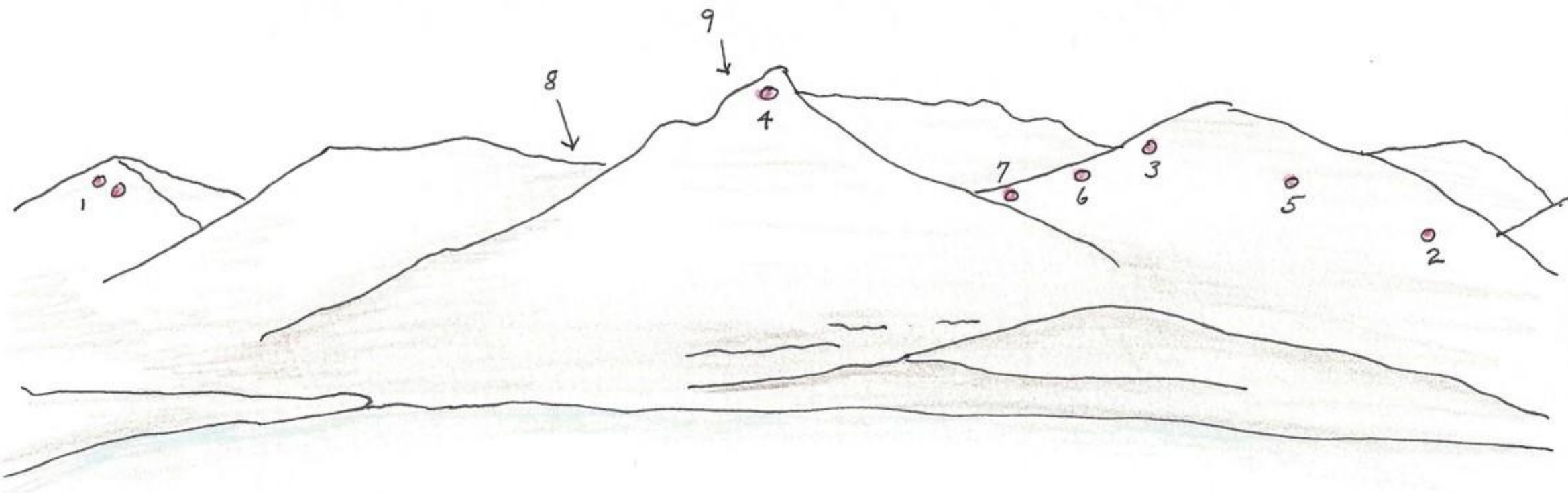
preference. The last 8 traps on isolated ridges in marsh sedges (micratus oeconomus community). At 11:30 A.M a female caribou (without antlers) and a young (1/2 size adult) left vicinity of mouth of canyon just south of trapping area. They crossed the valley to east, fording at least 2 of the large streams. They did not act like caribou of the open tundra at Teshekpuk Lake but more like the actoic movement of the mule deer. ~~Too~~ & It is remarkable how these animals can traverse these slopes and low tundra. In certain areas the tundra is difficult to cross by foot because of the hummocky nature of Eriophorum, but these animals cross without hesitation and at high speed. Photo 510817-101 of stream that issues from glacial canyon to right (facing south), trapping marsh in foreground with red flowers (leaves) in immediate foreground. Photo 510817-102 of lake and snow covered range to east. One can detect the low marsh-sedge community with one section partly inundated and the drier, better drained hillside grass meadow. The turbid waters of the stream from the south are marked from the clear water of Chandler Lake.

The willow-rack set west of camp which has been set for several days as: (traps numbers are correlated with mammals or traps sprung but trap numbers are not correlated with field numbers as I have usually done in previous days.):

trap 2 Clethrionomys rutilus
4 sprung
5 sprung
13 micratus minus
23 sprung
24 tree sparrow
25 Clethrionomys rutilus
27 sprung
32 Clethrionomys rutilus
33 " "
34 sprung
36 Clethrionomys rutilus
38 " "
45 " "

The remaining traps through 63 show that micratus minus are trapped out and do not reinvade area trapped out. Rechecked marsh set today as trap 111 micratus oeconomus, 112 micratus minus, trap 113 micratus minus. This afternoon took movie

camera and still camera up mt. to west to point on ridge where I could shot across conyon to north. As I left camp the sun was shinning on mt and showed prospects of excellent lighting but before I gained redge the sky had closed in and had started to snow — result, no photographic record. Photo 510817-114 of mt. sheep to right of high ridge meadow. The slope where sheep were located had good forage and just enough varied topagrophy to allow for shelting for protection against winds. Old glacial benches present. Photo 510817-115 on return showing contrast of rock slede and stable exposures. The rock slede is partially sealed in. The three streams entering the lake show their turbid nature. Betula nana in red color. Photo 510817-116 of slope west of camp showing ground surface. Conspicuous red flowers dominant, willow to right. Betula nana in racks and beyond on hillside. Photo 510817-117 of hillside of Betula nana in color and red leaved ground plant in upper left. Large boulders on bench-land, either coming from mountain slope above or an erratic left by glacier. Photo 510817-118 of dry hillside of red Betula nana and green willow. Hillside becoming red from Betula nana. The larger willows line a stream in distance. This section represents good community of for Clethrionomys and where associated with damp areas, Microtus mucrus. a trap placed in association with any of the large boulders would certainly yield a Clethrionomys. Photo 510817-119 of red leaved low growing plant (red of landscape) in aggregations when found. Leaves now about as red as they will get. These plants are surrounded by lichens (as on rock slides and protected areas. Photo 510817-120 ibid. Photo 510817-121 of dry hillside community showing end of talus slope and rocks sealed. The white lichens on north exposures to right are completely covering the slope. This some lichen is among rocks. Green willow associated. This spot produces clethrionomys. Middle distance red of Betula nana and yellow-green bench feeld where some of the traps of first few days were placed and in which area produced many Microtus mucrus. A trap placed in lichen covered areas to right would not produce but in rocks - yes. Observed 4 Dall sheep on hillside, 2 ♂♂ and 2 ♀♀, the females always in advance while the males fought with each other, almost continuously. One ♂ seemed to have central



DALL SHEEP OBSERVED FROM CAMP ON CHANDLER LAKE

no. 1, Aug 14, 8:00 A.M (2); no. 2, Aug. 14, 8:00 A.M (2); no. 3 Aug 14, 1:00 P.M (2); no 4, Aug 15, 11:00 A.M (1); no 5, Aug 17, 9:00 A.M (5); no. 6 Aug. 17, 3:30 P.M (7); no 7, Aug 19, 8:00 A.M (1); no 8, Aug . 19, 2:00 P.M (in Canyon) (5); no 9, Aug . 25, 10:00 A.M (in Canyon) (2).

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and would ward off the other animals by bunting with head. at 6:00 A.M one northern violet green swallow (?) at camp. It flew down to within 4 feet of tent to inspect and then fluttered around in close proximity. Its curiosity for this tent lasted for 2 minutes after which it hunted over lake and then flew gradually to south. This swallow may have been a tree swallow. It called several times at the tent. Mammals and birds collected today are: 31 clethrionomys, 1 Lemmus tri.; 6 microtus murus; 1 Sorex cinereus; 1 microtus oeconomus; 2 Spizella arborea.

Chandler Lake, 68°12', 152°45', 2900 ft., Brooks Range, Alaska
Aug. 18, 1951

Calm from 3 to 6 A.M. Wind from south at 6:30 A.M. Heard one single call of marmot as I left camp. It came from rock slide high on mountain SW of camp. This call is not the loud single sharp note of the marmota flovieventris of the States, but one that has a slurred note and much lower in pitch. These marmot rarely call more than once when one enters their territory or even the general area of the SW end of the lake. Calcarius observed leaving ground with audible commotion and flipping of wings on the vegetation. It might be awkwardness or could be

intentional. Collected one Citellus parryi 510818-1 from ground hole among large slower boulders east of rock-willow Clethris set. Traps 1-50 of boulder-willow slt: trap 5 Clethrionomys rutilus 510818-5; 15 Clethrionomys rutilus 510818-15; 16 sprung; 17 sprung; 22 sprung; 32 sprung; 33 sprung; 34 Microtus miurus 510818-34; 35 sprung; 36 sprung; 38 sprung; 39 sprung; 40 sprung; 45 sprung; 49 Clethrionomys rutilus 510818-49. The great number of sprung traps must have been made by a Citellus or some other large mammals visiting the area; an animal visiting the first time last night as previous check did not show many sprung traps.

Linear trapline up slope (51-100): 51 Microtus miurus 510818-51; 55 Microtus miurus 510818-55; 59 Microtus miurus 510818-59; 65 sprung; 73 Clethrionomys rutilus 510818-73; 78 Microtus miurus 510818-78; 91 Clethrionomys rutilus 510818-91; 92 Spizella arborea 510818-92; 100 Clethrionomys rutilus 510818-100. This line yielded a greater percentage of miurus today than yesterday. From the marsh set of traps 101-138 Collected: 101 Microtus oeconomus 510818-101; 104 Microtus oeconomus 510818-104; 112 Sorex cinereus 510818-112; 115 Microtus oeconomus 510818-115; 117 sprung; 118 sprung; 119 sprung; 120 sprung; 121 Clethrionomys rutilus 510818-121; 122 sprung; 124 Microtus oeconomus 510818-124; 125 M. oeconomus 510818-125; 127 M. oeconomus 510818-127; 128 Clethrionomys rutilus 510818-128; 129 C. rutilus 510818-129.

Inspected set of 63 traps on slope west of camp: 5 sprung; 8 Clethrionomys rutilus; 10 Calcarius; 11 Microtus miurus; 28 C rutilus; 24 C rutilus; 29 Lemmus t; 32 Clethrio rutilus; 34 sprung; 36 Clethris rutilus; 45 Clethris rutilus; 57 Microtus miurus.

Photo 510818-160 general view of SW end of Chandler Lake and associated marsh and meadow grasses. Camp on distant shoreline. marsh land immediately adjacent river and lake good Microtus oeconomus area. Rocks in extreme right lower area of 1-50 trap set. This photo taken from top of 50-100 trap line. Old shoreline on east range on east side of Chandler Lake. Photo 510818-161 from top of trapline (50-100) showing area just south of Chandler Lake. note diffuence between straight stream channel in foreground and meandering streams to east. Photo 510818-162 general dry hillside community of Betula nana as red. The two grass meadows in middle distance excellent Microtus miurus area. These areas much like low marsh grasses & sedges but dominated by M. miurus, while below in marsh bordering lake the domanant mammal is Microtus oeconomus. It is possible that Microtus

oeconomus must have a permanent body of water adjacent while M. murus prefers damp grass meadows beyond permonent bodies of water and can use dry surrounding country when dry or wet community fluctuates. Caught a ♂ Cristovomer namaycush at 6:00 P.M which measured 450 mm standard length and weighed 1191 gms. Internal parasetes covered stomach 4 per 20×20 mm surface. They were whitish-yellow and approx 0 in size (cross-section —). Sto stomach contained the body and flesh of one micratus oeconomus which I had thrown out into lake this morning to see just what they would do with it. All day these lake trout were favoring this spot as if expecting another mouse. The vole was swallowed complete, head ~~first~~ last (eaten tail first and showed degestion of muscles. Trout swam by at 1 per 4 minuets in 1 foot of water 8 feet from shore at 6:00 P.M. Rained hard this late P.M and will nodoubt spring many traps.

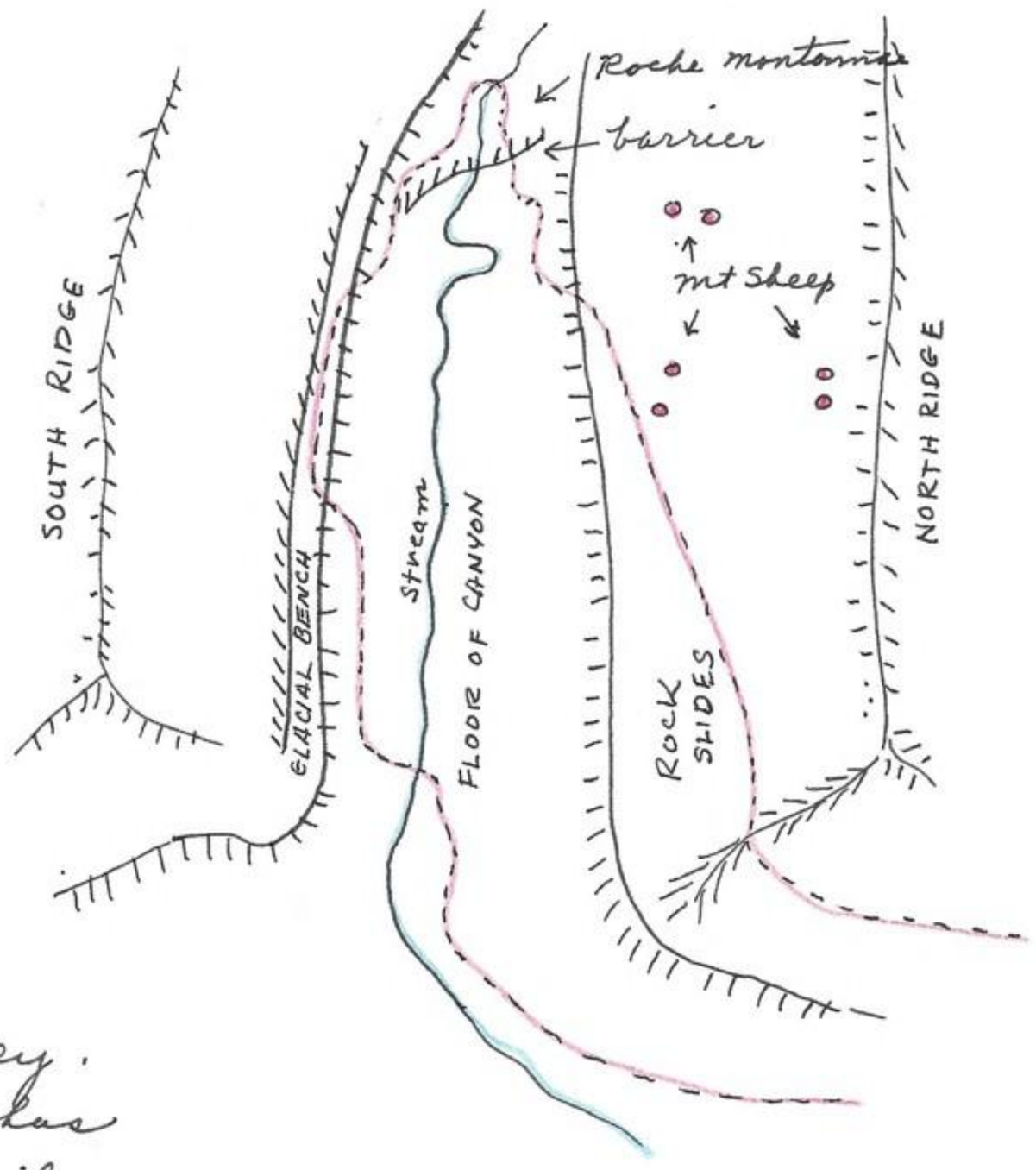
Chandler Lake, 68°12', 152°45', 2900 ft., Brooks Range, Alaska.
Aug. 19, 1961

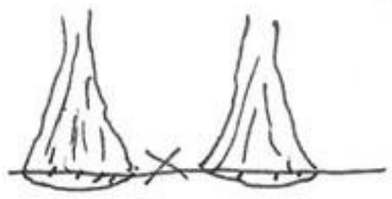
Min. temp 40°F last night. Collected one Cristovomer namaycush 510819-1 with a micratus oeconomus in stomach. This mouse was one thrown in lake this morning. It measured 540 standard length and weighed 1975 (?) gms. 14 parasites on stomach (4 mm wide). Preserved one liver fluke (on stomach) and a few external stomach parasetes. Dall sheep on mt. to west at 8:00 A.M. Two rovens flying and soaring around peaks on mt east of Chandler Lake. It (one of the rovens) left and sailed across valley to mt top west of the lake. It called three times enroute. There must be some type of carrion at these higher elevations (presumably dead sheep or caribou).

This morning made trip up canyon to south west of the south end of Chandler Lake and the canyon that supplies the water for the westernmost creek that enters the lake at the south end. The entire trip was on or along talus slopes, moraines etc. but at no instance did I see pika or marmots or the haystacks or dens. It was a surprise as I considered this canyon ideal for both these mammals. The itinerary was a traverse across the west side of the Chandler Lake valley, following along a bench, thence west up canyon & crossing talus and rock slides at about 2/5 way up slope. From the ridge took photo 510819-2 to south across canyon showing glacial bench as it gradually slopes down (to west) to valley floor. This

5108 19-135

This bench (glacial) from canyon floor to rock slide above bench is completely sealed with the dominant white lichen, growing away below, in a very abrupt manner, to the grasses and sedges of the canyon floor. At places it shows a wrinkled pattern. The stream has willows on bank. Toward mouth of canyon water flows rapidly from slow moving stream above. This might indicate recent rejuvination of range along Chandler Lake valley. The canyon floor has fewer caribou trails and tracks than main N S valley of the Chandler Lake. Photo 5108 19-4 of 2 ♂ Dall sheep fighting. The glacial bench can be plainly seen to left. It is on this benchland that I found the most ideal and undisturbed plant-animal community for small mammals. The most favorable situation on this bench was between two rock slides where the bench was relatively flat and grasses and sedges grew profusely. Caribou trails did not interfer. The area covered by clouds is over a cirque which has been formed according to structure of the rocks thus:





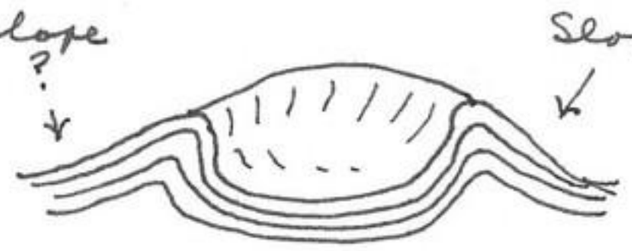
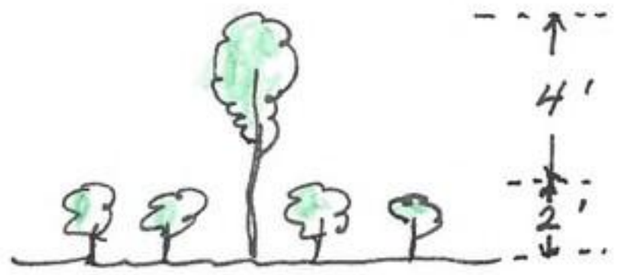
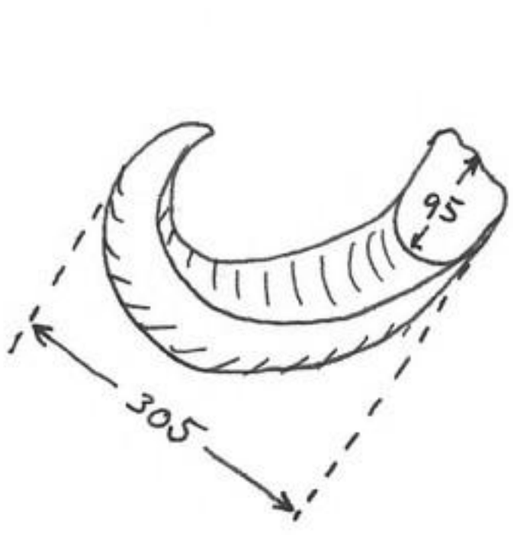
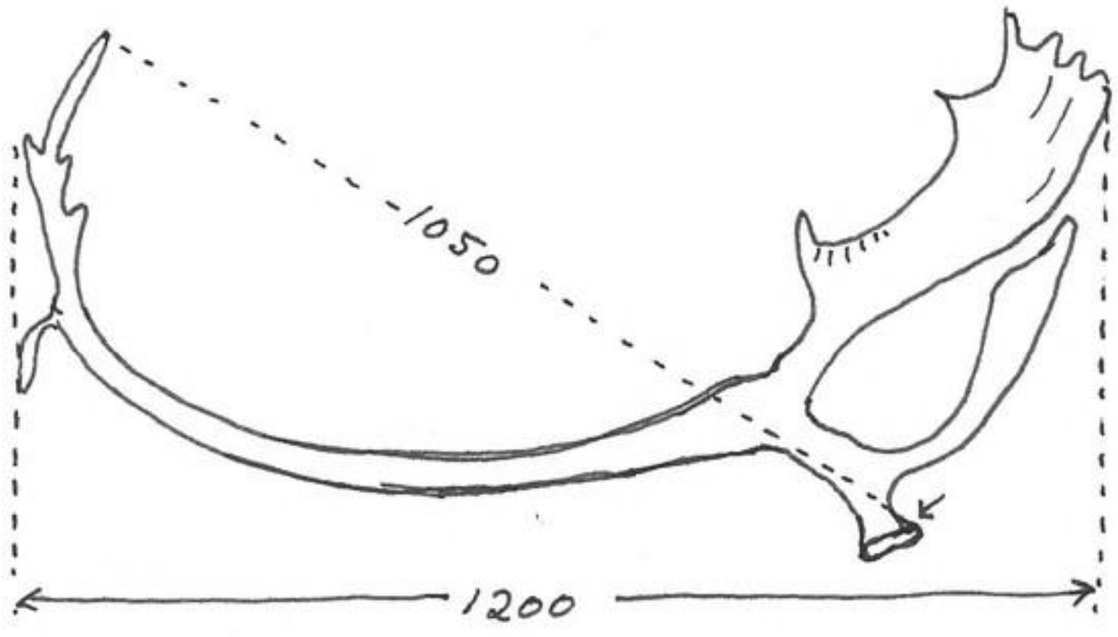


Photo 5108 19-5 as above but closer to mountain sheep. These animals have not as yet recognized the intruder, as they have been fighting continuously. The cirque structure is more in evidence. Photo 5108 19-6 of closer view of sheep. The two ♂♂ are now slowly moving up slope as I near.

Can now see why these 2 ♂♂ were fighting; 2 ♀♀ directly above on upper slope. These females were securely anchored among steep precipitous slopes. Of the 2 ♂♂'s the younger was dominant in fighting. The older one was too old for aggressive fighting. If the old one made a move the young one would charge and crash horns with a noise that could be heard throughout the Canyon. If the charge was without Contact, the feigning movement demanded respect. The animal on the uphill slope had advantage of greater momentum when contact was made. This was clearly a case of the younger animal taking over physical superiority. Apparently this is the peak of rutting as every group of sheep observed so far, showed this tendency of males competing with each other for the dominating of the herd. Photo 510819-7 of glacial canyon with lateral crescent bench to right where conditions were favorable for plant-animal communities. Lighting typical in these east-west canyons. Photo 510819-8 of damp rock vegetation at upper barrier. This barrier is a ridge across the floor of the canyon where the glacier has over ridden and displaced large boulders from its wall. These boulders are as large as a large house. I have wondered if these accumulations and good overhead protection might house early aboriginal man and other large mammals who certainly must have roamed these canyons in the late Pleistocene. Polished rock surfaces remain on the roche montanne. The willows suggest either two species or more likely sheep grazing in winter when the lower willows are covered with snow. This high-line of upper willows has also been observed in other areas where sheep spend the winter. Examined one willow 10 feet high and 4 inches at the base. On return







along glacial bench measured the horn of a Dall Sheep. One antler of several noted had an overall measurement of 1200 mm. At several places, particularly in upper reaches of canyon and on glacial bench, noted numerous trails across masses and lichens, many leading to holes penetrating the moss and lichen cover. These runways were always associated with vascular plants but demonstrated a use of these lower plants (masses & lichens), at least for runways and protection. Microtus miurus is perhaps the mammal using these runways. Spizella arborea most common bird with occasional pipit. Wheatears only at mouth of canyon. Otherwise, the canyon was quiet and devoid of live animal and bird activity. Continued down canyon and crossed at head of fast moving water. Just below mouth of canyon are two or three good looking fishing holes for lake trout and grayling, neither species however, were caught with meat as bait. Did not see fish in this stream. As compared with bird and mammal activity of alpine meadows of southern range (Utah), can say that this canyon is not as prolific in the arctic. The main valley, along sides, support more life than in the east-west canyons and might be explained on the basis of sun exposure. As I did not inspect traplines this morning, made inspection on the return from this trip.

Boulder-willow set of 1-50':

35 microtus muurus
37 sprung
48 bird
49 Clethrionomys rutilus

From linear line up mountain 50-100':

51 microtus muurus 510819-51
59 " " 510819-59
63 Clethrionomys rutilus 510819-63
70 Spizella arborea 510819-70
72 Sorex cinereus(?) 510819-72
73 Clethrionomys rutilus 510819-73
74 " " 510819-74
81 " " 510819-81
83 " " 510819-83
84 Spizella arborea 510819-84
88 Clethrionomys rutilus 510819-88
89 " " 510819-89
90 " " 510819-90

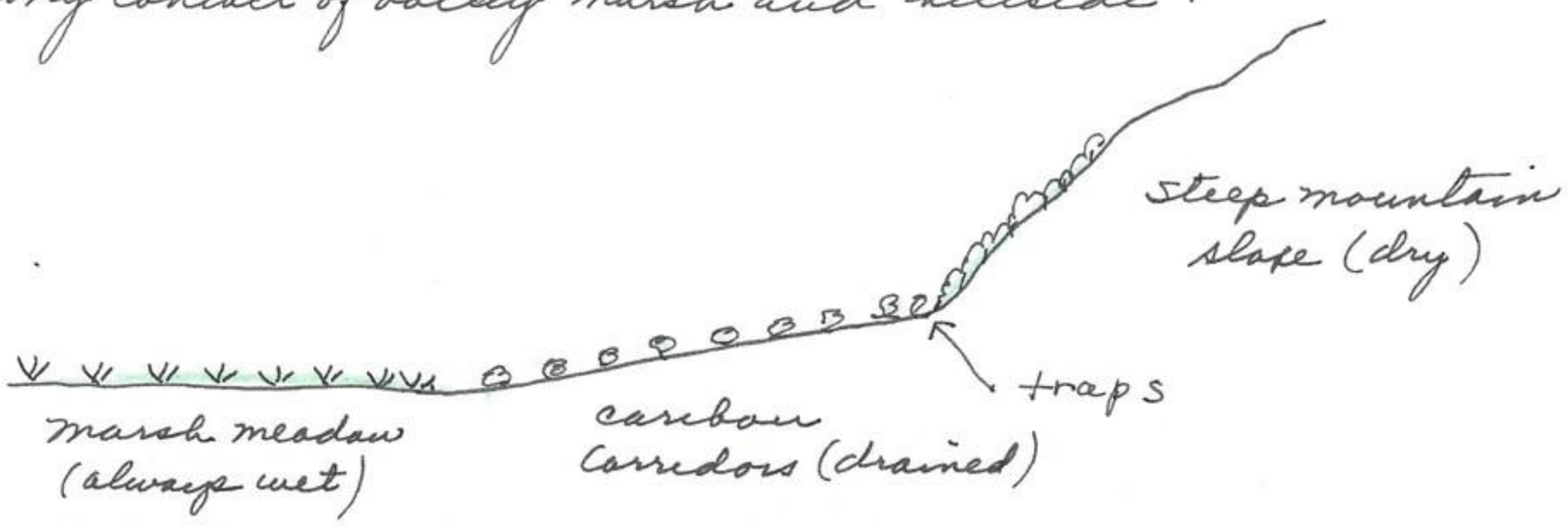
510819-138

91 Spizella arborea 510819-91
92 " " 510819-92
96 Zonatrichia 510819-96
100 Clethrionomys rutilus 510819-100
From marsh set (100-138)
115 Microtus oeconomus 510819-115
117 " " 510819-117
119 " " 510819-119
120 Clethrionomys rutilus 510819-120
121 " " 510819-121
122 " " 510819-122
124 " " 510819-124
126 " " 510819-126
127 Microtus oeconomus 510819-127
129 Clethrionomys rutilus 510819-129

From rock-willow mountain slope meadow west of Camp (traps 1-63).

3. Microtus miurus
4 Clethrionomys rutilus
6 " "
9 Microtus miurus
11 Spizella arborea
30 Clethrionomys rutilus
32 " "
40 " "
42 " "
43 " "
44 " "

On the basis of above trapline (1-63) set now for several days, the microtus miurus become trapped out first and they do not reinvade. It is more difficult to trap out Clethrionomys because of their tendency to go beyond the limits of established trails. This evening set 44 traps from marsh set at 20' apart along contact of valley marsh and hillside.



with information from this line will have tested:
1. wet low lying marsh. 2. well drained allumial slope. 3. steep hillside of dry condition. 4. boulder fields. 5 hillside streams and their assaciated vegetation.

Mammals and birds collected today are:

7 microtus muurus
2 sparrows
26 clethrionomys rutilus
3 Spizella arborea
1 Larex tundrensis
4 microtus oeconomus
1 zonatrichia leucophrys.

There is a definite migration of small birds, especially Spizella arborea. The Calcarius and wheatears have decreased in numbers.

Chandler Lake, 68°12', 152°45', 2900ft., Brooks Range, Alaska
Aug. 20, 1951

Minimum temp. last night 38°F. 49°F this afternoon. Made collection of plants, mainly grasses, sedges, mosses and lichens from various trapping areas. Have recognized for many yeas the close relationship of microtines and various grasses and sedges, particularly in the States and alpine meadows. This association of microtine and grass is no eception in the arctic. While mosses and lichens are dominant in the area, the microtine association is with the mosses & lichens. The grass-sedge-microtine community is an eltension from the south and the mosses & lichens are dominant but are accessory elements in the community.

From the upland meadows west of camp and in the area of the first few days of trapping for mammals collected the following grasses and sedges:

510820-1 Carex aquatilis Wahl, dominant.

510820-2 Calamagrostis canadensis (Michx.) Beauv., subdominant from less saturated areas. The other domenant is a sedge which at this time of year does not have flowers. It is the same sedge which is dominant in the low marsh area. There is consederable Eriophorum in running water. Low willows are meped among the grasses. It was in such an assaciatim where 13 microtus muriis were taken in 20 traps. Caribou trails are assaciated with this trapping area.

510820-3 of Carex lugens Holm. in drier areas of grass meadows mentioned above and is an associated plant. 510820-4 of Carex lugens Holm and also associated. no. 510820-5 as above, Carex lugens Holm. and on borders of meadows. These plants have a slightly different life form in the various areas of the meadow.

From the sleep meadow swales on side of steep mountain (area of trapline 1-63) collected the following grasses and sedges: Here the swales are associated with a small stream (150 mm wide & 30 mm deep) with willows dominating and providing overhead protection (2/3 meters high) and protecting the understory of grasses & sedges. The low leaves of the grasses and sedges a mat condition with high stems extending above level of willows. These grasses give the characteristic yellow appearance to the swale;

510820-6 Festuca altaica Trin, dominant.
510820-7 Poa arctica R. Br., dominant,
510820-8 Festuca scabrella Torr., associated.
510820-9 Calamagrostis sp., associated.

From the low marsh community which borders the lake and on the slopes immediately adjacent are as follows:

510820-10 Carex aquatilis Wahl., dominant in the low evenly inundated areas and less influenced by caribou trails.

510820-11 Carex sp., dominant in deep water and ~~more~~ a permanent community.

510820-12 dominant from permanent and moving water.

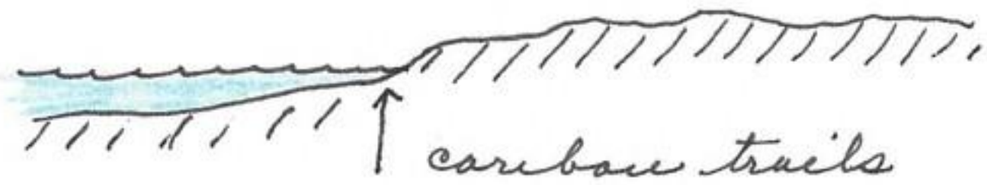
510820-13 Arctagrostis latifolia (R. Br.) Griseb., subdominant to above two.

510820-14 Carex physocarpa Presl. associated with above three plants and is more frequently found on elevations in marsh or mixed in with dominants. The following grasses and sedges are associated with dominants of the marsh community.

510820-16 Poa arctica R. Br.
510820-17 Carex lugens Holm.
510820-18 Poa glauca Vahl
510820-19 Carex lugens Holm.
510820-20 Carex aquatilus Wahl.
510820-21 Carex aquatilus Wahl.
510820-24 Festuca scabrella Torr.
510820-25 Carex lugens Holm.

510820-26 Carex Kelloggii W. Booth
510820-28 Carex lugens Holm.
510820-30 Calamagrostis neglecta (Ehrh) Gaertn. Meyer and Schreb. inter. with C. purpurascens R. Br.
510820-31 Poa arctica R. Br.
510820-32 Arctagrostis latifolia (R. Br.) Griseb.
510820-33 Trisetum spicatum (L.) Richt.
510820-34 Carex aquatilis Wahl.
510820-35 Carex aquatilis Wahl.
510820-36 Carex lugens Holm.
510820-37 Carex podacarpa R. Br.
510820-38 Arctagrostis latifolia (R. Br.) Griseb.
510820-39 Trisetum spicatum (L.) Richt.

The contact zone between the low lying marsh and hillside is most extensively used by caribou as trail formation. As a result these areas support irregularities of drainage and life form of grasses and sedges. Trail preference was employed around tundra lakes to north on coastal Plains. At these lakes caribou trails follow the contact zone between the rough tundra and the deeper part of the lakes where the avenue of travel follows zones of least resistence. I followed these same zones in traversing the tundra.



From the line of 44 traps set last night at the marsh-mountain contact, collected the following mammals.

7 Clethrionomys rutilus (nos 510820-38 to 510820-44).
1 Lemmus trimucronatus 510820-45
1 Sorex tundrensis 510820-46.

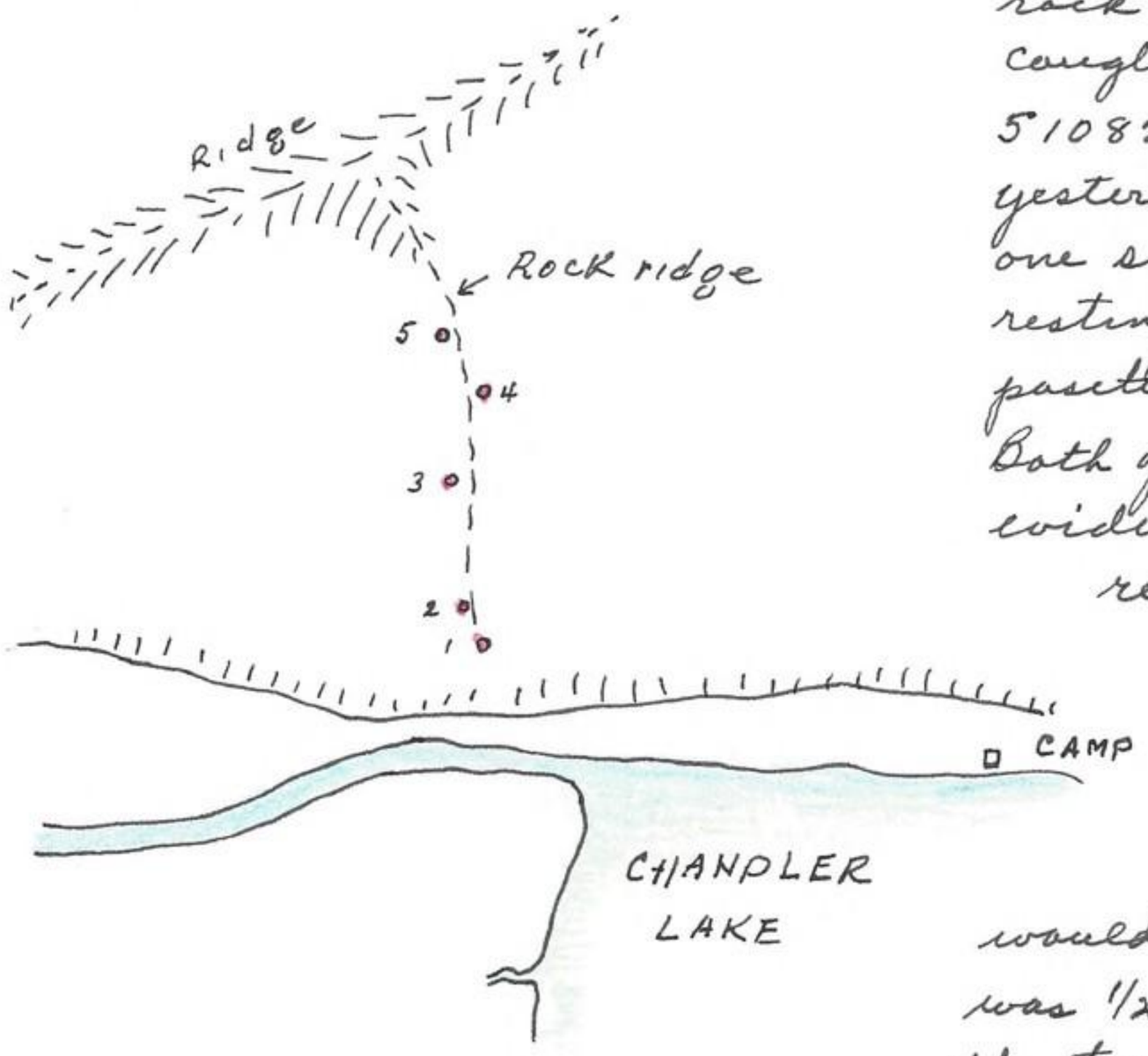
Livingston and Byron presented an immature Canis lupus 510820-48. Ursus arctos 510820-49 of upper skull only and 510820-50 Ursus arctos, lower rame only from Eskimo camp on east side of Chandler Lake.

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

Aug. 21, 1951

min. temp last night 38°F. 48°F at 10:00 A.M In the last three days the wind has shifted or fluctuated from calm to windy with occasional light wind. Of all the element of the climate, rain is the main concern of field work. The most important item is

the tent which should be of a qualety to shed rain. This morning witnessed the dramatic color change of nearly all willow, cotton-grass and other grasses from green to yellow color. The yellow changed overnight from a relatively green plant to a yellow plant. The willow was the main plant to give the country the yellow color to the landscape. Grass and sedges, however, were a close second in producing the yellow color. The cottongrass (Ereophorum) changed from green to one in which the base of the blade remained green and the rest of the terminal blade a greenish yellow to yellow. Other grasses and sedges to change color were those in the drier areas of the marsh and slope. Some of the grasses, particularly in more permanent deep water showed no effect of change to yellow, or at least the minimum change. This was especially true of large sedges along well irrigated water channels. Betula nana now nearly all red. Along with change of color of plants was a change of bird life. Now very few birds are in the area. I have not observed evidence of the Chandler Lobe valley being used ~~for~~ by large birds for a migrating corridor. The smaller birds have been moving but may be local movement out of the immediate area.



From 5 steel traps set in rock slide (set yesterday) caught one Mustela ermnea 510821-1 in trap no one. yesterday noted one large and one small marmota caligata resting on large boulders in pasetion 1 and 2 of trapline. Both of these areas showed evidence of having been used recently by these animals with droppings and disturbed soils around dens. They called only once. I would judge the lowest animal was 1/20 th the destance to the top of the mountain and 1/10 the the distance up the rocky ridge and rock slides used by these animals. No evidence of Citellus parryi at this heights. Collected the dominant lichens from the slope of the mountain

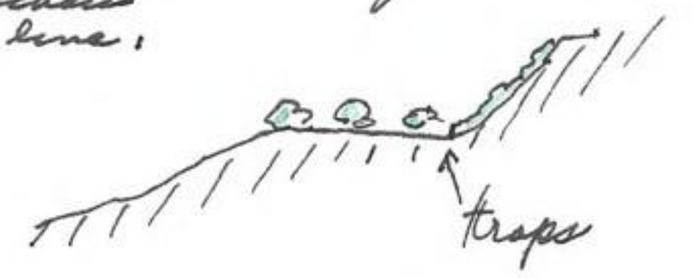
above camp (steep slope of mt), no 510821-2 from steep slope among protection of boulders of rock slides and no. 510821-3 the dominant moss-lichen complex on the exposed slopes of the mountain where the surface is exposed to direct influence of wind, sun shine and caribou (these consist of 510821-3 Cladonia gracilis v. chordalis (Flk.) Schaer; 510821-3B Cladonia sylvatica (L.) Hoffm; 510821-3a Cetraria islandica (L.) Ach). no. 510821-4 among rocks on n exposure where it peals in almost all rocks and ground. (use nos 510821-5 to 510821-6 - 24 specimens) Have noticed that when Microtus miurus is actively building its food pile, the willow leaves remain green throughout pile and the uppermost additions are never allowed to deteriorate to the extent that the chlorophyll is lost, when a mouse is caught at the nest pile (forage pile) in a trap, the green leaves on top gradually change to dead brown. This would indicate that the accumulation must be regulated according to the drying capacity of the sun and wind and that periods during rain the storage process must be checked to permit proper drying before additional material is placed on top, otherwise the leaves might mold because of lack of proper dryness. It would also indicate that when a Microtus miurus is taken from its territory, there is no immediate attempt by other mice to take over and continue building the forage pile. I have noticed one mouse having two or three forage piles in close proximity. This condition however, is exceptional, also there is no assurance that these piles that appear to be owned by one mouse are not mutually shared by other mice. A pigeon hawk was observed today in same area and activity as of yesterday. This hawk (I presume is the same bird) has been flying or feeding both from south to north and from north to south in the Chandler Lake Valley and does not indicate a southern migration. Have pulled all traps (museum specials) in anticipation of Andersons arrival. As he has not arrived will reset some near camp so they can be readily collected when he does show up. Anderson was scheduled to pick us up on either the 19th or 20th. Stoples gone and gas for stove down to about 1½ quarts. No fear of starving with lake trout at our front door and mountain sheep on the hillside.

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

Aug. 22, 1951

min temp last night 38°F. Temp at 8:00 A.M. 47°F. There was less

wind last night. Sun for a few minutes at about 8:00 A.M followed by rain. Inspected 5 steel traps in rock slide and on ridge. no evidence of traps having been visited which was a surprise, as all traps 5 traps were set at entrances to marmot dens among rocks. These sets were perfect as far as I was concerned!. On approach to the traps heard one marmot call at about trap number 5 position and given at about 1½ blocks away. Did not see or hear this animal again. Marmot on the Arctic Slope are shy and do not react like those in temperate states. I have wondered if possibly the marmots are in a pre-hebernation period of quiescense ~~where~~ when they remain quiet and out of sight so that predators will not be attracted to their denning areas. rated grass of last years growth (dead) 500 mm in heighth which was 200 mm higher than the grass now growing from the same stock. On the basis of information about unusually cloudy weather this year am of the opinion that the grass, because of lack of warm weather and sunshine, have not grown as much as last year. The high rodent population could also be correlated with cloudy weather this year because, the poor lighting conditions could, in effect, have the same influence as overhead protection of vegetation. Heard the pacific loon call (chicken call) 3 times today at SE end of Chandler Lake. Only birds observed today on topline were 3 Calcarius. no Spizella oborea which was the domenant bird in area a few days ago. This evening set 130 traps on the mountain slope west of camp in various plant and animal communities from rock sets to willow sets and along stream. Traps every 20 feet apart. As this route traversed several different communities, observed birds not commonly seen in usual trapping areas. The birds were in willows (extensive growth on flood plain from canyon NNW of camp) These willows associated with stream are larger than willows beyond influence of stream, probably because of soils brought down from canyon, and some measure 9 feet high and 4 inches in diameter at base. This willow forest harbours a definite aggregation of birds including; 15 tree sparrows; 2 white crowned sparrows; 1 shrike; 2 wheatears; 1 rock ptarmigan and a few redpolls. A greater percentage of traps were placed on several benches on hillside at what would be equivalent to the base of the talus, sealed in with mosses & lichens moraine or fault line. This contact supports more small mammals than any other topographical relief or exposure. This zone supports



the largest plants and shrubs. A rock ptarmigan flew from ridge of boulders on ~~east~~ outwash plain and flew 70 meters beyond to hillside south of the canyon where it alighted and after looking about for a few seconds walked ~~lit~~ surely up slope. I searched the area where was seen to alight but could not flush it. Rained occasionally throughout day and stopped at 8:00 P.M. Mild but threatening clouds developing. High temp today 69°F. Spent most of day organizing specimens for transportation back to Bettles and thence to Point Barrow. Our lack of sufficient housing for specimens has created a problem. We have filled 2 foot lockers and have utilized every piece of cardboard we have for pinning the specimens. The only spot we have not used is the top of the tent! Our expedition to Chandler Lake was for 10 days, but now we are on our 16th day + specimen storage and food is becoming critical. For food we have celery tops and mayonnaise only.

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

Aug. 23, 1951

minimum temp last night 34°F. Calm and clear to north but clouds congested to south. Snow on peaks to west. Inspected trapline of 130 traps set last night. From traps 1 to 35 in willows (9 feet high + 5 inches diameter at base) (mostly 4 or 5 feet high) along creek and among boulders along side of cascading creek, collected the following birds and mammals.

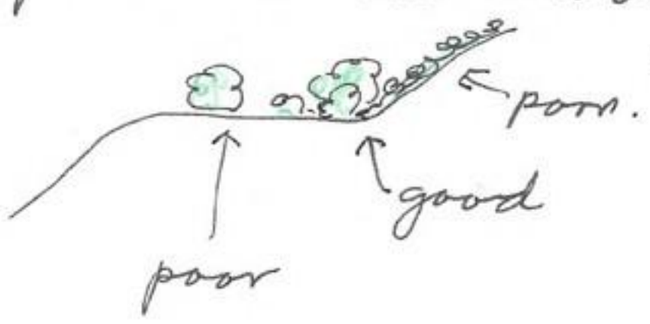
1 Hylocichla minima aliciae 510823-1
2 Clethrionomys rutilus 510823-2 and 510823-3
1 Spizella arborea 510823-4

From trapline 36 to 130 among basal rocks of talus on benchland and associated grasses and shrubs took the following.

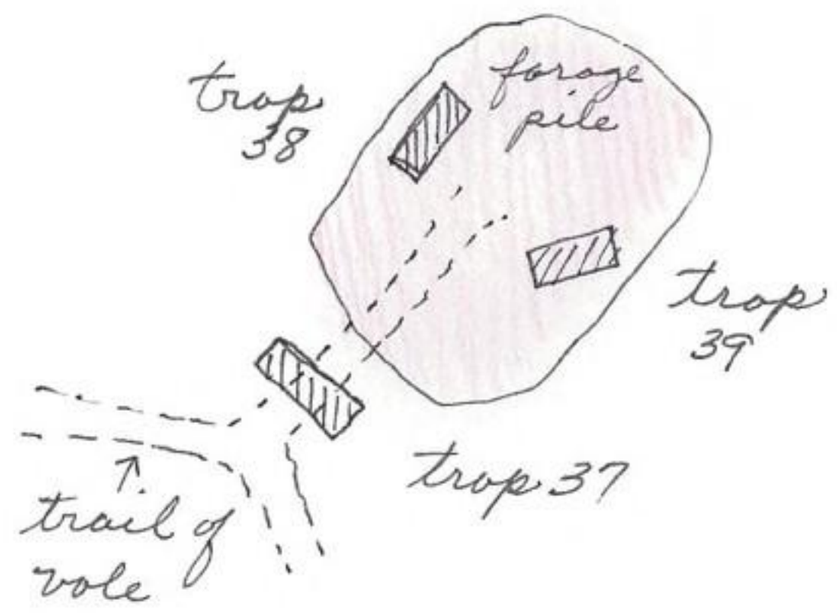
1. Sorex cinereus 510823-5
28 Clethrionomys 510823-6 to 510823-33.
5 Microtus miurus 510823-34 to 510823-38
1 Calcarius 510823-39.

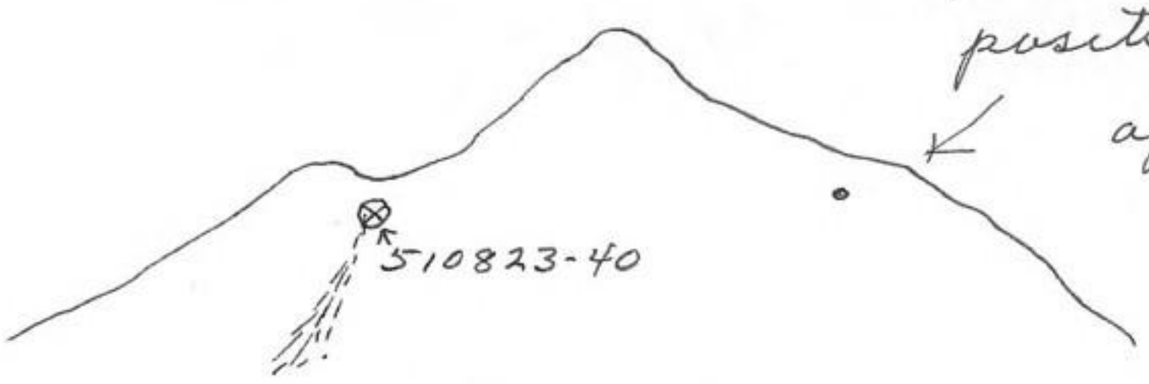
Most of the traps were sprung in areas of Microtus miurus as if areas being shared by weasel or Citellus, probably the latter. Have concrete evidence of the association of Citellus + M. miurus. In general these two mammals (Citellus + M. miurus) share the same general type of community. A few Clethrionomys were taken

from open exposed situations such as on surfaces of masses and lichens but most of them were from under protection of willows, in among rocks and under the evergreenlike plant (Cassiopia ?), but in nearly all cases in those areas with overhead protection. Sorex cinereus 510823-5 and Clethrionomys 510823-16 from same general area in traps placed 2 inches apart among rocks covered with mosses and lichens and in runways there. There was generally a system of runways among these boulders and vegetation. Outwardly on flat part of bench the population of mice depreciated considerably.



This was equally as true in areas ~~as~~ upslope from the contact. The difference between the areas contrasted is one of degree of overhead protection. Placed traps nos 37-38-39 on a haystack or forage pile of Microtus muurus in the following way: From trap 38 took a Calcarius, from trap 39 a microtus muurus. Trop 37 was sprung. The microtus was trapped as it was placing leaves of willows on the forage pile. This morning noted more birds in open situations on the side of the valley west of camp (general trapping area) which would indicate that these birds are less conspicuous in evening hours and rainy days than more favorable days. In bad weather they must retreat to willows on outwash plain. Collected 510823-40 and 510823-47 among willows along boulder near running water. This morning inspected steel traps set for marmots. One called high (elevation) on approach. but did not hear again while exploring trapline. Just beyond trap 5 (highest trap) saw 2 marmots sunning themselves on rocks, one large adult and 1 small. The adult moved down slope toward me for 20 feet where it entered a used den. At about same time the young marmot also approached den but in a slightly different direction. As it paused momentarily at edge of den by boulders, I collected it, no 510823-40. I am sure these two marmots are the ones noted near valley level the other day. They have been moving gradually up the slope beyond trapline.

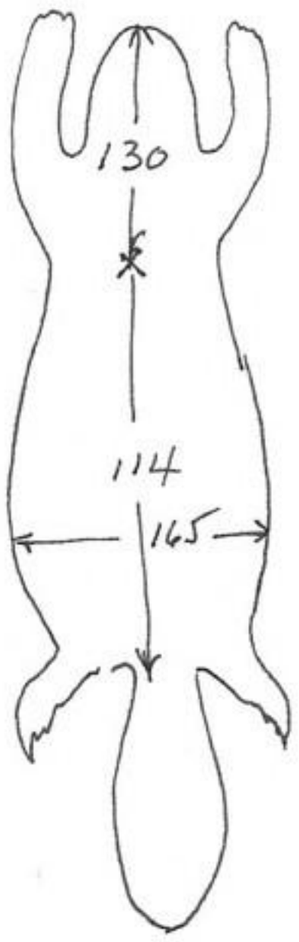




mountain west of camp.

Heard 2 calls (2 different animals or positions) from this position but after 2 hours examination with binoculars did not locate. This elusiveness of these marmots is difficult to explain as one would imagine that they would be desirous of man and would tolerate close inspection. Eskimo depredation could be a factor but I doubt it. More likely a predator-prey reaction. The call of the marmot is more prolonged than the sharp note of marmota flaviventris of the States. Enroute up this trapline made the following photographs. Photo 510823-41 taken above camp. Photo 510823-42 of hillside slope above camp showing general condition of the sealed rock slopes (with mosses and lichens). Betula nana red. Bench meadow to right. The foreground of this area supported Clethrionomys, M. mucus and Sorex cinereus. 510823-43 of typical steep hillside showing the way in which the boulder fields are sealed with mosses and lichens and the favorable community for some microtines. This sealing in of rock slides might be a factor in the geographical distribution of the Ochotona. Photo 510823-44 from trap 5 (steel trap) showing general condition of valley below. 510823-45 of general vegetation among boulders and sidehill. Photo 510823-46 of valley from near top of ridge (ridge of marmot trapline) Photo 510823-47 up a west canyon from top of marmot ridge. Photo 510823-48 from top of marmot ridge showing valley below. Photo 510823-49 top of marmot ridge. Photo 510823-50 same as above. Lighting getting very poor. Photo 510823-51 of Chandler Lake Valley from top of marmot ridge. Photo 510823-52 Ibid but to north. From this vantage point can see up the west canyon and see 3 Dall sheep feeding in same area as noted ~~yesterday~~ on previous day. On return from top of marmot ridge inspected the 5 steel traps set for marmots. Collected one Citellus parryi in trap 1 and hair of some kind of animal in trap 2. This would indicate a general movement up slope of both Citellus and marmots. This trend may be the same as with the marten, which, I am told by trappers in Alaska, ascends mountains in fall on approach of cold weather. They go to higher places because they are warmer or perhaps they are following the marmots and Citellus as they retreat to higher elevations. The valleys may be colder/

especially closed valleys. Up to this time I have not trapped Citellus on slopes except at level of the valley at the base of the ridge. Returned to camp. Measured marmot collected today 510823-53 ♂ 408-110-73-23-1835 gms, testis 10 mm. Stomach weighed 250 gms, intestines weighed 410 gms. These two items constitute ~~a the~~ major part of the weight of the marmot. The abdomen was enlarged as usual in young at this time of the year. It was so distended that it felt as ~~tough~~ taut as a drum. Leaves in mouth. Bullet (22) grazed top of head but close enough to stun the animal. Photo 510823-54 of this animal showing distended abdomen and the general distribution of fat on the venter. Photo 510823-55 of fat distribution and arrangement of organs in body cavity. Photo 510823-56 of distribution of fat on dorsal side of body cavity. Liver directed anteriorly. This distribution of fat suggests an animal preparing for hibernation.



Chandler Lake, 68°12', 152°45', 2900 ft., Brooks Range, Alaska
Aug. 24, 1951

Min. temp last night 28°F. Snow low on mt to south. Day partly clear - sunshine approx. 40% of the time. Rain and snow on higher mountains at 7:00 P.M. Rain from nodurdeak clouds which on high slopes produced light snow, particularly to west. At 2:00 P.M lake clear and calm and could see many trout about 350 mm in length swimming in deeper water of lake. One 150 mm long near shore. Average temp today 34°F. Mot. 54°F. Loons still calling. Heard marmot call on slide area below highest peak to west. Ice crystals on ponds or non-circulating water, 500 mm long and very slender instead of sheet ice which generally forms on ponds. Lake unaffected by low temperatures. No pilot today to pick us up. Andersons inability to get into Chandler Lake suggests general extent of bad weather the last week. This evening set 150 traps in same general area as set two days ago. Traps 20 feet apart. Choice of placement of traps about same as on previous sets. Storage problem becoming more and more critical with each day.

Chandler Lake, 68°12', 152°45', 2900, Brooks Range, Alaska.

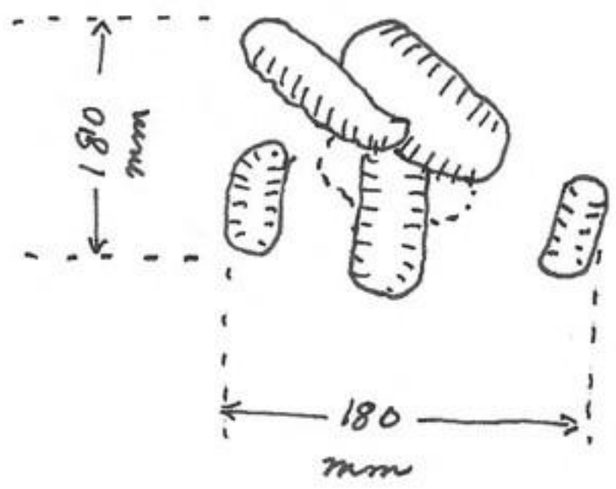
Aug. 25, 1961

Min. temp last night 23°F. At 9:00A.m 40°F in shade and 58°F in sun. Prospects of a clear day. Anderson will certainly be here today as weather is perfect for flying. In the meantime will pull all traps and prepare for departure. Photographed the following conditions of the effect of last nights freeze on creek. N of Camp. Photograph 510825-1 of creek showing eftent of ice crystals. In many places it was completely sealed with ice. The sun is melting ice on creek wherever exposed to sun rays. The bottom of creek and willow bordered edges can be seen from this photo. Photo 510825-2 of close-up of ice crystal formation over creek bed. Photo 510825-3 also of krystal in chek. Temp at this time (~~atmospheric~~ creek) 35°F. Ponds had larger crystals than creek being longer and more slender. Most undisturbed water frozen but lake or its edges not influenced by low temperatures of last night. At 8:00A.m Chandler Lake like a mirror for about 1/2 hour. From trapline of last night collected the following mammals: 9 microtus muurus, 22 clethrionomys rutelus. All mice frozen in traps. Vegetation with heavy dew. Chandler Lake water at 9:00A.m 46°F. This A.M. made final trip to marmot ridge to pull the 5 steel traps and to record the general area from the top of the marmot ridge vantage point. Made top of ridge by wide traverse from camp. Photo 5108 25-34 of lower slopes of mountain just west of camp. The trapping area of 63 traps of a week or so ago is now a greenish yellow meadow to the left of photo just above the boulder accumulation. Area to right general trapping area of last 2 or 3 days. Red color from Betula nana which is now tending toward a brown instead of the brilliant red of a week ago! The entire hillside supports Clethrionomys with Microtus muurus preferring damp swales of willows and grasses. The mountain in the background was favorite feeding and resting grounds of the Dall sheep which use pastures and rocky ridges for protection from winds. The slope, from extreme left upper to base of range, support trails of caribou and sheep. Main talus boulder feed to left of photo. Note snow on peak to right. Winds have sealed irregularities of peak. This photo shows the Clethrionomys – Betula nana association between the precipitous mountain slopes and the low marsh communities below. Mixed in with this association is the upland grass meadows or Microtus muurus – Salix association.

Photo 510825-34a as above but taken from near edge of lake. In addition to the Clethrionomys - Betula assocaation is the upland grass meadows in association with the large willow stands along the stream. The community to the right is an adaphic condition due to influence of the stream that issues from the canyon beyond. These meadows differ from the others by lack of permanent supply of water. Some of the willows in right side of photo are 9 feet high. The benches where traplines were placed are to the left. Interesting Pleistocene erosional levels are present in this photo. Photo 510825-35 from high traverse across mountain slope showing condetion of rock slopes and eftent of moss - lichen cover among these slides. Yellow leaves are Salix and some red (brown now) of Betula nana. 2 rock ptarmigan at this point. Photo 510825-36 from top of marmot ridge showing Chandler Lake below. Camp and Cessna 170, which just arrived, can be seen. Rocks to left are dropping strongly to north and is an erosional element of an overturned structure. mosses and lichens still among rocks at this altitude. The microtus oeconomus - Carex assaciation lies just to left of lake and stream channel from a point just south of tent to a point well beyond the limits of the photo. The eftent of turbidity of the streams can be determined by color of water as the streams enter the lake. Interesting alluvial depasit from active slide from canyon on range east of Chandler Lake. Photo 510825-37 from top of marmat ridge. The relatively undis-turbed meadow show evidence of use by Dall Sheep. This ridge, at this point, drops abruptly on three sides. If I were to return to Chandler Lake, I would want to spend a couple of days on this vantage point to observe movements of larger mammals. High powered binoculars would be required. Photo 510825-38 as above but better exposure. Photo 510825-39 from top of marmot ridge showing Chandler Lake to north. Camp and Cessna 170 can be seen. The microtus oeconomus - Carex association borders lake and stream; Clethrionomys dry hillside community and damp meadow penetrating slope can be seen. Betula nana now brown instead of red. Old Pleistocene lake levels on mountain east of lake. Lake becomes constricted by out-wash plain from canyon on east side of lake. Edaphic community to left. Photo 510825-40 also from top of marmot ridge to south showing valley of Chandler Lake and the three

streams that empty into the lake. The stream to the left does not empty into the lake which lies at the south end of the picture but bypasses it to the north. One can see the erosional remnants of elevated valleys both to the left and at the south end of the valley just beyond the cirque. The hanging valley to right (in distance) is probably of this same erosional level. The glacial bench at bottom of photo dips down into the valley proper. The small lakes in the distance are moraines (terminal) lakes from the canyon beyond the limits of the picture and to the right. Photo 510825-41 up west canyon from same vantage point showing how rock slides are at gradational repose; Cirques at head of valley at bend of canyon occupying a synclinal valley or structure and its base is at the same level as the top of the ridge to the left. This may have been one of the older erosional levels. This canyon holds possibilities for small mammal trapping. Photo 510825-42 Chandler Lake and environs from top of Marmot ridge. Same as 510825-39 but with greater width. The tent and Cessna can be seen. The light colored ranges to the extreme north are rounded and show effects of glaciation. The Plateau Provence is beyond these ranges. Chandler Lake extends north in a series of connected lakes. Jones stopped north to last bay indentation and found good areas for small mammals and for Citellus. Photo 510825-43 from near pass at top of marmot ridge showing valley south of Chandler Lake. The manner in which the end of Chandler Lake is filling and the fact that successional accumulation still controls plant composition, suggests a rather recent process of filling in. It would make an interesting project to run a transect from edge of lake south, testing the different successional areas and their plant & animal constitution. In the extreme lower left hand edge is a profile of the successional deposit as seen from the east edge of the river bank. There has been a considerable amount of deposit in recent years. The meandering rivers show effect of size and source of water. The more distant one which is the largest, draining lakes to south, shows the most stable water source. The river is 20' from its meandering equivalent. Livingston and Bryon report a Mustela erminea that followed them down this section of the river as they floated their rubber boat down the river. The weasel ran back and forth along bank in a very nervous manner. After 100 feet it left and returned up river. This area of river will become an oxbow in years to come.

The valley to the right is a former valley near grade and since elevated or valley eroded down. These rivers are to large to be forded by boats. The largest river from left at base of snow covered peak. Collected a marmat Caligata 510825-57 from highest point to right, near top of marmat ridge. This marmat had apparently moved up to top of ridge from ridge at near valley level. It was alone when collected and did not call during entire I was in area. It would be interesting to know if the upward movement during the last week was instinctive in reaction to weather change or because of our presence in the area. A .22 caliber shell is better than a .410 because of the greater range of the former. One is seldom able to stalk these marmots to within shotgun range. These marmats have been observed on rocks during cloudy days but a sunny day with wind is most favorable. The pictures taken from the top of this marmat ridge have duplicated pictures taken previously but are better because of more favorable lighting conditions. Photo 510825-44 of marmat showing color adaption to lichens and moss background on rocks. Descended ridge and pulled all steel traps. From trap 5 collected a Citellus parryi 510825-58 which indicates an upward movement of both the marmat & Citellus. They are (Citellus) definety using marmat den areas. At base of marmat ridge photographed fecal dropping of a wolf 510825-45 placed approx. in this relationship to carcass of a caribou.



dimension of dropping

80 x 25 mm
80 x 40 mm
110 x 50 mm
60 x 30 mm
80 x 40 mm.

wt of dry mass = 170 gms.

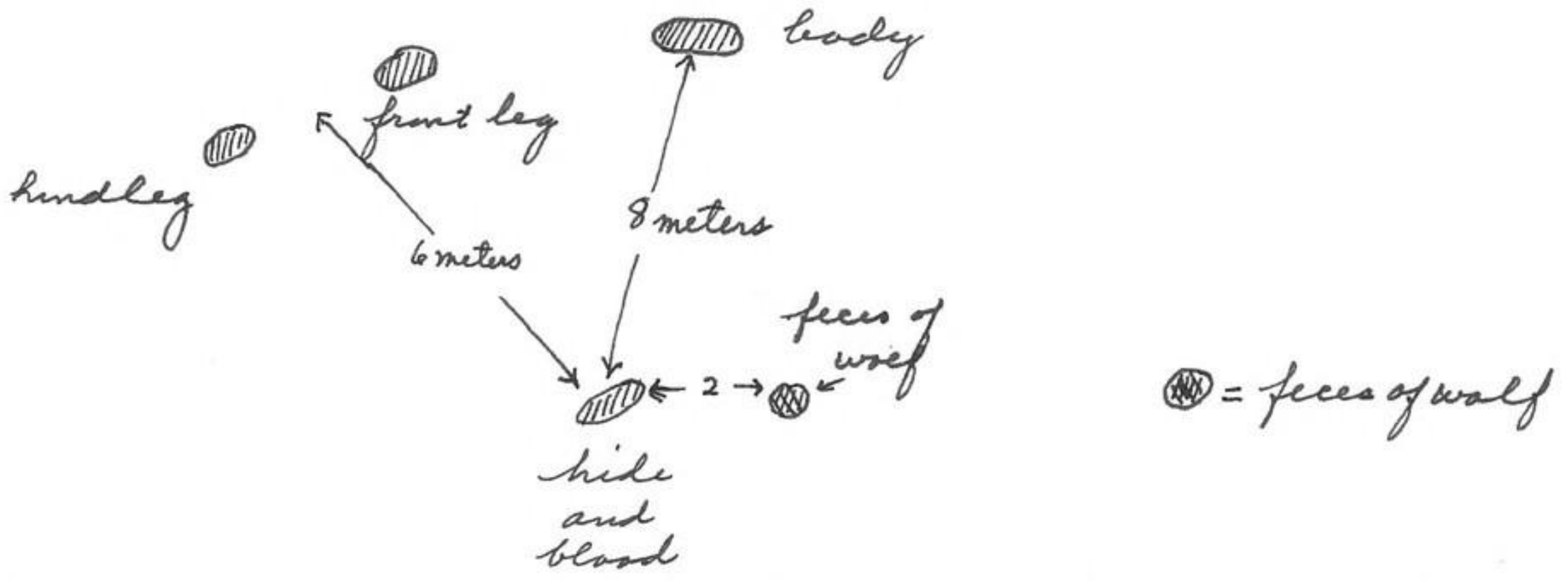


Photo 510825-46 of caribou which wolf had supplemented its meal. note condition of ribs. Head still retaining original fur. Returned to base camp and photographed 510825-47 nest of small bird taken in willow at trap 97 on linear line up mountain slope of several days trapping. Jones and Anderson left with first compliment of equipment. I will break camp and prepare for second trip this afternoon. In preparing marmat 510825-57 the stomach weeghed 270 gms and the intestines 580 gms. This animal measured 553-150-88-25-7 lbs, ♀, uteres normal. While awaeting return of Anderson recorded some comments and suggestions.

For future trapping in this area, concentrate in same area but eptend investigation up one of the lateral canyons (E-W trending canyons) so a comparison can be made between the main N-S glaceated canyons and lateral canyon as to composition of bird and mammal populations and the effect of sunshine, exposure and winds on these two types of canyons.

Trap in higher country (altitudinally) to see if the community has as distinct a fauna and flora as between timbered area to south and tundra to north.

Investigate area to south at contact with timber

Determine southern limit of microtus mirurus.

Work out life history of microtus mirurus and determine what influence it might have upon interpretation of Pleistocene history. Tie in the microtine - plant association with invasion of grasses from the south or as a remnant of a warmer climate during Pleistocene in this region

Test polygons south of Chandler Lake for Dicranum/ colony, particularly cottongrass community.

Have knee boots during wet weather and especially in early morning when dew is on the vegetation.

Give special emphasis on possible occurrence of Ochotona. and why it does not occur here.

Approach Chandler Lake from Umiat instead of from Bettles which is a more hazardous route.

Have emergency contact by radio with Umeat or Bettles. Anderson arrived this afternoon and after loading 350 lbs of equipment in the Cessna 170, departed.

Instead of returning via canyon to east through east range (route followed originally) flew south up Chandler Lake Valley to divide, thence east down Hunt Canyon to John River.

most northern conifers at head of John Canyon and there confined mainly to river bottom. Peaks high to south but without snow. Snow more to east. There are many outstanding peaks that are worthy of mountaineering. Anderson reports colors have been in John River Canyon for last 10 days. These colors are confined mainly to canyon bottoms and on immediate sidehill. Enroute saw 1 mountain sheep near convergence of Hunt's and John River canyons and 1 moose near lower limits of John R. Canyon. Arrived Bettles at late twilight and set 50 traps along north side of runway (air plane) in timbered marsh land (west of road that leads to river).

Bettles, 66°54', 151°34', 671 ft., Alaska

Aug. 26, 1951

Checked trapline this A.M and collected: 2 Sorex tundrensis, 6 Clethrionomys rutilus, 3 microtus oeconomus. The Sorex t. were 10 feet apart and in a well established trail on surface of sphagnum moss (mat) among and under sparse growth of spruce and birch. Swallows observed on previous trip now missing having left to south sometime in last two weeks. Robert William, an Eskimo employed by Anderson reports the following:

Fifty five years ago rabbits, ptarmigan and wolverine were common ~~in~~ Bettles (region) but are now rare.

Muskrats and beaver up John River as far as Hunt's Canyon

Today 5 or 6 caribou are seen in Bettles but 15 years ago were common.

Most large mammals gone but geese & ducks still about as common as ~~formerally~~ formerly.

Mink, otter, marten in Bettles area.

Porcupine less common than.

Rained all night and day. Mrs. Ralph James Anderson saw a least weasel run under the board walk in front of their home. Reports microtus oeconomus in their cellar. Jones shot a Richardson grouse and tree squirrel. The grouse was in crosswalk bank preparing for roosting. Mr. R. J. Anderson, our pilot, has a parka made of 20 ske-see-puk or marmota caligata. This coat made by Eskimo and valued at $350.00. The marmot has a commercial value of $6.00 to $8.00. He says that one Eskimo will spend all summer collecting 20 marmots. They do not like to hunt for them because of their difficulty of

Capture. Several Eskimos of Bettles have never seen this animal. The pelts in Andersons parka were the same as the one I collected from Chandler Lake. Some, however, had traces of brown.

Bettles, 66°54', 151°34', 671 ft., Alaska
Aug. 27, 1951

Rained all night. As nearly all traps were set at edge of water they were inundated. Pulled all traps as we did not know when plane might arrive from Fairbanks enroute to Point Barrow. Discussed problems of navigation in the Brooks Range with Anderson (Pilot for Weins):

Mid June first time for floats.
Ground landing from mid Sept to first of May.
Cache food + equipment during winter or in March or April.
Possible to use Cesna 170 from Bettles to Arctic Ocean if permission can be obtained at Umiat for refueling.
Housing and food at his lodge are:
$2.50 per bed; $5.00 per room; $1.65 per meal; $30 per hour for ski or wheeled Cesna 170; $35.00 per hour for float Cesna 170; $ 65-70 per hour for horseman.

Anderson reports 8 inch spruce log with limbs on east side of river between convergence of Titaluk and Ichpicpuk rivers, which is a most significant find, if it can be as authentic.

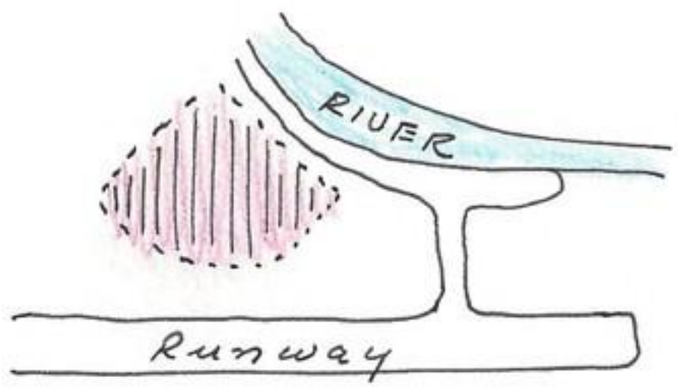
Photo 510827-1 and 510827-2 of James R Andersons Cesna 170 which we used to fly into Chandler Lake. Photo 510827-3 of trapping area at Bettles. Tamiasciurus in trees beyond. Anderson also said that he can reach any point in Brooks Range. Can make Cross country reconnaissance (E.W) if desired. Can see tusks of mammoth in lakes and rivers on the lower Ichpicpuk River.

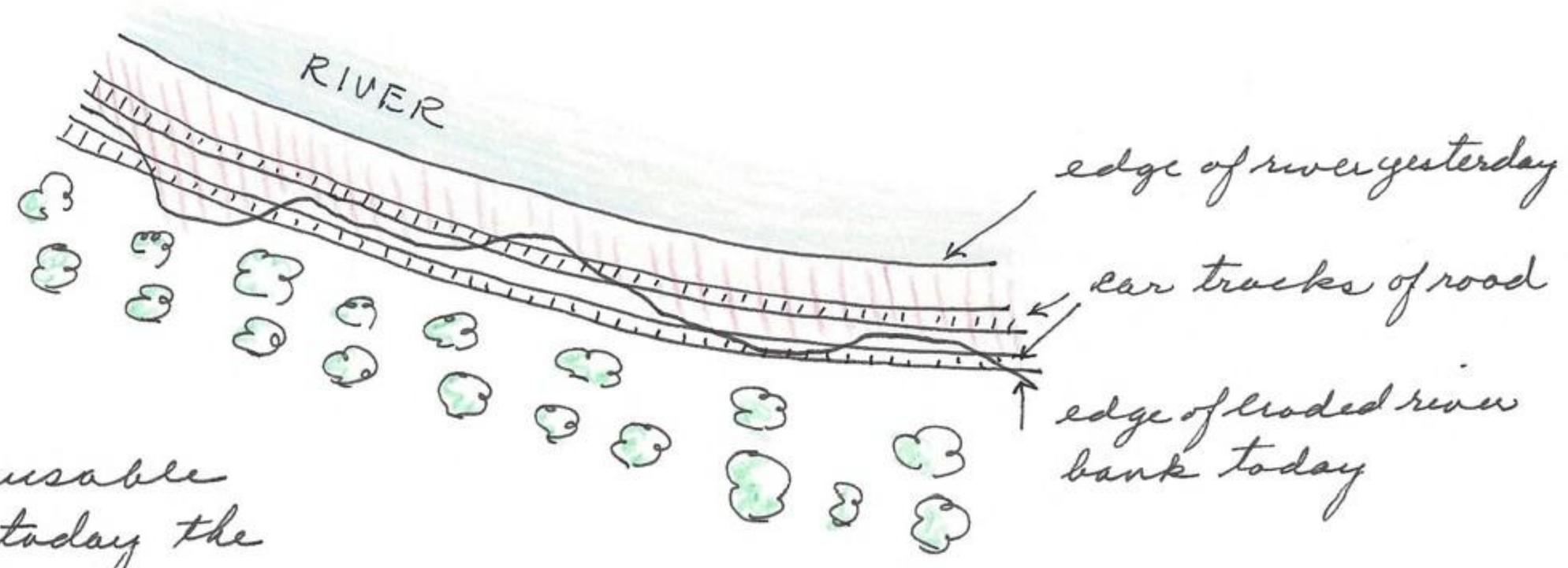
510828-156

Bettles, 66°54', 151°34', 671 ft., Alaska

Aug. 28, 1951

Inspected a tract of land apprax 8 square acres of typical deciduous-coniferous community NW of Anderson home. From this area heard 10 Tamiasciurus hudsonicus and collected 3, nos 510828-1, 510828-2 and 510828-3. These squirrels have typical tree nests and midden piles of conifer scales. The nature of the ground surface permits trail formation from one group of trees to another. These forests can be navigated but there are small deciduous trees and shrubs to hinder. The ground under trees are covered with mosses and lichens. From ten steel traps set at abandoned tents and buildings caught 1 mustela erminea 510828-4. The last day or so has been rainy and as a result the river is ~~not~~ now at a high. Yesterday the road along river was complete



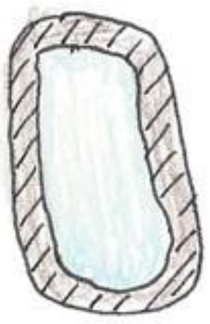


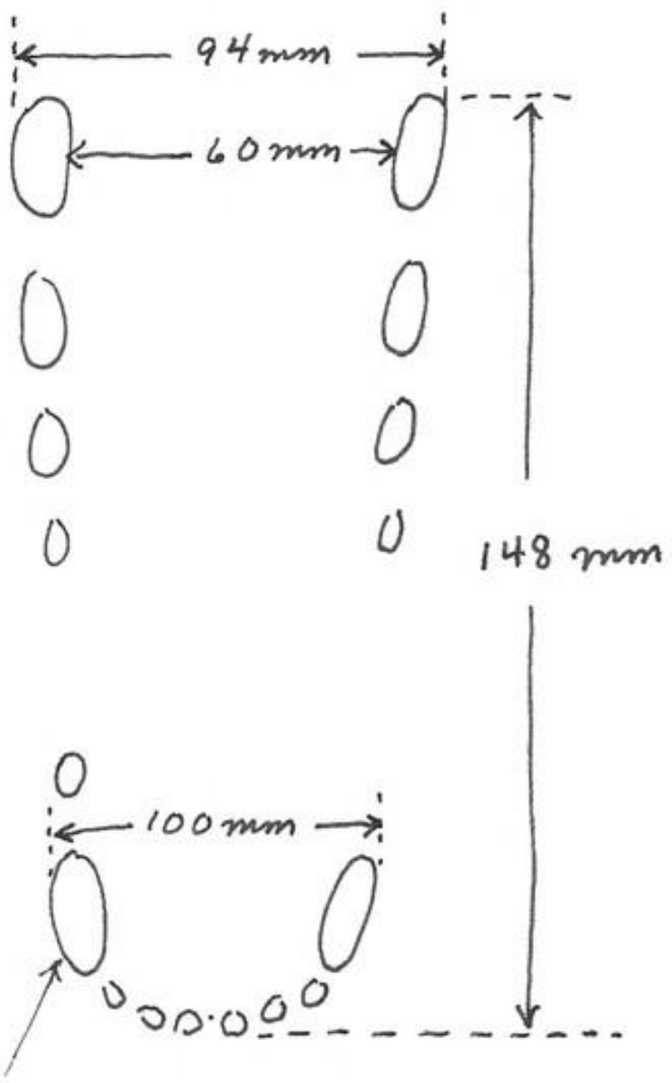
and usable but today the bank was eroded, in some places, across road. Large logs and trees are floating down river which makes landing and takeoff difficult and hazardous. 4 Richardson grouse in forest area checked today. Collected the dominant and subdominant grasses from the marsh trapping area of Aug. 8 (see notes of that date)

510828-6 Agropyron latiglume (Scribn. & Smith) Rydb.
510828-7 Agrostis scabra Willd.
510828-9 Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Schreb. approaches C. canadensis (Michx.) Beauv.
510828-10 Glyceus
510828-11 Carex canescens L.
510828-12 Carex Kelloggii W. Booth
510828-14 Carex aquatilis Wahl. dominant in wet areas

510828-16 Beckmannia syzigachne (Stend.) Fernald.
510828-17 Carex aquatilis Wahl.
510828-18 Poa alpigena (Fr.) Lindeu
From same area collected cryptogamous mosses and lichens
510828-21 Cladonia cornuta (L.) Schaer.
510828-23 " sylvatica (L.) Hoffm.
510828-25 Nephroma arcticum (L.) Torss.
510828-26 Cladonia alpestris (L.) Rabh.
510828-28 Cladonia crispata (ach.) Flot.
510828-29 Cetraria islandica (L.) ach.
510828-29a Dactylina arctica (Hook.) Nyl.

Departed Bettles 1:00 P.M for Pt. Barrow via C46. Many lakes beyond Umiat on Coastal Plains with muddy waters around edges indicating erosion of lake banks on all sides. Center of lakes clear. Arrived Pt. Barrow. This evening Wilbert K. Carter showed me several polar bear skulls (nanook) from house 'Q' in the Birnirk group of mound at Point Barrow. In each case the brain had been extracted by penetrating one side through the parietal bone. The Eskimos (1200 A.D.) were particularly fawnd of this mammal as food. The largest skull measured:





Back of incisor to notch of foramen magnum 347mm

Greatest length of skull 460 mm

Zygomatic breadth 263 mm

Interparietal width 107mm

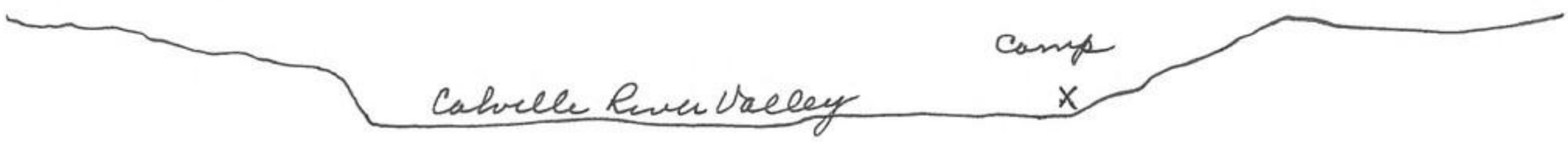
Cain presented 9 domestic dog skulls 510829-1 to 510829-9 from Deadmans Island, SE of Point Barrow, all surface pickups.

5108 30-158

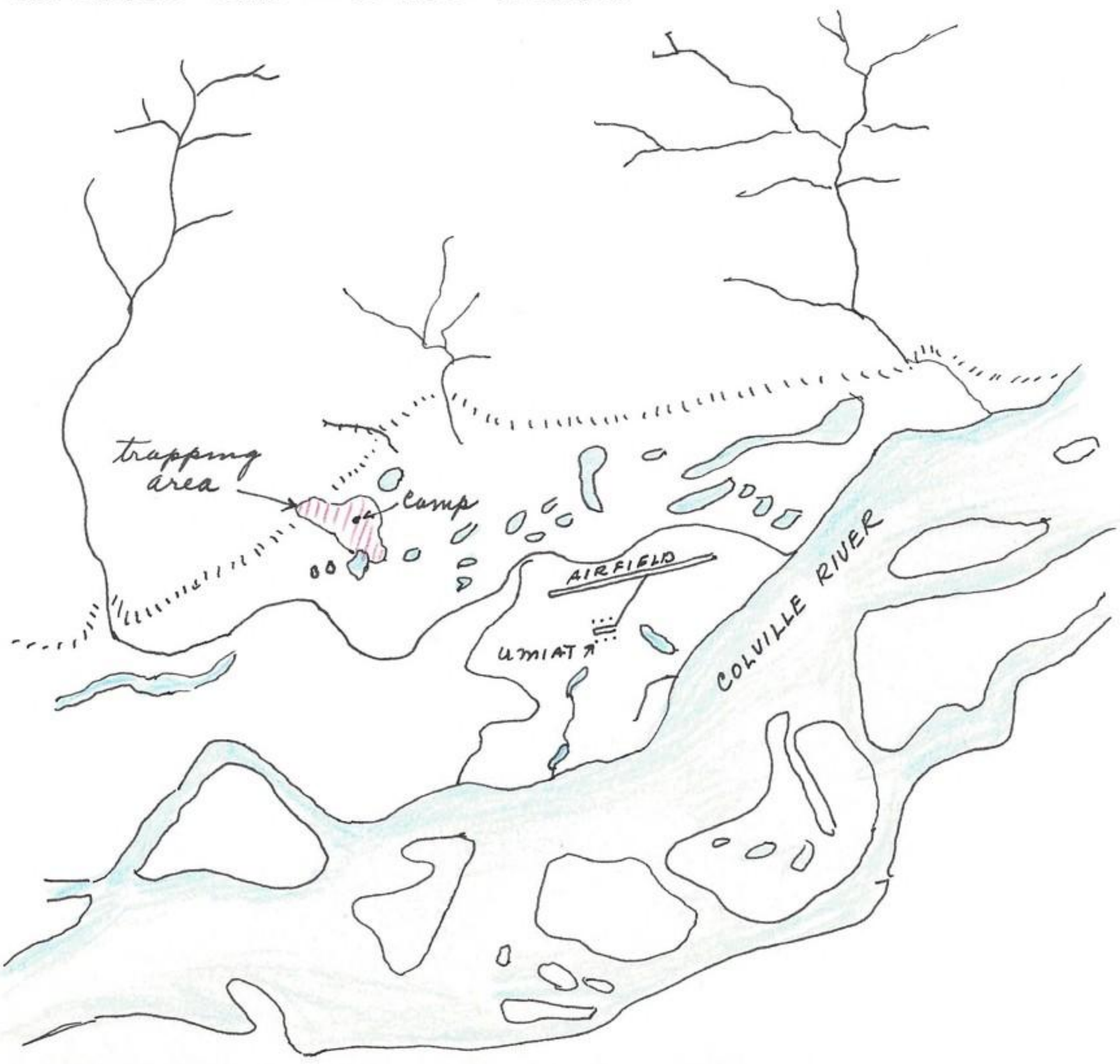
Arctic Research Laboratory, Point Barrow, Alaska

Aug. 30, 1951

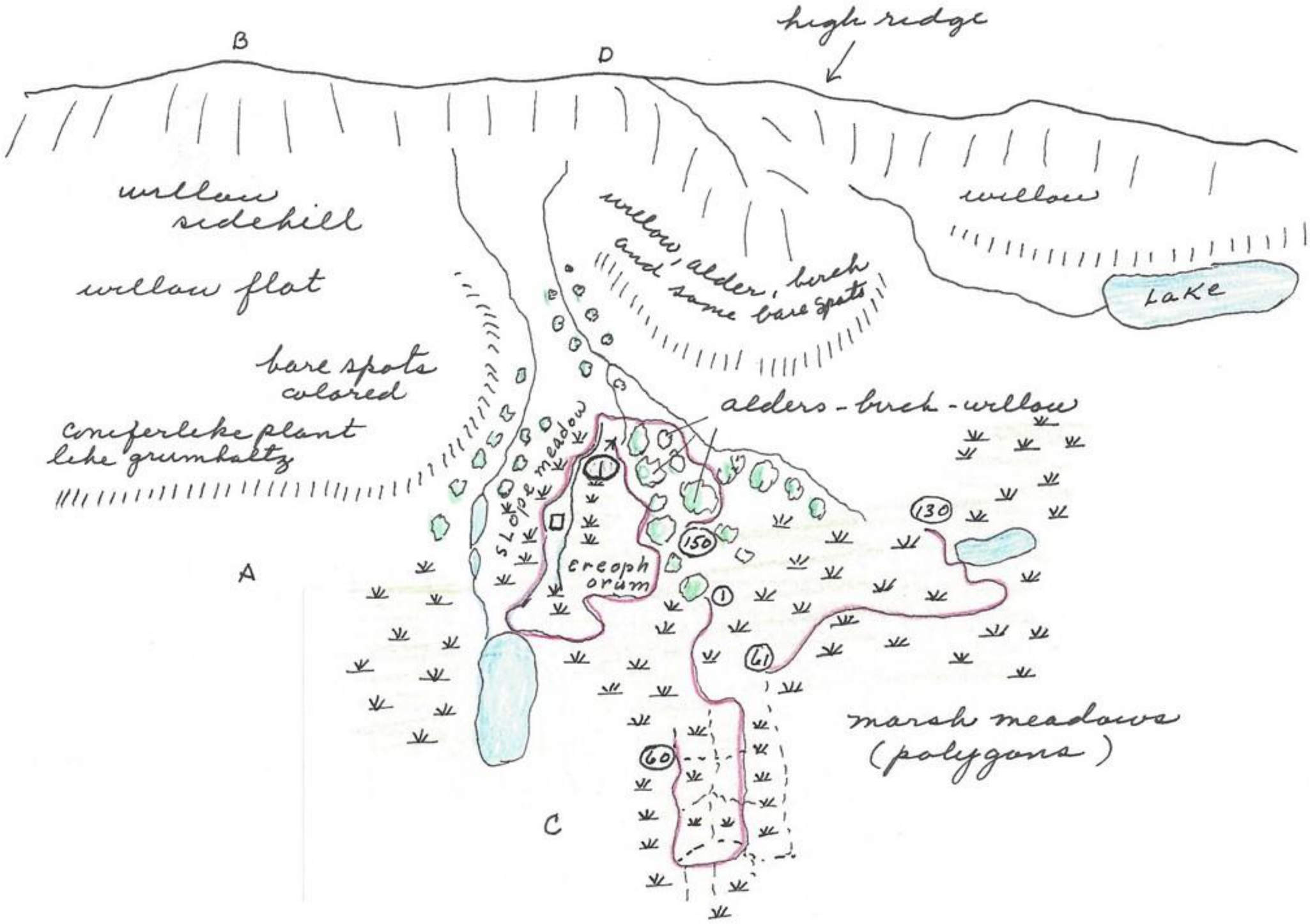
Departed Point Barrow this A.M in C46 for Umiat. Cloudy most of way. Contacted Ralph Steiner, superintendent of Umiat Camp, who arranged weasel transportation to a point approx. 1 1/4 miles NW of Umiat at precisely 1 1/2 mi. W and 3/4 mi N Umiat, 69°22'18", 152°08'10", 370 ft., Alaska. Enroute passed 16 white-fronted geese feeding along Seabee Creek on the tundra. This base camp is at base of hill on north side of river valley.

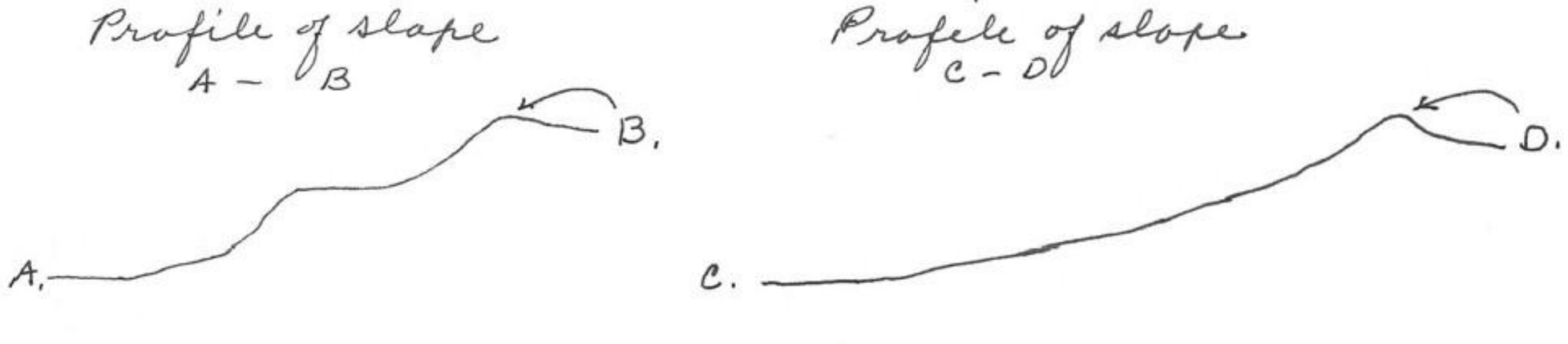


This area, and especially the slope, is unusually populated with shrubs and small trees which are shrublike in life form. The communities range from dry hillside to damp stream beds on slope, to marsh meadows below on the river plain. At 4:00 P.M set 150 traps in green hillside meadows, willow, alder and Betula thickets and lowland marsh



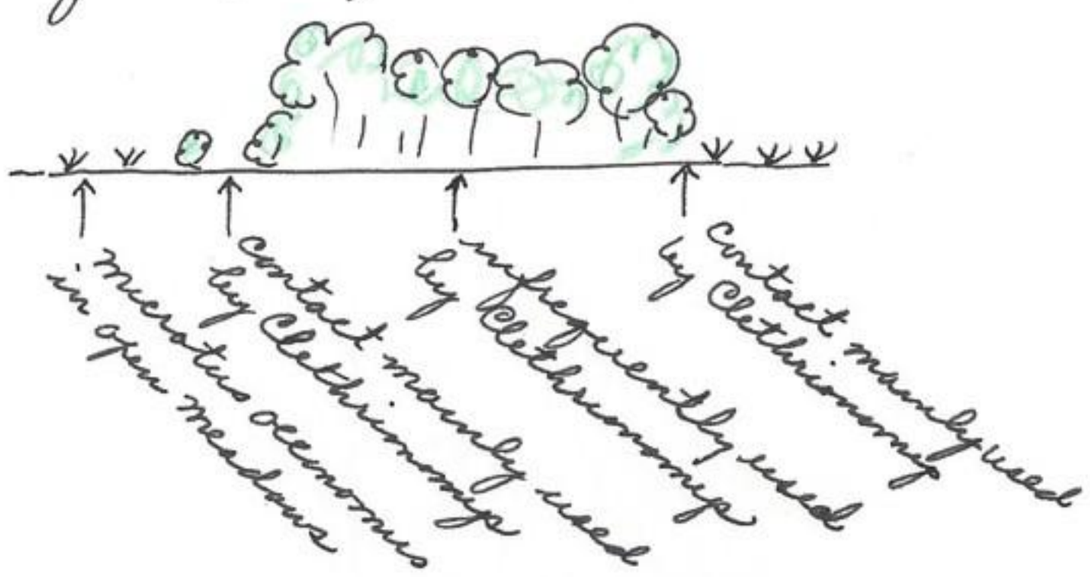
5108 30-159





checked trapline of 150 traps at 7:00 P.M and in this short period of time collected: 14 Micratus oeconomus and 11 Clethrionomys. most of the Clethrionomys were among high shrublike growth or at edge while micratus oeconomus were in open meadows. The Clethrionomys were mainly along edge of thickets rather than in center of thickets.

Clethrionomys is a vole that requires overhead protection in the form of shrubs or trees.



510830-160

30 August 1951

Mr. Ralph Steiner
Camp Superintendent
Umiat, Alaska

Dear Ralph:

This will introduce James Bee and Knox Jones, two of the men who have been working out of the ARL this summer. They wish to do some trapping of mammals in the vicinity of Umiat for a few days under a permit issued by the Fish and Wildlife Service in order to carry out the terms of their contract with the Office of Naval Research.

I will appreciate your kindness if you can give these men a bit of help on transportation from Umiat out three or four miles to a camp site where they can operate without being in your way and where the activities of the camp will not have reduced the small mammal population. All they will need will be weasel transporation from the Umiat camp to a site of their choosing, where they and their gear will be deposited by your weasel operator, then, at the time determined in their conversation with you, a weasel to run out and take them and their gear back to Umiat so they can return to Barrow. It is my understanding that Mr. Jones will return to Umiat with only his personal gear by foot a few days before Mr. Bee breaks camp at the end of his collecting season.

I think the above is about what Jim Dalton has set up with you for the visit to the Umiat region by these two men. If not, please feel free to modify the details in accordance with your communications with Jim.

Dorothy sends her regards to Davie. Best wishes from us both.

Very sincerely,

Ira L. Wiggins
Scientific Director

510831-161

1¼ mi nw Umiat, 1½ mi. w and ¾ mi n Umiat, 69°22'18", 152°08'10", 370 ft., Alaska.

Aug. 31, 1951

Checked trapline of 150 traps. Each trap 20' apart and in same position as originally set. Mammals caught.

1. Lemmus trimucronatus
20 Microtus oeconomus
1 Microtus muurus
11 Clethrionomys
2 Sorex cinereus
2 Sorex tundrensis
1 Acanthis linaria (sp.?)

The Clethrionomys were, as usual assaceated with high overhead protection and relatively open ground below the overhead protection. Sorex tundrensis in dry areas among dense evergreenlike mat plants. Many Clethrionomys in same situations Michotus muurus was taken in what would be good microtus oeconomus community but near alder and willow growth. Microtus oeconomus in wet grass marsh and in drier areas but associated or adjacent marsh meadows. Lemmus in cottongrass in damp areas. The trap was between 2 hummocks of Eriophorum. Clethrionomys in variety of places but mainly in areas of high, other than grass, protection. This evening checked trapline at twilight (feed numbers 39 to 52) as follows:

9 microtus oeconomus
+ Clethrionomys rutilus
1 Spizella arborea.

From trapping so far all animals are active at least sometimes during daylight hours.

Collected dominant and conspicuous lichens and mosses in the various areas (510831-53 to 510831-100). (32 samples with several species in each sample). Species are as follows;

510831-53 Peltigera aphthosa (L.) Willd.
510831-54 Cladonia gracilis v. chordalis (Flk.) Schaer.
510831-58 Cladonia rangiferina (L.) Web.
510831-59 Dactylina arctica (Hook.) Nyl.
510831-60 Alectoria nigricans (Ach.) Nyl.
510831-63 Cetraria nivalis (L.) Ach.
510831-63a " cucullata (Bell.) Ach.

510901-162

1 1/2 mi. W and 3/4 mi. N Umiat, 69°22'18", 152°08'10", 370 ft., Alaska

Sept. 1, 1951

Checked trapline of 150 traps this A.M as (cat. nos 1-11):

7 microtus oeconomus
3 Clethrionomys rutilus
1 Sorex tundrensis.

Betula nana is more red than yesterday and showing a similar trend in color change as I observed at Chandler Lake earlier this season. The large alders are now dropping their green leaves which are covering the surface of ground below. The willows are now nearly all yellow. Pulled all traps and set 130 in marsh (see map for second set). From this line before I pulled traps Caught:

1 microtus murus
1 Sorex cinereus
9 Microtus oeconomus
1 Clethrionomys rutilus

all mammals active in daytime. Gyrfalcon (brownish-grey) in area. 16 white-fronted geese flew over marsh set and are probably the same group as observed the previous day. They call frequently after dark.

1 1/2 mi. W and 3/4 mi N Umiat, 69°22'18", 152°08'10", 370 ft., Alaska

Sept. 2, 1951

Cold last night. Sprinkled lightly this A.M. Checked the new trapline of 130 traps in marsh. This set is on ridges of polygons where the mammal (microtine) trails are numerous. Centers of polygons have standing water and sedges. The fracture

has excellent corridors used as trails and are protected on sides except the top. Overhead protection is vital in ecology of arctic slope mammals. If protection is present, one generally finds mammals. If overhead protection is not present, one is more than likely going to be disappointed. Lemmus and Dicrostonyx fluctuation may be governed by plant growth for overhead protection, and if we have a knowledge of plant fluctuation we may have the key to small mammal population fluctuation, at least in part. Periodic flooding certainly is a factor in this country and perhaps

is related to plant development. From the marsh set collected (see catalogue numbers 1 to 45):

34 microtus oeconomus
5 Clethrionomys
3 Sorex cinereus
3 Sorex tundrensis

The Clethrionomys from marsh associated with Betula nana on ridges 23 traps sprung which indicates that there are large M. oeconomus or perhaps Mustela rixosa. The gryfalcon working over marsh and on north ridge at highest point. This evening at twilight inspected trapline of 130 traps (catalogue numbers 46-57) as follows:

1 Sorex tundrensis
11 microtus oeconomus

Cool this evening. Set 10 traps 10 feet apart at camp along wet water course.

September 3, 1951

Cold last night, more wind than in last 3 days but this morning only moderate and from the east. Examined trapline of 10 traps set last night along damp course at camp as (Catalogue nos 1-7); (community varied);

1 Sorex cinereus
1 microtus muurus
3 microtus oeconomus
2 Clethrionomys

Examned trapline of 130 traps in marsh (catalogue numbers 8-46) as follows:

30 microtus oeconomus
1 Lemmus trimucronatus
1 Clethrionomys rutilus
1 Sorex cinereus
4 Sorex tundrensis
1 mustela rixosa

Sorex tundrensis in drier part of ridge and associated with low shrubs. The mustela rixosa 510903-18 was taken in a runway used by microtus oeconomus on ridge of polygon. Dwarf willow 350 mm high formed the overhead protection in this particular set. From general evidence would say that rixosa is associated with marsh or damp meadows and follows closely the microtines which make trails in relatively protected places of sedges & grasses. This in contrast to mustela erminea

which uses rock slides, dry slopes, subterranean corridors and other larger mammal holes. The trap that caught the weasel was approx. 200 meters from the hillside to the north. This evening at late twilight examined the marsh set of 130 traps (catalogue nos. 47-55) as follows:

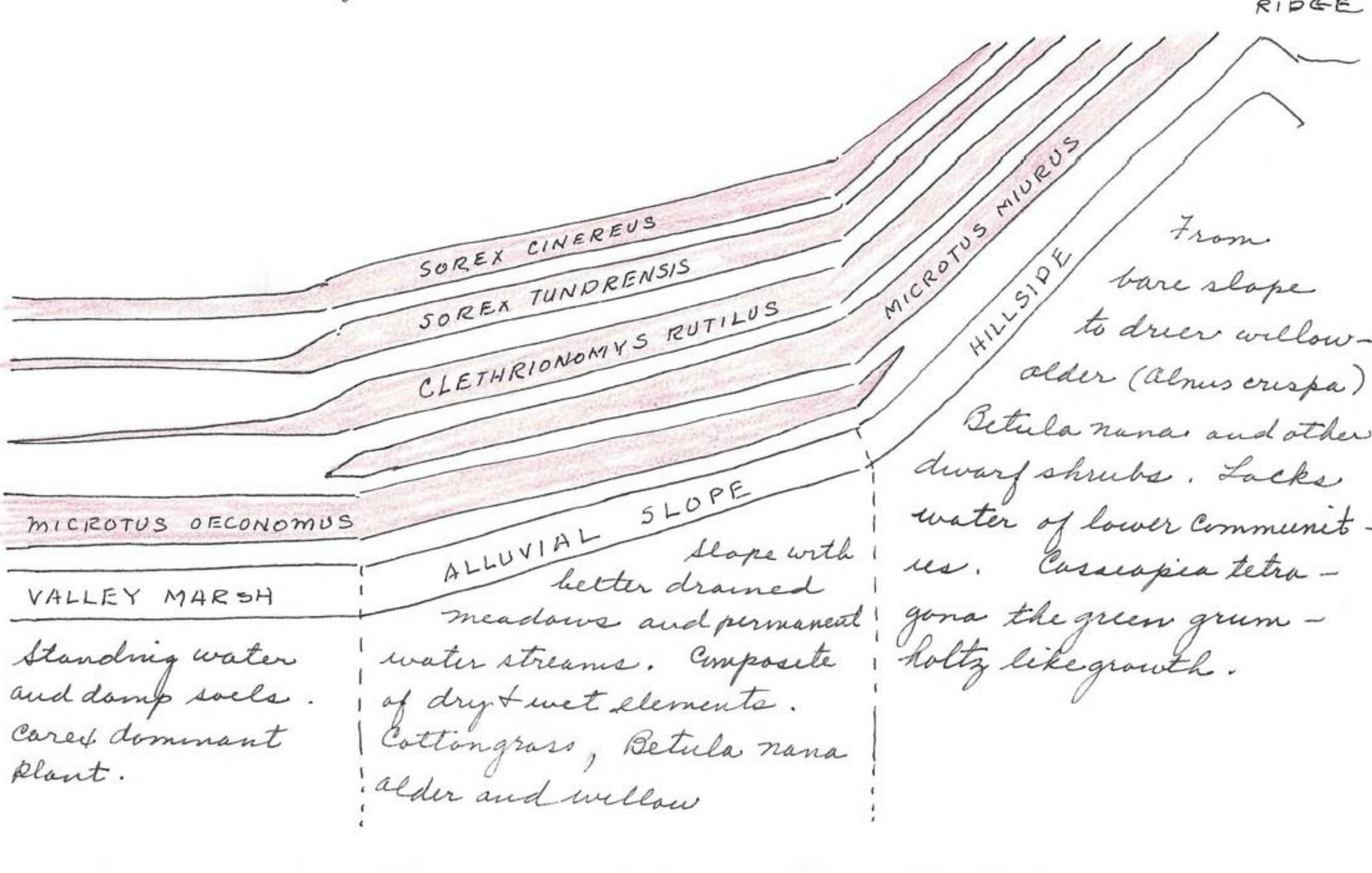
13 Microtus oeconomus.

From the condition of body heat of these animals would say their greatest activity is just before dark. This evening afternoon photographed several trapping areas at camp. Light poor. Photo 510903-51 of Eriophorum association with Betula nana and other grasses mixed. alder trees (shrubs) in background. This community is present among sparse alder & willows but is excluded in thick stands of these trees. The Lemmus was from this Eriophorum association. Photo 510903-52 of Eriophorum association with alders in background. Betula nana mixed in among cottongrass. This association does not extend into the meadow or marsh association but is distinct. It is not popular as a community for microtines but is used when associated with grass & sedge communities. It is in drier areas than usual marsh or meadow community. This type of terrain is difficult to navigate but the caribou seem to take it in stride. It is interesting to speculate as to the evolution of this particular life form. It may have evolved as result of a combination of several factors such as trampling of caribou, frequent inundation of ground causing a higher growth to remain above the water level, foraging of Dicrostonyx and other small mammals at the lower levels of the plant, etc. while we did not capture Dicrostonyx at this point, I am sure it will be taken in this type of community on the higher and drier slopes, particularly the upland gentle sloping plateau above. Photo 510903-53 of general trapping area. The grasses in the immediate foreground is along damp to wet water course while on each side the Eriophorum occupies drier areas. The alders are generally distributed usually in abandoned stream channels. Willows on drainage course to extreme left are yellower and can be traced up canyon. The upper slope, especially to right are covered with extensive willow fields, to right the willows are shared with alders. Areas that are bare, except to left on colored ground spots, are covered with low matlike plants. Areas of small willow on hillside constitute good Microtus mucrus community. The vegetation below the

purple bare ground is an evergreenlike plant that forms
efcellent protection for Clethrionomys and Sorex tundrensis.
Photo 510903-54 of general veew from flat marsh to high ridge.
Typical marsh begins where alluvial slope ends. It is interest-
ing to note that the cottongrass continues to retain bloom
on the island while it is absent from the mainland. This
situation also chists at Chandler Lake where the grass at
water edge and in slightly inundated areas retain the white
inflorescence. Photo 510903-55 of valley veew from comp
looking south. This valley has been carved by Colville
River, forming conspicuous bluffs on both north and south
side of valley. Grasses beyond alder trees or bushes considered
marsh association, particularly where supplied with wet or
damp channels or influenced by the numerous lakes that
dot the area. Watched an American rough-legged hawk
hunting on both side hill and over marsh. Rained occasionally
late this P.M.

1 1/2 mi. W and 3/4 mi N Umiat, 69° 22' 18", 152° 08' 10", 370 ft., Alaska
Sept. 4, 1951

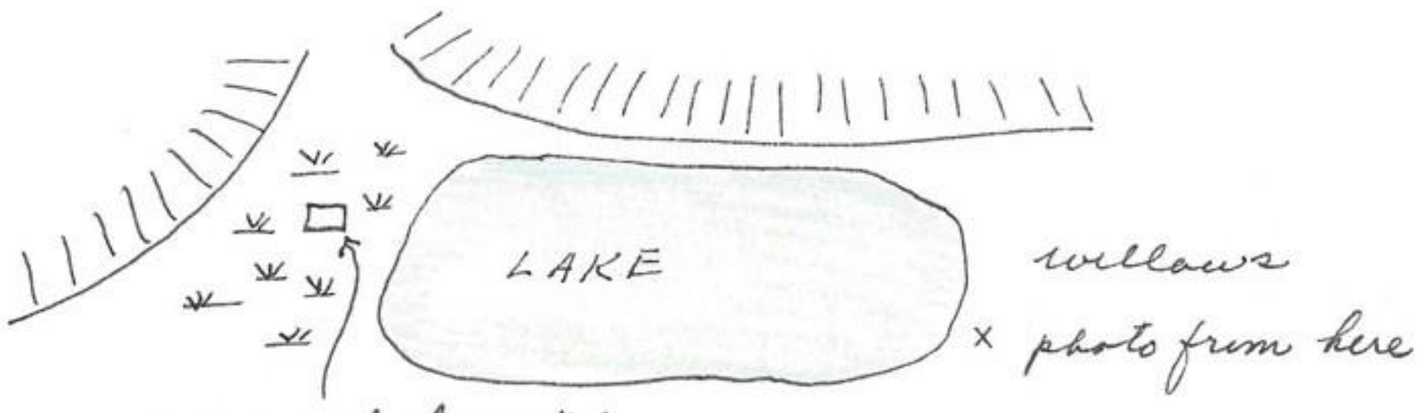
Generalized distribution of plant-animal communities in
area trapped. Grade or slope has an important influence
on community.



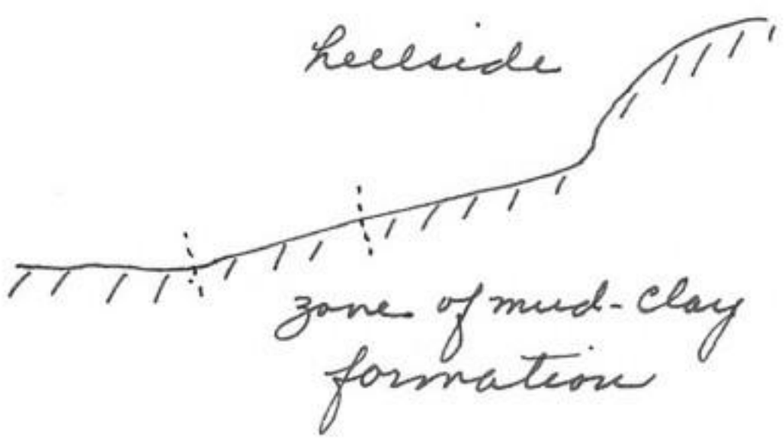
chicked 10 traps at camp but no mammals which was a surprise as yesterday I caught 7 out of the 10 traps. Examned marsh set of 130 traps (catalogue nos 1-27) as follows:

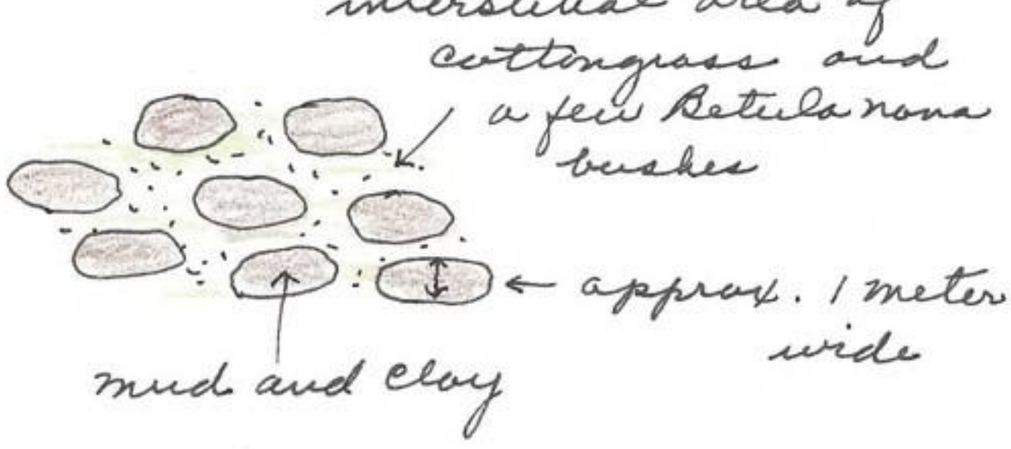
3 Sorex tundrensis
23 microtus oeconomus
1 Clethrionomys rutilus.

Dew was heavy this morning and formed a crystal grey surface on all mammals caught in traps. The ten traps of last 2 days were placed 20 feet from original line and parallel with it. Pulled all traps this A.M and prepared to depart for Umiat. Weasel vehicle arrived 9:30 A.M and we left at 10:00 A.M. Photo 5 10 90 4 - 101 of lake east of Camp along base of valley side. This lake would be an excellent place to establish a camp.



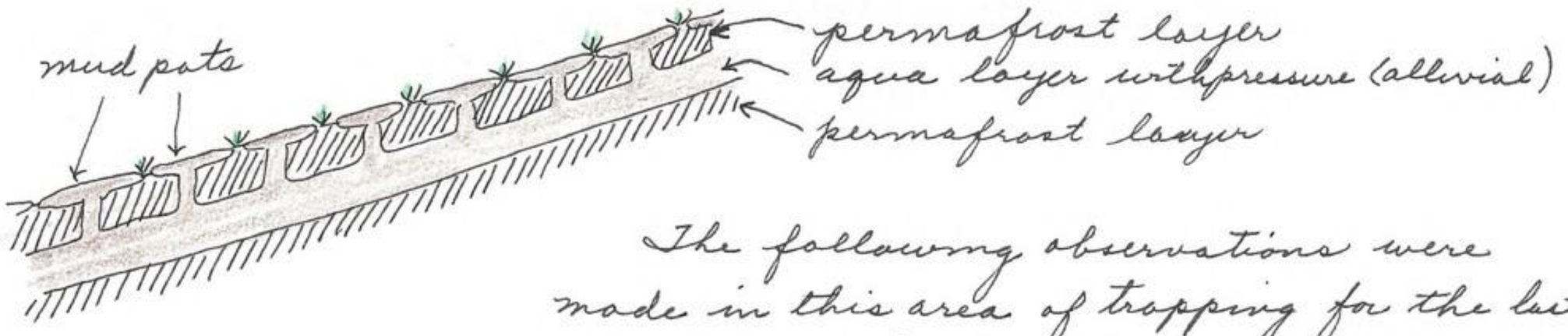
From this camp could investigate hillside, lake and marsh communities. The range to south in this photo a riot of color. Willows S E of lake would offer unlimited trapping. This statement can be applied to practically ever situation in the Umiat valley. Photo 5 10 90 4 - 102 of extensive dwarf willow just east of lake. This area not trapped but am of the opinion that it would produced a great number of mammals. The overhead protection is ideal. Photo 5 10 90 4 - 103 general view of lake and willow fields with valley slope and ridge to west. Blue or green-winged teal in water in foreground. The area between lake and our camp has a peculiar ground formation (an alluvium).





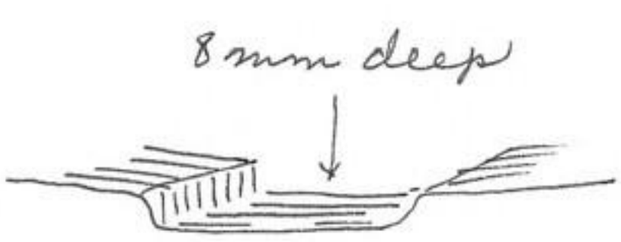
The cottongrass, Betula may be considered an early successional stage

These mud pats can be explained on the following basis:



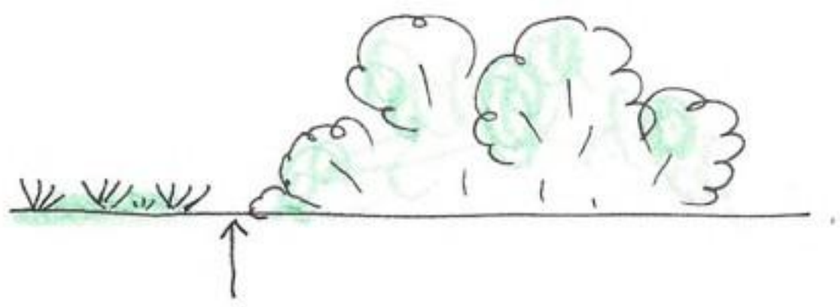
The following observations were made in this area of trapping for the last few days. Caribou droppings numerous in area of about 1 pile of pellets per 10 sq. meters. Some places on dry elevations in meadow area every 4 sq meters. Some of these droppings have been placed recently and indicate extensive use at some season of the year. Gyrfalcon noted every day feeding from top of ridge N of camp to meadows S of camp. It would inspect by hovering at 10 meters heighth and just over our head as in contrast to the ~~gyrfalcon~~ gyrfalcon at Teshekpuk Lake where they would leave ground at about a block away and fly out of area. American roughleg fed in same areas as gyrfalcon, hovering frequently over marsh area. many dropping of willow ptarmigan in area.

Noted a Sorex tundrensis active at twilight running along a runway. It ran about 2 meters up and down its trail with the same speed, slow but constant. This traik is consistently regular and uniform in shape and has an odd shape with angular edges. Width constant. It Crossed portions of trails which supported water. Placed trap in this trail in evening and caught one shrew. The next morning caught another one in same trap and going in same direction as one caught the previous evening. This would indicate that Sorex tundrensis have established trails and use consistently



Microtus oeconomus have many sections of their trails under water (shallow) but the animals use them constantly. They tolerate more water in their community than most of the other other microtines.

Clethrionomys and Sorex most common among conifer like plants or at edge of alder-grass contact. Overhead protection so necessary whether it be rocks, bushes etc.



510904-167

Lemmus irregular in distribution but fovar dampen situations. They were in cottongrass bordering damp situations, on polygonal ridges in deep fracture channels or deep trails  associated with microtus oeconomus trails. Lemmus also taken on high ridge to north by Jones. It would appear that their distribution is irregular and at a low in this area — at a time when other microtines are at a high. It is possible that Lemmus does not fluctuate as do the Lemmus at Point Barrow. Birds in area at camp; white-fronted goose, ravens, gull, American rough-leg hawk, tree sparrow, redpoll, willow ptarmigan, gyrfalcon, bluewing teal?; ducks (deep divers), jaylike bird like a shrike with a tail with a white band  .

Collected dominant grasses and sedges in meadow grass association and damp grasses on slope.

510904-106 Arctagrostis latifolia (R. Br.) Gresib.
510904-107 Carex aquatilis Wahl.
510904-108 Carex Kelloggii W. Booth
510904-109 Calamagrostis neglecta (Ehrh) Gaertn. Meyer and Schreb.
510904-110 Carex lugens Holm.

Departed for Umiat via weasel vehicle. Mr. Ralph Steiner superintendent of camp Umiat reports:

In February counted 100 mooses along river Colville River from Umiat west to 100 miles.

Barren ground grizzly mainly at Lookout Ridge and through to Liberty Lake, but a few around Umiat.

Caribou remain on plains last year but generally by hundreds in normal years.

Dall sheep numerous west of Chandler Lake, most numerous between Barter Island and Fairbanks by air route.

Departed from Umiat to Pt. Barrow at 5:00 P.M by C46. Returned above clouds but could occasionally see creeks and lakes below. Streams of plains lined with yellow willows. Arrived Pt. Barrow.

Point Barrow, Arctic Research Laboratory, Alaska.
Sept. 5, 1951

Acquired photo 510905-1 from Dr. Wiggins of 3 polar bears taken Aug. 26, 1951 some 35 miles NW of Point Barrow and approx 50 miles from the ice flows to the north. The two young are 65% as large as adult in total length and from ear to

tip of nose (judged and measured from picture). Photo 510905-2 also from Wiggins showing Topagaruk oil well taken a few months ago, showing degree of interference of tundra in the immediate area of the camp. It is very difficult to get beyond this area be - cause of the water and mud soaked tracks made by L.V.T. vehicles. Photo 510905-3 of aerial view of Point Barrow Camp. Arctic Research Laboratory as indicated. Made preparation for departure to the outside (States) and started final report.

Arctic Research Laboratory, Point Barrow, Alaska

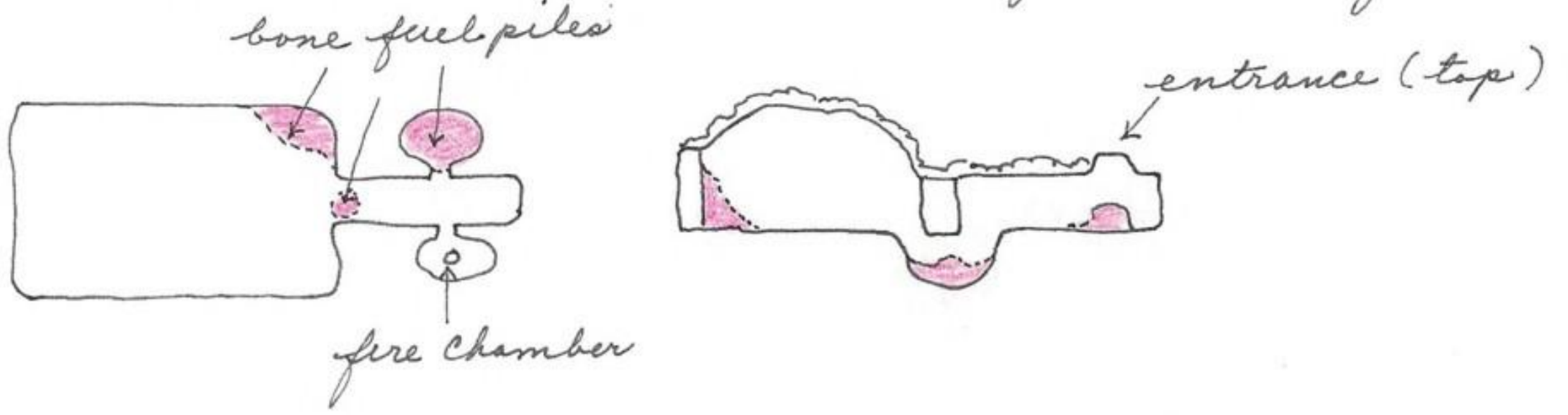
Sept. 6, 1951

Continued packing for leaving. Heard report today of a hairy mammoth tusk taken at the Fairbanks gold digging operation which measured 13 1/2 feet long and 28 1/2 inches in circumference at base, Also one taken which measured 8 1/2 feet long and 19 1/2 inches in circumference. Jones departed for U.S today. I will remain and finish packing of specimens and equipment.

Sept. 7, 1951

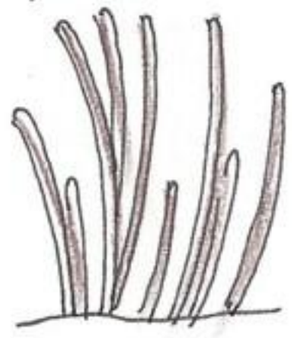
This evening set 65 traps at Bernirk mounds at 8:00 P.M. Traps set on 13 mounds in the unusually well developed grass associated with the mounds. These grasses and sedge grow more than other grasses & sedges in adjacent areas because of soil enrichment by Eskimo debris and oils from animal food. Temp. of Arctic Ocean at 11:00 P.M 4.2°C. Air temp 2°C at same time. This evening talked to several Eskimos employed by the Arctic Research Laboratory. Questioned one about habits and manners of the old Eskimos who inhabited Bernirk mounds. Pete Savolik of Barrow Village and now employed by ARL reports the following:

1. Bone piles of bearded seal, hair seal, walrus, polar bear, ducks etc were allowed to accumulate in either the corner of the main room, in the entrance to room or in a special chamber across entrance corridor to the fire or cooking room.



The blubber and grease was placed on top of bone pile so that it would soak down through the bone pile and create a saturated bone suetable for a cooking fire. The house proper was of logs, horizontally placed, or whale bone as supports and covered with sod. Only entrance to house through roof door as indicated. He says the ribbon seal occurs only rarely in the ocean. Consulted Wilbert Carter who says that the information I got from Novalik applies to his facts of the excavation of the Bonerk sites.

Today picked up representative marine fauna and flora from beach at Point Barrow. The last storm forced waves high upon the beach. most forms were tunicates.



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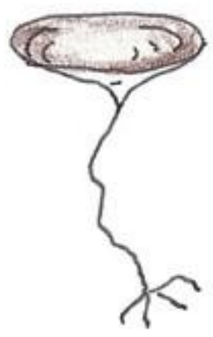

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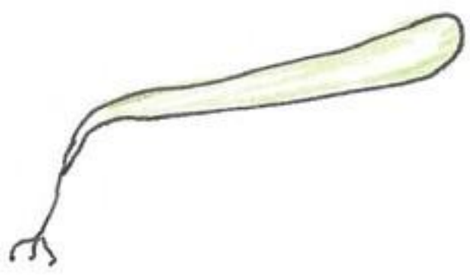

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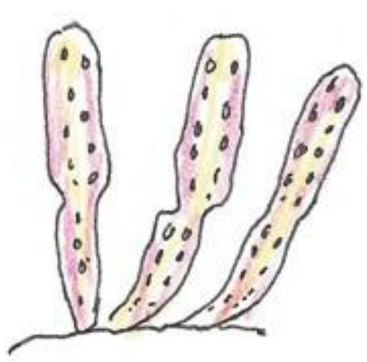

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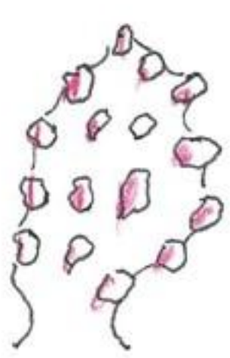

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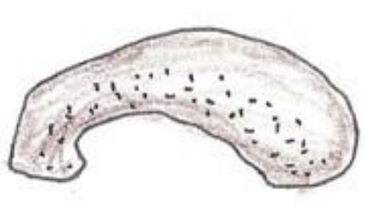


12

13

↑
soft shelled

14

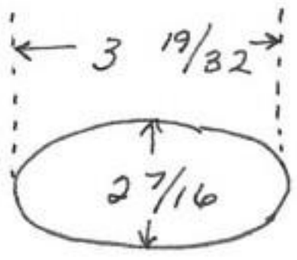
15

no 13 a gastropod which has usual appearing hard shell but when allowed to dry wrinkles as if chitinous The shell does not have calcium in its structure.

These heavy waves must occasionally overflow beach onto the

the fresh water lakes as marine shells are on shorelines of these lakes. Examined a walrus tusk taken at Barrow Village last year. It measured:

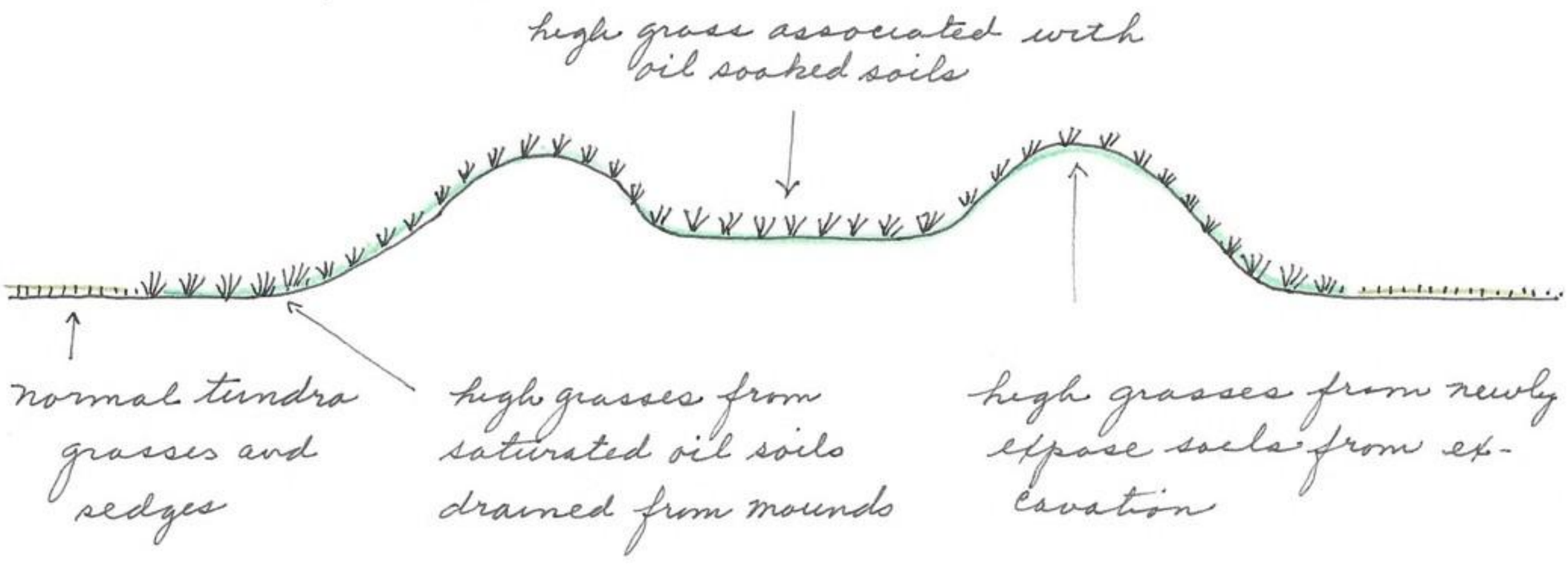
greatest width at base - 3 19/32 x 2 7/16 inches. Total length 26 3/4 inches. Weighed 8 lbs. 9 3/4 inches in circumference at base.



Point Barrow, Arctic Research Laboratory, Alaska

Sept. 8, 1951

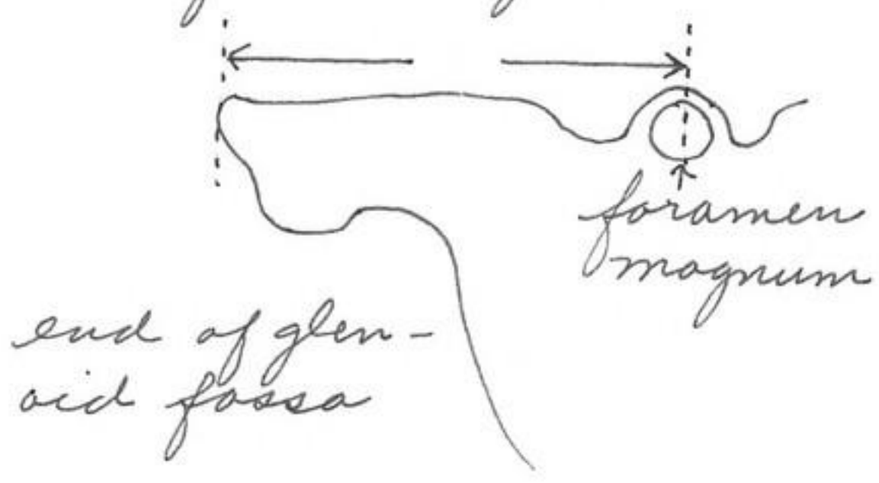
Continued preparation for departure to outside. Checked the set of 65 traps set at Birnirk mounds last night. (4 1/2 mi. SW of Point Barrow proper, approx. 5 feet elevation) and collected 5 Lemmus trimucronatus. These mammals were from the 13 mounds, the largest mound with sprung trap only. In each setting, the grasses were well developed and confined to mounds only. The new soil, as exposed by excavation, and particularly the oil from these diggings, helped to increase the unusual development of these grasses. Runways associated.



The lemming were in higher grasses (high in growth form) associated with oils from the mounds. In these areas of high grass the trails were well developed because of overhead protection. The grasses on new soils from excavations, were used but not as extensively as those in high grass associated with oil soels because of lack of adequate overhead protection. The low sparse grasses of tundra beyond the mounds showed no development of trails except those associated immediately with mounds. Lemmus prahably range beyond mounds at times. One is impressed that overhead protection is required for their development in normal numbers. Grasses around Point Barrow beyond influence of

mounds do not supply adequate overhead protection either because of overgrozing or because of a natural low in plant development. On the basis of 180 square meters trapped, each lemming occupied 36 square meters. In instance did I trap more than 1 lemming per mound. Here is case where one can postulate the area requirement for maintenance of one lemming at this season a period of fluctuation. The smallest area occupied by one lemming was 4 X 4 meters or 16 sq. meters. The largest lemming no 510908-5 from approx 5 X 5 meters or 25 square meters. (see photograph 510908-7). Photo 510908-6 of Barrick Eskimo camp, established to collect eider and other ducks as they fly across this part of peninsula. Hundreds of thousands of water fowl fly over at this spot. These flights may have been a factor in the original choice of the old Barrick ploplus. The last 50 mile wind from the north blew down all tents and forced water practically across the sand and gravel peninsula. According to the Eskimos the eider fly directly over Barrick mounds in foggy weather and just about 1 block east when clear. Photo 510908-7 of one of the elevated mounds showing extent of green grass associated with oils of excavation and the grasses used by Lemmus. Area beyond the mounds not used by Lemmus, at least, as evidenced by runway development. I believe lemming spend entire existence on these maunds. It would be interesting to live trap these mounds and determine the extent of movement beyond the limits of the mound and particularly communication between lemming of various mounds. Photo 510908-8 of an elevated mound of well developed grasses from oil which have flowed from mound on to tundra as result of organic remain become unthawed and oil ~~liberated~~. These grasses (Arctophila fulva) supported well established runways of lemming. These trails did not extend beyond confines of high grasses. There is another factor which might explain lemming on these mounds, which is the elevation of these mounds above the influence of periodic inundation or supersaturation of the ground. High grasses is the more likely explanation. The yellowish brown grasses in foreground do not have lemming trails. The grasses supplied by oils have retained their chlorophyll long beyond the time the other tundra grasses have undergone the seasonal changes of green to yellow to brown. Fluctuation in numbers of lemming may be caused by overpopulation in winter when snow allows lemming to go beyond areas of overhead protection and then when snow leaves ground in spring the retraction

of lemming to areas of adequate protection avertopes the vegetation support and the lemming die after protection it illuminated. and confusion produces a psychological death. Fluctuation of water in community when timed with disappearance of snow can multiply the deasterous effect of the illumination of overhead protection of snow and the inability of lemming to dig under, so to speak. Photo 510908-9 of House Q, Burnurk mounds showing oil in bottom of pit and east wall of excavation where bone pile and polar bear skull was found. Photo 510908-10 of one of the excavated sites showing some of the whale bones used for the house construction. This section was part of the corridor leading into the main house. Photo 510908-11 of excavated whale skull showing grasses placed there by Eskimos and seal by sod of grasses which grew upon the mound. These grasses may have been placed there by lemming and confined by Eskimos as representing food for the deceased ancestors. Their sealing in may be their reaction to keep the spirits secure. Traps placed on these accumulations did not produce lemming. Photo 510908-12 of whale bone from one of the excavated mounds. Took measurements of several whale skulls as:



770 mm
680 mm
640 mm
680 mm
640 mm
780 mm
700 mm

Also measured two polar bear skulls from mounds as: 200 mm zygomatic breadth each. Photo 510908-13 showing accumulation of grasses placed in brain cavity of whale skull from excavated mound. A trap placed in this foramen magnum did not produce a lemming but now believe that this grass was placed in skull by Eskimo as an offering to departed ancestor.

Arctic Research Laboratory, Point Barrow, Alaska
Sept. 9, 1951

Photographed arctic ocean from Arctic Research Lab, nas. 510909-1, 510909-2, 510909-3 showing the short but wild surf on the gravel shoreline. Photo 510909-4 of J.W. Bee at Pt. Barrow.

Arctic Research Laboratory, Point Barrow, Alaska
Sept. 10, 1951

made final packing for shipment and departure tomorrow. The following recommendations are presented.

1. A.R.L. acquire 2 Cessna 170 for field work to supplement plane transportation supplied by Wien, Transocean & Navy. Have equiped for float and wheel.

2. Equip plane with facilities for photographing from air such as side and bottom apertures.

3. In addition to standard equipment add;

a. observation windows in tent placed at sitting position heighth.

b. heating stove and pipe outlet (gas on northern tundra, wood in all areas where available which is generally south of Coastal Plains)

c. extra generators and tools to change gasoline & cooking stoves.

d. add Coleman gas lamp, extra mantles and generators, particularly toward latter part of season when nights are dark.

e. cooking stove with 2 burners.

f. funnel for pouring gas.

g. light folding table and 2 comfortable tables.

h. ground cloth.

i. small shovel and light axe.

j. knee boots

k. 1 pr hip boots of light weight

l. proper head nets

m. pillow for sleeping bag.

n. emergency radio sender

o. flash for photography - lights seldom or infrequent in arctic.

p. utensils should include, in addition to cooking kit.

1. standard frying pan
2. 2 gallon water bucket.
3. high edged washing pan for dishes
4. rinsing pan for dishes
5. dish rags and dish cloth.
6. spatula
7. large fork and spoon
8. butcher knife
9. scouring pads
10. wash basin and hand towel

q planned food menues

r. adequate first aid.

s. bring museum special traps up to 500 per man for periods of low population numbers and 300 traps for normal numbers.

t. Establish double precautionary measures for all captive mammals which are brought to A.R.L for experimental purposes. Citellus parryi is a point in mind where animals from several localities on coastal plain are at A.R.L now.

u. arrange for overall permits for both birds and mammals.

v. Investigate for 1952 the following localities. Cornwallis Island, Peters Lake in Romanzof Mts, Driftwood and Cape Beaufort.

Recommendations and problems of a higher level of consideration for Arctic research in 1952.

1. Investigate - Peters Lake, Driftwood Lake, Cape Beaufort, Gubic, East Oumalik, Kaluk.

2. Request 2 weeks collecting trip to Bathhurst Island for correlation purposes.

3. Problems in air travel from home station to Fairbank.

a. Elevate priority from 2 to 1 for return trip in interest of assuring rapid return of perishable collections.

b. Have all flight arrangement made by Commanding Officer of Air Base Transportation section (makes it possible to appeal to higher authority).

c. Grant 200 lbs excess baggage.

d. Initiate M.A.T.S from Tinker Field, Oklahoma City, with special chartered from Topeka Army Air Base to Tinker Field for both ougnal and return trip.

e. Arrange for official letter of authorization for eating, post exchange and billeting preveleges on military posts while travelling as a civilian from home base to Fairbanks.

4. Issue official credentials as Navy employee.

5. Establish direct phone contact with Washington Office for conformation of project procedures, if required.

6. Issue full protection of life insurance.

7. Issue overall collecting permit for mammals, birds and other ecological specimens.

8. Problems Concerning A.R.L.

a. Employ 2 Cesna 170 planes for summer months.

b. Establish emergency contact while in field.

c. Establish permanent research and investigate

areas in immediate vicinity of A.R.L.

d. Establish a marine research area near Point Barrow.

e. Establish measures to prevent taxonomical contamination and escape of experimental mammals.

9. General problems of Arctic Slope.

a. Preserve Bernirk mounds and other archeological villages as historical monuments (Bernerk mounds and houses at Point Barrow (not Barrow Village)

b. Enforce non-scientific collection of Pleistocene fossils

c. Confine vehicles to established routes

d. Determine extent and prevention of erosion of trails and road construction.

e. Investigate overgrazing of caribou.

f. Discourage molesting mammals and birds by plane.

g. Discontinue using Arctic Ocean for garbage and trash disposal.

h. Enforce clean up of abondoned camps

i. Investigate extent and manner of acquiring game by Eskimos, especially in respect to shooting for pleasure.

j. Postpone development of natural resource until required.

Left the following equipment at A.R.L.: pressure cooker, .410 auxiliary barrel, 18 live traps, 7 boxes .410 shells, 2 metal boxes.

5107 11 - 175

Point Barraw, Alaska

Sept 11, 1951

The following information was reported to Dr. Ira L. Wiggins Scientific Director of ARL at Point Barrow in a report:
Progress report for the month of August and September on the investigation of native Land mammals of northern Alaska.

Continued mammal investigations on August 1 from the NE shore of Teshekpuk Lake. Dicrostonyx groenlandicus is the only mammal represented in our collection from this area. However, the 1,000 meter transects indicated the former presence of both the lemming but fewer in numbers than found at any of our previous collecting stations. Because of the low population of small mammals, gave greater attention to the collection of the few remaining nesting birds. The caribou apparently reach their greatest numbers in this area with herds numbering in the aggregate of some 500 to 600 individuals. Their ceaseless moving permitted exceptional opportunity for the color movie. The tent and cooking equipment remained for use by Cometa and Main of the University of Washington. Returned to ARL and made preparation for immediate departure for Chandler Lake.

Left Point Barraw Aug. 7 and arrived Bettles approx. 4:00 A.M. Set traps shortly after arrival and by 10:00 A.M had a 50% return from our trap line. Our 3 day waiting period at Bettles proved indeed profitable with the acquisition of a full series of most of the common mammals of the wet grass community. On August 10, Mr. James Anderson of the Wien airlines flew us into Chandler Lake.

From August 10 to 25 made collection of small mammals from our station on the SW shore of Chandler Lake. It would appear from our reseults that all small mammal populations are at a relative high except Lemmus which was taken in about the same frequency per trap night as was found on the tundra to the North. The period of our stay at Chandler Lake was during the aspectional change from summer to

to fall with accompanying changes in the vegetation and temperature. Toward the end of August the snow line had descended to the base of the mountains and the temperature dropped to a low as 23° F. Creeks and undisturbed ponds supported ice. Of the more important collections were the addition of approx. 30 shrews and marmots. Of the ~~notable~~ Notable observations were 19 mountain sheep that ranged on the upper reaches of the mountain slopes to the west of our camp.

Returned to Bettles, thence to Point Barrow, arriving August 28. After resupplying departed Umiat August 30 for 5 days. Established camp 1 1/2 miles west of Umiat and trapped representative plant-animal communities from the valley floor to the high plateau. The least weasel was taken from this area in addition to adequate samples of all common mammals. As at all areas examined, the dominant grasses and other vegetation was collected in an attempt to define the plant-animal community. Departed Umiat Sept 4 for ARL.

Except for local testing of mammal populations in the immediate vicinity of Point Barrow, prepared for final departure from the laboratory, leaving the morning of Sept. 11, 1951.

Mammals collected during the months of August and September.

Sorex cinereus cinereus
" " hollisteri
" obscurus obscurus
Mustela erminea arctica
" rixosa eskimo
marmota caligata caligata
Citellus parryi barrowensis
Lemmus trimucronatus alascensis
Dicrostonyx groenlandicus rubricatus
Clethrionomys rutilus dawsoni
Microtus miurus paneaki
Microtus oeconomus macfarlandi

510411-149

CATALOGUE - Grasses & sedges.
Entered in journal Sept. 11, 1951

Grasses and sedges from collecting localities on the Arctic Slope of Northern Alaska (summer of 1951).

Kaolak, 69°56'00", 160°14'51", 178 ft., Alaska. July 26, 1951

510726-1 Arctagrostis latifolia (R. Br.) Griseb.
510726-2 Carex lugens Holm.
510726-3 Poa arctica R. Br.
510726-4 Carex aquatilis Wahl.
510726-5 Carex lugens Holm.
510726-6 Arctagrostis latifolia (R. Br.) Griseb.
510726-7 Calamagrostis canadensis (Michx.) Beauv.
510726-8 Eriophorum
510726-16 Carex (?) sterile
510726-17 Carex aquatilis × C. lugens
510726-18 Carex physocarpa Presl.
510726-19 Carex aquatilis Wahl.

Birnirk mounds, Point Barrow Alaska, 71°20'35", 156°36'10", 5 ft., Alaska July 28, 1951.

510728-5 Arctophila fulva (Trin.) Anderss.
510728-6 " " " "
510728-7 Alopecurus alpinus J. E. Smith
510728-8 Poa
510728-9 Alopecurus alpinus J. E. Smith

N.E. Teshekpuk Lake, 153°05'40", 70°39'40", 12 ft., Alaska July 31, 1951

510731-1 Arctagrostis latifolia (R. Br.) Griseb.
510731-2 Hierochloe alpina (Swartz) Roem. and Schult.
510731-3 Carex misandra R. Br.
510731-4 Festuca ovina var. brachyphylla (Schult.) Piper.
510731-5 Carex misandra R. Br.
510731-6 Luzula (confusa Lindberg (?))
510731-7 Trisetum spicatum (L.) Richt.
510731-8 Arctagrostis latifolia (R. Br.) Griseb.
510731-9 Trisetum spicatum var. molle (Michx.) Beal
510731-10 Festuca ovina var. brachyphylla (Schult.) Piper
510731-11 Hierochloe alpina (Swartz) Roem. and Schult.
510731-12 " " " " " "

Aug. 2, 1951

510802-4 Carex aquatilis Wahl.
510802-5 " " "
510802-6 Carex aquatilis × C. lugens.

510802-7 Carex misandra R. Br.
510802-8 Carex lugens Holm.
510802-9 Carex misandra R. Br.
510802-10 Juncus
510802-11 Arctophila fulva (Prin.) Anderss.

Chandler Lake, 68°12', 152°45, 2900 ft., Alaska Aug. 20, 1951
510820-1 Carex aquatilis Wahl.
510820-2 Calamagrostis canadensis (michx.) Beauv.
510820-3 Carex lugens Holm.
510820-4 " " "
510820-5 " " "
510820-6 Festuca altaica Prin.
510820-7 Poa arctica R. Br.
510820-8 Festuca scabrella Torr.
510820-9 Calamagrostis sp. florets all shed.
510820-10 Carex aquatilis Wahl.
510820-11 Carex (?) sterile
510820-12 Arctophila fulva (Prin.) Anderss.
510820-13 Arctagrostis latifolia (R. Br.) Griseb.
510820-14 Carex physocarpa Presl.
510820-15 Poa arctica R. Br. -- viviparous form
510820-16 Poa arctica R. Br.
510820-17 Carex lugens Holm.
510820-18 Poa glauca Vahl.
510820-19 Carex lugens Holm.
510820-20 Carex aquatilis Wahl
510820-21 " " "
510820-22 Arctophila fulva (Prin.) Anderss.
510820-24 Festuca scabrella Torr.
510820-25 Carex lugens Holm.
510820-26 Carex Kelloggii W. Booth
510820-28 Carex lugens Holm.
510820-29 Poa arctica R. Br.
510820-30 Calamagrostis neglecta (Ehrh.) Gaertn. meyer and Schreb
510820-31 Poa arctica R. Br.
510820-32 Arctagrostis latifolia (R. Br.) Griseb.
510820-33 Trisetum spicatum (L.) Richt.
510820-34 Carex aquatilus Wahl.
510820-35 " " "
510820-36 Carex lugens Holm.

510820-37 Carex podocarpa R. Br.
5108 20-38 Arctagrostis latifolia (R. Br.) Griseb.
5108 20-39 Trisetum spicatum (L.) Richt.

August 28, 1951
510828-6 Agropyron latiglume (Scribn. + Smith) Rydb.
510828-7 Agrostis scabra Willd.
510828-9 Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Schreb. approaches C. canadensis (Michx.) Beauv.
510828-10 Juncus
510828-11 Carex canescens L.
510828-12 Carex Kelloggii W. Booth
510828-14 Carex aquatilis Wahl.
510828-16 Beckmannia syzegachne (Stend.) Fernald.
510828-17 Carex aquatilis Wahl.
510828-18 Poa

1 1/2 mi. W and 3/4 mi N Umiat, 69°22'18", 152°08'10", 370 ft., Alaska Sept. 4, 1951
510904-106 Arctogrostis latifolia (R. Br.) Griseb.
510904-107 Carex aquatilis Wahl.
510904-108 Carex Kelloggii W. Booth
510904-109 Calamagrostis neglecta (Ehrh.) Gaertn. Meyer + Schreb.
510904 110 Carex lugens Holm.

Lichens from collecting localities on the Arctic Slope of northern Alaska. (summer 1951)

Kaolak, 69°56'00", 160°14'51", 178 ft., Alaska July 27, 1951
510727-12 Ochrolechia frigida (Sw.,) Lynge
510727-13 Peltigera aphthosa (L.) Willd.
510727-15 Sphaerophorus globosus (Huds.) Vainio
510727-16 Dactylina arctica (Hook.) Nyl.
510727-17 Cladonia rangiferina (L.) Web.
510727-18 Nephroma arcticum (L.) Torss.

Chandler Lake, 68°12', 152°45', 2900 ft., Alaska. Aug. 21, 1951
510821-3 Cladonia gracilis v. chordalis (Flk.) Schaer.
510821-3a Cetraria islandica (L.) Ach.
510821-3b. Cladonia sylvatica (L.) Hoffm.

510821-5 Thamnolia vermicularis (SW.)
510821-6 Stereocaulon paschale (L.) Hoffm.
510821-7a Alectoria nitidula (T. Fr.) Vain.
510821-8 Cladonia amaurocraea (Flk.) Schaer.
510821-9 Cetraria nivalis (L.) Ach.
510821-11 Cladonia amaurocraea (Flk.) Schaer.
510821-11 Cladonia sylvatica (L.) Hoffm.
510821-11a Cladonia gracilis v. chordalis (Flk.) Schaer.
510821-11-b. Cladonia sylvatica (L.) Hoffm.
510821-11-b Cladonia rangiferina (L.) Web.
510821-12 Cetraria cucullata (Bell.) Ach.
510821-12a Thamnolia vermicularis (SW.) Schaer.
510821-13 Cetraria Chrysantha Tuck
510821-15 " richardsonii (Hook.) Tuck
510821-16 Thamnolia vermicularis (SW.) Schaer.
510821-16a Cladonia pyxidata (L.) Hoffm.
510821-17 Dactylina arctica (Hook.) Nyl.
510821-17 Parmelia separata Th. Fr.

Bettles, 66°54', 151°34', 678 ft., Alaska. Aug. 28, 1951
510828-21 Cladonia cornuta (L.) Schaer.
510828-23 " sylvatica (L.) Hoffm.
510828-25 Nephroma arcticum (L.) Torss.
510828-26 Cladonia alpestris (L.) Rabh.
510828-28 " crispata (Ach.) Flot.
510828-29 Cetraria islandica (L.) Ach.
510828-29 Dactylina arctica (Hook.) Nyl.

1 1/2 mi. W and 3/4 mi N Umiat, 69°22'18", 152°08'10", 370 ft., Alaska Aug 31, 1951
510831-53 Peltigera aphthosa (L.) Welld.
510831-54 Cladonia gracilis v. chordalis (Flk.) Schaer.
510831-58 Cladonia rangiferina (L.) Web.
510831-59 Dactylina arctica (Hook.) Nyl.
510831-60 Alectoria nigricans (Ach.) Nyl.
510831-63 Cetraria nivalis (L.) Ach.
510831-63a Cetraria cucullata (Bell.) Ach.

510911—181

Point Barrow, Alaska

Sept. 11, 1951

The following mammals were collected this summer from northern Alaska.

Sorex cinereus cinereus	Cinereous shrew	3
Sorex cinereus ugyunak	" "	27
Sorex obscurus	Dusky shrew	2
Sorex tundrensis	Tundra shrew	27
Marmota caligata broweri	Hoary marmot	2
Citellus parryi barrowensis	Ground squirrel	9
Tamiasciurus hudsonicus preblei.	Red squirrel	6
Synaptomys borealis dalli	Northern bog lemming	3
Lemmus trimucronatus alascensis	Brown lemming	63
Dicrostonyx groenlandicus rubricatus	Collared lemming	6
Clethrionomys rutilus dawsoni	Dawson red backed vole	203
Microtus oeconomus macfarlani	Tundra vole	182
Microtus miurus paneaki	Singing vole	111
" pennsylvanicus tananaensis	Meadow vole	3
Mustela erminea arctica	Short-tailed weasel	8
" rixosa eskimo	Least weasel	1
Thalarctos maritimus	Polar bear (skull)	1
Ursus horribilis (skull)		1
Vulpes fulva alascensis (skull)		1
Alopex lagopus innuitus (skull)		1
Canis lupus tundrarum (skull)		1

Information was acquired on the following mammals: Lepus othus othus Tundra hare; Erethizon dorsatum myops, Porcupine; Delphinapterus leucas, white whale; Monodon monoceros, Narwhal; Grampus rectipinna Pacific Killer whale; Phocoena vomerina, Pacific harbor porpoise; Eschrichtius gibbosus, Gray whale; Balaena mysticetus, Bowhead whale; Canis latrans incolatus, Coyote; Ursus americanus americanus, Black bear; Mustela vison ingens, mink; Gulo luscus luscus, Wolverine; Lutra canadensis yukonensis, River Otter; Lynx canadensis canadensis, Lynx; Callorhinus ursinus cynocephalus, northern Fur Seal; Odobenus rosmarus divergens, Walrus; Phoca vitulina richardii, Harbor Seal; Phoca fasciata; Ribbon seal; Phoca hispida beaufortiana, Ringed Seal; Erignathus barbatus nauticus, Bearded seal; Alces alces gigas, Moose; Rangifer arcticus stonei, Barren-ground caribou; Ovibos moschatus moschatus, Muskox; Ovis dalli dalli, Dall Sheep.

Bird skeletons collected from arctic Slope of northern alaska in the summer of 1951. Entered in journal Sept. 11, 1951.

Gavea adamsi - yellow-billed loon - Bee 1
Gavea arctica pacifica - Pacific loon - Jones 2
Gavia stellata - Red-throated loon - Bee 1, Jones 3
Clangula h. hyemalis - Old squaw duck - Jones 1
Polysticte stelleri - Steller's eider - Bee 1.
Squatarola squatarala - Black-bellied plover - Jones 2
Pluvialis dominica - Golden plover - Bee 7, Jones 2.
Arenaria interpres morinella - European turnstone - Bee 3, Jones 1
Erolia melanotos - Pectoral sandpiper - Bee 33, Jones 17
" bairdii - Baird sandpiper - Bee 2, Jones 2
" alpina pacifica - Red-backed sandpiper - Bee 11, Jones 8
Ereunetes pusillus - Semipalmated sandpiper - Bee 16, Jones 10
Limnodromus griseus scolopaceus - Long-billed dowitcher, Bee 3, J. 1
Phalaropus fulicarius - Red phalarope - Bee 8, Jones 3
Lobipes lobatus - Northern phalarope - Bee 3, Jones 2
Stercorarius parasiticus - Parasitic jaeger - Bee 1, Jones 1
" longicaudus - long-tailed jaeger - Bee 4, Jones 1
Larus hyperboreus barrowensis - Point Barrow Gull - Jones 1
Xema Sabini - Sabines gull - Bee 4, Jones 4
Sterna paradisaea - Arctic tern - Bee 6, Jones 3
Canachites canadensis osgoodi - Alaska spruce grouse - to Petelka
Lagopus lagopus alascensis - Willow ptarmigan - Jones 4
Lagopus mutus nelsoni - Rock ptarmigan - Bee 1 to Petelka.
Hylocichla minima minima - Grey-cheeked thrush - Bee 1
Oenanthe oenanthe - European wheater - Bee 1, Jones 3
Motacilla flava alascensis - Alaska yellow wagtail - Jones 1
Acanthis flammea - Common redpoll - Bee 9, Jones 1
Passerculus sandwichensis anthinus - Western Savanna Sp - Bee 11, Jones 5
Junco h. hyemalis - Slate-colored Junco - Jones 1
Spizella arborea ochracea - Western tree sparrow - Bee 1
Spizella passerina arizonae - Chipping sparrow - Bee 1
Zonotrichia coronata - Golden-crowned sparrow - Bee 1
Zonotrichia leucophrys gambeli - Gambel's sparrow - Bee 2
Calcarius lapponicus alascensis - Alaska longspur - Bee 32, Jones 37
Plectophenax n. nivalis - Eastern snow bunting - Bee 2, Jones 3

total 286.

5109.1 - 183

CATALOGUE - mammals and birds. Entered Sept. 11, 1951 into journal.

Topagaruk, 70° 34', 155° 48', Alaska

July 5, 1951

SKel	510705-1 ♀	Arenaria interpres morinella	125 gms
"	510705-2 ♂	~~Lebidonia~~ Erolia alpina ~~sakhalina~~ pacifica	58 gms, testes 5 mm
"	510705-3 ♂	Phalaropus fulicarius	51 " , " 7 "
mio	510705-4 ♂	Calcarius lapponicus alascensis	26 " , " 12 "
SKel	510705-5 ♀	Ereunetes pusillus	30 " .
"	510705-6 ♂	" "	22 " , " 4 "
"	510705-7 ♀	" "	27 " .
"	510705-8	Lagopus	19 " , L. 100, ex cul 6.5, tar. 23

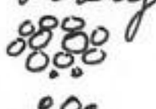
July 6, 1951

SKel	510706-1 ♂	Xema sabini	190 gms, testis 9 mm
"	510706-2 ♂	Phalaropus fulicarius	54 " , " 8 "
"	510706-3 ♂	~~Lebidonia~~ Erolia alpina ~~sakhalina~~ pacifica	64 " , " 5 "
"	510706-4 ♂	Phalaropus fulicarius	53 " , " 9 "
"	510706-5	Calcarius l. alascensis	Length 112 mm, immature
"	510706-6 ♂	Erolia melanatos	102 gms, testis 11 mm
"	510706-7 ♂	Ereunetes pusillus	26 " , " 4 "
"	510706-8 ♂	Plectophenax n. nivalis	36 " , " 9 "

July 7, 1951

SKel	510707-1 ♂	Micrastur gf groenlandicus rubricaudatus	115-11-16.5-6-45 gms
"	510707-5 ♂	~~Lebidonia~~ Erolia alpina ~~sakhalina~~ pacifica	testis 5 mm
"	510707-6 ♀	Erolia bairdii	42 gms
"	510707-7 ♂	Limnodromus griseus	110 gms, testis 6 mm
"	510707-8 ♂	Erolia pusillus	28 " , " 3.5 "
"	510707-9 ♂	" "	28 " , " 3.0 "
"	510707-10 ♀	Plectophenax n. nivalis	35 " , egg mass

July 8, 1951

SKel.	510708-1 ♀	Xema sabini	172 gms, 
↓	510708-2 ♀	Limnodromus ~~griseus~~ scolopaceus	130 gms, 
	510708-3 ♂	Arenaria interpres morinella	~~105~~ 116 " , testes ~~2.5~~ 3 mm
	510708-4 ♂	" " "	105 " , testes 2.5 "
	510708-5 ♀	Stercorarius parasiticus	320 " , ovary 
	510708-6 ♀	Erolia melanatos	65 " ,  largest ovum 3 mm
↑	510708-7 ♀	" "	61 " , 
SKeL	510708-8 ♀	Erolia alpina pacifica	60 " , 

Skel. ↓	510708-9	♀	Erolia alpina pacifica	56 gms wt. ⁂
	510708-10	♀	"	65 " " , egg masses present
	510708-11	♂	Phalaropus fulicarius	49 " " , testis 8 mm
	510708-12	♂	"	45 " " , " 9 "
	510708-13	♂	Ereunetes pusillus	25 " " , " 2 "
	510708-14	♀	"	32 " " , egg masses ⁂
	510708-15	♂	"	30 " " , testes 2 mm
	510708-16	♂	Calcarius lapponicus alascensis	26 " " , " 10 "
	510708-17	♂	"	30 " " ,
	510708-18	♂	Erolia alpina pacifica	59 " " , testes 3 mm
	510708-19	♂	"	56 " " , " 4 "
	510708-20	♂	Ereunetes pusillus	30 " " , " 2 " , fat
	510708-21	♂	Xema sabini	203 " " , testes 14 mm ⬭
↑ Skel	510708-22	♂	Ereunetes pusillus	28 " " , ovary ⁂

July 9, 1951

	510709-1	♀	Erolia melanotos	wt 68 gms, ⁂
	510709-2	♀	"	" 65 " , ⁂
	510709-3	♀	"	61 gms wt, ⁂
	510709-4	♀	"	86 " " , 1 shelled egg, 1-20 mm, 1-10 mm
	510709-5	♂	Ereunetes pusillus	26 " " , testes 2 mm
	510709-6	♂	Erolia alpina pacifica	58 " " , " 2 "
	510709-7	♂	"	55 " " , " 2 "
	510709-8	♂	"	53 " " , " 2 "
	510709-9	♂	"	58 " " , " 3 "
	510709-10	♂	Phalaropus fulicarius	50 " " , " 2 "
	510709-11	♂	"	50 " " , " 4 "
	510709-12	♀	Xema sabini	158 " " , ⁂
	510709-13	♂	Arenaria interpres morinella	96 " " , testes 3 mm
	510709-14	♀	Ereunetes pusillus	28 " " , ⁂
	510709-15	♂	Acanthis flammea holboellii	15 " " , testes 5 mm
	510709-16	♂	Phalaropus fulicarius	52 " " , " 2 1/2 "
	510709-17	♂	Lobipes bilobes	33 " " , " 3 "
	510709-18	♂	Calcarius lapponicus alascensis	25 " " .

July 10, 1951

	510710-2	♀	Erolia bairdii	45 gms wt, ovary ⁂
	516710-6	♀	Pelidna stelleri	○○○ ovary (3x area indicated)

5109 11–185

Kaolak River, 70°11'15", 159°47'40", ft., Arctic Coast Plain, Alaska

July 12, 1951

skel ↓	510712-6	♀	Pluvialis d. dominica	143 gms wt,
	510712-7	♂	" " "	148 " " , testes 5 mm
	510712-8	♂	" " "	150 " " , testes 3 mm
	510712-9	♀	Sterna paradisaea	~~300~~ 100 " " ,
	510712-10	♀	Stercorarius longicaudus	300 " " ,
	510712-11	♂	Limnodromus scolopaceus	100 " " .
	510712-12	♂	" "	
	510712-13	♂	Acanthus flammea holboellii	13 gms wt,
	510712-14	♂	Erolia bairdii	32 " " , testes 3 mm
	510712-15	♀	" melanotos	53 " " ,
	510712-16	♂	Ereunetes pusillus	23 " " , testes 2 mm
	510712-17	♂	Calcarius l. alascensis	28 " " , " 2 "
↑	510712-18	♂	"	22 " " .
skel	510712-19	♀	Erolia melanotos	destroyed

Kaolak River, 70°11'15", 159°47'40", 30 ft., Alaska

July 13, 1951

	510713-1	♂	Lemmus trimucronatus subarcticus	108-19-19-8-24 gms, testes 7 mm
	510713 2	♀	Spermophilus undulatus kennicottii	394-112-62-9-775 ", 9 plac. scars

July 14, 1951

	510714-1	♂	Dicrostonyx groenlandicus rubricatus	118-16-17-6-35 gms, testes 7 mm
	510714-2	♂	"	120-16-18-6-45 gms, " 8 "
	510714-3	♂	Lemmus t. subarcticus	100-18-18-8-20 " , " 6 "
	510714-4	♀	Erolia melanotos	54 gms wt, ovary
	510714-5	♂	Ereunetes pusillus	33 " " , testes 2 mm
	510714-6	♂	Limnodromus scolopaceus	106 " " , " 4 "
imm	510714-7		"	L. 150, excul. 33, tar 36, wt. 28 gms
"	510714-8		Lobipes lobatus	L. 162, " 18, " 25, " 38 ", wing 88
"	510714-9		Erolia melanotos	L. 140, " 17, " 38, " 26" " 48
	510714-10		Vulpes fulva	
	510714-11		Nyctea nyctea (pellets)	

July 15, 1951

Rec.o	510715-1	♂	Lagopus lagopus alascensis	
Skel	510715-2	♀	Calcarius l. alascensis	24 gms wt
	510715-4	♂	Lemmus. t. subarcticus	138-19-19-11-68 gms, testes 12 mm
	510715-7		Ereunetes pusillus	
	510715-8	♂	Lemmus. t. subarcticus	116-19-19-9-38 " , " 9 mm
	510715-10	♂	Microtus oeconomus gilmorei	154-42-20.5-13-42 gms
Skel	510715-11		Clangula hyemalis	

5109 I - 186

Skel	5107 15-13	Lobipes labatus	28 gms wt
"	5107 15-14 ♂		33 " " , testes 2 mm
m.o.	5107 15-15 ♀	Acanthis flammea halboellii	11 " " ,
Skel	5107 15-16 ♀	Calcarius l. alascensis	25 " " ,
"	5107 15-17	Erolia fusillus	23 " " ,
m.o.	5107 15-18	Erolia melanotos (imm)	L. 135 , ex cul 17, tar 30, wing 40, wt 26 gms
"	5107 15-19	Lagopus l. alascensis (mm)	L. 156, " 10, " 30, " 76, " 63 "

July 16, 1951

Skel	5107 16-1 ♂	Acanthis f. hoeboellii	14 gms wt, testes 5 mm
m.o.	5107 16-2 ♂	Calcarius l. alascensis	28 " " , " 1 1/2 mm
Skel	5107 16-3 ♀	"	26 " " ,
	5107 16-6 ♂	Lemmus t. subarcticus	105-15-18-T-20 gms testes 5 mm
	5107 16-8 ♂	"	150-19-19-11-64 " , testes 11 mm
Skel	5107 16-10	Lobipes labatus (jun)	L. 176, ex cul 18, tar 26, wing 103, wt 55 gms

July 17, 1951

Skel	5107 17-1 ♂	Calcarius l. alascensis (jun.)	23 gms wt, testes 1 mm
"	5107 17-3 ♀	"	20 " " ,
	5107 17-4 ♀	Lemmus t. subarcticus	108-17-17-8-22 gms
Skel	5107 17-6 ♂	Acanthis f. hoeboellii	15 gms, testes 6 mm

Egg mass 45 x 20 mm largest egg 8 mm to speck, many black

July 18, 1951

Skel	5107 18-11 ♀	Gavia adamsii	ex cul, 94, wing sp. 1620 L. 870, tail 70, wing 380, tar 118, wt 13 lbs.
"	5107 18-12 ♂	" stellata	wt. 5 lbs, testes 10 mm
"	5107 18 13 ♂	Sterna paradisaea	94 gms wt, " 5 "
"	5107 18-14 ♂	Acanthis f. hoeboellii	13 " " ,
"	5107 18-15 ♀	Erolia melanotus	55 " " ,
"	5107 18-16 ♀	Pluvialis d. dominica	150 " " ,

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

July 21, 1951

Skel ↓	5107 21-1 ♂	Passerculus sandwichensis	20 gms wt, testes 1 mm (~~1mm~~)
	5107 21-2 ♂	"	20 " " , " 1 mm (1mm)
	5107 21-3	Acanthis f. hoeboellii (juv.)	13 gms wt.
	5107 21-4 ♀	" "	13 " "
	5107 21-5 ♀	"	13 " " ovary
	5107 21-6 ♀	Passerculus s. anthinus	19 gms, ovary
	5107 21-7 ♀	"	18 " , ovary
	5107 21-8 ♀	"	16 " , "
	5107 21-9 ♂	"	19 " , testes 1 mm
↑	5107 21-10 ♀	"	17 " , ovary
Skel	5107 21-11	"	26 " ,
m.o	5107 21-12	Calcarius l. alascensis	

510911-187

Skel. ↓	510721-13	♀	Erolia melanatos	55 gms wt, ovary
	510721-14	♀	"	55 " " ,
	510721-15	♀	"	52 " " ,
	510721-16	♀	Stercorarius longicaudus	298 gms ,
	510721-17	♀	"	285 " ,
	510721-18	♂	"	250 " , testis 8 mm
	510721-19	♂	Pluvialis d. dominica	130 " , " 4 "
↑ Skel.	510721-20	♂	"	145 " , " 5 "
	510721-21	♂	Lemmus t. subarcticus	114-16-18-8-26 gms, testis 9 mm
	510721-22	♀	" " "	

July 22, 1951

Skel.	510722-1		Calcarius l. alascensis	28 gms wt.
	510722-3	♀	Lemmus t. subarcticus	112-16-18-7.5-30 gms, 2x6 emb 8 mm
Skel.	510722-4	♀	Passerculus sandwichensis	16 gms ovary
"	510722-5		Erolia melanatos (im)	L.185, ex cul 21, tar 33, wing 94, wt 40 gms
"	510722-6		Phalaropus fulicarius (im)	L.180, " 17, " 25, " 112, wt 31 "

July 23, 1951

Skel.	510723-1	♂	Calcarius l. alascensis	22 gms wt, testes 1 1/2 mm
"	510723-2		"	23 " " ,
SKIN	510723-3	♀	Dicrostonyx g. rubricatus	136-17-18-7-55 gms, ut. enlarges 2 blood data
m.o.	510723-6	♂	Passerculus sandwichensis	24 gms wt, testes 1.5 mm
	510723-7	♀	Lemmus. t. subarcticus	115-17-18-9-36 " , 2x2 emb 12 mm
	510723-8	♀	Sorex cinereus cinereus	89-32-12-4 gms
	510723-9	♀	Lemmus t. subarcticus	115-18-18-9-36 " , 2x3 emb 13 mm , one weighed 105.
	510723-10	♂	"	125-19-19-9-39 " , testes 10 mm
	510723-11	♂	"	124-18-21-10-43 gms, testes 10 mm
Skel.	510723-15	♀	Pluvialis d. dominica	142 gms wt.
"	510723-16	♂	Acanthis f. holboellii	14 gms wt, testes 5 mm
	510723-17	♂	Lemmus. t. subarcticus	102-18-18-8-26 gms, testes 7 mm

July 24, 1951

	510724-1	♂	Lemmus t. subarcticus	122-18-19-9-37 gms, testes 7 mm emb. .35 gms and 21 mm total length
	510724-2	♀	"	130-20-20-10-60 " , 6x3 emb 18 mm ,
	510724-3	♂	"	138-~~20~~-19-~~20~~-19-~~10~~-11-62 gms, test 11 mm
	510724-4	♂	"	125-19-19-9-35 gms, " 9 "
	510724-5	♀	"	144-19-19-9-64 " , 4x4 emb 5 mm
	510724-6	♂	"	120-18-19-9-37 gms. testes 10 mm emb. .10 gms and 12 mm total length
	510724-7	♀	"	119-18-18-9-40 " , 2x4 emb 12 mm

July 25, 1951

	510725-1	♂	Lemmus t. subarcticus	142-20-19.5-11-64 gms, testes 11 mm
	510725-2	♂	"	120-19-19-9-39 gms, " 9 "
	510725-3	♂	"	122-20-18-8-40 " , " 9 "

	510725-4 ♂	Microstonyx groenlandicus rubicatus	119-18-17-5-33 gms, testis 7 mm
skel.	510725-5	Calcarius l. alascensis	38 gms wt, testis 1 mm
"	510725-6	"	30 " " ,
m.o.	510725-7	"	26 " " , leng. 162 mm (im)
"	510725-8	"	25 " " , " 160 " (imm)
"	510725-9	"	24 " " , " 159 " "
"	510725-10	"	26 " " , " 162 " "
"	510725-11	"	26 " " , " 162 " "

July 24, 1951

m.o.	510726-10	Calcarius l. alascensis	22 gms wt., leng 154 mm
"	510726-11	"	L. 265, wt 70, ~~circ~~ 54 mm
	510726-12	Limnodromus ~~griseus~~ scolopaceus	~~L 265~~ 136-18-18.5-9-53 gms, testis 9 mm
	510726-13 ♂	Lemmus t. ~~alascensis~~ subarcticus	131-19-19-9-47 " , " 9 "
	510726-14 ♂	"	~~140-19-19-9-53 " , recent plac. clots~~
	510726-15 ♀	"	140-19-19-9-53 " , recent plac. clots

July 27, 1951

510727-1 ♀	Lemmus t. ~~alas~~ subarcticus	138-18-19-8-51 gms, 3x2 emb 19 mm
510727-2	Nyctea nyctea (pellets)	
510727-3	moss-lichen, 1/10 meter sample from 1 sq meter	

NE Teshekpuk Lake, 153°05'40", 70°39'40", sea level, Alaska

Aug. 1, 1951

	510801-5 ♂	Sterna paradisaea	106 gms wt, testes 2 mm
	510801-6 ♂	"	92 " " , " 2 "
	510801-7 ♀	"	91 " " ,
	510801-8 ♂	Calcarius l. alascensis	24 " " , testis 1 mm
	510801-9 ♂	"	26 " " .
	510801-10 ♂	"	24 " " , testis 1 mm
	510801-11	"	24 " " ,
	510801-12 ♀	~~Calcarius pusillus~~ Calcarius l. alascensis	26 " " .
	510801-13 ♂	Calcarius l. alascensis	25 " " , testes 1 mm
	510801-14 ♂	"	26 " " , " 1 "
	510801-15 ♂	"	24 " " , " 1 "
	510801-16 ♀	"	30 " " ,
	510801-17 ♀	"	26 " " ,
	510801-18 ♂	"	28 " " , testis 1 mm
	510801-19 ♀	"	27 " " .
	510801-20 ♂	"	30 " " , 1½ mm testes
	510801-21 ♂	"	31 " " , 1½ " "
	510801-22 ♂	Ereunetes pusillus	24 " " , 1 mm
	510801-23 ♀	Crotia melanotos	26 " " ,

510801-24 ♂ Erolia alpina pacifica 48gms wt, testes 1.5 mm
lengths 210, exposed 13.
m.o. 510801-25 ♀ Tringa aretica pacifica (imm) 112 gms wt, wing 36, tar 39, mid toe 39

Aug 2, 1951

510802-1 ♀ Lemmus t. alascensis 100 - 17-16-7-17 gms, ut. enlarged.

Aug 3, 1951

SKULL 510803-4 alapex lagopus innuitis

SKEL. 510803-5 ♂ Erolia melanotos 80 gms, testes 2 mm
↓ 510803-6 ♂ " 82 " , " 2 "
510803-7 ♂ " 80 " , " 2 "
510803-8 ♂ " 72 " , " 2 "
510803-9 ♂ " 68 " , " 2 "
510803-10 ♂ " 79 " ,
510803-11 ♂ " 80 " , testes 2 mm
510803-12 ♂ " 73 " , " 2 "
510803-13 ♂ " 86 " , " 2 "
510803-14 ♀ " 81 " , " 2 "
510803-15 ♀ " 57 " , ovaries undeveloped
510803-16 ♂ " 76 " , testes 2 mm
510803-17 ♂ " 79 " , " 2 "
510803-18 ♂ " 84 " , " 2 "
510803-19 ♀ " 60 " , ovaries undeveloped
510803-20 ♀ " 57 " , " "
510803-21 ♀ " 59 " , " "
510803-22 ♂ " 80 " , testes 2 mm
510803-23 ♀ " 57 " , ovaries undeveloped
↑ 510803-24 ♀ " 58 " , " "
SKEL 510803-25 ♂ "

Aug. 4, 1951

510804-1 ♀ Dicrostonyx groenlandicus rubricatus uterus enlarged

Bettles, 66°54', 151°34', 671 ft., Alaska

Aug. 7, 1951

510807-1 ♂ microtus oeconomus gilmorei 177-51-20-14-58 gms, testes 4 mm
m.o. 510807-2 ♂ " 128-34-20-22 " ,
m.o. 510807-5 ♂ " 125-34-20-23 " , testes 2 mm
510807-8 ♀ " 171-49-20-13-51 " , ut. normal
m.o 510807-11 ♂ " 128-32-19-22 gms, testes 2 mm
510807-17 ♀ " 165-46-20-12-48 " , ut. normal
510807-18 ♀ " 168-50-19.5-12-49 " , " "
m.o. 510807-19 ♂ " 134-36-20-24 gms, testes 2 mm
m.o 510807-24 ♂ " 117-30-19-19 gms, " 2 "

	510807-26 ♂	micratus oeconomus gilmorei	170-50-19.5-14-51 gms, testes 4 mm
	510807-40 ♀	"	178-51-21-13-54 " , ut normal
	510807-45 ♂	"	181-52-21-14-58 " , testes 8 mm
	510807-47 ♀	"	162-46-19-12-45 " , ut. normal
m.o.	510807-62 ♀	"	173-47-20-43 gms, ut. normal
m.o ↓	510807-69 ♀	"	110-28-18-16 " , " "
	510807-70 ♀	"	168-46-20-53 " , " "
	510807-94 ♂	"	134-34-19-22 " , testes 2 mm
↑	510807-101 ♂	"	112-30-18-17 " , " 2 "
m.o	510807-102 ♀	"	128-32-19-23 " , ut. normal
	510807-121 ♀	"	153-45-19.5-12-44 gms, ut. normal
	510807-123 ♂	"	175-53-20-14-54 " , testes 5 mm
m.o ↓	510807-126 ♂	"	121-31-19-18 gms, testes 1.5 mm
	510807-127 ♂	"	126-32-19-20 " , " 2 "
↑	510807-158 ♀	"	118-30-19-19 gms, ut. normal
m.o	510807-164 ♀	"	123-31-19-20 gms, " "
	510807-168 ♂	"	180-52-20-14-56 " , testes 4 mm
m.o.	510807-180 ♂	"	124-32-19-21 gms, " 2 "
	510807-181 ♀	"	164-47-19.5-13-45 gms, ut. normal
m.o ↓	510807-189 ♂	"	127-33-19-23 gms, testes 2 mm
	510807-205 ♂	"	125-33-19-23 " , " 2 "
	510807-206 ♂	"	130-39-20-23 " , " 2 "
	510807-215 ♂	"	128-34-19-21 " , " 2 "
	510807-217 ♀	"	128-33-19.20 " , ut. normal
	510807-218 ♀	"	128-33-19-22 " , " "
	510807-220 ♂	"	133-36-19.5-23 " , testes 2 mm
↑	510807-226 ♂	"	137-35-20-22 " , " 2 "
m.o	510807-252 ♀	"	112-33-18-15 " , " 1 1/2 "
	510807-255 ♀	"	175-45-20-13-50 gms, ut. normal
m.o.	510807-262 ♀	"	121-30-18-15 gms, ut. normal
	510807-264 ♂	"	174-52-20-13-55 gms, testes 3 mm
m.o ↓	510807-265 ♀	"	110-31-18.5-14 gms ut. normal
	510807-268 ♀	"	123-34-19-20 " , " "
	510807-269 ♀	"	120-33-18.5-17 " , " "
	510807-270 ♀	"	146-39-19-35 gms, " "
	510807-281 ♂	"	123-34-18-17 " , testes 2 mm
	510807-287 ♂	"	118-29-18-17 gms, " 2 "
	510807-288 ♂	"	120-29-18-18 " , " 2 "
	510807-307 ♂	"	130-33-19-20 " , " 2 "
↑	510807-308 ♂	"	129-38-19-20 " , " 2 "
m.o	510807-311 ♂	"	139-40-20-23 " , " 2 "

m.o.	510807-316	Zonotrichia	
	510807-326 ♀	microtus oeconomus	180-52-20-13-48 gms, ut. normal
m.o	510807-334 ♂	"	121-29-19-19 " , testes 2 mm
m.o.	510807-346 ♂	"	115-29-19-17 gms, " 2 "
	510807-348 ♀	" pennsylvanicus	155-46-20-13-41 gms,
	510807-354 ♀	" "	148-43-19.5-13-40 " , 4×2 placental scars
	510807-381 ♀	Sorex c. cinereus	96-37-11-4 gms, ut. normal
	510807-382 ♂	microtus oeconomus	133-36-20-13-26 gms, testes 2 mm
m.o.	510807-384 ♂	"	109-28-18-16 gms, " 2 "
"	510807-387 ♂	"	122-30-19-20 " , " 2 "
"	510807-399	no mammal in this trap no,	
	510807-400 ♀	microtus oeconomus	158-45-20-13-49 gms, ut. normal

Bettles, 66°54', 151°34', 671 ft., Alaska

Aug. 8, 1951

	510808-1 ♀	microtus oeconomus	171-45-20-14-54 gms, ut. normal
	510808-2 ♀	"	183-54-20-15-59 " , " "
	510808-5 ♀	"	130-30-20-13-24 " , " "
m.o.	510808-11 ♂	"	128-32-18-12-21 " , " "
"	510808-13 ♂	"	125-31-19-11-17 " , testes 2 mm
	510808-14 ♂	"	132-25-19-13-32 " ,
m.o.	510808-15 ♂	"	134-34-18-13-21 gms, test 2 mm
	510808-17 ♂	"	[160]-[30]-20-14-56 " , " 5 "
m.o	510808-20 ♀♂	"	133-33-19-13-20 " , ut. normal
m.o	510808-26 ♂	"	135-34-18-13-22 gms, test. 2 mm
	510808-27 ♀	"	129-35-18-13-21 " , ut. normal
m.o	510808-37 ♀	"	125-31-18-12-18 " , " "
"	510808-40 ♀	"	126-32-18-12-20 " , testes 2 mm
"	510808-43 ♂	"	184-50-19-14-52 " , " 4 "
	510808-46 ♂	"	110-21-18-12-16 " , uterus normal
m.o	510808-47 ♀	"	119-22-18-12-16 " , " "
"	510808-52 ♀	"	120-23-18-12-16 " , testes 2 mm
"	510808-54 ♂	"	113-30-19-10-15 " , ut. normal
"	510808-61 ♀	"	110-25-18-11-15 " , testes 2 mm
"	510808-63 ♂	"	126-25-19.5-14-34 gms, testes 4 mm
	510808-64 ♂	"	120-33-19-12-23 gms, " 2 "
	510808-68 ♂	"	129-28-18-13-18 " , ut. normal
m.o	510808-69 ♀	"	128-32-19-12-20 " , ut. normal
"	510808-72 ♀	"	101-18-18-10-11 gms, " "
"	510808-74 ♀	"	122-33-19-12-18 " , test. 2 mm
"	510808-75 ♂	"	

	510808-82	♂	Microtus oeconomus	158-41-20-13-41 gms, testis 14 mm
m.o	510808-87	♂	"	122-30-18-11-18 " , " 2 "
m.o.	510808-89	♂	"	126-31-19-13-18 " , " 2 "
	510808-96	♂	"	148-41-19-13-40 " , " 2 "
m.o	510808-102	♂	"	136-35-20-13-22 " , " 2 "
"	510808-105	♂	"	122-30-18-11-18 " , " 2 "
	510808-106	♂	"	134-36-20-13-24 " , " 2 "
skel	510808-107		Zonotrichia leucophrys	27 gms wt.
m.o	510808-110	♂	Microtus oeconomus	130-34-19-13-20 gms, testis 2 mm
"	510808-111	♂	"	132-34-19-12-22 " , " 2 "
	510808-112	♂	"	184-55-20-14-53 " , " 6 "
	510808-113	♂	Sorex cinereus cinereus	98-38-12-4 gms
	510808-117	♀	Microtus oeconomus	183-51-20-14-54 " , ut. normal
m.o.	510808-121	♂	"	113-26-18-11-15 " , testis 2
"	510808-122	♀	"	115-28-18.5-12-15 " , ut. normal
"	510808-130	♂	"	125-33-19-12-22 gms, testis 2 mm
skel	510808-132	♂	Passerculus sandwichensis	
	510808-133	♂	Microtus oeconomus	186-53-20-14-58 gms, testis 7 mm
m.o.	510808-134	♀	"	130-32-19-12-20 " , ut. normal
	510808-143	♂	" pennsylvanicus	135-40-19.5-12-23 gms ~~186-53-20-14-58~~ " , ~~testis 7 mm~~
m.o.	510808-146	♂	" "	123-31-18-12-15 gms, testis 4 mm
"	510808-150	♀	" "	134-37-19-13-24 gms, ut. normal
"	510808-154	♂	" oeconomus	96-24-17-7-8 gms, testis 4.5 mm
TO. A.R.L.	510808-155	♂	Clethrionomys rutilus	Skull K.U., Skin Arctic Research Lab. 122-53-19-13-20 " , testis 3 mm
m.o.	510808-158		Microtus oeconomus	
	510808-168	♂	"	180-53-20-14-60 gms, testis 8 mm
	510808-179	♂	"	168-51-19.5-13-50 " , " 8 "
skel	510808-183		Passerculus sandwichensis	
m.o	510808-186	♂	Microtus oeconomus	128-34-19-13-20 gms, testis 2 mm
"	510808-195		" "	
"	510808-196	♂	" "	126-34-19-12-20 gms, testis 2 mm
"	510808-199	♂	" "	129-35-19.5-22 " , " 2 "

Aug. 9, 1951

m.o.	510809-3	♀	Microtus oeconomus	129-32-18-13-21 gms, ut. normal
	510809-5	♂	"	138-36-20-13-22 " , test 2 mm
m.o	510809-14	♀	"	126-30-19-12-20 " , ut. normal
"	510809-19	♂	"	129-31-18-13-22 " , testis 2 mm
	510809-30	♀	"	109-22-18-13-17 " , ut. normal
	510809-33	♂	"	158-47-20.5-14-87 " , testis 7 mm
	510809-41	♂	"	138-36-19.5-13-21 " , " 2 "
m.o.	510809-53	♀	"	119-33-19-13-18 gms, ut. normal

m.o	510809-59 ♂	microtus oeconomus		136-37-19-14-22gms, testes 2 mm
	510809-70 ♀	"		160-42-20-14-45 ", ut. normal
m.o	510809-81 ♂	"	pennsylvanicus	120-30-19-14-20 ", test. 4 mm
m.o	510809-89 ♂	"	oeconomus	127-31-18-13-19 ", " 2 "
	510809-96 ♂	clethrionomys rutilus		118-33-19-14-17 ", " 2 "
m.o	510809-98 ♀ ♂	microtus oeconomus		128-31-18-13-20 ", ut. normal
m.o.	510809-103 ♂	"		130-34-20-13-23 ", testes 2 mm
	510809-104 ♀	"		161-47-20-14-41 ", ut. normal
	510809-105 ♂	"		143-43-20-13-27 ", testes 2 mm
	510809-129 ♂	"		130-31-20-12-21 ", " " "
m.o.	510809-136 ♀	"		130-31-9-22 gms, ut. normal
"	510809-145 ♀	"		135-36-19-14-19 ", " "
"	510809-148 ♂	"		138-37-19.5-14-21 ", test 2 mm
	510809-151 ♀	"		150-43-19-14-41 gms, 2 plac. scars
	510809-175 ♂	"		138-38-19.5-14-23 ", testes 3 mm
m.o	510809-181 ♂	"		130-31-19-22 gms, test 2 "
	510809-183 ♂	"		130-38-19-13-21 ", " 2 "
skin.o.	510809-195 ♂	"		165-47-19.5-14-41 ",

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

Aug. 10, 1951

	510810-1 ♀	microtus oeconomus		165-50-20-12-44 gms, ut. vascularized
	510810-2 ♂	"		[155]-[42]-20-12-43 ", test 9 mm
m.o.	510810-3 ♀	"		131-32-19-12-27 gms, 4x1 emb 9 mm
	510810-4 ♂	microtus minus muricei	flank glands	144-36-19.5-13-45 ", testes 9 mm,
	510810-5 ♀	"		155-33-20-13-44 ", ut. normal
	510810-6 ♂	"		119-25-20-13-22 ", testes 3 mm
	510810-7 ♂	"		115-24-20-12-21 ", " 3 "
	510810-8 ♂	"		123-24-20.5-13-23 gms, " 3 "
	510810-9 ♂	microtus oeconomus		116-17-19-33 gms, ut normal
	510810-10 ♀	Clethrionomys rutilus		150-41-20-15-35 ", 4x3 plac. scars
	510810-11 ♀	"		118-30-19-14-19 ", ut. normal
	510810-12 ♂	"		123-32-20-14-19 ", test 3 mm
m.o.	510810-13 ♂	"		122-31-20-14-19 ",
	510810-14 ♂	Sorex cinereus ugyunk		91-31-12-5 gms, testes 4.5 mm
	510810-15 ♂	Spermophilus undulatus kennicottii		340-112-64-14-560 gms, testes 8 mm
	510810-16 ♂	Passerculus sandwichensis		

Aug. 11, 1951

	510811-1 ♀	microtus minus muricei	133-27-20-13-27 gms, ut. normal
	510811-2 ♀	"	145-34-19.5-13-40 ", " "
	510811-3 ♀	"	148-33-20-13-47 ", 4x2 emb 20 mm

	510811-4 ♀	microtus miurus muriei	151-41-20-13-41 gms, ut. normal
	510811-5 ♂	"	118-28-19.5-12-18 ", testis 3 mm
	510811-6 ♂	"	120-27-19-12-17 gms, " 3 "
	510811-7 ♂	"	126-27-20.5-20 gms, " 3 "
	510811-8 ♀	"	121-26-20-12-17 ", ut. normal
	510811-9 ♂	"	114-28-20-12-15- testis 3 mm
	510811-10 ♂	"	116-27-20-12-18 gms, " 3 "
	510811-11 ♂	"	118-28-20-12-20 ", " 3 "
m.o ↓	510811-12 ♂	"	112-25-20-12-19 ", " 3 "
	510811-13 ♀	"	113-25-19.5-12-20 ", ut. normal
	510811-14 ♀	"	111-28-20-12-19 ", " "
	510811-15 ♀	"	120-27-19-12-18 ", ut. normal
	510811-16 ♂	"	130-27-20-13-21 ", testis 3 mm
	510811-17 ♀	"	123-28-20-13-19 ", ut. normal
↑	510811-18 ♀	Clethrionomys rutilus	127-35-19-17-18 ", " "
m.o	510811-19 ♂	"	124-31-19-16-20 ", testis 3 mm
	510811-20 ♂	"	122-33-19-16-22 ", " 3 "
	510811-21 ♂	"	146-48-20-17-36 ", " 4 "
	510811-22 ♀	"	116-33-19-16-18 ", ut. normal
	510811-23 ♂	"	115-34-19.5-17-19 ", testis 3 mm
	510811-24 ♀	"	116-33-19-17-20 ", ut. normal
	510811-25 ♀	"	118-34-19.5-18-21 ", " "
	510811-26 ♀	"	126-35-19-17-18 ", " "
SKel.	510811-27 ♂	Calcarius l. alascensis	
	510811-28 ♀	Sorex arcticus tundrensis	93-30-13-5 gms, ut. normal
	510811-29 ♂	mustela ermines	395-95-50-24-190 gms
m.o.	510811-30 ♂	Lemmus t. subarcticus	90-14-16-6-13 gms
SKel	510811-31 ♀	Spermophilus undulatus kennicottii	363-112-63-12-530 gms, ut. normal, fat

Aug, 12, 1951

	510812-8 ♂	Clethrionomys rutilus	123-36-19-15-19 gms
	510812-9 ♀	"	121-36-19-14-19 "
	510812-10 ♀	"	120-35-19-14-18 "
	510812-11 ♂	"	122-36-19-15-20 "
	510812-12 ♀	"	125-37-19-15-18 ", ut. normal
	510812-13 ♀	microtus oeconomus	122-33-19-11-17 ", " "
	510812-14 ♂	microtus miurus muriei	134-28-20-12-23 ", testis 3 mm
	510812-15 ♂	"	120-26-20-12-22 gms, " 3 "
	510812-16 ♂	"	123-27-20-12-20 ", " 5 "
m.o.	510812-17 ♀	"	121-26-20-11-29 ", ut. normal
"	510812-18 ♂	"	122-26-20-11-30 ", test 2.5 mm
"	510812-19 ♀	"	125-28-20-12-21 ", ut. normal

5109 11 – 195

m.o	510812-20 ♂	Microtus muurus muriei	120-26-20-11-28 gms, testes 2.5 mm
"	510812-21 ♀	"	116-28-18.5-11-16 ", ut. normal
"	510812-22 ♀	"	130-27-20-12-19 ", " "
"	510812-23 ♀	"	121-26-20-11-18 ", " "
	510812-24 ♂	Lemmus l. subarcticus	105-23-18-10-24 ",
	510812-25 ♂	mustela erminea	340-94-49-22-195 ".
m.o.	510812-26	Passerculus sandwichensis	
"	510812-27	" "	
Skel.	510812-28 ♂	Oenanthe o oenanthe	
m.o.	510812-29	Calcarius l. alascensis	

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

Aug. 13, 1951

	510813-1 ♂	Clethrionomys rutilus	116-31-19-14-18 gms, testes 3 mm
	510813-2 ♂	"	124-36-19-14-20 ", " 3 "
	510813-3 ♂	"	142-39-20-15-27 ", " 6 "
m.o.	510813-4 ♀	"	126-31-20-12-25 ", ut. normal
"	510813-5 ♀	"	122-34-19-13-21 ", " "
	510813-6 ♀	Microtus muurus muriei	125-30-20-12-24 ", " "
	510813-7 ♀	"	115-26-19-13-20 ", testes 3 mm
	510813-8 ♂	"	122-26-19.5-13-20 ", " 2 "
	510813-9 ♀	"	122-26-19-14-20 ", ut. normal
	510813-10 ♀	"	138-30-19-13-30 ", " "
m.o.	510813-11 ♀	"	112-25-18.5-13-14 ", " "
	510813-12 ♀	" Aecomomys galmorei	160-44-20-12-44 ", ut. vascularized
	510813-13 ♂	"	160-43-20-13-50 ", testes 8 mm
	510813-14 ♀	"	148-40-19-13-38 ", ut. enlarged & vasc.
	510813-15 ♀	"	152-44-19.5-13-36 ", 3x2 emb 5 mm
m.o.	510813-16 ♀	"	116-31-18-12-16 ", ut. normal
"	510813-17 ♂	"	117-30-18-12-17 ", testes 2 mm
	510813 18 ♂	Lemmus l. subarcticus	109-19-18-9-27 ", " 8 "
	510813-19 ♂	"	113-20-18-9-25 ", " 3 "
	510813-20 ♂	Sorex arcticus tundrensis	102-34-12.5-8-6 gms, testes 8 mm
	510813-21 ♂	" cinereus cinereus	83-31-11-4 gms, testes 3.5 mm
	510813-22 ♀	" arcticus tundrensis	95-31-12-8-7 ", ut. normal
Skel.	510813-23 ♂	Spermophilus u. kennicottii	277-81-53-14-330 gms, testes 4.5 mm

Aug 14, 1951

510814-9 ♂	Lemmus l. subarcticus	116-19-18-9-22 gms, testes 3 mm
510815-10 ♀	"	114-19-18-9-21 ", ut. normal, fat along uterus
510815-11 ♀	clethrionomys rutilus	126-33-19-14-20 gms, ut. normal
510815-12 ♀	"	118-33-19-14-17 ", " "

	510814-13 ♂	Clethrionomys rutilus	123-33-19-14-19 gms, testes 2 mm
	510814-14 ♀	Microtus oeconomus	111-27-18.5-11-13 ", ut. normal
SKull	510814-15 ♂	Spermophilus undulatus kennicotti	361-102-59-722 gms, testes 13 mm
	510814-16 ♂	"	405-125-60-2 lbs.

Aug. 15, 1951

	510815-1 ♀	Clethrionomys rutilus	125-33-20-15-23 gms, ut. normal
	510815-2 ♀	"	128-34-20-14-23 ", " "
	510815-3 ♀	"	132-34-20-14-21 ", " "
	510815-4 ♀	"	126-33-20-14-17 ", " "
	510815-5 ♂	"	125-34-20-14-22 ", testes 3 mm
	510815-6 ♂	"	128-34-20-14-18 ", " 2 "
	510815-7 ♂	"	127-34-20-14-17 ", " 2 "
	510815-8 ♀	"	120-32-19.5-14-17 ", Ut. normal
	510815-9 ♂	"	123-33-19-14-18 ", testes 2 mm
	510815-10 ♂	"	133-36-20-14-20 ", " 2 "
	510815-11 ♂	"	138-37-20-14-28 ", " 6 "
	510815-12 ♀	"	126-34-19-14-21 ", ut. normal
	510815-13 ♂	"	130-35-20-14-21 ", testes 3 mm
	510815-14 ♂	"	118-33-20-14-16 ", " 3.5 "
	510815-15 ♂	"	118-33-20-14-16 ", " 3.5 "
	510815-16 ♂	"	110-30-19.5-13-13 ", " 3.5 "
	510815-17 ♀	Microtus muscus muriei	153-34-19-13-35 ", ut. normal
	510815-18 ♂	"	121-27-21.5-12-22 ", testes 2 mm
	510815-19 ♀	"	115-27-19-12-19 gms, ut. normal
	510815-20 ♀	"	125-28-19-12-21 ", " "
m.o.	510815-20a ♀	" oeconomus	128-31-19-11-18 ", " "
	510815-21 ♂	" muscus muriei	125-27-21-13-24 ", testes 2.5 mm
	510815-22 ♀	"	122-26-19-12-20 ", ut. normal
	510815-23 ♂	"	115-23-19-12-20 ", testes 2.5 mm
m.o.	510815-24 ♂	"	106-24-18-10-12 ", " 2.5 "
"	510815-25 ♀	"	108-25-18-10-13 ", ut. normal
"	510815-26 ♀	"	106-24-18-10-13 ", " "
Skel.	510815-27 ♂	Passerculus sandwichensis	L. 156, 18 gms wt.
SKull	510815-28 ♂	Spermophilus u. kennicottii	392-115-64-15-558 gms, testes 6.5
	510815-29 ♂	Lemmus t. subarcticus	132-19-16.5-10-40 ", " 6 mm
	510815-30 ♂	Clethrionomys rutilus	120-29-20-14-20 ", testes 1.5 mm
	510815-31 ♂	"	118-27-20-14-20 ", " 1.5 "
	510815-32	Sorex arcticus tundrensis	98-33-13-5 gms
	510815-33 ♀	Microtus muscus muriei	128-27-20-13-21 gms, ut. normal

Aug. 16, 1951

	510816-1 ♀	Clethrionomys rutilus	123-34-21-14-23 gms., ut. normal

510911-197

m.o	510816-2 ♂	microtus muurus muriei	98-22-19-10-13 gms, testis 3 mm
"	510816-3 ♀	"	105-25-19-10-13 gms, ut. normal
"	510816-4 ♂	"	100-23-19-10-12 " , testis 4 mm
	510816-5 ♂	clethrionomys rutilus	123-34-19.5-14-24 " , " 2.5 mm
	510816-6 ♂	"	125-34-20-14-22 " , " 3 "
	510816-7 ♂	Sorex cinereus ungyrak	88-33-12-4 gms, testis 2.5 mm
	510816-8 ♀	clethrionomys rutilus	144-40-19.5-15-34 gms, 4x4 placentae
m.o.	510816-9 ♂	"	110-39-19-14 gms, testis 3.5 mm
	510816-10 ♂	"	118-33-19.5-14-20 gms, " 3 "
SKel	510816-11 ♂	Calcarius l. alascensis	L. 175, wt 27 gms.
SKull	510816-12 ♂	Spermophilus u. kennicottii	393-130-65-12-685 gms, testis 9 mm

Aug. 17, 1951

m.o	510817-2 ♀	clethrionomys rutilus	132-34-19-14-20 gms, ut. normal
"	510817-13 ♀	"	130-34-19.5-14-20 " , " "
"	510817-14 ♂	"	128-34-19-14-21 " , testis 2.5 mm
	510817-23 ♂	Lemmus t. subarcticus	113-19-19-10-25 gms, " 4.5 "
m.o.	510817-27 ♀	clethrionomys rutilus	126-33-19-13-17 " , ut. normal
	510817-30 ♂	"	129-34-19-14-21 " , testis 2.5 mm
m.o.	510817-31 ♀	"	129-34-19-14-17 " , ut. normal
	510817-32 ♂	"	143-42-20.5-15-26 " , testis 6 mm
m.o.	510817-34 ♀	"	130-28-20.5-13-26 " , ut. normal
	510817-35 ♂	"	126-33-20-14-22 " , testis 2.5 mm
m.o	510817-40 ♀	"	130-28-20-13-19 " , ut. normal
"	510817-43 ♀	"	130-28-19-13-19 " , " "
"	510817-45 ♀	"	127-34-19-14-18 " , " "
"	510817-46 ♂	"	123-33-19-13-17 " , testis 2.5 mm
"	510817-51 ♂	"	124-33-19-13-18 " , " 2.5 mm
	510817-53 ♂	microtus muurus muriei	130-28-20.5-13-26 " , " 3 "
	510817-55 ♂	clethrionomys rutilus	146-40-21-16-34 " , " 7 "
m.o	510817-56 ♂	"	136-35-19-14-23 " , " 3 "
"	510817-57 ♀	microtus muurus muriei	121-24-20.5-12-17 " , ut. normal
"	510817-61 ♀	"	122-24-20.5-12-18 " , " "
"	510817-74 ♂	clethrionomys rutilus	128-34-19-14-18 " , test 2.5 mm
	510817-75 ♀	"	122-32-19.5-14-20 " , ut normal
m.o.	510817-78 ♀	microtus muurus muriei	130-28-20.5-13-25 gms, ut. normal
"	510817-79 ♀	clethrionomys rutilus	128-34-19-14-19 gms, ut. normal
	510817-85 ♀	Sorex cinereus ungyrak	86-33-11-7-4 gms, ut. normal
m.o.	510817-86 ♂	clethrionomys rutilus	126-33-19-14-19 gms, test 2.5 mm
"	510817-87 ♀	"	134-35-19.5-14-20 " , ut. normal
"	510817-90 ♀	"	131-34-19-14-19 " , " "
	510817-98 ♀	"	142-38-20-15-31 " , " "

510911-198

m.o	510817-99 ♂	Clethrionomys rutilus	125-34-19-13-20gms, ut. normal
"	510817-102 ♀	"	131-34-19-13-19 ", " "
"	510817-103 ♂	"	130-33-18-13-20 ", testes 2.5 mm
"	510817-104 ♀	"	130-33-19-14-20 ", " "
	510817-105 ♂	"	123-36-19-14-20 ", testes 3 mm
m.o.	510817-106 ♂	"	130-34-19-14-21 ", " 2.5 "
"	510817-107 ♀	"	128-33-19-13-18 ", ut. normal
"	510817-108 ♂	"	126-33-19-13-28 ", testes 2.5 mm
"	510817-109 ♂	microtus muurus muriei	110-22-17-12-13 ",
"	510817-110 ♂	Spizella arborea	L.160, 18 gms
"	510817-111 ♀	microtus oeconomus	180-48-20-13-65gms, 2x4 emb 21 mm
	510817-112 ♀	" muurus muriei	133-29-19.5-13-27 ", ut. normal
m.o.	510817-113 ♀	Spizella arborea	L.156, 18 gms

Aug. 18, 1951

	510818-1 ♂	Spermophilus u. kennicottii	385-122-63-13-620gms, testes 9 mm
	510818-5 ♀	Clethrionomys rutilus	152-41-19-14-33gms 6x6 plac scars
	510818-15 ♀	"	143-43-20-14-38 ", lactating
	510818-34 ♂	microtus muurus muriei	121-27-20.5-13-24gms, testes 3 mm
m.o.	510818-49 ♀	Clethrionomys rutilus	112-34-18-13-18 gms, ut. normal
"	510818-51 ♂	microtus muurus muriei	120-28-20-13-19 ", testes 2.5 mm
	510818-55 ♂	"	128-28-21-13-24 ", " 3 "
	510818-59 ♂	"	131-34-21-13-23 ", testes 3 mm
m.o.	510818-73	Clethrionomys rutilus	118-33-18-13-15gms.
	510818-77 ♂	"	124-36-19-13-17 gms, testes 2.5 mm
m.o.	510818-78 ♀	microtus muurus muriei	100-24-18-12-11 gms, ut. normal
	510818-88 ♀	"	88-33-20-14-39 ", 4x2 plac. scars
	510818-91	Clethrionomys rutilus	126-36-20-15-22 ",
m.o.	510818-92 ♂	Spizella arborea	L.156, wt 20gms
"	510818-100	Clethrionomys rutilus	140-43-20-14-16 gms
	510818-101 ♂	microtus oeconomus	170-44-20-13-50 ", testes 5 mm
m.o.	510818-104 ♂	"	105-28-17-11-12 gms, testes 4 mm
	510818-112 ♀	Sorex cinereus ugyuak	98-34-12-7-3.5 gms, ut. normal
m.o.	510818-115 ♂	microtus oeconomus	115-32-19-12-15 gms,
	510818-121 ♂	Clethrionomys rutilus	118-31-19-14-21 gms, testes 2.5 mm
	510818-124 ♂	microtus oeconomus	168-45-21-13-52 gms, testes 7 mm
	510818-125 ♂	"	152-42-20-12-42 ", " 6 "
	510818-127 ♀	"	146-38-19-13-42 ", plac. scars & vascular
m.o.	510818-128 ♀	Clethrionomys rutilus	127-33-19-13-20 gms, ut. normal
	510818-129 ♂	"	120-30-19.5-13-24 ", testes 3 mm
	510818-150 ♂	"	120-30-19.5-13-21 ", testes 2.5 mm
Skel.	510818-151	Calcarius l. alascensis (juv).	L. 170 mm, wt 23 gms.

510911-199

	510818-152	♀	Microtus m. muriei	118-26-20.5-13-23 gms, ut. normal
m.o.	510818-153	♀	Clethrionomys rutilus	[105] [21]-18-13-20 gms, " "
	510818-154	♂	"	120-33-20-14-23 " , testes 3 mm
	510818-155	♀	Lemmus t. subarcticus	108-18-18-9-24 " , ut. normal
m.o.	510818-156	♀	Clethrionomys rutilus	[85] [9]-18-13-12 " , " "
	510818-157	♂	"	123-31-19.5-13-21 " , testes 2.5 mm
	510818-158	♀	"	140-39-19-14-28 gms, plac. scars
m.o.	510818-159	♀	Microtus m. muriei	117-26-20-13-20 " , ut. normal
	510818-160	♂	Spermophilus u. kennicottii	375-120-64-12-550 gms, testes 10 mm

Aug. 19, 1951

	510819-35	♂	Microtus m. muriei	135-27-20.5-13-24 gms, testes 2 mm
Skel	510819-37		Spizella passerina	L. 165, wt 16 gms
Skel	510819-48	♂	Zonotrichia coronata	L. 190, wt 32 " , testes small o.
	510819-49	♂	Clethrionomys rutilus	123-30-19-14-19 gms, testes 2.5 mm
	510819-50	♂	Microtus m. muriei	126-26-20-12-23 " , " " 2.5 "
	510819-59		"	130-27-20.5-13-24 " ,
	510819-63	♀	Clethrionomys rutilus	123-33-20-14-17 gms, ut. normal
Skel	510819-70	♂	Spizella arborea	L. 162, 19 gms wt.
	510819-72	♀	Sorex o. obscurus	116-47-14.5-7-5.5 gms, plac. scars
	510819-73	♀	Clethrionomys rutilus	161-41-19-15-33 gms, plac. scars
m.o.	510819-74	♂	"	132-36-20-14-21 " , testes 2.5 mm
	510819-81	♀	"	155-46-19.5-15-32 " , plac. scars
	510819-83	♂	"	130-33-19.5-14-23 " , testes 2.5 mm
m.o.	510819-84	♂	Spizella arborea	L. 165, 21 gms, (entire body molting)
	510819-88	♂	Clethrionomys rutilus	128-32-19-14-21 gms, testes 3 mm
	510819-89	♂	"	125-31-19-14-19 " , testes 2.5 mm
m.o.	510819-90	♀	"	115-32-19-13.5-13 gms. ut. normal
"	510819-91		Spizella arborea	L. 160, 19 gms wt (entire body molting)
	510819-92		"	L. 160, 17 " " (" " ")
Skel	510819-96		Zonotrichia leucophrys	L. 175, 28 " " .
m.o.	510819-98	♀	Clethrionomys rutilus	130-36-20-14-20 gms, testes 2.5 mm
	510819-100	♀	Clethrionomys "	123-30-19-14-19 " , ut. normal
	510819-115	♂	Microtus oeconomus	173-48-22-14-55 " , testes 5 mm
m.o.	510819-117	♀	"	124-30-18-12-15 " , ut. normal
	510819-119	♀	"	150-42-19-14-36 " , lactating
m.o.	510819-120	♀	Clethrionomys rutilus	132-35-20-15-20 " , ut. normal
"	510819-121	♂	"	128-35-20-15-20 " , testes 3 mm
"	510819-122	♂	"	128-33-20-14-20 " , testes 3.5 mm
	510819-124	♂	"	124-31-19-14-19 " , " 2.5 mm
m.o.	510819-126	♀	"	123-32-18.5-13-19 " , ut. normal
"	510819-127	♀	Microtus oeconomus	89-24-15-7-7 gms " "

510911-200

m.o.	510819-129	♀	Clethrionomys rutilus	124-28-20-14-19 gms, wt. normal
	510819-130	♀	"	129-31-19-14-20 " , " "
	510819-131	♀	"	127-33-19-14-21 " , " "
	510819-132	♂	"	120-32-19-15-21 " , testes 2.5 mm
	510819-133	♀	"	152-39-19.5-15-28 " , wt. normal
m.o	510819-134	♀	"	127-33.20-14-21 " , " "
"	510819-135	♂	"	128-33.20-14-20 " , testes 3 mm
"	510819-136	♂	"	120-29-19-13-18 " , " 2.5 "
"	510819-137		"	130-35-20-14-21 " , " 3 "
"	510819-138		"	128-33-20-14-20 " , " 3 "
"	510819-139		Microtus muurus	118-28-19-13-19 " ,
	510819-140	♂	"	124-27-19.5-13-20 " , testes 2 mm

Aug. 20, 1951

	510820-38	♂	Clethrionomys rutilus	120-30-19-14-22 gms, testes 2.5 mm
	510820-39	♀	"	122-30-19-14-23 " wt. normal
m.o.	510820-40	♀	"	125-32-19.5-14-20 " , " "
"	510820-41	♀	"	115-28-19-13-17 gms , " "
"	510820-42	♀	"	125-33-19.5-14-20 " , " "
"	510820-43	♀	"	118-29-19-14-15 " , " "
"	510820-44	♀	"	124-33-19-14-20 " , " "
skel.	510820-45	♀	Lemmus t. subarcticus	109-18-18-8-20 gms, " "
	510820-46		Sorex arctica tundrensis	95-30-12-4 gms
	510820-47	♀	Clethrionomys rutilus	120-30-19-14-21, wt. normal
	510820-48		Canis lupus tundrarum	

Aug. 21, 1951

	510821-1	♂	Mustela erminea	323-93-50-23-155 gms, testes 5 mm

Aug. 23, 1951

	510823-1	♂	Hylocichla minima aliciae	L. 186 mm, wt 34 gms.
	510823-2	♂	Clethrionomys rutilus	128-34-20-14-19 gms, testes 3 mm
	510823-3	♀	"	143-38-20-15-31 " , lactating
m.o.	510823-4		Spizella arborea	
	510823-5	♂	Sorex cinereus tegyrak	90-33-11-7-4 gms, testes 1 mm
	510823-6	♂	Clethrionomys rutilus	128-35-20-14-19 gms, testes 3 mm
	510823-7	♂	"	140-38-19-13-26 " , testes 3.5 mm
	510823-8	♂	"	126-33-20-14-22 " , testes 3 mm
	510823-9	♀	"	156-41-21-15-32 " , plac. scars
skull	510823-10	♂	"	128-33-20-14-23 " , testes 2.5 mm
m.o.	510823-11	♂	"	130-34-20-14-21 " , " 3 "
"	510823-12	♀	"	124-32-19-14-18 " , wt. normal
"	510823-13	♀	"	128-32-19.5-14-21 " , " "
"	510823-14	♀	"	124-32-19-14-20 " , " "

510911-201

m.o.	510823-15 ♂	Clethrionomys rutilus	127-33-20-46-22 gms, testes 3 mm
↓	510823-16 ♂	"	130-34-19.5-14-21 " , " 3 "
	510823-17 ♀	"	128-33-19.5-14-20 " , ut. normal
	510823-18 ♂	"	124-32-19-14-19 " , testes 3 mm
	510823-19 ♂	"	124-33-19-14-17 " , " 3 "
	510823-20 ♀	"	128-33-19.5-14-20 " , ut. normal
	510823-21 ♀	"	122-31-19-13-20 " , " "
	510823-22 ♀	"	127-33-19.5-14-18 gms, " "
	510823-23 ♀	"	122-31-19-13-20 " , " "
	510823-24 ♂	"	131-34-20-14-22 " , testes 3 mm
	510823-25 ♀	"	124-32-19-14-16 " , ut. normal
	510823-26 ♂	"	127-34-19.5-14-21 " , testes 3 mm
	510823-27 ♂	"	124-32-19-14-21 " , " 3 "
	510823-28 ♀	"	128-34-20-14-20 " , ut. normal
	510823-29 ♀	"	126-33-19.5-14-18 " , " "
	510823-30 ♀	"	128-33-20-14-19 " , " "
	510823-31 ♂	"	132-35-19-14-21 " , testes 3 mm
↑	510823-32 ♀	"	132-34-19.5-14-23 " , ut. normal
m.o.	510823-33 ♀	"	127-33-19.5-13-17 " , " "
	510823-34 ♂	microtus muurus muriei	126-29-20.5-13-20 gms, testes 3 mm
	510823-35 ♂	"	123-26-20.5-13-21 " , " 3 "
	510823-36 ♀	"	126-29-20.5-13-26 " , plac. scars
m.o.	510823-37 ♂	"	124-26-20.5-13-21 " , test 2.5 mm
"	510823-38 ♀	"	118-24-20-13-18 " , ut. normal
	510823-39	Calcarius lapponicus	L. 165 mm, 23 gms
	510823-40 ♂	marmota caligata	408-110-73-23-184 3/4 gms
	510823-53 ♂	Spermophilus u. kennicottii	364-116-64-16 testes 8 mm

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

Aug 25, 1951

	510825-4 ♀	microtus muurus muriei	148-30-19-13-35 gms, ut. normal
m.o.	510825-5 ♂	"	125-30-20-12-19 " , testes 2.5 mm
↓	510825-6 ♂	"	120-27-20-12-18 " , " " "
	510825-7 ♀	"	132-28-20-12-23 " , ut. normal
	510825-8 ♀	"	126-30-20-12-19 gms ut "
	510825-9 ♀	"	120-27-20-12-18 " , " "
	510825-10 ♂	"	126-30-20-12-19 " , testes 2.5 mm
	510825-11 ♀	"	107-22-19-10-15 " , ut. normal
↑	510825-12 ♂	"	132-28-20-12-24 " , testes 3 mm
m.o	510825-13 ♀	clethrionomys rutilus	130-33-20-14-23 " , ut. normal
	510825-14 ♂		126-32-20-14-21 " , testes 2.5 mm

m.o	510825-15 ♂	Clethrionomys rutilus	128-31-20-14-21 gms, testes 3 mm
↓	510825-16 ♀	"	123-32-20-14-18 " , ut. normal
	510825-17 ♂	"	125-32-19.5-14-18 " , testes 2.5 mm
	510825-18 ♀	"	125-32-19.5-14-22 " , ut. normal
	510825-19 ♀	"	120-28-19-13-19 " , " "
	510825-20 ♂	"	126-32-19-13-20 " , testes 2.5 mm
	510825-21 ♂	"	123-32-20-14-18 " , " 2.5 "
	510825-22 ♀	"	126-33-19.5-14-18 " , ut. normal
	510825-23 ♂	"	126-32-19.5-14-20 " , testes 3 mm
	510825-24 ♀	"	124-32-19.5-14-18 " , ut. normal
	510825-25 ♀	"	120-28-19-13-18 gms, ut. normal
	510825-26 ♂	"	124-32-19.5-14-21 " , testes 3 mm
	510825-27 ♀	"	125-33-19.5-14-24 " , ut. normal
	510825-28 ♂	"	124-32-19.5-14-23 " , testes 3 mm
	510825-29 ♂	"	130-32-20-14-21 " , " 3 "
	510825-30 ♂	"	126-33-19.5-14-20 " , " 2.5 "
	510825-31 ♂	"	127-33-19.5-14-22 " , " 3 "
	510825-32 ♂	"	118-27-19-13-17 " , testes 2 mm
↑	510825-33 ♀	"	125-33-19.5-14-24 " , ut. normal
m.o.	510825-34 ♀	"	124-32-19.5-14-23 " , ut. "
	510825-57 ♀	marmota caligata browni	553-150-88-25-7 lbs (3181 gms) ut. normal
	510825-58 ♂	Spermophilus u. kennicottii	490-112-64-12 testes 9 mm
	510825-59	Lagopus repastris	To Frank Pitelka

Bettles, 66°54', 151°34', 671 ft., Alaska

Aug. 26, 1951

	510826-1 ♂	Sorex arcticus tundrensis	98-35-14-9-6 gms, testes 1 mm
	510826-2 ♀	"	(39)-30-14-9-6 " , ut. normal
	510826-3 ♀	Clethrionomys rutilus	120-33-20-14-21 gms, " "
	510826-4 ♀	"	118-31-19-13-19 gms, ut. normal
	510826-5 ♂	"	146-36-20-14-26 gms, testes 4.5 mm
	510826-6 ♂	"	120-30-20-14-19 gms, testes 2.5 mm
m.o.	510826-7	"	119-31-20-14-19 " ,
	510826-8 ♂	"	122-30-20-14-17 " , testes 3 mm
	510826-9 ♀	microtus oeconomus	170-50-20-13-43 " , ut. normal
	510826-10 ♀	"	172-47-20-13-43 " , ut. "
	510826-11	"	168-48-20-13-40 " .

Aug 28, 1951

	510828-1 ♀	Tamiasciurus hudsonicus	306-126-51-23-176 gms, ut. normal
	510828-2 ♀	"	335-145-50-23-200 gms, " "
	510828-3 ♀	"	296-117-50-23-161 " , " "
	510828-4	mustela erminea	286-72-40-20-117 " .

1 1/2 mi. W and 3/4 mi. N Umiat, 69°22'18", 152°08'10", 370 ft., Alaska

Aug. 30, 1951

	510830-1 ♂	Microtus oeconomus		171-46-20-13-54 gms, testes 6 mm
	510830-2 ♀	"		170-50-20-13-42 " , ut. vascular
	510830-3 ♀	"		150-44-20-13-30 " , " "
	510830-4 ♂	"		164-45-19-12-43 " , testes 5 mm
	510830-5 ♀	"		133-37-20-11-22 " , ut. normal
m.o.	510830-6 ♂	"		132-31-20-11-21 " , testes 2 mm
↓	510830-7 ♀	"		126-30-19-11-21 " , ut. normal
	510830-8 ♂	"		128-31-19-11-21 " , testes 2 mm
	510830-9 ♀	"		130-33-19.5-11-24 " , ut. normal
	510830-10 ♂	"		134-34-19.5-12-23 " , testes 2 mm
	510830-11 ♀	"		124-30-A-11-18 gms, ut. normal
	510830-12 ♂	"		130-32-19-11-21 " , testes 2 mm
↑	510830-13 ♀	"		132-33-19-11-22 " , ut. normal
m.o	510830-14 ♀	"		130-33-19.5-11-20 " , " "
	510830-15 ♀	Clethrionomys rutilus		113-31-18-13-14 gms. " "
	510830-16 ♀	"		130-34-18.5-13-25 " , " "
m.o.	510830-17 ♀	"		118-28-18-13-16 gms, " "
↓	510830-18 ♂	"		121-28-18-13-17 " , testes 2 mm
	510830-19 ♂	"		119-30-18-13-18 gms, " 2 "
	510830-20 ♀	"		120-29-18-13-17 " , ut. normal
	510830-21 ♂	"		118-29-18-13-16 " , testes 2.5 mm
	510830-22 ♀	"		118-30-18-13-18 " , ut. normal
	510830-23 ♀	"		118-30-18-13-19 " , " "
	510830-24 ♀	"		120-29-18-13-18 " , " "
↑	510830-25 ♂	"		119-30-18-13-19 " , testes 2 mm

Aug. 31, 1951

	510831-1 ♀	Lemmus trimucronatus subarcticus		137-22-20-9-44 gms, plac. scars
m.o.	510831-2 ♀	Microtus oeconomus		164-47-21-14-47 gms, plac. scars
	510831-3	"		135-32-20-11-23 " ,
	510831-4 ♀	"		165-47-21-14-51 " , ut. normal
	510831-5 ♀	"		163-48-19.5-14-50 " , " "
	510831-6 ♀	"		152-42-20-13-31 " , " "
	510831-7 ♂	"		130-36-20-12-24 " , testes 4 mm
	510831-8 ♂	"		133-35-20-12-24 " , " 5 "
	510831-9 ♂	"		123-33-20-12-21 " , " 2.5 "
	510831-10 ♀	"		121-33-19-11-22 " , ut. normal
	510831-11 ♀	"		144-39-21-12-31 " , " "
m.o.	510831-12 ♂	"		128-33-20-11-21 " , testes 2 mm
"	510831-13 ♂	"		130-34-20-11-21 " , testes 2.5 mm

m.o ↓	510831-14 ♂	Microtus oeconomus	136-33-20-11-24 gms	testis 3 mm
	510831-15 ♂	"	126-32-20-11-21 "	" 2 "
	510831-16 ♂	"	130-34-19-11-20 "	" 2.5 "
	510831-17 ♀	"	132-33-19-11-20 "	ut. normal
	510831-18 ♂	"	124-30-20-11-20 "	testis 2 mm
	510831-19 ♀	"	133-34-20-11-21 "	ut. normal
	510831-20 ♀	"	132-33-20-11-20 "	" "
↑ m.o	510831-21 ♀	"	130-31-19-11-18 "	" "
	510831-22 ♂	Microtus miurus muriei	115-23-20-10-20 "	testis 3 mm
	510831-23 ♂	Clethrionomys rutilus	114-29-18-14-20 "	" 2.5 "
	510831-24 ♀	"	112-28-18-13-19 "	ut. normal
	510831-25 ♀	"	113-29-18-14-20 "	" "
	510831-26	"	115-30-18.5-14-19 "	
	510831-27 ♀	"	116-31-18.5-14-21 "	ut. normal
	510831-28 ♂	"	136-34-19-14-29 "	testis 6 mm
m.o ↓	510831-29 ♂	"	120-27-18-13-15 "	" 2.5 "
	510831-30 ♀	"	120-28-18-13-14 "	ut. normal
	510831-31 ♀	"	122-28-18-13-18 "	" "
↑	510831-32 ♀	"	118-27-18-13-16 "	" "
m.o.	510831-33 ♀	"	118-26-18-13-16 "	" "
	510831-34 ♂	Lorex cinereus wrangeli	81-29-11-7-4 gms	testis 2 mm
	510831-35 ♂	"	81-30-11-7-4 gms	" 1.5 "
	510831-36 ♂	" arcticus tundrensis	99-33-18-8-6 gms	Skull K.U. Skin ARL. testes 1.5 mm
	510831-37 ♂	"	91-33-13.5-8-6 "	" 1.5 "
m.o.	510831-38	Acanthus flammea kolbellii		
	510831-39 ♀	Microtus oeconomus	173-49-20-19-43 gms	plac. scars
	510831-40 ♀	"	[154]-[37]-20-13-48 "	ut. normal
	510831-41 ♀	"	153-45-20.5-13-29 "	" "
	510831-42 ♂	"	132-34-19.5-13-27 "	testes 2 mm
	510831-43 ♀	"	129-34-19.5-12-22 "	ut. normal
	510831-44 ♂	"	135-34-20-12-24 "	testes 2 mm
m.o.	510831-45	"		
"	510831-46	"		
"	510831-47	"		
	510831-48 ♂	Clethrionomys rutilus	116-30-19-14-19 gms	testes 3 mm
	510831-49 ♂	"	112-25-18-14-19 "	testes 2.5 mm
	510831-50 ♀	"	114-28-18.5-14-20 "	ut. normal
"	510831-51	"	115-28-18-14-20 "	
	510831-52	Spizella arborea	L. 160 mm, wt 17 gms	

Sept. 1, 1951

510901-1 ♂	Microtus oeconomus	180-54-21-13-51 gms	testis 6 mm

	510901-2 ♀	microtus oeconomus	~~180-54-21-13-51 gms, testes 6 mm~~
	510901-3 ♂	"	124-29-19-11-24 " , ut. normal
	510901-4 ♀	"	125-30-19-11-20 " , testes 2 mm
	510901-5 ♂	"	125-29-19-12-25 " , ut. normal
	510901-6 ♂	"	127-35-20-11-20 " , testes 2 mm
	510901-7 ♂	"	132-36-30-12-27 " , " 2 "
	510901-8 ♀	clethrionomys rutilus	118-33-19.5-11-22 " , " 3 "
	510901-9 ♂	"	113-27-18-12-18 " , ut. normal
m.o.	510901-10 ♀	"	120-30-18-13-19 " , testes 2.5 mm
	510901-11 ♂	Sorex arcticus tundrensis	100-28-17.5-12 gms, ut. normal
	510901-12 ♀	microtus miurus muriei	95-34-13.5-7-6 " , testes 2 mm
	510901-13 ♂	Sorex cinereus cinereus	138-28-20-12-34 " , uterus vascular
m.o.	510901-14	microtus oeconomus	[76]-[9]-12-4 gms, testes 1.5 mm
	510901-15 ♂	"	130-34-20-11-22 gms, testes 2.5 mm
m.o ↓	510901-16 ♂	"	122-30-19-11-18 gms, testes 2 mm
	510901-17 ♂	"	130-33-20-11-19 " , " 2 "
	510901-18 ♂	"	130-34-19.5-11-18 " , " 2 "
	510901-19 ♂	"	132-33-20-11-19 " , " 3 "
	510901-20 ♂	"	132-34-20-11-21 " , " 2.5 "
	510901-21 ♀	"	130-32-20-11-21 " , ut. normal
↑ m.o	510901-22 ♂	"	136-34-20-11-22 " , testes 3 mm
	510901-23 ♀	clethrionomys rutilus	118-25-18-13-20 " , ut. normal

Sept 2, 1951

	510902-1 ♀	microtus oeconomus	159-42-20-11-34 gms, ut. normal
	510902-2 ♀	"	155-43-21-12-54 " , " "
	510902-3 ♂	"	131-35-20-11-24 " , testes 2 mm
m.o.	510902-4 ♀	"	147-40-20-12-33 " , ut. normal
	510902-5 ♀	"	176-51-19.5-14-47 " , plac. scars
	510902-6 ♀	"	172-49-20.5-13-48 " , " "
	510902-7 ♂	"	172-49-20.5-12-43 " , testes 3.5 mm
	510902-8 ♀	"	157-43-20.5-12-45 " , ut. normal
	510902-9 ♂	"	136-36-20-12-26 " , testes 2 mm
	510902-10 ♂	"	120-29-19-12-20 " , " 3 "
	510902-11 ♂	"	130-30-20-12-26 " , " 2 "
	510902-12 ♂	"	127-33-20-12-20 " , " 2 "
	520902-13 ♂	"	130-37-20-12-27 " , " 2 "
	520902-14 ♂	"	127-34-20-12-25 " , " 2 "
m.o.	520902-15 ♂	"	130-34-20-11-19 " , " 2 "
"	520902-16 ♀	"	132-32-19-11-19 " , ut. normal
"	520902-17 ♂	"	134-34-20-12-21 " , testes 2.5 mm
"	520902-18 ♂	"	130-32-18-11-20 " , " 2 "

m.o. ↓	510902-19 ♀	microtus oeconomus	123-30-18-11-18gms, ut. normal
	510902-20 ♂	"	126-32-20-12-17 " , testis 2 mm
	510902-21 ♀	"	125-31-19-11-18 " , ut. normal
	510902-22 ♀	"	125-32-19-11-19 " , " "
	510902-23 ♂	"	136-34-19-11-22 " , testis 2 mm
	510902-24 ♀	"	130-32-19-11-18 " , ut. normal
	510902-25 ♀	"	130-31-19-11-21 " , " "
	510902-26 ♂	"	133-34-19.5-12-21gms, testis 3.5 mm
	510902-27 ♂	"	128-31-19-11-19 gms, testis 2 mm
	510902-28 ♂	"	132-33-19.5-11-21 " , " 2.5 "
	510902-29 ♂	"	128-32-19-11-19 " , " 2 "
	510902-30 ♂	"	139-34-20-12-24 " , " 2.5 mm
	510902 31 ♀	"	132-33-19-11-22 " , ut. normal
	510902-32 ♀	"	126-33-18.5-11-18 " , " "
↑	510902-33 ♂	"	132-34-19.5-12-23 " , testis 2.5 mm
m.o.	510902-34 ♀	"	128-32-19-11-19 " , ut. normal
	510902-35 ♀	clethrionomys rutilus	113-25-18-14-19 gms, ut normal
m.o.	510902-36 ♂	"	117-28-19-14-19 " , testis 3 mm
	510902-37 ♀	"	115-26-18.5-14-18 " , ut. normal
	510902-38 ♀	"	137-36-18.5-14-31 " , plac. scars
m.o.	510902-39 ♀	"	120-27-18-13-17gms, ut. normal
	510902-40 ♂	Sorex cinereus cinereus wiggsnak	80-31-12-7-4gms, testis 1 mm
	510902-41 ♂	"	78-29-12-7-4 " , " 1 mm (TOAEL)
	510902-42	"	87-32-12.5-4 " ,
	510902-43 ♂	" arcticus tundrensis	93-32-13.5-8-6 gms, testis 1 mm
	510902-44 ♂	"	100-33-13.5-8-7 gms, " 1.5 mm
m.o.	510902-45 ♂	"	99-33-13.5-8-7 gms, testis 1 mm
	510902-46 ♂	"	98-32-13.5-8-7 " , " 1 "
	510902-47 ♂	microtus oeconomus	142-41-20-11-32 gms, testis 5 mm
m.o.	510902-48 ♀	"	133-40-20.5-10-24 gms, ut. normal
↓	510902-49 ♂	"	130-39-20-11-20 gms, testis 2 mm
	510902-50 ♂	"	128-35-20-11-21 " , " 2 "
	510902-51 ♀	"	130-34-20-11-21 " , ut normal
	510902-52 ♀	"	128-33-19.5-11-22 " , " "
	510902-53 ♂	"	127-33-19.5-11-19 " , testis 2 mm
	510902-54 ♀	"	127-33-20-11-21 " , ut. normal
	510902-55 ♀	"	121-32-18-10-17 " , " "
	510902-56 ♂	"	129-34-20-11-21 " , testes 2 mm
↑ m.o	510902-57 ♀	"	130-34-20.5-11-22 " , ut. normal

Sept. 3, 1951

510903-1 Sorex cinereus wiggsnak 91-35-12-7-4 gms.

	510903-2 ♂	Microtus miurus muriei		133-27-21-11-22 gms, testes 2.5 mm
	510903-3 ♂	"	oeconomus	144-41-19.5-12-23 gms, testes 8 mm
m.o.	510903-4 ♀	"		145-42-20-12-24 ", ut. normal
"	510903-5 ♂	Clethrionomys rutilus		118-27-18-13-16 ".
"	510903-6 ♀	"		119-28-18-13-17 ", ut. normal
	510903-7 ♀	microtus	oeconomus	158-45-21-12-40 ", " "
	510903-8 ♀	"		160-45-21-12-40 ", " "
	510903-9 ♀	"		153-41-20-12-39 ", " "
	510903-10 ♂	"		155-43-20.5-12-41 ", testes 7 mm
	510903-11 ♂	"		120-33-19.5-11-18 ", testes 3 mm
m.o.	510903-12	"		
	510903-13 ♂	Lemmus trimucronatus		113-18-18-7-30 gms, testes 6 mm
	510903-14 ♂	Clethrionomys rutilus		113-29-18-13-14 "
	510903-15 ♂	Sorex cinereus	ugyunak	85-30-12-7-4 gms, testes 1 mm
	510903-16 ♀	"	arcticus tundrensis	96-32-13-7-7 gms, ut. normal
	510903-17 ♂	"		94-31-13-7-7 gms, testes 1 mm
	510903-18 ♀	mustela	rixosa	Reprod aptem, chet + stomach specimens. 160-23-20-10-33 gms, ut. normal
	510903-19 ♂	microtus	oeconomus	176-48-20-13-56 gms, testes 6 mm
skel.	510903-20 ♂	"		172-46-20.5-13-55 ".
m.o.	510903-21 ♀	"		159-43-19-( )-35 gms. ut normal
↓	510903-22 ♀	"		123-32-19-11-18 gms, ut. normal
	510903-23 ♂	"		126-33-19.5-11-23 ", testes 2.5 mm
	510903-24 ♀	"		123-32-19-11-17 ", ut. normal
	510903-25 ♀	"		128-33-19.5-11-24 ", " "
	510903-26 ♂	"		144-41-19.5-11-26 ", testes 3 mm
	510903-27 ♂	"		116-30-19-11-17 gms, " 2 "
↑ m.o.	510903-28 ♂	"		130-33-19-11-22 ", " 3 "
skel	510903-29	Sorex	arcticus tundrensis	98-31-13-6-6 gms
sk+skel	510903-30 ♀	"		110-31-13-7-15 ", 5x5 emb. 14 mm
	510903-31 ♀	microtus	oeconomus	146-40-19-12-43 ", plac. scars
m.o.	510903-32 ♂	"		106-28-18-11 gms, testes 2 mm
"	510903-33 ♂	"		130-34-19.5-11-18 gms, testes 2 mm
"	510903-34 ♀	"		127-33-19-11-18 gms, ut. normal
"	510903-35 ♂	"		120-30-20-11-17 ", testes 2 mm
	510903-36 ♂	"		122-31-20-11-19 ", " 2 "
m.o.	510903-37 ♂	"		125-33-19-11-17 ", " 2 "
"	510903-38 ♂	"		129-33-19.5-11-21 ", " 2.5 "
"	510903-39 ♀	"		118-30-19-11-16 ", ut. normal
"	510903-40 ♂	"		130-33-19.5-11-22 ", testes 3 mm
"	510903-41 ♂	"		138-34-20-11-21 gms, " 3 "
"	510903-42 ♂	"		132-33-20-11-19 ", " 2.5 mm

m.o. ↓	510903-43 ♀	Microtus oeconomus	127-32-18-11-20 gms, ut. normal
	510903-44 ♂	"	128-32-19-11-19 ", testes 3 mm
	510903-45 ♀	"	123-32-19-11-19 ", ut. normal
	510903-46 ♀	"	132-33-19-11-22 ", " "
	510903-47 ♂	"	129-34-19.5-11-19 ", testes 2.5 mm
	510903-48 ♂	"	125-32-19-11-16 ", " 2 "
	510903-49 ♂	"	125-32-19-11-19 ", " 2.5 "
	510903-50 ♀	"	130-33-20-11-21 ", ut. normal
	510903-51 ♂	"	125-31-19-11-18 ", testes 2 mm
	510903-52 ♀	"	129-32-19-11-20 ", ut. normal
	510903-53 ♂	"	132-34-20-11-22 ", testes 2.5 mm
↑	510903-54 ♂	"	126-31-19-11-20 ", " 2.5 "
m.o.	510903-55 ♀	"	131-32-20-11-24 ", ut. normal
	510903-56 ♂	"	129-32-~~18~~19-11-24 ", testes 2 mm
	510903-57 ♀	"	150-42-20-12-31 ", ut. normal
SKULL	510903-58 ♂	"	[141]-[13]-20-13-52 ", testes 6 mm
"	510903-59 ♀	"	170-46-20-13-53 gms.

Sept. 4, 1951

	510904-1 ♀	Sorex arcticus tundrensis	96-31-13-6-6 gms, ut. normal
	510904-2 ♀	"	102-31-13.5-7-8 ", " "
	510904-3	"	97-31-13-6-6 gms.
	510904-4 ♂	Microtus oeconomus	133-37-2-11-26 ", testes 3 mm
	510904-5 ♀	"	172-44-21-12-42 gms, ut. normal
	510904-6 ♀	"	152-43-20-12-33 ", ut. normal
	510904-7 ♀	"	154-42-20-12-37 ", ut. normal
	510904-8 ♂	"	178-44-20-13-50 ", testes 4 mm
m.o.	510904-9 ♀	"	122-33-19-11-19 ", ut. normal
↓	510904-10 ♀	"	113-30-18-10-19 ", " "
	510904-11 ♀	"	127-34-20-11-21 ", " "
	510904-12 ♂	"	129-34-19-11-22 ", testes 2 mm
	510904-13 ♂	"	128-33-19-11-22 ", " 2.5 "
	510904-14 ♂	"	128-34-19.5-11-25 ", " 2 "
↑	510904-15 ♂	"	127-34-19-11-21 ", " 2 "
m.o	510904-16 ♂	"	120-32-19-10-19 ", " 2.5 mm
↓	510904-17 ♀	"	126-33-19-11-23 ", ut. normal
	510904-18 ♀	"	120-31-19-20-20 ", " "
	510904-19 ♀	"	123-31-19-11-20 ", " "
	510904-20 ♀	"	120-31-19-10-19 ", " "
	510904-21 ♀	"	126-30-19-11-20 ", " "
	510904-22 ♂	"	124-32-19-11-19 ", testes 2.5 mm
↑	510904-23 ♂	"	121-31-19-11-21 ", " 2 "
m.o.			

510911-209

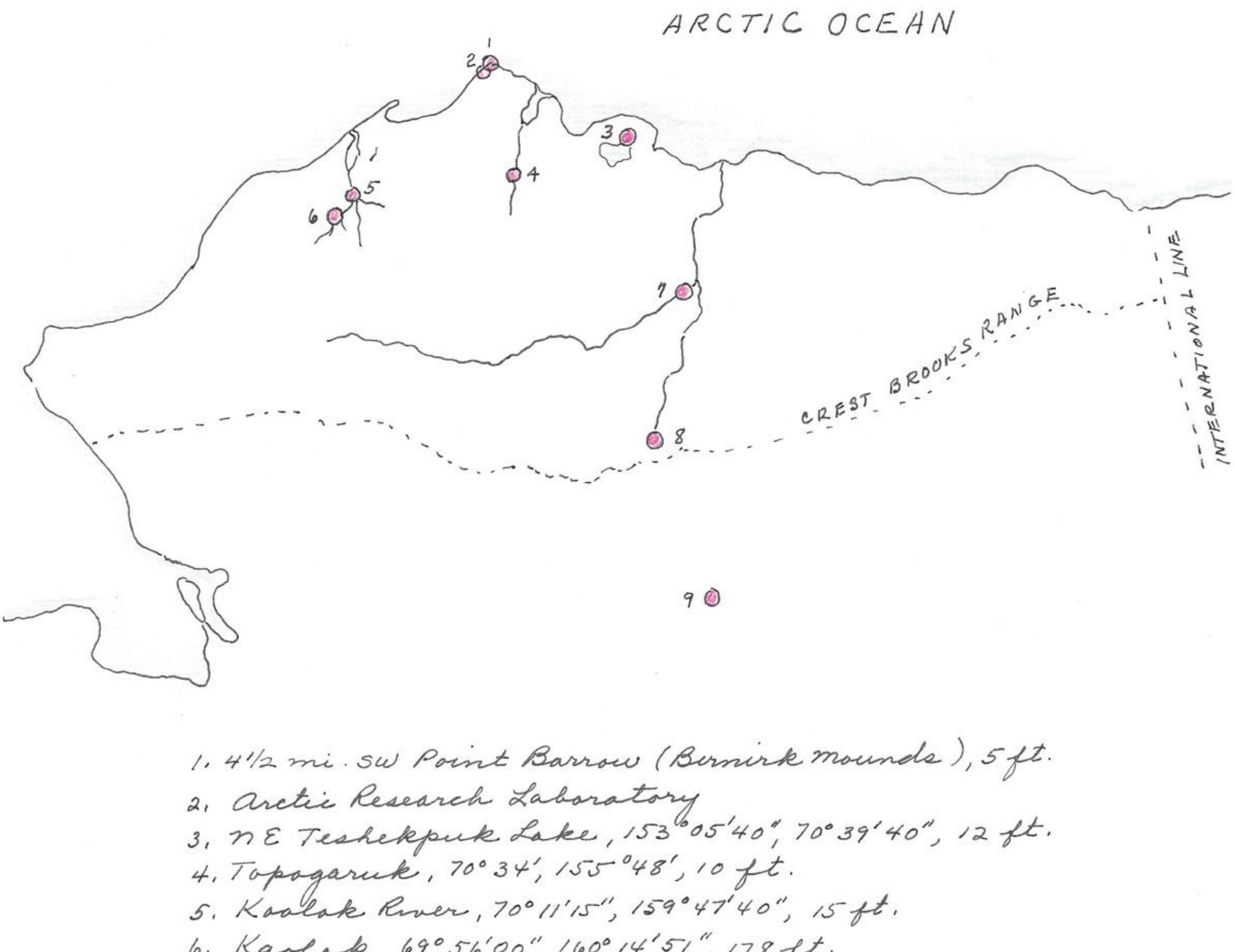
m.o	510904-24 ♀	Microtus oeconomus	122-31-19-11-22 gms, ut. normal
"	510904-25 ♀	"	127-33-19.5-11-22 gms, ut normal
"	510904-26 ♂	"	121-31-19-11-19 gms, testes 2 mm
"	510904-27 ♀	Clethrionomys rutilus	118-27-18-13-16 " , ut. normal

4 1/2 mi. SW Point Barrow (Birnirk mounds), 5 ft., Alaska.
Sept 8, 1951

SKIN + SKEL	510908-1 ♂	Lemmus trimucronatus alascensis	133-24-22-9-45 gms, testes 10 mm
"	510908-2 ♂	"	120-21-19-8-32 gms, testes 8 mm
"	510908-3 ♂	"	128-20-20-8-34 " , " 8 "
SKIN	510908-4 ♀	"	111-17-18-8-30 " , 3X2 emb. 5 mm
SKIN + SKEL	510908-5 ♀	"	145-22-22-10-63 gms, testes 11 mm

510911-210

COLLECTING LOCALITIES IN NORTHERN ALASKA -1951



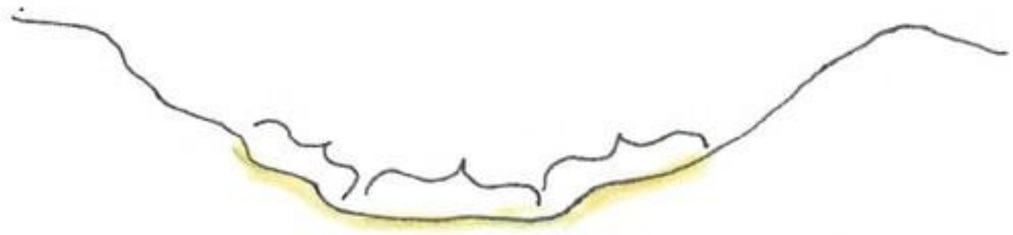
1. 4½ mi. SW Point Barrow (Burnirk mounds), 5 ft.
2. Arctic Research Laboratory
3. NE Teshekpuk Lake, 153°05'40", 70°39'40", 12 ft.
4. Topogaruk, 70°34', 155°48', 10 ft.
5. Kaolak River, 70°11'15", 159°47'40", 15 ft.
6. Kaolak, 69°56'00", 160°14'51", 178 ft.
7. 1½ mi. W and ¾ mi. N Umiat, 69°22'18", 152°08'10", 370 ft.
8. Chandler Lake, 68°12', 152°45', 2900 ft.
9. Bettles, 66°54', 151°34', 671 ft.

510911-211

Sept. 11, 1951

Departed Point Barrow 9:30 A.M for Fairbanks. Arrived Umiat 10:35 - all above clouds. At Umiat alder still green but willows now all green and foliage no showing effect of missing leaves. Departed from Umiat 11:10 A.M. Gained elevation above clouds. As we approached range cloud disappeared below and at this moment photographed terrain below no 510911-2 of rolling plains between the Brooks Range and Coastal Plains to north. Just before we passed the Front Range of the Brooks Range, photographed area of Chandler Lake. Except for a few outliers, the rolling plateau joins the range abruptly. The white in river bottoms is snow but cannot explain why it should be there this time of year unless it is a permanent ice jam. Animals at Chandler Lake should not be much different from those on Plateau Provence to the north. It is on the same altitudinal level and without barrier to north. The low passes from south side of Brooks Range to north side are low and do not offer much of an altitudinal barrier. Just beyond the front range to the south the clouds begin to form again and shows how range of mountains affects the climate. Also took several feet of 16mm movies of the front range. The vegetation and color in John River Canyon (11:55 A.M) and the other major canyons are confined principally to the canyon floor and lower side hills.

At 12:40 P.M approached south side of range. Here the yellow-orange foliage extends over entire mt except slaty areas.



Zones of colored vegetation

From here to north there is a complete transition from tundra covered mountains to above timberline (tundra) ranges and all approx same elevation. Arrived Fairbanks, Alaska.

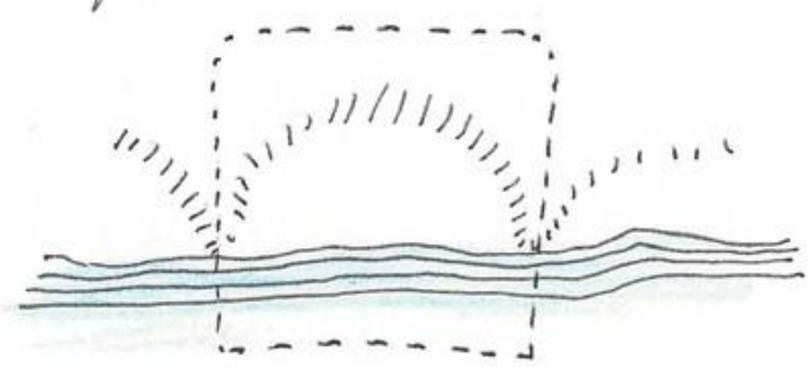
Fairbanks, Alaska

Sept. 13, 1951

Departed 4:45 P.M by C 54. At 5:45 A.M photographed Mt. McKinley National Park in both still and movies. No 510913-1 of general area with Mt. McKinley in background. Yukon valley to north. Photo 510913-2 of Mt. McKinley but farther to south than above.

This mt is isolated from range to east. Note alpine lake in foreground. Mt. McKinley in background →

Area bare to N but wooded to S and east. This range would be an excellent place to work. This area, the east extension of the Alaskan Range, particularly St. Elias Range, the entire Brooks Range particularly the east end, N & S yukon are the most interesting areas in Alaska. Continued south to Elmendorf Air Base at Anchorage where we stopped for about 1½ hours. Checked with Public Health office but Dr. Rausch not in at this time. Departed Elmendorf 9:25 A.M. at ~~1:15~~ 1:15 P.M photo 510913-4 of ocean and sky which were of some intensety of color. Range in middle distance. At 1:25 P.M first land with radio station. We have been flying over Pacific since shortly out of Anchorage. At 2:10 PM near southern end of Queen Charalotte Island. This group of islands would be an excellent area to study; compact but many islands. It looks like a series of mountain peaks sticking out of the ocean. Photo 510913-5 of these islands to west. 2:45 P.M first of Vancouver Islands. The north end of Vancouver Islands is high and mountainous while south end is low. Photo 510913-6 of Pacific ocean from the northern part of Vancouver Island. This island appears to be relatively untouched by man. Would like to acquire several locations of beach land and the immediate adjoining woodlands before it becomes prohibitive to buy such area. The ideal location would be one with beach barrier and protected alcove with perpendicular cliffs. Photo 510913-7 of the north Vancouver Island with fjords and glaciated outer islands showing common trend. Photo 510913-8 ~~oo~~ ↑ above. This country would make interesting boating country. Continued south along shoreline of Vancouver Island, thence up Straits of Juan de Fuca, thence over Bremerton, thence to Tacoma where we alighted at about dark for refueling, thence to Great Falls, Montana (via Mt. Rainier by moonlight). It was interesting to note the difference between the misuse of U.S country just S of the straits and Vancouver Island — primitive to north and gutted to south. In Washington the forests are cut over, many fire scars, roads in all directions, etc. The Olympic National Park is somewhat insignificant compared to the Brooks Range and the other ranges to the north of the U.S.



Remained in Great Falls until 15th.

Great Falls, Montana

Sept. 15, 1951

Departed Great Falls and flew directly to Ogden, Utah. Enroute photographed:

510915-1 Fault range at 12:25 P.M.

510915-2 To west of low range at 12:40 P.M

510915-3 Low range, calor starting, 12:55 P.M.

510915-4 Wheat fields south and west of Pocatella, Idaho at 1:40 P.M. Filmed some areas in color. Arrived Odgen, Utah. Continued south to Provo, Utah. Dad and mather gave me Stansburys Report on Great Salt Lake Valley with map supplement. Mr. David Rust gave me Powelks - High Plateaus.

Provo, Utah

Sept. 16, 1951

Enroute to sister marys home in Salt Lake took the following photographs on the Mt. Timpanogas Sceenee loop trip;

5-10916-1 Stewarts flat. Aspen and maple-in color, This is the second fall color change I have experienced this year.

510916-2. Between Stewarts flat and Aspen Grove with maple ridge in full color.

510916-3 Mother, Dad and I on road above Timpooneke Basin. Bracken fern among aspens.

510916-4 Ibid mother & Dad.

510916-5 Chrysothamnus near Springdell.

510916-6 Mary at her Salt Lake home near mouth of Big Cottonwood Canyon.

510916-7 Chrysanthamums at Mary's home.

510916-8 Ibid

510916-9 Maple leaves from Brighton (in Wasatch Range).

510916-10 Mary's home with Wasatch Range in background.

510916-11 Mary and Don (Jensen) at their home.

510916-12 Close up of Mary & Don.

Returned to Provo in evening after driving to Alta. Two new ski lodges in area.

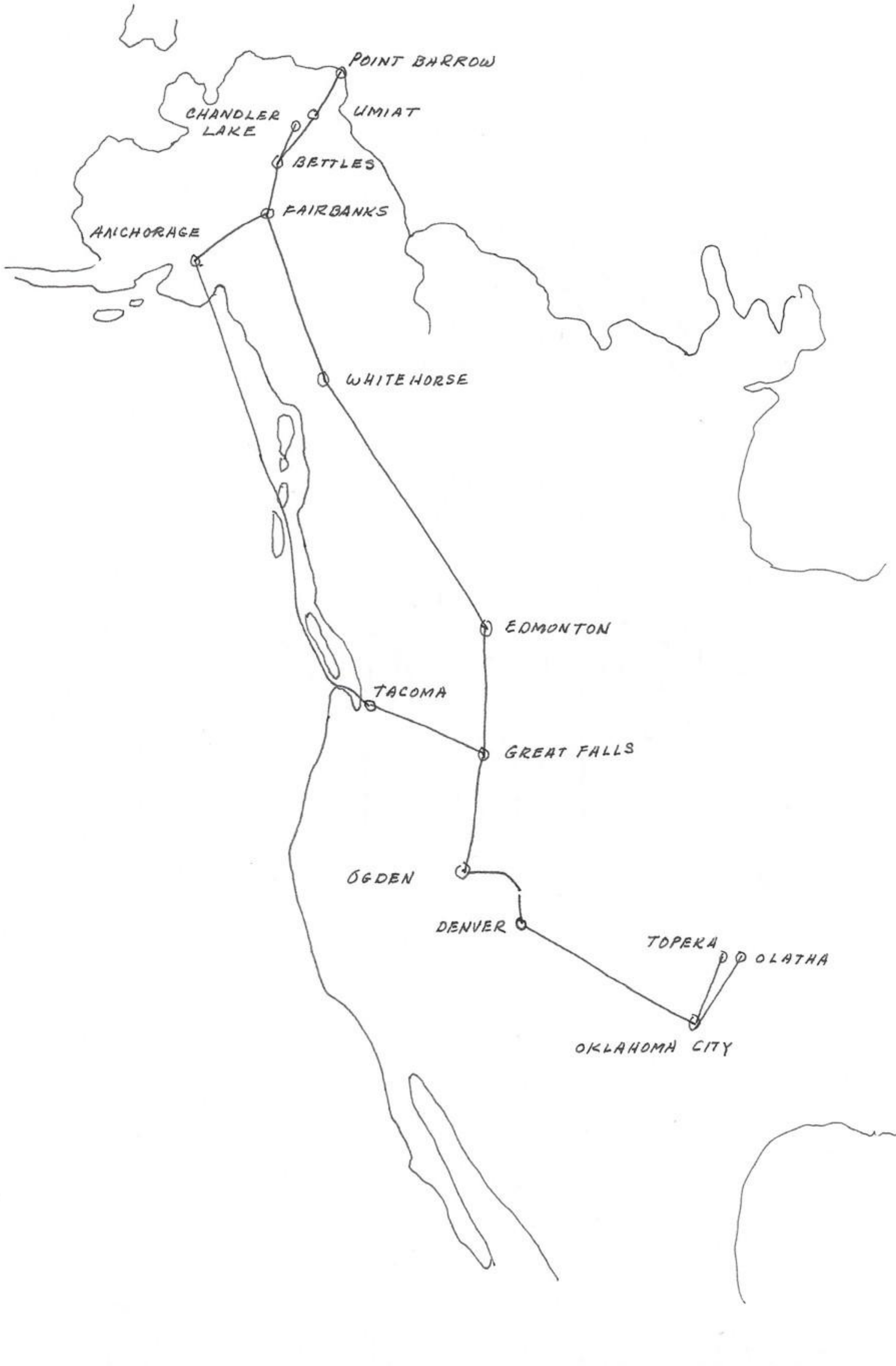
Provo, Utah

Sept. 17, 1951

Returned to Odgen to await transportation back to Lawrence,

510917-214

ROUTE TRAVELLED BY AIR TO POINT BARROW AND RETURN.
(Approx 14,000 mi.)



Kansas. Remained at Odgen Army Air Base until 19th waiting for transportation, M.A.T.S. flight to Tinker Field in Oklahoma City. Departed Sept 19 at 2:32 P.M. A civilian operating transportation (18-year old) caused unnecessary delay (see recommendations for air travel).

Oklahoma City, Oklahoma
Sept. 20, 1951

Arranged with Commanding officers of Post to set up special flight to Forbes Army Air Base in Topeka. Two pilots flew me (2:10 P.M) in a B26 (no. 5378). Rode in front nose all the way. This is the most ideal position for viewing the country below. Arrived Topeka 3:35 P.M. Arrived Lawrence, Kansas in the evening.

Lawrence, Kansas (21 B Sunnyside)
Sept. 25, 1951

Photo 510925-1 in color of mother malseed, annette c and mary Pauline.
Photo 510925-2 of mother malseed and Annette

Lawrence, Douglas Co., Kansas
Oct. 14, 1951

Flock of blue and snow geese flew over campus going south at 6:00 P.M and another group at 9:40 P.M. Clear moonlight night.

Lawrence, Douglas Co., Kansas
Oct. 21, 1951

Photographed the following:
511021-1 Chris, Jay with Maple tree background near home
511021-2 Ibid.
511021-3 Chris and Jay on Univ. Kansas campus
511021-4 Chris and Jay near home. Maple tree in background
511021-5 Chris & Jay with border of yellow leaves. U.K campus
511021-6 Chris & Jay on tractor near museum
511021-7 Chris & Jay by cottonwood tree on bank of Kaw River at main bridge.
511021-8 Chris & Jay, as above on sands at edge of Kaw River.
511021-9 Chris & Jay at same place as above. Jay fishing.

511015-216

October 15, 1951

Mr. Karl Klooz
Bursar's Office
University of Kansas

Dear Mr. Klooz:

The following is a report of the finances and expenditures of the Navy-University of Kansas project (temporary number RF 327 on account at Bursar's Office at University of Kansas) to investigate the mammals of the Arctic slope of Northern Alaska for the undersigned and J.Knox Jones Jr. Project activated July 1, 1951.

Received from University of Kansas	$1477.98
Expenditures on project	450.15
Refund to University of Kansas	1027.83

Itemized expenditures for period June 24, 1951 to October 1, 1951 by date:

June 24	Prints: Northern Alaska Field Maps. (Univ. of Kansas Press No. 7985)	$4.85
June 24	Gas for transportation to Olathe Army Air Base, Kan.	1.15
June 27	Dinner (2) Tinker Army Air Base, Okla.	2.15
June 27	Lodging BOQ Tinker Field Army Air Base (2) Okla.	2.00
June 28	Breakfast (2) Tinker Field Army Air Base, Oklahoma	1.56
	Dinner (2) Hill Field Army Air Base, Utah	1.94
	Supper (2) Great Falls Army Air Base, Montana	2.20
	Lodging (2) BOQ Great Falls, Army Air Base, Montana	2.00
June 29	Breakfast (2) Gr. Falls Army Air Base, Montana	1.40
	Dinner (2) GFAAB, Montana	1.80
	Supper (2) GFAAB, Montana	1.90
	Lodging (2) BOQ, GFAAB, Montana	2.00
June 30	Breakfast (2) GFAAB, Montana	1.70
	Telegram to OICC, Fairbanks and Scientific Director at Arctic Research Laboratory, Alaska.	10.94
	Maps and small note books for field work reference.	4.50
	Dinner (2) GFAAB, Montana	1.65
	Supper (2) GFAAB, Montana	1.80
	Lodging (2) BOQ GFAAB, Montana	2.00
July 1	Breakfast (2) GFAAB, Montana	1.40
	Dinner (2) GFAAB, Montana	2.10
	Supper (2) GFAAB, Montana	2.40
	Lodging (2) BOQ, GFAAB, Montana	2.00
July 2	Breakfast (2) GFAAB, Montan	1.90
	Lunch on plane (2) enroute to Fairbanks, Alaska	1.00
	Supper (2) Fairbanks, Alaska	3.90
	Transportation to and from Ladd Field Army Air Base, Fairbanks, Alaska	2.50
July 3	Breakfast (2) Fairbanks, Alaska	3.50
	Dinner (2) Fairbanks, Alaska	1.95
July 4	Clothing purchased at Point Barrow (2)	9.40
Aug 7	Dinner (2) Bettles, Alaska	4.00
	Supper (2) Bettles, Alaska	4.00
	Lodging (2) Anderson Lodge, Bettles, Alaska	5.00
Aug 8	Breakfast (2) Bettles, Alaska	4.00
	Dinner (2) Bettles, Alaska	4.00

	Supper (2) Bettles, Alaska	4.00
	Lodging (2) Anderson Lodge, Bettles, Alaska	5.00
Aug 9	Breakfast (2) Bettles, Alaska	4.00
	Dinner (2) Bettles, Alaska	4.00
	Supper (2) Bettles, Alaska	4.00
	Lodging (2) Anderson Lodge, Bettles, Alaska	5.00
Aug 10	Breakfast (2) Bettles, Alaska	4.00
	Dinner (2) Bettles, Alaska	4.00
	Supper (2) Bettles, Alaska	4.00
	Lodging (2) Anderson Lodge, Bettles, Alaska	5.00
Aug 26	Dinner (2) Bettles, Alaska	4.00
	Fleshing knife for equipment kit	2.00
	Supper (2) Bettles, Alaska	4.00
	Lodging (2) Anderson Lodge, Bettles, Alaska	5.00
Aug 27	Breakfast (2) Bettles, Alaska	4.00
	Dinner (2) Bettles, Alaska	4.00
	Supper (2) Bettles, Alaska	4.00
	Lodging (2) Anderson Lodge, Bettles, Alaska	5.00
Aug 28	Breakfast (2) Bettles, Alaska	4.00
	Dinner (2) Bettles, Alaska	4.00
Sept 6	Breakfast (1) Fairbanks, Alaska	1.80
	Supper (1) Fairbanks, Alaska	2.25
	Lodging (1) BOQ Ladd Field Army Air Base, Fairbanks.	1.00
Sept 7	Breakfast (1) Fairbanks, Alaska	1.50
	Prepared lunch (1) enroute by air to Great Falls	.50
	Shipping expense (Railway Express) Great Falls, Montana to Lincoln, Nebraska	7.31
	Supper (1) Great Falls Army Air Base	1.75
	Taxi fare between Great Falls Army Air Base and Commercial Air Office in Great Falls.	7.50
	Commercial Air Ticket from Great Falls to Denver, Colorado	51.18
	Excess baggage on commercial air transportation	2.94
	Lodging (1) Denver, Colorado	3.00
Sept 8	Breakfast (1) Denver, Colorado	1.25
	Dinner (1) Denver, Colorado	1.55
	Commercial Air Ticket from Denver to Lincoln, Neb	31.86
	Excess baggage on commercial air transportation	2.02
	Supper (1) Lincoln, Nebraska	1.00
Sept 11	Lunch (1) Fairbanks, Alaska	2.10
	Dinner (1) Fairbanks, Alaska	2.30
	Supper (1) Fairbansk, Alaska	2.00
	Lodging (1) BOQ Fairbanks, Army Air Base	1.00
Sept 12	Personal travel insurance	7.50
	Breakfast (1) Fairbanks, Army Air Base	1.90
	Dinner (1) Fairbanks, Alaska	2.35
	Supper (1) Fairbanks, Alaska	2.40
	Lodging (1) BOQ Ladd Field Army Air Base	1.00
Sept 13	Breakfast (1) Fairbanks, Alaska	1.90
	Lunch (1) on plane enroute to Freat Falls, Montana	.50
	Personal Travel Insurance, Anchorage, Alaska	1.50
	Lodging Great Falls Army Air Base, BOQ (1)	1.00
	Dinner (1) Great Falls, Montana	1.10
	Supper (1) Great Falls, Montana	1.60
	Lodging (1) Great Falls, Army Air Base, Montana	1.00
Sept 15	Dinner (1) GFAAB, Montana	1.65
	Supper (1) Hill Field Army Air Base, Utah	1.80
	Lodging (1) BOQ Hill Field Army Air Base, Utah	1.00

Sept 16	Breakfast (1) Hill Field Army Air Base, Utah	.60
	Dinner (1) Ogden, Utah	1.20
	Supper (1) Ogden, Utah	1.90
	Lodging BOQ Hill Field Army Air Base, Utah	1.00
Sept 17	Breakfast (1) Hill Field Army Air Base, Utha	.70
	Shipping Railway Express to Lawrence, Kanaas	9.30
	Dinner (1) Ogden, Utah	1.30
	Transportation to Salt Lake City to arrange for commercial air transportation and return.	7.70
	Supper (1) Ogden, Utah	1.50
	Lodging (1) BOQ Hill Field Army Air Base, Utah	1.00
Sept 18	Breakfast (1) Hill Field Army Air Base, Utah	.90
	Dinner (1) Ogden, Utah	1.40
	Supper (1) Ogden, Utah	1.60
	Lodging (1) BOQ Hill Field Army Air Base	1.00
Sept 19	Breakfast (1) Hill Field Army Air Base	.90
	Lunch on plane (1) enroute to Tinker Field, Oklahoma	.50
	Supper (1) Tinker Field Army Air Base, Oklahoma	1.80
	Lodging BOQ Tinker Field Army Air Base, Oklahoma (1)	1.00
Sept 20	Breakfast (1) Tinker Field AAB, Oklahoma	.80
	Dinner (1) Tinker Field AAB, Oklahoma	1.60
	Taxi Lawrence, Kanasas	1.25

Equipment purchased for expedition:

Temperature thermometer	3.50
Maximum-minimum thermometer	8.00
Gram weight scales	10.00
Tooling of 4.10 auxillary barrel for collecting gun	2.50
skinning equipment	12.00
millimeter calipers	6.25
viles for preserving specimens	5.00
leather field notebook	3.00
first aid set	2.25
compass	.75
metal containers for equipment	6.00
spring scales	2.50
alarm clock	8.10
stamps	1.50
cloth for collecting bags	2.25

Lawrence, Douglas Co., Kansas
Oct 28, 1951

Recorded following subjects in color:

511028-1 James R. and Annette C on Unv. Kansas Campus and Louisiana Street.

511028-2 General color of same tree as above

511028-3 Close up of above.

511028-4 Models of Virginia Deer (approx. 7 inches high). Setting on Unv. Kansas Campus

511028-5 Deer models as above in sand along edge of Kaw River at bridge.

511028-6 Same as above with sand background.

511028-7 Ibid.

511028-8 Annette C and James R along Kaw River below bridge N town.

511028-9 Annette C and James R on log on sands of Kaw River as above

511028-10 Ibid

511028-11 Same area as above. James R fishing & Annette C waiting.

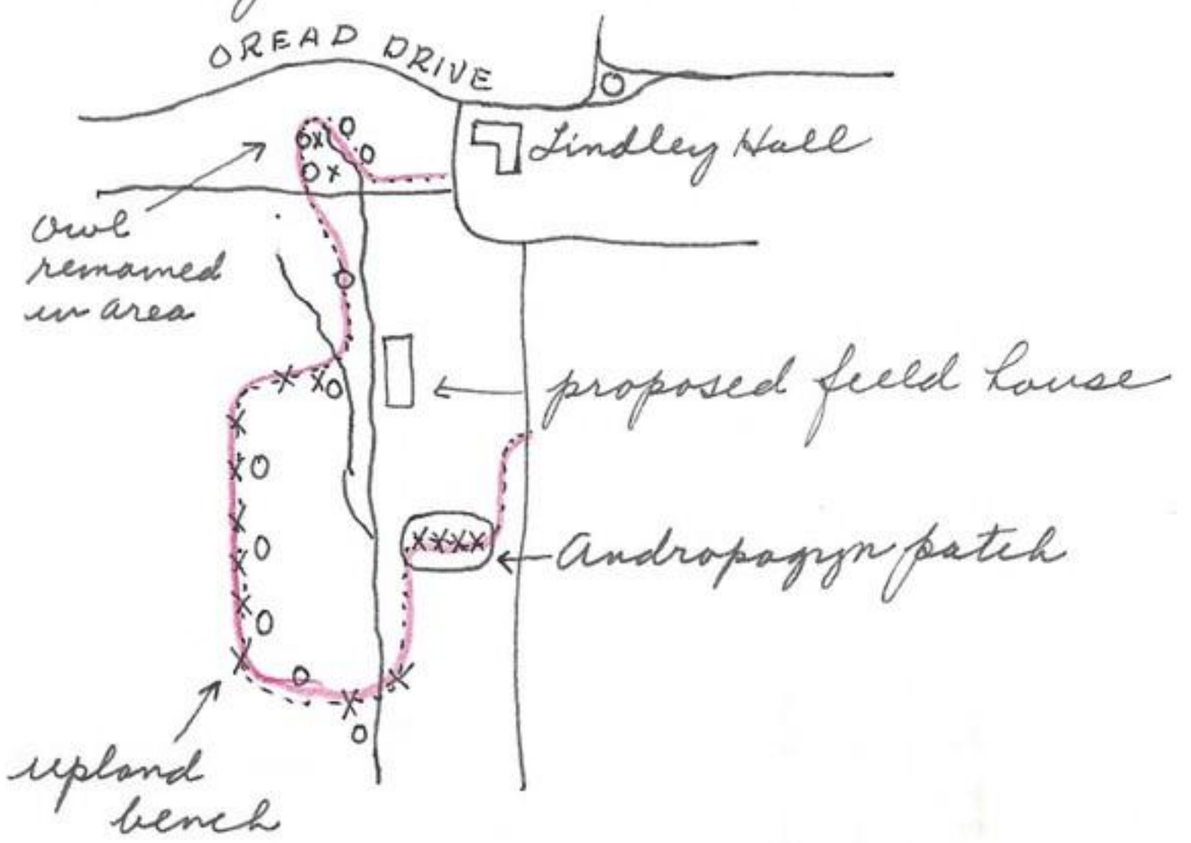
511028-12 Annette C at home (21 Sunnyside on K.U. Campus)

Museum natural History, Unv. Kansas, Lawrence, Kansas
Nov. 12, 1951

Dr. E. Raymond Hall's mother caught an opossum which weighed 11 lbs 10 ounces. Fur with many flees.

Unv. Kansas, Douglas Co., Kansas
Dec. 1, 1951

Surveyed birds and mammals on campus:



O = cottontail

X = runways of Sigmadon and Microtus ochrogaster.

Birds and mammals observed.

11 Sylvilagus floridana
1 Sciurus
1 Neotoma floridana
Sigmadon hispidus
Microtus ochrogaster
1 G. H. Owl

5111 01-220

3 red-tailed hawk
6 blue jays
18 black-capped chickadees
6 bridled titmouse
24 juncos.
3 sparrow hawks
1 downy woodpeckers
1 yellow-shafted flicker
2 sparrows (sp.)

Frogs active in running water, also insects, millipeds. Porcillio under rocks active.