JOURNAL 1952

JAMES W. BEE

520108-2

BRIGHAM YOUNG UNIVERSITY

PROVO, UTAH

January 8, 1952

BOTANY DEPARTMENT

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

Dear James:

I am enclosing the list of identifications of most of the Alaska plants that you left with me for identification. There are one or two grasses not yet reported but I shall try to send you those soon. I have had a delightful time working over these grasses and seeing vicariously the vegetation of the Arctic.

I am enclosing a label of the type which we had printed up to use with your collection; I hope you approve of its form and content. I am placing the mounted specimens for the 1951 collection in our herbarium. The 1952 collection, however, is a little more extensive and these I am dividing up. I am placing a specimen in our herbarium and sending the remaining specimens to you. I am also sending one or two specimens to the National Herbarium for checking for my own satisfaction. Should I find any differences in the identification of these ~~field~~ numbers I shall notify you immediately.

The balance of the plants from the Arctic, that is those which are not grasses, I am listing on a separate sheet identified only to genus in most cases. As soon as I can get the Carexes identified to species I will pass the word along to you. Now, as to the plants from Wyoming and vicinity. I do not recall what you wanted me to do with them. What I intended to do was to send you a list of the specimens that are complete enough for herbarium sheets or for identification, and the others I would note only to the genus. Will this be satisfactory? I am sorry to be so long in getting these identifications to you; however, I surely appreciate receiving the plants. They are a wonderful addition to our collection. They make me want to spend some time in the Arctic studying them first-hand, but then I think about the mosquitos you told me about and I lose heart.

Best regards to you and Mrs. Bee.

Yours truly,

Bertrand F. H.

Bertrand F. Harrison
Chairman of Botany Department

BFH:mr

520108-3

SERVICE LOT No. 139

Plants submitted by James W. Bee

Identified by: Bertrand F. Harrison

510726-1	Arctagrostis latifolia (R.Br.) Griseb.
510726-3	Poa arctica R.Br.
510726-6	Arctagrostis latifolia (R.Br.) Griseb.
510726-7	Calamagrostis canadensis (Michx.) Beauv.
510728-7	Alopecurus alpinus J.E. Smith
510728-9	Alopecurus alpinus J.E. Smith
510731-1	Arctagrostis latifolia (R.Br.) Griseb.
510731-2	Hierochloe alpina (Swartz) Roem. & Schult.
510731-4	Festuca ovina var. brachyphylla (Schult.) Piper
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. & Schult.
510731-12	Hierochloe alpina (Swartz) Roem. & Schult.
510820-2	Calamagrostis canadensis (Michx.) Beauv.
510820-6	Festuca ~~scabrella Torr.~~ *altaica Trin.*
510820-7	Poa arctica R.Br.
510820-8	Festuca scabrella Torr.
510820-13	Arctagrostis latifolia (R.Br.) Griseb.
510820-15	Poa arctica R.Br. -- viviparous form
510820-16	Poa arctica R.Br.
510820-18	Poa glauca Vahl.
510820-24	Festuca scabrella Torr.
510820-29	Poa arctica R.Br.
510820-30	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer & Schreb. intermediate with C. purpurascens R.Br.
510820-31	Poa arctica R.Br.
510820-32	Arctagrostis latifolia (R.Br.) Griseb.
510820-33	Trisetum spicatum (L.) Richt.
510820-38	Arctagrostis latifolia (R.Br.) Griseb.
510820-39	Trisetum spicatum (L.) Richt.
510826-8	Arctagrostis latifolia (R.Br.) Griseb.
* 510826-19	Calamagrostis inexpansa A. Gray
510828-7	Agrostis scabra Willd.
510828-9	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Schreb. approaches C. canadensis (Michx.) Beauv.
510828-16	Beckmannia syzigachne (Stend.) Fernald.
510904-106	Arctagrostis latifolia (R.Br.) Griseb.
510904-109	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Schreb.

* 510828-6 Agropyron latiglume (Scribm. & Smith) Rydb.

320108-4

SERVICE LOT No. 139

Plants submitted by James W. Bee

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* 510828-6 Agropyron latiglume (Scribm. & Smith) Rydb.

520109-5

Museum Natural History
University of Kansas
Lawrence, Kansas

January 9, 1952

Dear Sir:

The following birds were collected under permit no. 51-1662 issued to James W. Bee, Museum Natural History, Lawrence, Kansas.

AOU		
7	Gavia adamsi Yellow-billed loon	1
11	Gavia stellata Red-throated loon	1
157	Polysticte stelleri Steller's eider	1
272	Pluvialis dominica Golden plover	7
283	Arenaria interpres interpres European turnstone	3
240	Erolia melanotos Pectoral sandpiper	20
241	Erolia bairdi Baird sandpiper	2
243	Erolia alpina pacifica Red-backed sandpiper	11
242	Erunetes pusillus Semipalmated sandpiper er	16
231	Limnodromus griseus scolopaceus Long-billed dowitch	3
222	Phalaropus fulicarius Red phalarope	8
223	Lobipes lobatus Northern phalarope	3
37	Stercorarius parasiticus Parasitic jaeger	1
38	Stercorarius longicaudus Long-tailed jaeger	4
62	Xema sabini Sabines gull	4
71	Sterna paradisaea Arctic tern	6
310	Lapopus mutus nelsoni Rock ptarmigan	1*
757	Hylocichla minima minima Grey-checked thrush	1
528	Acanthis flammea Common redpoll	9
542	Passerculus sandwichensis anthinus Western savannah sparrow	11
559	Spizella arborea ochracea Western tree sparrow	1
560	Spizella passerina arizonae Chipping sparrow	1
557	Zonotrichia coronata Golden crowned sparrow	1
558	Zonotrichia leucophrys gambeli Gambel's sparrow	2
536	Calcarius lapponicus alascensis Alask longspur	32
534	Plectophenax nivalis nivalis Eastern snow bunting	2

* Presented to Dr. Frank A pitelka, Museum Vertebrate Zoology, University of California, Berkeley, California

All specimens are now in the Museum of Natural History, Lawrence, Kansas.

A duplicate copy of this report has been sent to the Alaskan Game Commission, Juneau, Alaska as directed in permit gegulations.

Sincerely,

James W Bee

Museum natural History, University of Kansas, Lawrence, Kansas

Feb. 2, 1952

Identified dog-coyote hybrid sent by Mr. Glenn C. Sanderson, State Conservation, De Moines, Iowa. "Skull number (GCS #625) collected 5 miles SW of Garrison., Benton Co., Iowa. Female collected Dec. 26, 1951. Total length 980 mm, hind foot 180 mm, weight 22 lbs after it had been skinned. Shot 5 mi. SW of Garrison by rabbit hunters - a bounty gray wolf by county, but then some people got to wondering so they wrote to me. The hunters had pelted the animal and taken the skin with them before I saw it. Stomach full of domestic peg (hair, skin, feet, tail and meat) probably carrion."

Indices are: $\frac{\text{width basioccipital } 16.4}{\text{width braincase } 56.7} \times 100 = 28.9$

$\frac{\text{width basioccipital } 16.4}{\text{length basioccipital + basesphenoid } 54.3} \times 100 = 30.2$ $\frac{\text{Depth of jaw below M2 } 21.5}{\text{Length of lower jaw } 138.4} \times 100 = 15.5$

orbital angle - 47.0° According to Howard; width (31.4) of rostrum across from canines divided by length of tooth row (96.8) = 31.4
Total length = 1900 mm; breadth zygomatic arch = 93.7 mm.
Returned skull with letter to Sanderson.

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

Feb. 13, 1952

Heard first group of geese (snows & blues) flying north over campus. Only a few were calling. Skies sealed in with fog. They flew north about 1 block west of power plant (campus) at 8:30 P.M. Cardinals have been singing the last week and a half.

Feb. 15, 1952

Mr. Edward Glenn Campbell chosen as second member of expedition to Arctic Slope of Alaska. Address 727 Ohio, Lawrence, Kansas. Born Hally, Colorado, June 26, 1931. Home address Moline, Kansas. Ph. 186 - bakery 134. His measurements for clothing are: (for Arctic Research Laboratory) height 5'11", weight 185; collar 16½, sleeve 34; length 33, waist, 33, shoe 7½, sock, 11, hat 7⅛. These sizes are to be sent to Point Barrow (ARL) Alaska were proper clothing will be supplied.

made some initial preparations for Alaska trip.

Permits. Federal and Alaska Fish and Game. Ask for adequate series of all mammals and large forms when opportunity affords. Have Alaska F+G acquire 10 adults (skin, skull, skeleton) of all large forms as caribou, mt. sheep, moose, bear etc. All birds except those listed as rare by federal permit or those considered rare by Alaskan F+G.

Authorization. To travel by military aircraft thru Chief of Naval Operations, including excess baggage of 200 lbs for return trip. Raise priority to no. one because of perishable specimens.

Navy Clearance. Security information

Appointments and identification.

Pass Port. Will it be required to enter Canada?

Ship material. By end of march and include: 1, collecting chests, 2, skinning chests, 3 cotton 4, guns etc.

Immunizations. Get info from Walkins Hospital

Insurance. $85.50 or $88.00 with extra premium charge.

Transportation. Car to Utah.

Purchase.

mounting pin, no. 125 1¼ white Oakville glass headed pins

frying pan
scouring pads
spatula
hat and head net, 7⅛
butcher knife
large spoon and fork
funnel for pouring gas
max-min. thermometer
thread
pen points
colored pencils
soft lead pencil for marking traps
scissors
fleshing knife
scalpel
straight forceps
curved forceps
long-nosed pliers
wire cutters
needles
m.m tape
cheese cloth
notebooks
reflector mirror
wrist pad
alarm clock
parade chlorobenzene
emergency fishing equipment
transparent ruler
lb. scales
flashlight batteries
Colored glasses
receipt book
emergency flares.
potato peeler
Esterbrook pens
glue
4 yds cheese cloth
color film - roll + mag for 8 mm

Send color to: Chroma Color Lab. Inc
1301 Roy Street
Seattle, Washington

Sereal no. of Iver Johnson 22 over 410 under, 60454
" " J. Stevens single shot pistol 12937
Packed all books and personal equipment in 9 trunks and stored behind bird exhibits in museum.

Haskell Bottom, 1/2 mi. S Haskell Institution, Lawrence, Douglas Co., Kansas

March 28, 1952

At. 2:30 P.M observed 20 Anas acuta tzitzihoa, 2 nettion carolinensis, 4 Spatula clypeata, 8 pectoral sandpipers, 1 killdeer, 1 crow, 1 cathartes aureus, 18 Anas platyrhynchos. Area supersaturated with H_2O. Red-wing blackbirds establishing territories and singing from top of telephone poles and fence poles. One red-tailed hawk and one marsh hawk in area.

19th and Louisiana, Lawrence, Douglas Co., Kansas

March 29, 1952

Observed approx. 450 cow birds (molothrus) feeding in close formation in grass field. All dark shinny birds, except about 12 of which were brown or immature. Tendency toward foreward movement in feeding flock.

1/2 mi. S Haskell Bottoms, Lawrence, Douglas Co., Kansas

March 29, 1952

7 Chen hyperborea and 1 Chen cerulea feeding in lowland pasture. In leaving the blue goose assumed 3rd place in formation. They flew north over west end of Mt. Oread. 2 Fulica americana in area, no ducks. In an area of approx 3 sq. miles, 7 parties of hunters cruised the roads shooting at coots and anything that moved. One party shot at a snow goose. Observation from 11:00 A.M to 12:30 P.M. The prairie chickens are reported to be in nuptial dance at Ottawa, Kansas.

museum natural History, University of Kansas, Lawrence, Kansas

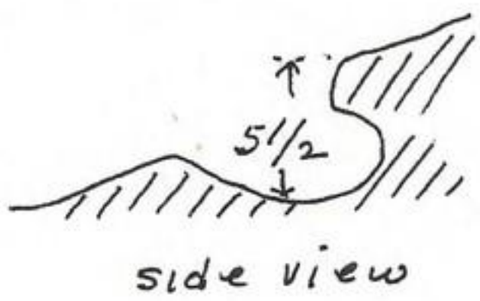
April 4, 1952

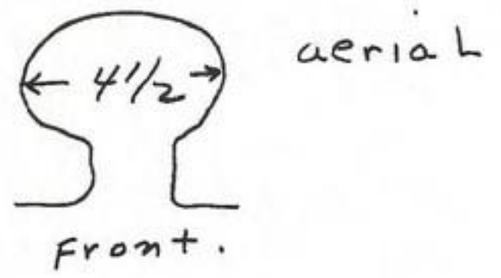
Packed 2 boxes for Point Barrow, alaska to be used this summer. Box no 1. contained: collecting chest, trays for chests, 10 rolls cotton, assorted straight mammal wires, 4 boxes .410 shells, 1 box skull tags, 1 box fish scale envelopes, 1 fish net. No. 2 box contained, 1 collecting chest, sacks, insect net, .410 gun, cloth collecting bags, .410 shell box (empty), vile box, plant press, 1 box

labels for skins, 4 rolls cotton, 1 bat net, 2 bags saw dust for skinning, 1 bot journal paper and Alaska mops.

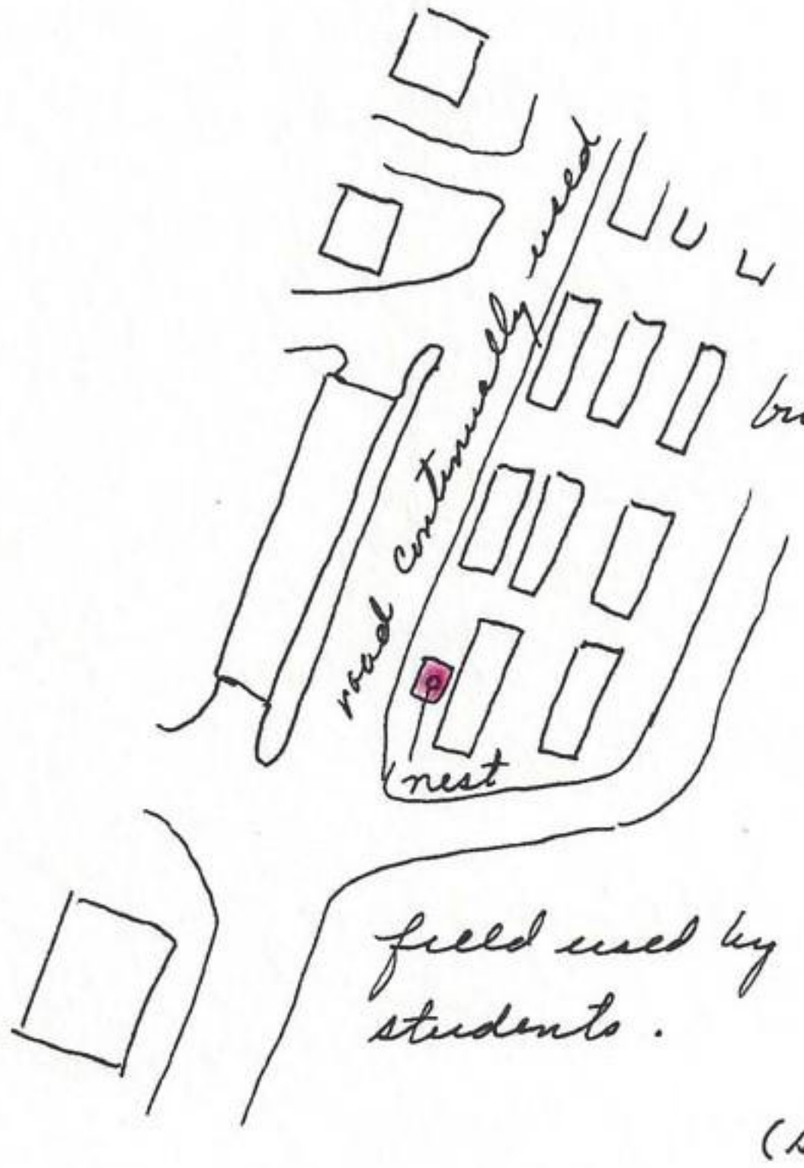
Univ. Kansas Campus, Lawrence, Kansas
April 6, 1952

at 21 B Sunnyside (Univ Housing) located nest of Sylvilagus floridana of three young each approx. 1300 mm in total length. The nest was 5 1/2 inches deep & 4 1/4 inches wide and excavated into soil.





The nest had been in use for 5 or 6 days but the adult was never seen in the area. Presumably the rabbits moved about after dark. The nest was in a dog proof enclosure (used for children) some 20x20 feet. It had not been used this season except once or twice for a dog pound. The ground was bare except a few patches of grass. Surround the pen was a road, building and trompled ground use by the many children and dogs and cats in the housing area. The nearest usable area for the rabbit was 500 feet away.



The choice of this unusual spot could have been prompted by 2 factors:

1. protection from dogs and children.
2. use of preestablished hole dug by dogs. The hole used by the rabbit was one of three shallow holes dug by dogs when they were enclosed.

(see letter april 7, 2 pages beyond)

Museum Natural History, Lawrence, Kansas
April 17, 1952

Observed 2 Chaetura pelagica circling above museum at

11:00 A.M. First swifts observed this season. These birds arrived after a week of rainy weather from the south. Other birds observed throughout the day.

April 24, 1952

Observed small bats flying around tower of museum at 8:00 P.M. This is the first time I have seen this bat this season

April 26, 1952

Pair of Eastern kingbirds arrived on territory used last year at 21 B. Sunnyside on campus.

Haskell Bottoms, approx 4 mi. S Lawrence (P.O.), Douglas Co., Kansas.

April 27, 1952

Observed: 30 blue-wing teal, 1 G. horned owl, 6 solitary sandpipers, 1 marmata mosad bunkeri.

museum natural History, Univ. Kansas, Lawrence, Kansas

May 6, 1952

Heard night hawks on campus for first time this season. James R and Chris caught the following fish at Potter's Lake.

Notropsis lutrensis - Plain red shiner. Blush-silvery sides, red fins, ♂ tubercule on head, back greenish.

Lepomis cyanellus - green sunfish. Blush spots and long lines on head and sides, dark.

Lepomis macrochirus - blue gill. Perpendicular stripes, lighter than green sunfish.

Lepomis humilis - orange spot.

Ameiurus melas - Bull-head

Notemigonus crysoleucas - golden shiner

SKi 520506-2 Sympetrum specimen from near lake. skin only.

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

May 14, 1952

Hylocichla ustulata swainsoni migrating north through Lawrence. There has been a cold front north which seems to have held this bird, as well as many smaller warblers, back for a few days. Migrating birds are everywhere in the grove on the campus.

520514-11

INSERT.
May 14, 1952

Lawrence, Douglas Co., Kansas

April 7, 1952

The following letter sent to Mr. M. Revel Lipman, office of Naval Research, St. Louis 5, Missoure on april 7, 1952.

"A proposal for research at the Arctic Research Laboratory entetled, "Manual of Native Land mammals of Northern Alaska", has been approved by the Office of Naval Research and at present we are actively preparing for the summers work.

Request approval for shipment of equipment by boat-rail to Point Barrow, Alaska and the issue of the Government Bill of Lading for this crated equipment (Export Packing):

1 crate	115 lbs	Field collecting chest	19" x 19" x 36"
1 crate	126 lbs	" " "	19" x 21" x 36"
1 box	30 lbs	.410 Collecting ammunition	9" x 9" x 18"

The following address is now placed on these 3 boxes.

ROICC, NOy-13360, NRR-4
Door 1, Beluding 46
U. S. Naval Supply Depot
Seattle 99, Washington.

I will insert on the "marks" block on the bill of lading "For transshipment via boat-rail to Arctic Research Laboratory, Point Barrow, Alaska.

A second problem is regard personal insurance for the 3 months this summer on the Arctic slope under Navy contract. In lieu of the fact that I do not have Workmans Compensation insurance for coverage in Alaska and that the Navy-approved standard policy, without the Workmans Compensation, would not be all inclusive in protection, I took out a policy of life insurance with the new England Mutal which will give me complete insurance. In order to receive this policy at standard rates it was necessary to apply before I had made agreements with the Navy for this summers work. Under this arrangement the premium costs will come to $85.00 which is the most inexpensive insurance for complete protection. From my experience on the Arctic slope of last summer have concluded that insurance is quite necessary. The extra charge of this premium can be accommodated by our present budget. Would appreciate your judgement concerning this issue

Very sincerely yours. James W Bee

520526-12

3-278
July 1951

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

CONDITIONAL PERMIT TO TAKE, POSSESS, EXCHANGE, AND TRANSPORT MIGRATORY BIRDS AND THEIR NESTS AND EGGS FOR SCIENTIFIC PURPOSES

Issued May 26, 1952

PERMIT NO. 1716

Expires December 31, 1952

JAMES WILLIAM BEE of LAWRENCE, KANSAS and those under the Alaska Game Law is hereby permitted, in accordance with the Migratory Bird Treaty Act Regulations, subject to the terms, exceptions, and restrictions expressed herein and on the reverse side hereof, and subject also to any other applicable Territorial, State or Federal regulations, to take for scientific purposes only, in *** ALASKA *** the following:

*** MIGRATORY AND NON-MIGRATORY BIRDS ***

(SPECIMENS TAKEN ARE TO BE ULTIMATELY DONATED TO PUBLIC MUSEUMS OR PUBLIC SCIENTIFIC OR EDUCATIONAL INSTITUTIONS)

and to possess, exchange, and transport for scientific purposes, the migratory birds and nests and eggs of such birds taken under authority of this permit.

THIS PERMIT IS CONDITIONAL and confers NO privilege whatever unless the permittee has in his possession, while exercising the privilege granted herein, a valid subsisting permit to take migratory birds and their nests and eggs for scientific purposes in the above-mentioned State(s) or Territory issued to him by such State(s) or Territory, and unless or until that condition is fulfilled the taking of migratory birds, their nests or eggs is a violation of the Migratory Bird Treaty Act.

THIS PERMIT IS NOT TRANSFERABLE, and is NOT VALID unless countersigned by the Chief, Division of Management, Fish and Wildlife Service, or his authorized representative.

Albert M. Day
Director.

COUNTERSIGNED:

R. J. Johnson
Chief, Division of Management.

16—60424-2

EXCEPTIONS AND RESTRICTIONS

This permit does not authorize the following:

1. The taking of specimens on Federal wildlife reservations, preserves, or refuges Nat'l Parks, Nat'l Monument's or Posted Nat'l Forests

2. THE TAKING AT ANY TIME OF TRUMPETER SWANS, WHOOPING CRANES. ESKIMO CURLEWS, BRISTLE-THIGHED CURLEWS, BALD EAGLES OR THEIR NESTS AND EGGS, OR _____

_____;
OR EAST OF MISSISSIPPI RIVER, LONG-BILLED CURLEWS OR SANDHILL CRANES OR THEIR NESTS AND EGGS; OR THE TAKING, POSSESSION, OR EXCHANGE OF MIGRATORY BIRDS OR THEIR NESTS OR EGGS IN VIOLATION OF TERRITORIAL OR STATE LAW, REGULATION, OR PERMIT.

3. The exchange of migratory birds, their nests or eggs, with persons who do not hold an appropriate permit.

4. The purchase or sale of migratory birds, parts thereof, or their nests or eggs.

5. The taking of waterfowl without a valid hunting stamp or of migratory game birds during the open season therefor in any manner or by any means or at any time of the day not permitted by the Migratory Bird Treaty Act Regulations, or the transportation of any migratory bird, part, nest, or egg thereof from Mexico into the United States unless accompanied by a Mexican export permit.

6. The capture alive or the possession of live migratory birds, unless expressly stated herein.

7. The taking of migratory birds by aid or use of falcons or other raptors.

GENERAL CONDITIONS

1. This permit is granted with the express understanding that all specimens taken under authority hereof are for ultimate deposit in a public museum or a public scientific or educational institution unless otherwise stated herein.

2. This permit, together with the State or Territorial permit or permits where required, must be carried on the person of the permittee at all times when migratory birds, their nests or eggs, are being taken thereunder, and both must be exhibited to any authorized person requesting to see them.

3. The holder of this permit shall keep books and records correctly setting forth the number of each species of birds, nests, and eggs collected; the name and address of each person with whom exchanges have been effected and the date thereof, and such books and records shall be available for inspection at all reasonable hours on request of any authorized representative of the Director of the Fish and Wildlife Service. Whenever requested by the said Director, the permittee shall submit to him such report of operations under this permit as may be called for, and in any event shall file with the said Director, on a form provided therefor, on or before January 10, a full report of his operations during the preceding calendar year. Persons collecting in Alaska must forward a copy of such report to the Alaska Game Commission at Juneau. The failure to render such reports promptly may prevent the issuance of further permits.

4. All shipments to a point within a State, Territory, or the District of Columbia shall be marked in accordance with the aforesaid Migratory Bird Treaty Act Regulations.

5. This permit may be revoked by the Director of the Fish and Wildlife Service without notice for violation of the terms, exceptions, restrictions, or conditions hereof, or for violation of general and/or specific State and Federal laws and regulations which are applicable; it is subject at all times to discretionary revocation by said Director; and if revoked shall be surrendered immediately to him or his authorized representative.

U. S. GOVERNMENT PRINTING OFFICE 16—60424-2

520527-13

(C O P Y)

Permit No. A-52-45 Date May 27, 1952

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
JUNEAU, ALASKA

PERMIT TO TAKE, POSSESS OR SHIP FROM ALASKA, ANIMALS, BIRDS OR GAME FISHES FOR SCIENTIFIC OR OTHER PURPOSES

By virtue of the authority delegated to the regional direstor by section 46.211 of the regulations promulgated under the Alaska Game Law, permission is hereby given to Dr. E. Raymond Hall, James W. Bee and Edward G. Campbell, Lawrence, Kansas, representing University of Kansas, Museum of Natural History, to take, possess, transport or export, from this date to Dec. 31, 1952, except in or from areas in which the taking of certain animals is prohibited by ~~law~~ the current "Regulations Relating to Game and Fur Animals, Birds and Game Fishes in Alaska", Unprotected mammals, squirrel, pika, hare, black bear, coyote, wolf, resident birds and not to exceed ten (10) foxes, ten (10) weasel, two (2) mink, ~~or~~ one (1) wolverine, five (5)lynx, ten (10) muskrat and skulls of legally taken big game.

Purpose: Scientific

Except as provided ~~by~~ /law/ below, this permit is valid during the open and closedseason on these species, when in conjunction with the hunting, trapping or fishing license and guide requirements prescribed by the aforementioned regulation.

THIS PERMIT MUST BE CARRIED ON THE PERSON OF THE PERMITTEE WHEN CONDUCTING OPERATIONS AUTHORIZED BY THIS PERMIT. THIS PERMIT MAY NOT BE TRANSFERRED NOR THE AUTHORITY CONTAINED HEREIN DELEGATED TO OTHERS. WHENEVER PRACTICABLE THE NEAREST Fish and Wildlife Service Agent should be notified prior to commencement of field collection activities.

The containers in which such animals, birds, or fishes are transported shall have plainly and clearly marked on the outside thereof, the name and adress of the consignee, and be labeled to show the exact contents thereof and purpose for which it is being transported. And if the shipment is out of the territory, a copy of this permit must also be securely attached to the container in which such animals, birds, or fishes are shipped, and shall remain attached to point of destination.

Not later than January 10, 1953, this permit together with a report in duplicate, must be furnished the office of the undersigned, stating the kinds and numbers and designation of game and? or fish taken or shipped out of the territory under authority of this permit.

Special provisions:

/s/ C. Howard Baltzo
C. Howard Baltzo

Acting Regional Director

Lawrence, Douglas Co., Kansas

June 5, 1952

Departed Lawrence with family at 5:25 P.M. Mileage 38482.7 for Provo, Utah. 10 gals gas $2.84 at Lawrence. At Junction City - gas 9 gals at $2.25. Stayed first night at Salina Rainbow motel $7.00. Wheat in best growing condition, now mainly green but showing slight tinge of yellow. 7 skunks (stripped ?) between Lawrence and Salina.

Salina, Kansas

June 6, 1952

Left 7:00 A.M. Breakfast $1.80. Gas 10 gal, $2.90 at Hayes. Lunch $2.05. First Citellus tridecemlineatus at Oakley and first observed. Wickan, 9 gal gas, 1 qt oil, $2.90. Dinner $1.60. Liman, 8 gal gas $2.00. Repair of tire $1.00. Denver 8:00 P.M. all travel on highway 40. Supper $2.00. Enroute vegetation thus:

← Lawrence	← Fort Hayes	← Colorado line	← Liman	← Denver
long green grass	medium short green grass, century plant flowering	short dry sparse grass, century plant past bloom - ing	short green grass, century plant blooming	

Denver, Colorado

June 7, 1952

Breakfast $2.10. Spent morning with mod. Car adjustment $3.75. Lunch $1.90. Rode ski lift at Berthaud. 10 gal gas at Berthaud $3.20. From Rabbit Ear Pass to bottom of mountain (west) counted 28 dead porcupines and 1 live along side of road. Generally distributed altitudinally but mainly at about Lower Montane Zone. Arrived Craig. Supper $2.15.

Craig, Colorado

June 8, 1952

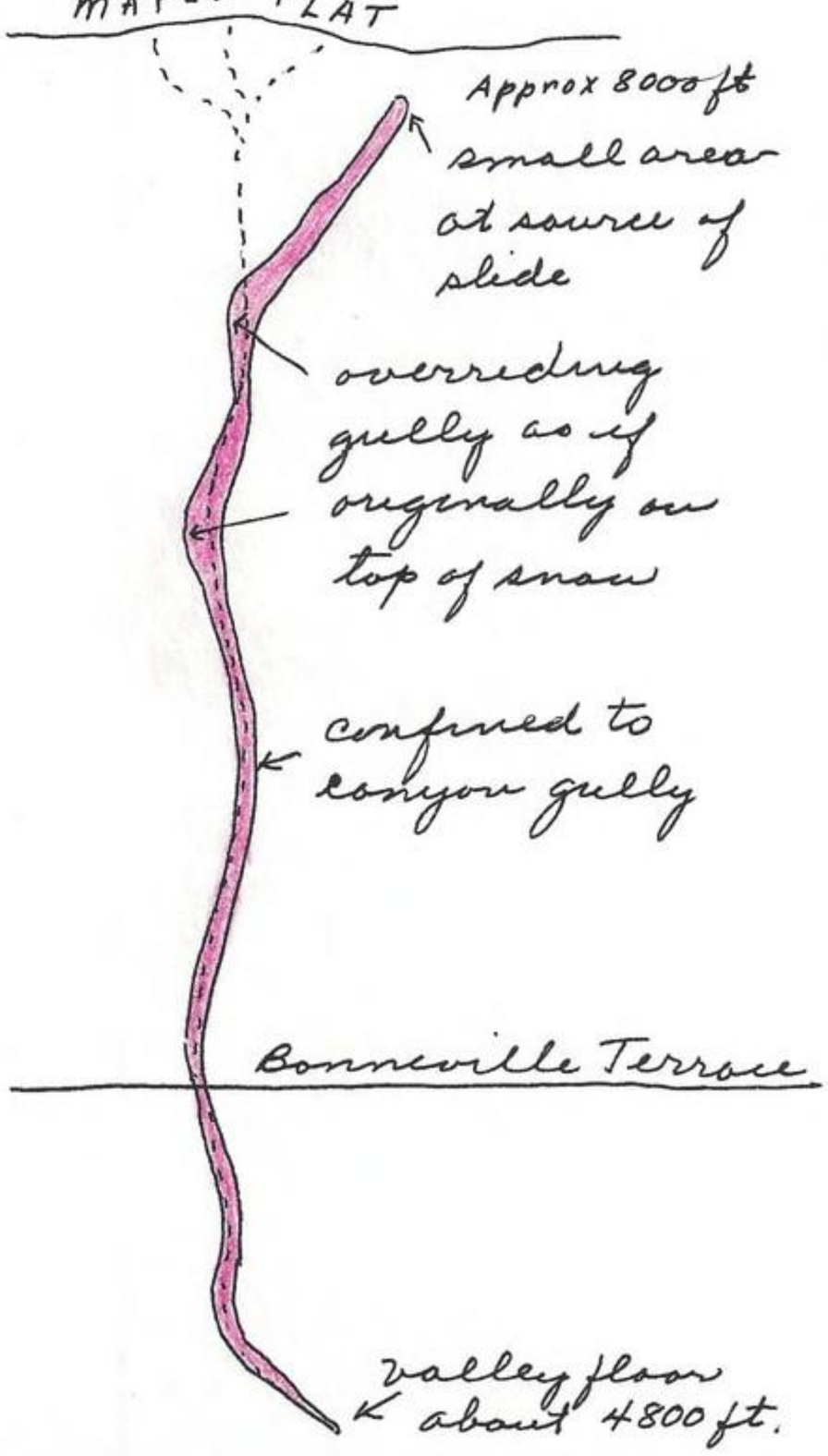
Breakfast $1.80. Lunch $2.20, Dinner $1.80. Annette did most

of the driving. Water high along Tampa River, highest in 50 or so years. Strawberry Reservoir in Utah to capacity. Three sage hens killed on road between east side of valley and head of Daniels Canyon. Deer Creek reservoir to capacity. Provo River high. Arrived Provo about 7:30 P.M.

Provo, Utah Co., Utah.

June 9, 1952

arranged with Dr. Bertrand Harrison for identifecation of grasses, mosses and lichens collected in Alaska and in Colorado, montana, north and South Dakota + Minnesota. Spent some time with Drs. Tanner, Beck and Hayward. Observed a slide (land) on the slope of the Wasatch Range below Maple Flat east of Provo. This type of slide had never been witnessed by man in the history of Utah. These soil slides were from north of Rock Canyon (3) to mapletoon mountain to the south. They all originated high on the mountain and in a zone that was covered with snow. Excessive moisture started the slide which continued down over the snow surface and beyond to the bottom of the mountain. One slide started just below Maple Flat and after sliding over snow for 1/3 of the way continued to the Bonneville Bench, over the bench and down onto the outwash plain in the valley below. It followed gully or canyon bottom for entire route except at the upper course where it had widened as it turned corners and run up the confining walls of the canyon. This would suggest passing of slide material over surface of snow, at least at the higher elevations. These slides were probably started by supersaturated soils at high elevations. There is no record of fault movement.



Salt Lake City, Wasatch Co., Utah

June 10, 1952

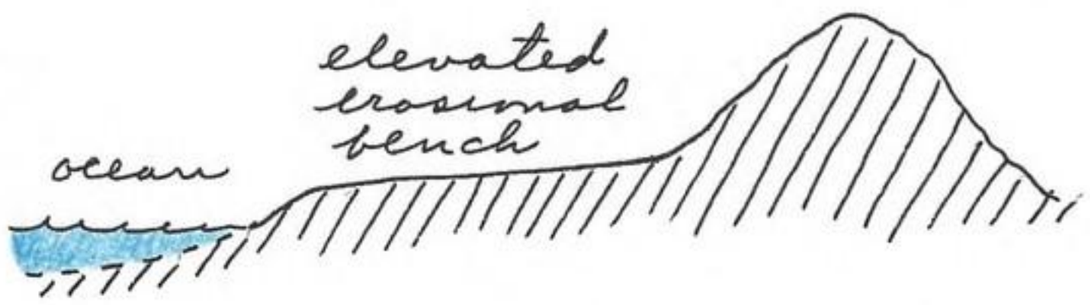
Departed Salt Lake Airport 1:25 P.M for Seattle, Washington. While waters in lake high, they did not cover the white salt flats to the west. Unexplainable white line on lake surface. Clouds free over lake but surrounding indicating effect of water surface on cloud formation. Enroute stopped at Pendleton, Boise. Blue mountains in eastern Oregon more extensive than when observed from the ground. Continued down Columbia River gorge, thence north to Seattle. The view of this river gorge and mountans, (Hood, Adams, St. Helens) is less impressive from the air than on the ground. The Columbia River is at flood stage and inundated in river bottoms adjacent river. Barnes General Hospital in tact and enlarged. Kaiser yards not active. Checked in at Hungerford Hotel and made arrangements for transportation to Fairbanks, Alaska for tomorrow morning at 8:30 A.M.

Seattle, Washington

June 11, 1952

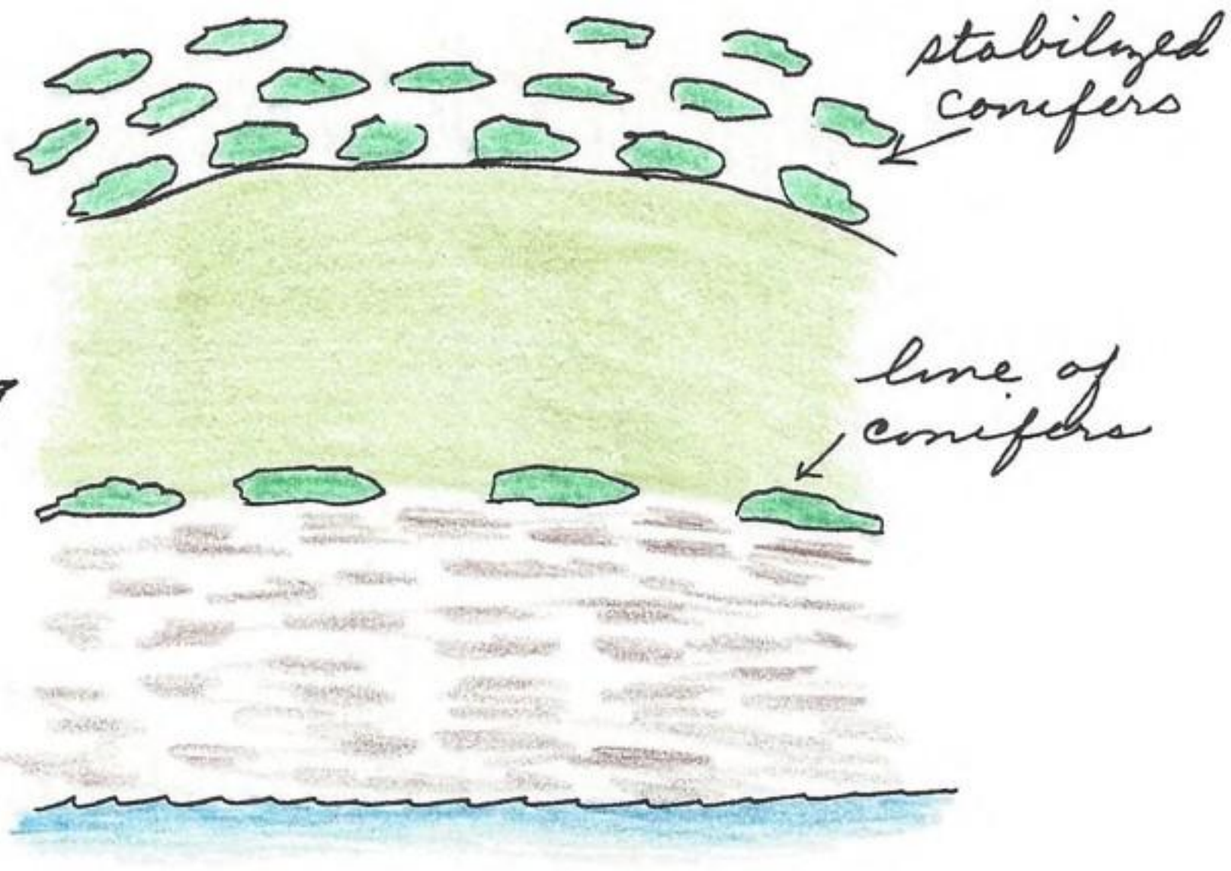
Departed Seattle 8:30 A.M via Pan American World Airways flight 705. Followed inland water route between Vancouver Island and mainland. Vancouver Island becomes progressively rugged from south to north and at about 3/4 distance north becomes a unique rugged mass of high mountains and snow covered peaks. The mainland also at this point is rugged and untouched as far as exploitation of timber is concerned which is in contrast to the conditions of Washington where the entire country has been gutted with fire and lumbering. This area is about as close to the U.S. for wild country exploration, as one will find. Beyond this point the mountains are farther from the inland passage and the plains & foothills are more extensive. Clouds clear above water but conforming to island masses and mainland. The clouds over water are more veil like. Water below greenish-blue with shadows casting a deep ink blue. Clouds more frequently polygonal in outline Below the low clouds and high cirrus one is a dense layer of stratus that, at a distance look like black horizontal streaks but

when approached are of considerable horizontal width. main swales of ocean north-south but smaller wind waves east-west. Under some conditions the ocean appears braided with a dendritic pattern of channels. Passed Rose Point about 1/2 way between the point and Prince Rupert Island. Queen Charlotte Islands are most impressive and rugged. Continued straight to Annette Island which is the air terminal for Ketchikan. Arrived at 12:00 A.M. This island is a low lying land mass and backed by a high range of snow & ice capped peaks to the east. The surface is about 90% water including many small natural lakes and small water channels or marshy areas. The vegetation is low consisting of horse tail like plants and willow with a sparse growth of conifer trees. The low tide exposed interesting beaches and rocky outcroppings. At the airport photographed the sign Annette 520611-1 for my wife and photo 520611-2 of our D.C. 4 and two small widgeon planes which carry passengers from Annette Island to Ketchican and other mainland points. The range of mountains in background are typical of this area. Specimens of Bufo 520611-3 from willow patches on the drier parts of the land surface. Most of them were at the edge of the willows and when approached would jump into willow thickets instead of into wetter areas of supersaturated grasses and ponds. Bufo no 520611-4 and 520611-5 also collected here. The toads (Bufo) occurred at about 1 per 20 feet of walking. Did not hear call for plane and returned just as Stewardess was closing door. Departed Annette Island 1:03 P.M. and passed by Ketchikan at 1:15 P.M as we flew up Clarence Straits. Photo 520611-6 of this city and range beyond. This town has good mountain country but is isolated from the main range to the east. The profile of this island would suggest a major erosional period followed by uplift or lowering of ocean level. This bench could have been glaciated. Continued up Clarence Strait east of Prince of Wales Island, thence up Stekine Straits, pass Wrangell (part of canning factor destroyed by fire) which



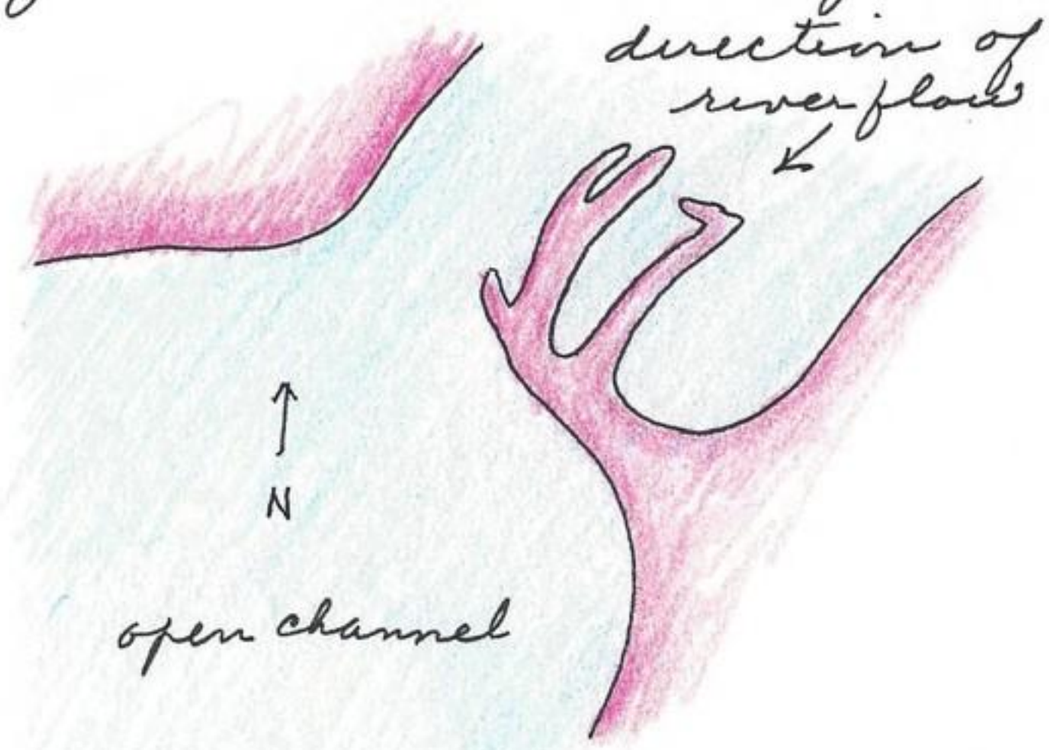
was to the right and almost directly below, thence up Frederick Sound, Port Houghton, and Stephens Passage. The entire route is marked by high, rugged mountains supporting glaciers and extensive snow fields. This is also true of Admiralty Island and mountains to the west. Flew near the eastern edge of the inland passage. Nearly all of the rivers and fjords supported ice bergs and ice masses with braided river channels of rock-flour. The glaciated water runs out into the inland passage where it is mixed with the blue water. In most places the line of demarcation is abrupt and is frequently associated with a white line of surface debris, foam or something that gives the water line a white color.

This is an important observation because it explains the appearance of line streaks found on other bodies of water such as the observation of lines on Great Salt Lake of yesterdays flight. Apparently the debris is pushed out from rivers and both the debris and white glacial rockflour demark the limits. It was also noted that wave action on small islands leave trails of white foam on the leeward side which is another method of line or streak formation on the surface of large bodies of water. Agraded mouths of fjords indicate extensive fill-in of these old Pleistocene water channels and are now, in many places becoming stabilized with conifers. They remain, however, in an active state and support a low green grasslike vegetation with braided river systems between. A typical transect of vegetation succession would be like this:

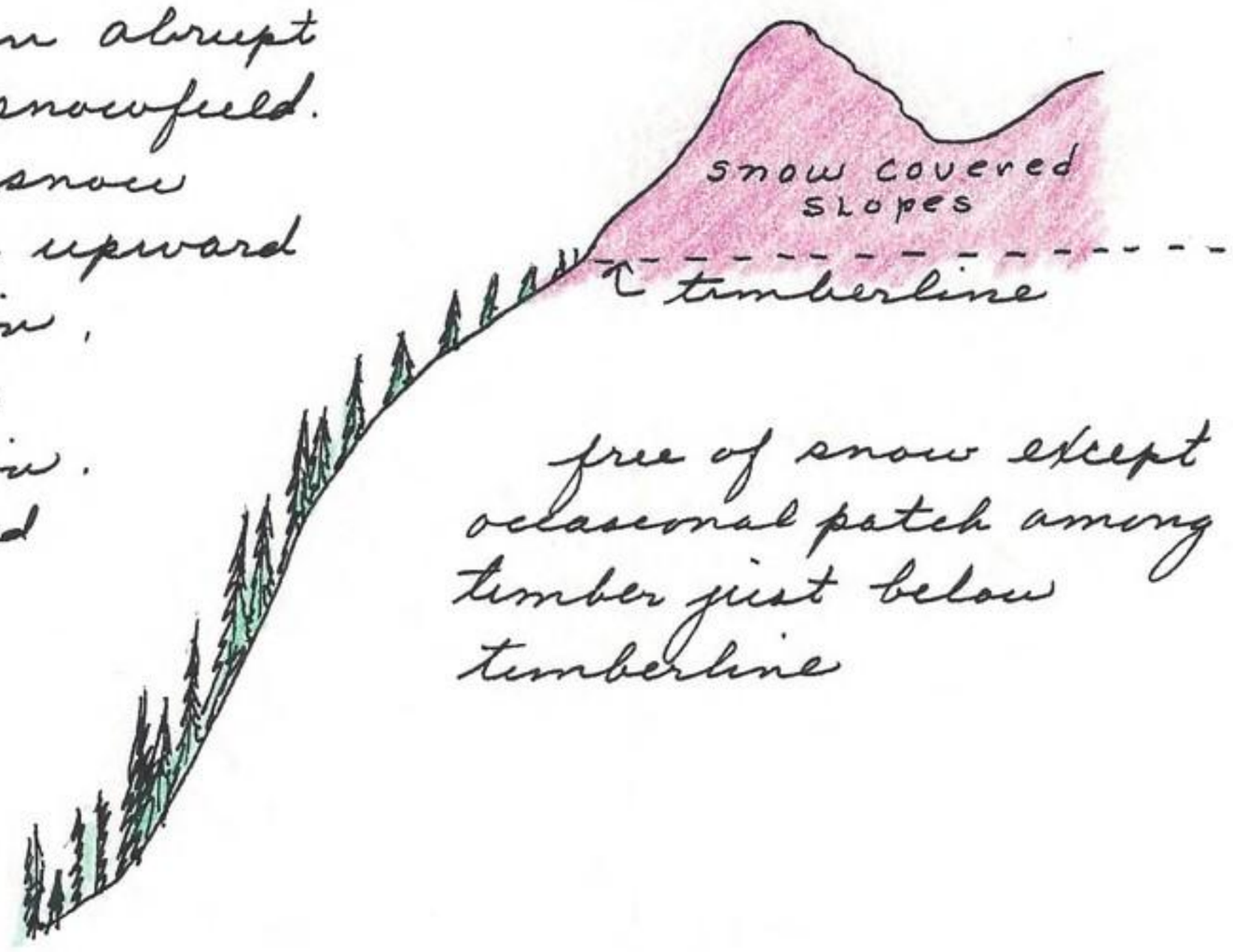


A few land, rock and snow avalanches on hillside. Treeless tracks start about 1/2 way up mountain slope and are started by soil creep and possibly some by snow avalanche. The snow avalanches, in turn, start above timberline and only invade the timber for a short distance. at 1:45 P.M arrived mouth of Baird Glacier. Just beyond the water front, the slopes start and are steep and covered with conifers. Bob McKinsey, the pilot said we were flying at 4000 ft. He said the brown bear came out of hibernation on Admiralty Island 1 month ago and at time there were only a few active bears. 2 weeks ago the greater number of bears were active. The bears hibernate high on the mountain slopes and in spring come down to the lowlands at edge of island to feed on salmon and deer. It is a common site to see them slide down the snow slopes with feet sticking out in all directions. They apparently do this for pleasure as they have been seen to go back up the same slope. The conifer slopes on the west and east side of Endicott Arm are used for hunting deer. Photo 520611-6 of snow covered mountains east of Juneau near Taku Harbor. These mountains are typical of the entire range of mountains. Flew over Taku Ice field. turning right up Taku River to point where glacier enters water, thence up main ice mass to near its source, thence across the many ice fields to the NW passed Mendenhal Glacier to Eagle Glacier, thence down to Lyons Canal, thence south to Juneau air field (upper one). While crossing over these upper glacial fields photographed in color (movie) about 30 feet of film of the upper white snow fields of Taku Glacier (at 2:45 P.M). These snow fields are white and smooth but become dirty in appearance at the lower levels where cracks become conspicuous and the glacier either enters the water or terminates. Photo 520611-7 of Taku Glacier near its source. Photo 520611-8 also of Taku Glacier a few minutes beyond above. Arrived Juneau air port at base of Mendenhal Glacier at approx. 3:55 P.M having flown about 20 minutes over the Taku Glacier. There is no doubt that Juneau is uniquely situated in relation to high snow fields and rugged mountains (Coastal Mountains) It is no. 1 place to live and work. I am convenced that a long range program

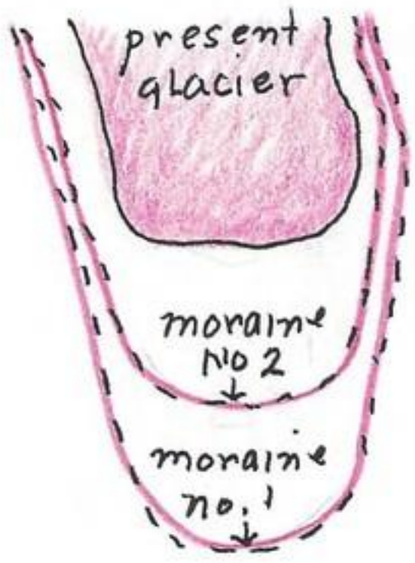
should be instigated to investigate the ecology and taxonomy of mammals on the numerous islands of the inland passage. It would require a small boat to get from one island to another and on which one could live and work. The oregional cost of the boat would be the most important expenditure. Such a program would appeal to me enormously. met Mr. Dean Williams who is considered one of the best guides in this part of Alaska. He is ready to give assistance to any expedition that might be anticepated in the future. Sterna arctica common at airport, few ducks, few cleff swallows and 1 raven. The filled in fjords now support a low growing green Equisetum which shows a recent change in the topography. Near Juneau observed the following off-shore bars:



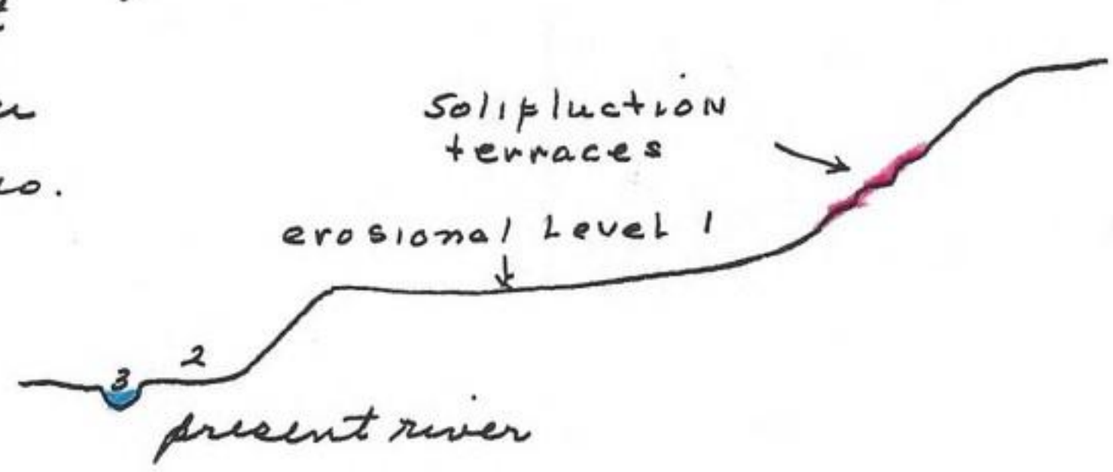
Departed Juneau 3:50 P.M for Whitehorse and now trending up Lynn Canal. High precipitous mountain slopes on both sides with extensive glacial snow fields beyond. many ice filled lakes in lower parts of range. One significant observation was the association of the timber line with snow fields. The timberline has an abrupt contact with the snowfield. It look like the snow cover limits the upward growth of vegetation. altitude controls snow accumulation. at 4:15 took colored movie (16 mm) to west in vicinity of Miier Glacier The route past Haines shows better scenic



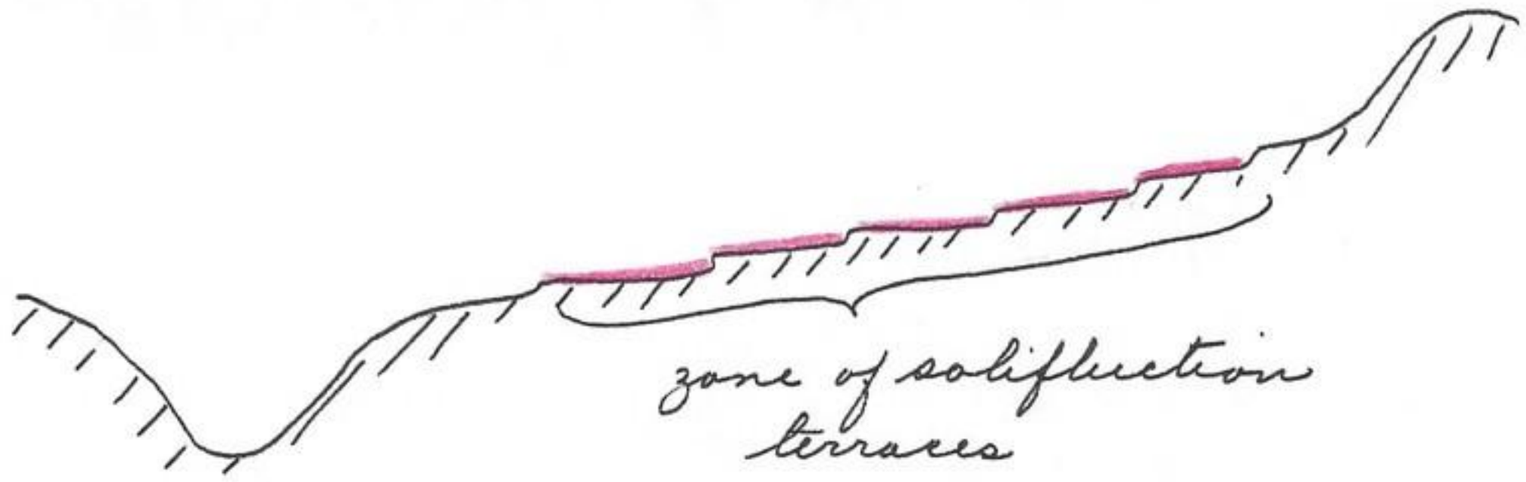
sites to west than to east. At 4:25 P.M color movies to east showing snow fields. The nedt valley north has White Pass and Yukon highway. 4:30 P.M colored movie to west of extensive snow fields. at this point several glaciers had 2 successional moraines thus:



At 4:35 mountains with smaller trees and more sparsely placed showing effect of ecological difference between the north and south side of the range At 4:38 movie to west with lake in foreground. at 4:39 P.M passed Carcross (short for caribou crossing) which is a narrow point along the river course that was formerly used by caribou migrating south. Continued n to Whitehorse and at 4:42 P.M passed many small algae (green-blue) lakes. This entire country was formerdly extensively flooded but now is in a stage of drying up because of water resources in head-water drainage. The lakes are segmented from formerly larger lakes. as these small lakes dry they leave a white bottom surface. At 4:44 P.M area of terminal moraines. Meandering course beyond. At 4:48 P.M found several lakes with several recessional or successional lines of plant vegetation. 4:50 burnt area with new growth of young green conifers. Ave circle around Whitehorse and then a landing at 4:53 P.M. Elevation 2300 ft. Photo. 520611-8 of whitehorse, Yukon, showing town and three solifluction terraces on the distant mountain. Yukon River now occupying valley no. 3. Departed Whitehorse at 5:50 P.M. Successive ridges to west showing evidence of wind from N.E.

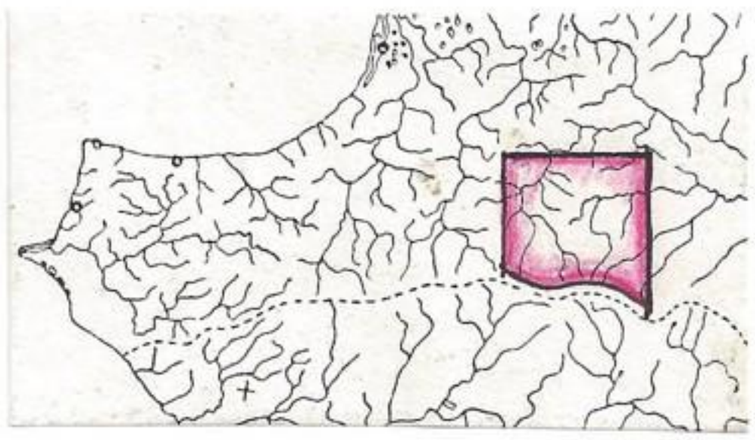


at 6:08 P.M well formed solifluction terraces to south on all exposures, some showing perpendicular alignment. Such alignment suggests a large rock accumulation. The main area of solifluction activity is on benchland between the higher mountain peaks and the sides of the erosional walls thus:



These terraces at certain levels appear as shorelines but some show convergence. nearly all lowlands without snow except occasional patch in protected river course. Lakes free of ice. Upper lakes with ice and slopes covered with patches of snow in protected areas. Many well established river channels trending north but now dry and filled in indicating a change of climate and recession of glaciers to the south. 6:40 P.M deciduous elements appear and give greenish color to slopes like grass. 6:45 P.M first cloudy river flowing north (Danyck River). 6:54 P.M (white River) cloudy. The only ice mass or snow in area of rivers level were islands in rivers and represent ice jams from early spring. A short destance beyond obscuring clouds and rain to Fairbanks. Arrive Fairbanks and landed by instruments at 8:30 P.M (some time as Seattle time as I did not change clock. This last leg of the trip from Whitehorse to Fairbanks is windy and air travel is rough. It reminded me of the area between Cheyenne and Odgen which is also rough riding. Enroute from Whitehorse met Mr. Charles Hummel of the U.S.G.S (age approx .23) who spent the summer of June, July and August, 1950 at the headwaters of Colville River in an area of approx 1000 sq. miles.
He reports the following:

1. Walverine June 1950 at Driftwood and one at the crest of the Brooks Range as of June.
2. Barrow Ground Grizzly. Approx. 10 adults and 9 cubs in June and July 1950 in 1000 sq. miles. Duplicating not likely. One female had three small cubs.



3. Caribou remain on flats in month of June and July and

then migrate to the mountains in August. This is peculiar as June & July are bad months for mosquitoes in the lowlands. He believes that caribou follow well defined trails but migrate through passes in the Brooks Range by trial and error.

4. 6 pair of wolves in 1000 sq. miles but believe on the basis of caribou kill, average 10 for June & July, that there are more in the area but are secretive and not commonly seen.

5. no pika

6. Two kinds of rabbits

7. Fewer red foxes than wolves and about 4-5 per 1000 sq. miles

8. Did not see arctic foxes.

9. Ground squirrels common and numerous

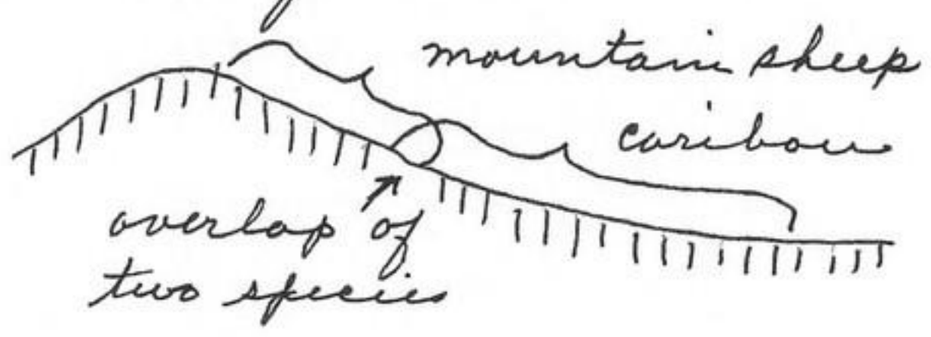
10. Marmot present.

11. Mustela ermnea common. 6 noted among rocks and probably a family group.

12. No mouse

13. Dall sheep more common at higher elevations near crest of range but are found all the way North to foothills.

Another passanger reported several groups of caribou (about 7 in each group) at Chicken, Alaska. In 1950 he saw a mule deer at Dawson, Yukon and to his knowledge was the first one seen in this part of Yukon. He also said that in 1922 he passed through Mt. Kinley Park and counted thousands of mountain sheep. Today there are only a few. He believes that the protection of wolves is responsible. Arrived commercial air field, Fairbanks, at 8:30 P.M. and made arrangements to lodge at B.O.Q at Ladd Field, east of Fairbanks



Fairbanks, Alaska

June 12, 1952

arranged for transportation to Point Barrow at the Arcon office for the Saturday linehaul flight. Met Daniel Thompson who will also leave for Point Barrow this same day. He said that Eskimos at Point Barrow killed 50 lemming at the village this spring with bow and arrow to feed to captive polar bear cubs. Composed some questions that might

be useful for interrogating Eskimos about certain aspects of the natural history studies

1. Relative abundance of rabbits, caribou, bear etc since pre-whiteman influence.

2. Do wolves and foxes turn to large game when lemming population is low.

3. Evedence of frogs and salamanders in deep protective mosses and lichens north of the Brooks Range.

4. Evidence of shift of animal populations

5. Comparison of vegetation since pre-whiteman influence.

6. Do animals fluctuate the same in the physeographic provences of the slope.

7. Does the west coast line of northern alaska permit mammal invasion to the north or is the bluffs of the Colville River used.

8. What were the migration routes and general movement of caribou in early times

9. Effects of the transverse Colville River in checking erosion of slope to north.

10. Reproductive period of all kinds of animals.

11. Effects of permanent springs on mammal & bird distribution.

12. Diseases and effects on mammals

13. Differences in ecological preferences between Mustela rixosa and M. erminea.

14. Effect of daylight periodicity on mammals & birds.

15. Early evidence of musk-oxen.

16. Do marmots have a wide altitudinal and lateral range or is it restricted to the more inaccessible rock slides of the higher Brooks Ranges

17. Are the marmots rare at Chandler Lake because of repeated depredation of Eskimos.

18. Is it possible that Eskimo extirpated the pika as it is known that marmots have been so eliminated in some areas.

Fairbanks, Alaska

June 13, 1952

Talked to a Canadian Entomologist today who was to investigate the insect life at Umiat. He reports:

1. male Culex mosquitoes live about 1 day after hatching.

The females live about 1 to 2 weeks and are dependent upon the fat left over from the larval stage. They may eat the juices from plants but mainly the pollen is consumed. Males do not bite.

2. Mosquitos pass the winter as eggs but must be well desiccated and pass the winter month in a dry condition. Late summer rains might prove unfavorable for the insect eggs. These eggs are generally placed in the dry mosses and lichens. Insect larvae and ova can stand many degrees below freezing. The temperature on the tundra in the moss and lichen under a good covering of snow is approx. 2 degrees below freezing.

3. Bot flies (like a bee) laye eggs on the hair of caribou and then gain entrance to the mouth of the animal, thence to digestive system, thence to all parts of the body via the body tissues. They finally come to rest on the back of the caribou just under the skin where they form a pocket and then penetrate the skin with a small puncture for air supply.

4. Diptera and arachnids most common group of insects on tundra.

5. There has been very little work done on the Arctic slope.

This morning, near College, collected 3 snails 520613-1 from borrow pit along side of railroad. Pond almost stabilized many shells on surface of water. Observed the following birds near the Univ. of Alaska along railroad grade:

Zonotrichia leucophrys
Junco hyemalis hyemalis
Turdus migritorius
melospiza melodia
Pewee
Thrush, sp.
Acanthis, sp.
Flicker
Vermivora celata
Hawk, sp.
Petrochelidon
Reparia reparia (four eggs just started, eye of emb. present)
Iridoprogne bicolor
Euphagus carolinus ?
Ondatra zebethicus

Microtus oeconomus, active at 11:00 A.M, day cloudy and cool.

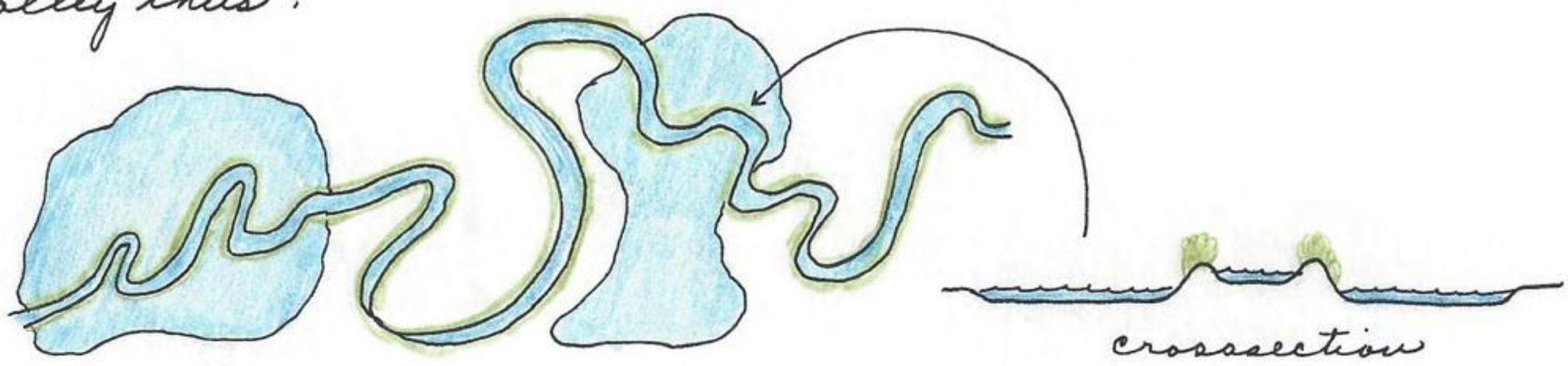
At museum at Univ of Alaska saw largest Alaska Brown Bear on record. Collected at Cold Bay, Alaska Peninsula by Bob Rieve. measured 17'7" long and about 1700 lbs.

Fairbanks, Alaska

June 14, 1952

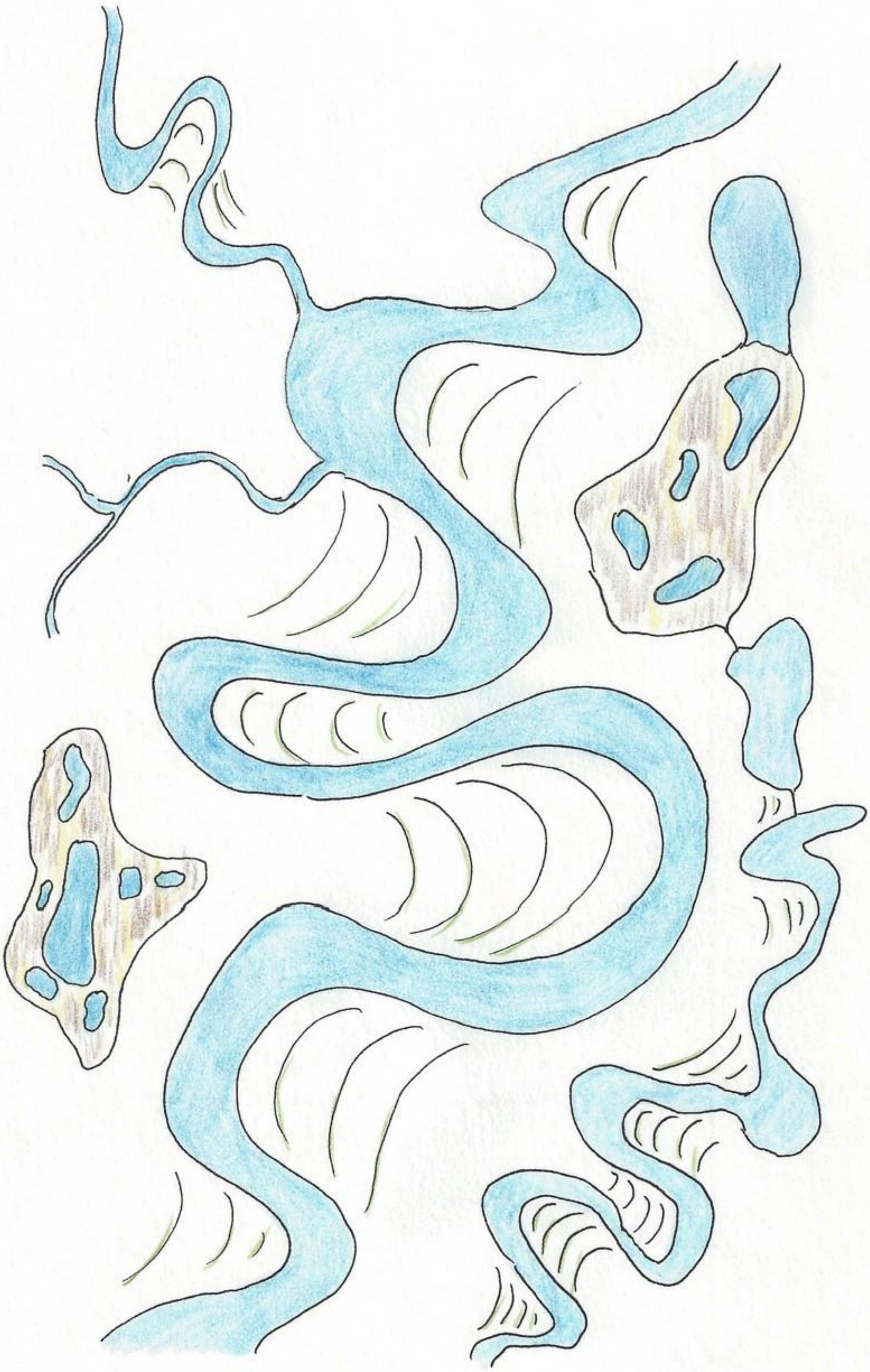
Departed for Point Barrow by Transoceanic plane at 8:36 A.M. Daniel Thompson of Missouri reports group of caribou aggregating 550 animals between Cutoff and Eagle Creek, Steese Highway.

These caribou were at divide above timberline and the largest group was about 180. One grizzly bear and 2 cubs observed in this same area June 13, 1952. Enroute to Point Barrow recorded the following observations. Route, Fairbanks, Minto, Bettles, Utmiat, Point Barrow. Flying over hills west of Fairbanks (8:48 A.M) observed snow cornices on the only remaining snow cover. The higher ranges all looked like they are fairly well covered with snow. Approaching broad valley of the Tanana River (8:49 A.M). This valley is at grade and is characterized by flood plains of old meandering rivers, or bows (lakes) by the hundreds, meandering vegetation scars and lakes of all description from young ones to old extinct ones. In many lakes the yellowish vegetation seemed to be confined mainly to the east side. Natural levees meander throughout the valley thus:

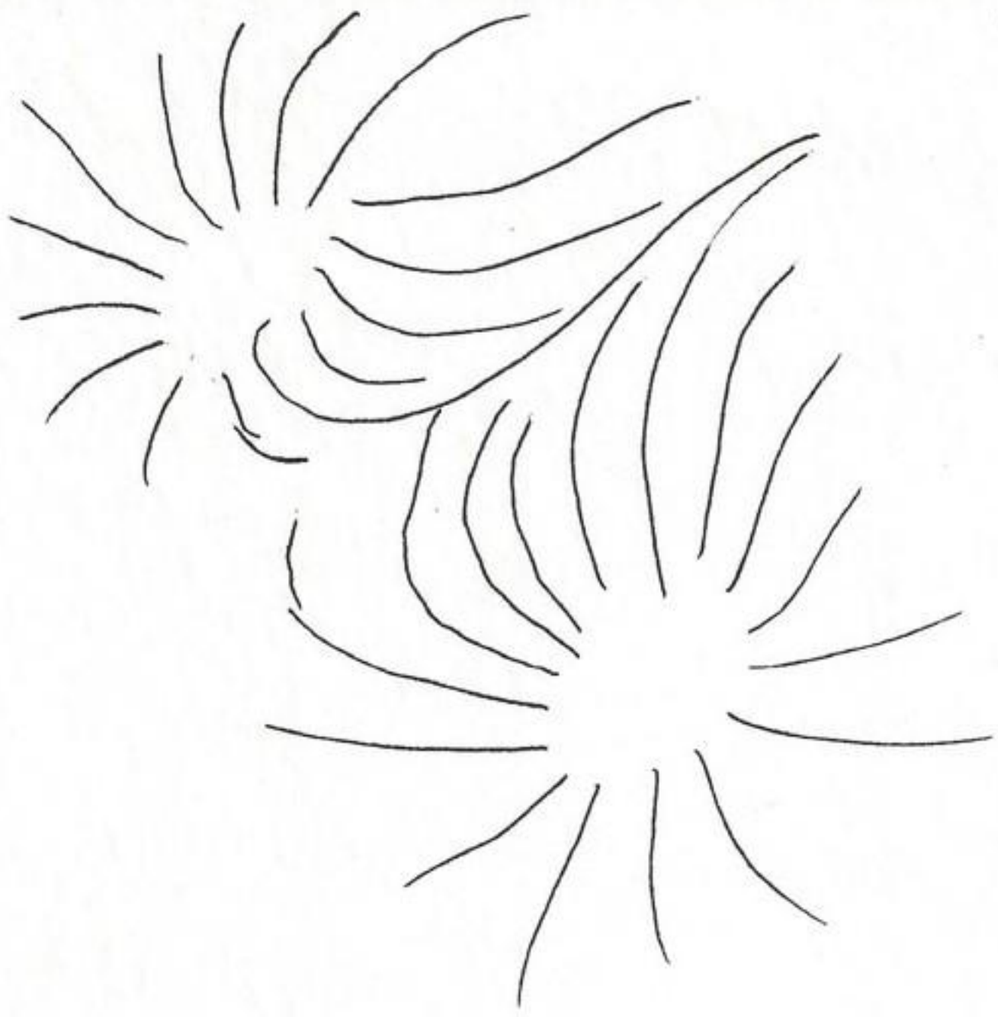


vegetation bordering but water beyond. These rivers and creeks are actually higher than the surrounding water level. This would suggest a stream that has reached base level and is actually filling in the old Pleistocene valley. At 8:52 A.M many lake segmented from oregonally larger lake. at 8:55 A.M. turning north at Minto for Bettles 9:01 A.M. Across few hills with snow cornices only. a few below timberline. The hills are broad and gently rolling and carved by frost action rather than by glaciation. As a result of rolling topography the slopes are characterized by linear lines of vegetation do to rill action of running water and soil creep. The following drawing of typical topography of the broad Tanana River Valley as seen from air.

520614-27

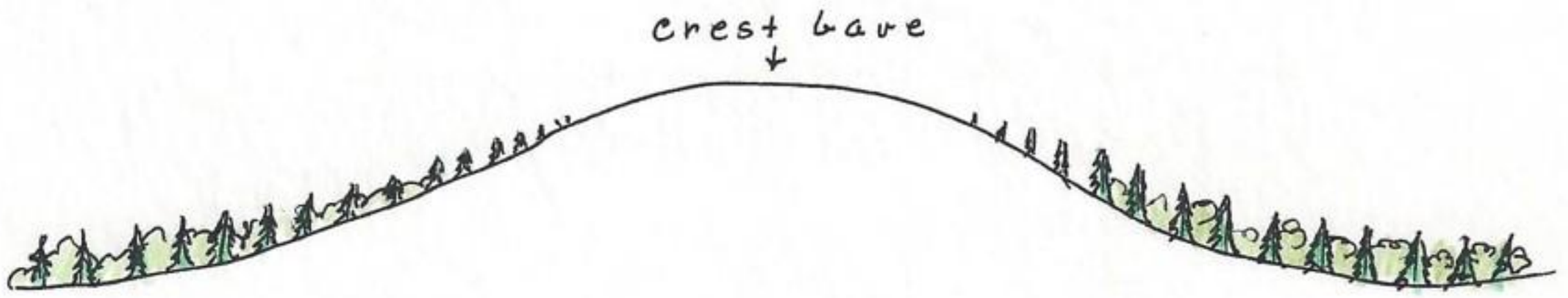


The rill action on rounded knolls has a very characteristic pattern thus:

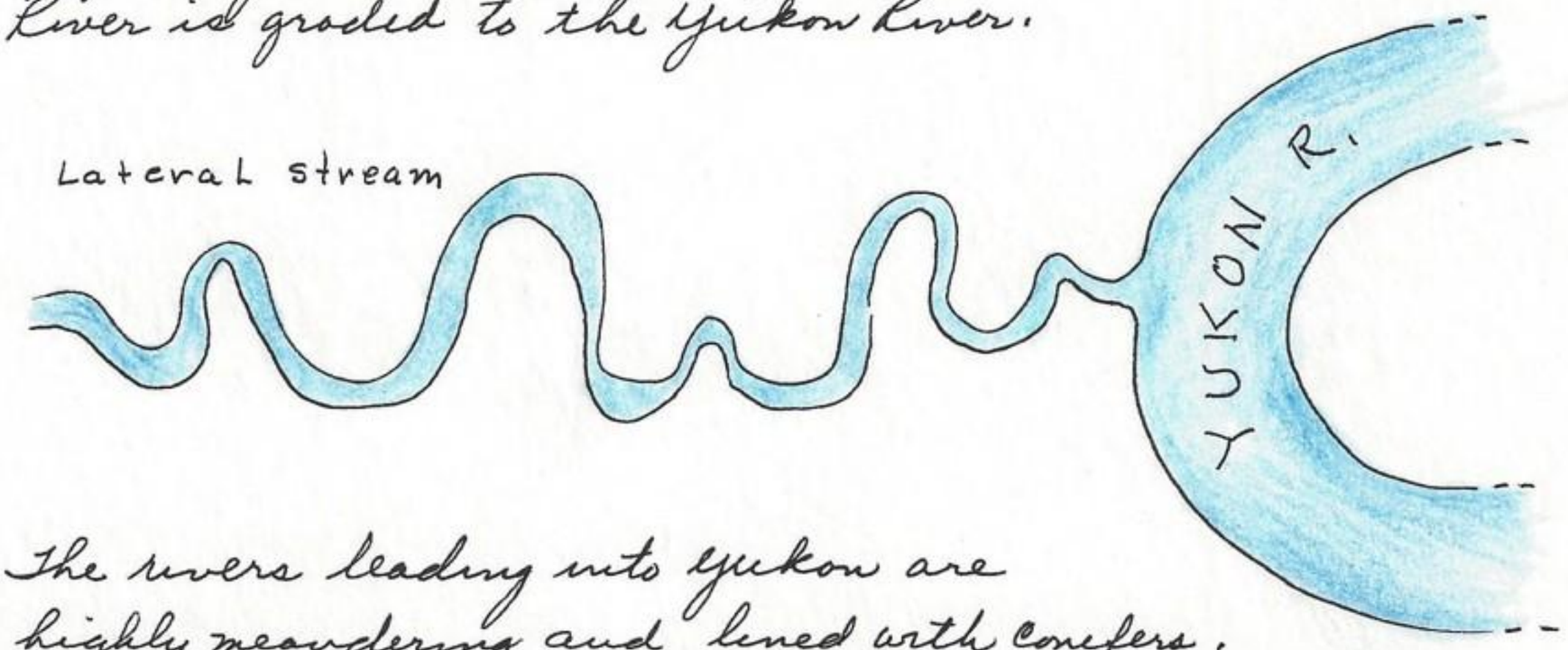


9:05 A.M. First above timberline country. Cornices only remaining snow but with few permanent snow banks in protected valleys. no cirque development. Vegetation mainly on south exposure. Snow 1/20 of surface and appearing as streaks. Deciduous - conifer elements in about 50-50% ratio.

9:10 A.M. leaving mountains on south side of Yukon Valley. Beyond can see the broad Yukon River widely meandering through the Yukon Valley. As a result of a gentle uplift, the river is entrenched and confined to a definite channel. There is no flood water and lowlands of overflowing rivers, but just the single confined Yukon River. The ranges and low hills are bare at crests as result of wind action. Deciduous element generally distributed, conifers selective and in protected areas. Timberline thus:



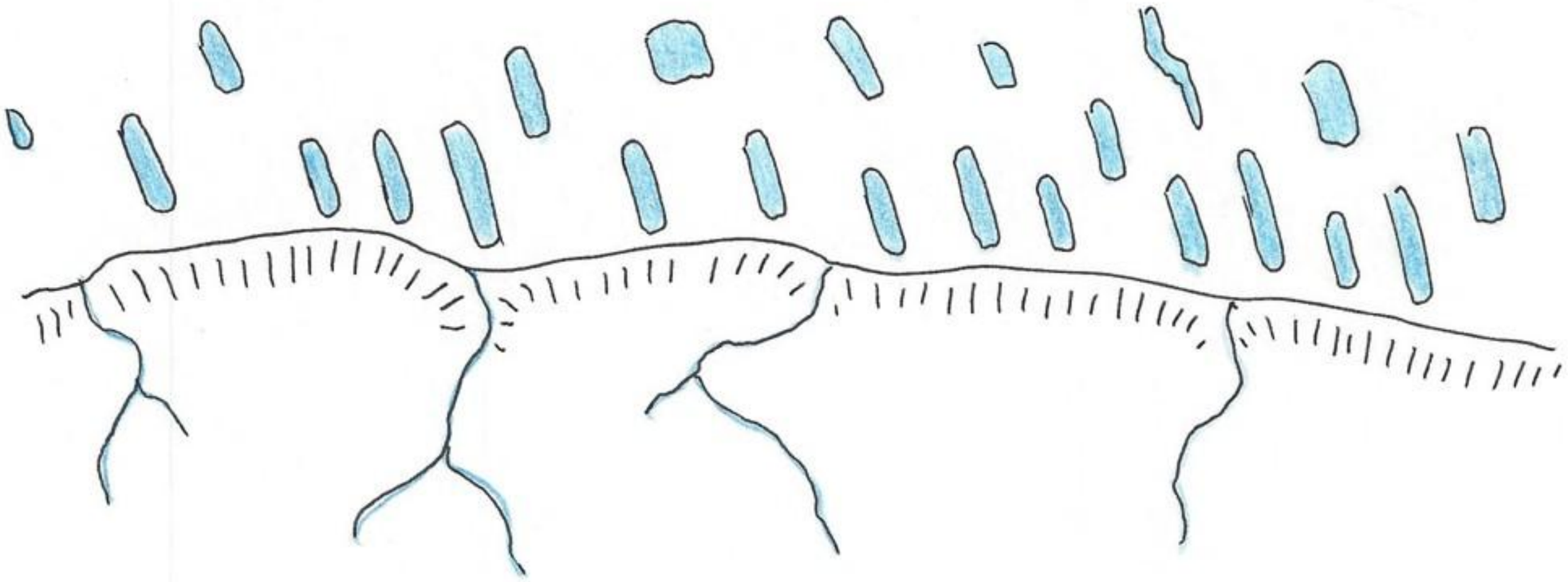
9:12 A.M Yukon River directly below. This river shows sign of filling valleys and is graded to the ocean while the Tanana River is graded to the Yukon River.



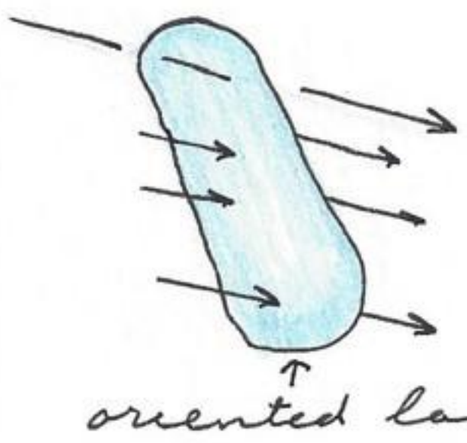
The rivers leading into Yukon are highly meandering and lined with conifers.

Endicott Range to west with approx. 40° snow. 9:25 A.M. Fewer trees in evidence. 9:35 A.M Bettles Valley. more lakes than in last stretch since the Yukon. Several larger rivers from the Brooks Range converge at this point, most of them meandering. 9:43 A.M. Bettles directly below. Conifers and deciduous trees confined mainly to river edges and favorable slopes. Front range (South) of Brooks Range at 9:47 A.M. Larger rivers meandering right up into mountains. Ridges now knife edged and sign of cirque development and glaciated valleys. 9:51 Conifers sparse and confined to timberline as a few trees in contrast to dense stands in the southern Alaska area. no evidence of rock slides but a few slump areas. First large glaciated lake at 9:54 A.M to right and in glaciated valley. Completely sealed in ice. Most valleys beautifully glaciated. 10:00 A.M All lakes frozen. 90% of land surface on N sides in snow. 10:03 A.M excellent cirque development. 10:09 Approaching north side of Brooks Range with plateau country beyond. Just as we passed the last mountain, took colored movie of range with clouds pushing in from the north. This low cloud condition is apparently a common feature in early spring. 10:16 A.M. area of plateau province with snow on ground producing spotty effect as if held by mound or vegetation clusters. Cornices on north slopes indicating direction of wind from south. This rolling plateau has parallel erosional lines. Rill development on both north and south slopes and those on north slope showing 40% snow coverage with snow confined to gullies. Lakes almost all frozen. Arrived Chandler River 10:25 A.M, milky. Snow now about 80% coverage. Lake ice greenish-blue. 10:30 A.M Uniat directly below. From this point on the snow cornices and snow accumulation is on the south exposures indicating that the sun has less effect and that the wind is from the north. Is it possible that the Colville River controls the climate or has the climate produced the transverse Colville River drainage pattern. The creeks are just beginning to break up and show a yellowish streak beneath which runs the creek. At some points the creek can be seen. In contrast to the rill development south of the Colville River, the north side has, in addition to the rill pattern, a spotty snow accumulation. 10:44 A.M. Just leaving the plateau province of rolling topography and beginning with low flat lying country of oriented lakes. This is the coastal province which goes N to the Arctic

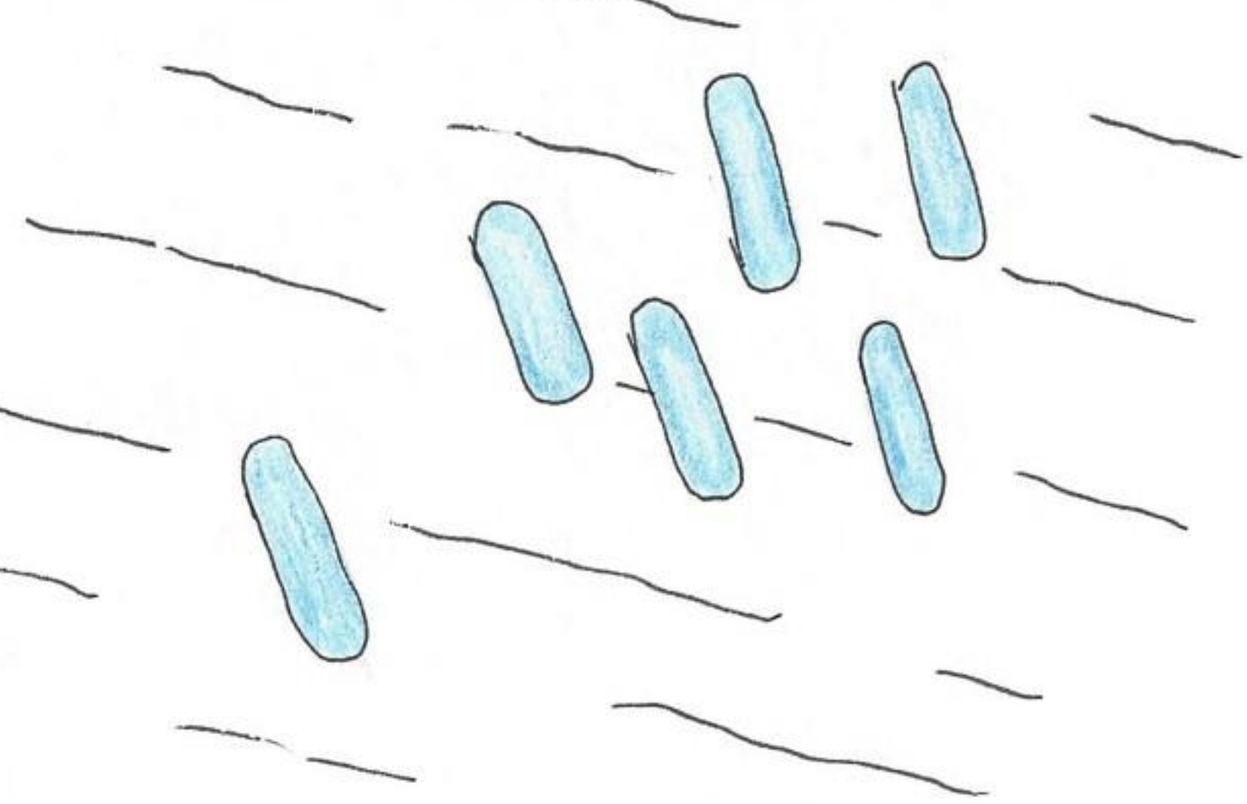
ocean. These oriented lakes have a definite contact with the Plateau Province thus:



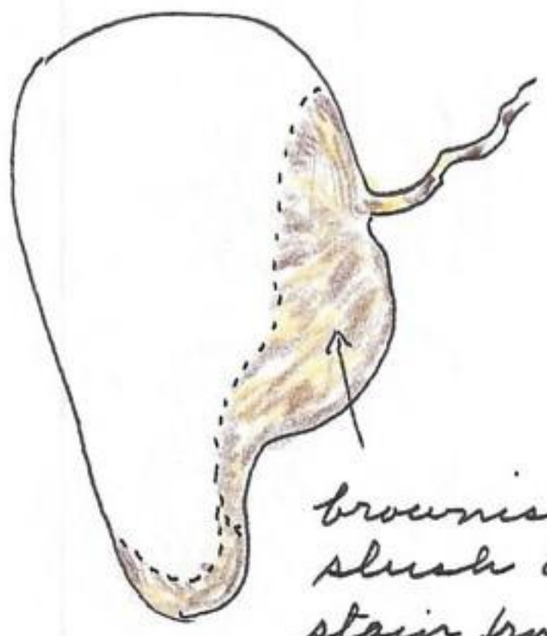
The result of wind action and direction is evident on the snow and ground surface in this area (Plateau Province and low tundra coastal plain contact) and for some distance beyond.



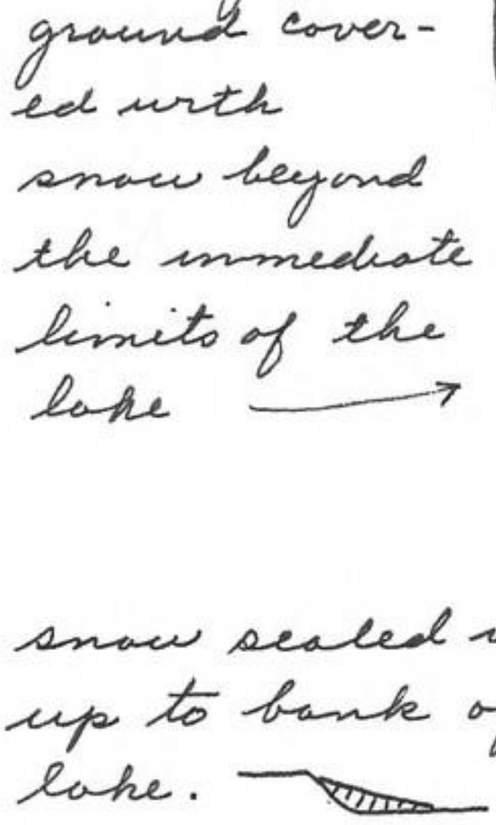
The wind forms linear lines across the snow and especially at the edges of the lakes the wind has excavated banks and trailed debris beyond the lakes. Irregular parallel lines of greater dimensions follow the same direction as the prevailing winds. While the general direction of prevailing winds is from the NW during the winter months, it has no effect upon the formation of oriented lakes except to erode the banks on the east and west sides of the lake. It is the direction of the prevailing winds of summer

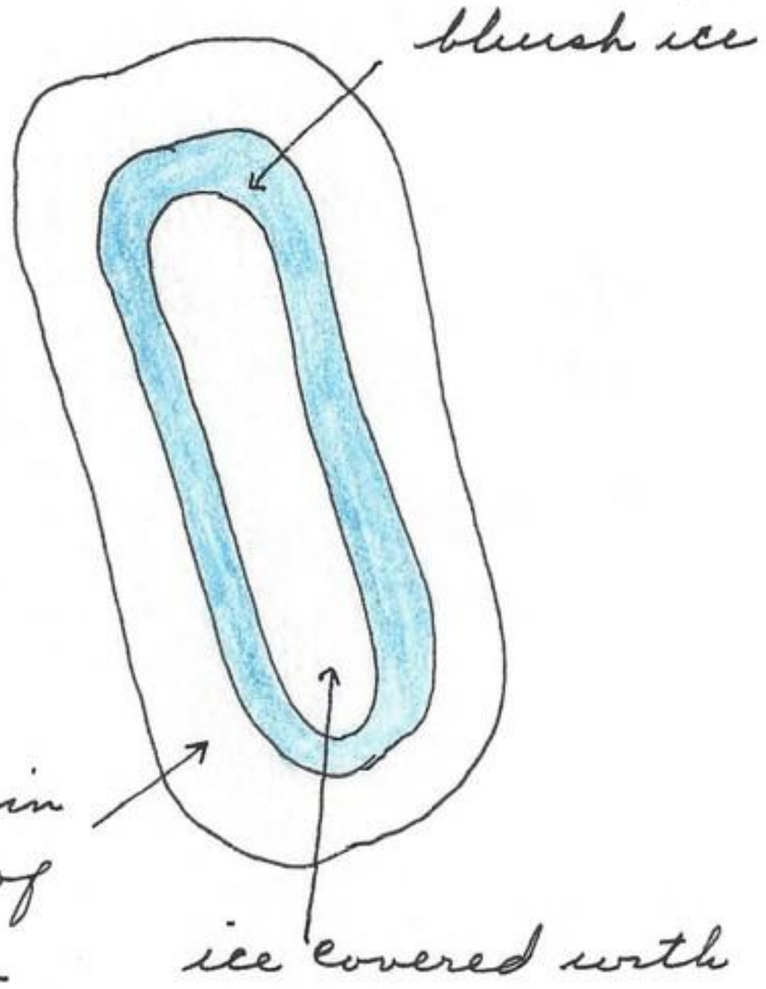


especially the storm winds, when the lakes are free of ice that produce oriented lakes by eroding the south ends of the lakes. The storm winds of summer blow parallel to the axis of the oriented lakes. The ground surface is 80% covered with snow. The lakes appear thus: →

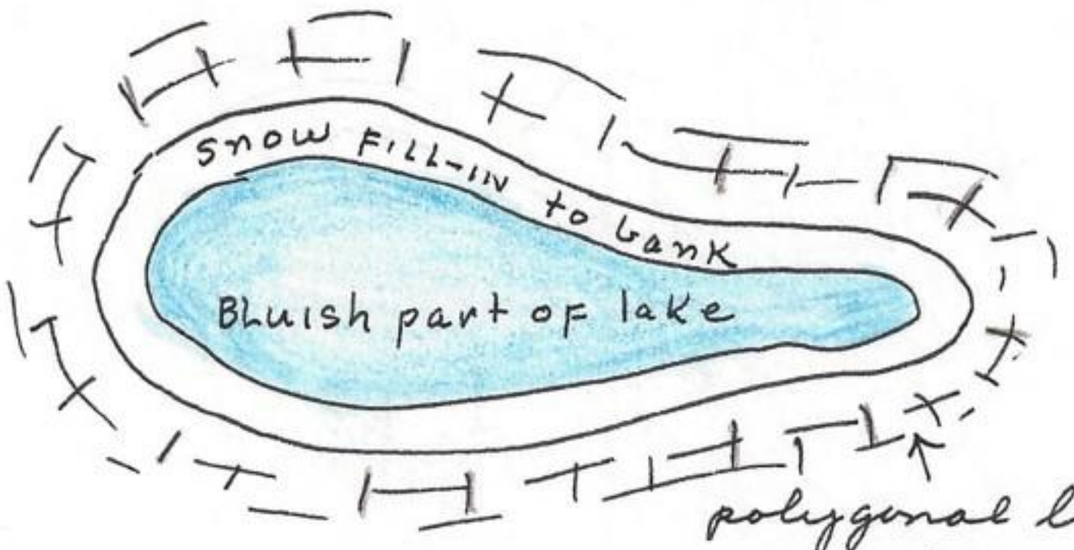


80% of ground covered with snow beyond the immediate limits of the lake →



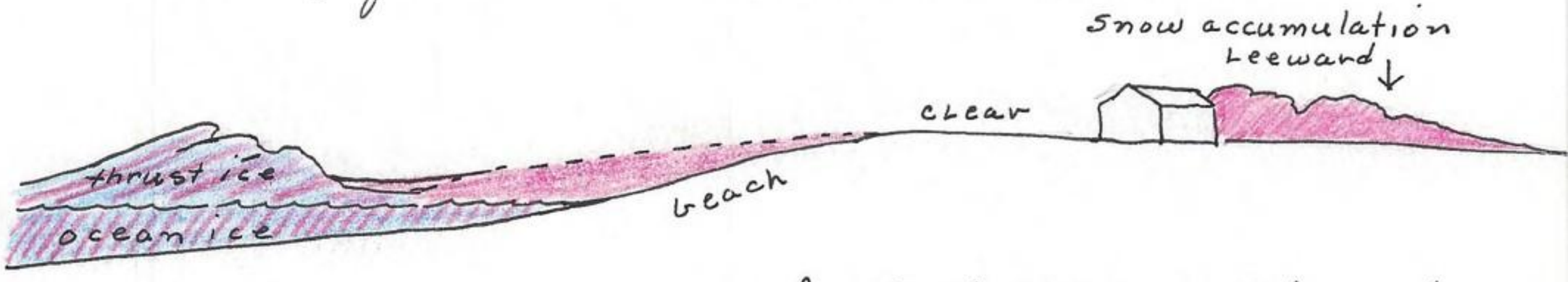


This was the general pattern but there were variations. Some lakes that had water running into them from a drainage creek had edges lined with a brownish slush or, more commonly the stained snow was confined to point where water entered the lake At 10:45 movie of oriented lakes. Photo 520614-1 of snow covered oriented lakes. Some large rivers open and running.

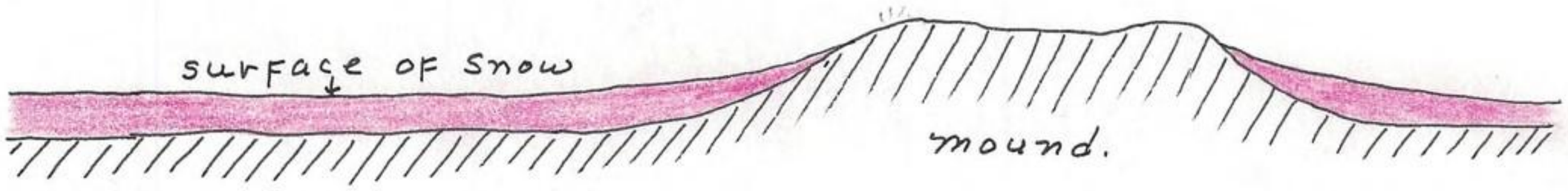


The effect of wind is to blow clear the high points and fill in the low points or depressions. Lakes with banks are sealed with snow up to top of bank and center of lake blown free of snow. 11:08 A.M. Less brownish

slush of creek flow. This is important in that it indicates a cooler climate. The polygon areas have high ridges and are exposed (see profile on previous page). The snow is in the center of a single polygon and in the depression between adjoining polygons. At 11:12 A.M can see the blue water of the Arctic Ocean ahead with ice pack between ocean and land surface. The shoreline of the ocean is discernable as a line of exposed tundra or snow surface irregularity. The tundra bordering the ocean has more snow than the tundra to the south because of the wind carried snow from the Arctic Ocean when the ocean is ice. This snow covers lakes as well as tundra. This condition is certainly a factor in animal ecology, especially time of emergence and winter protection. Arrived at Point Barrow a few minutes after last time record, just as a fog bank blew in from the ocean ice. At Point Barrow (Naval Research area) found the snow condition thus:

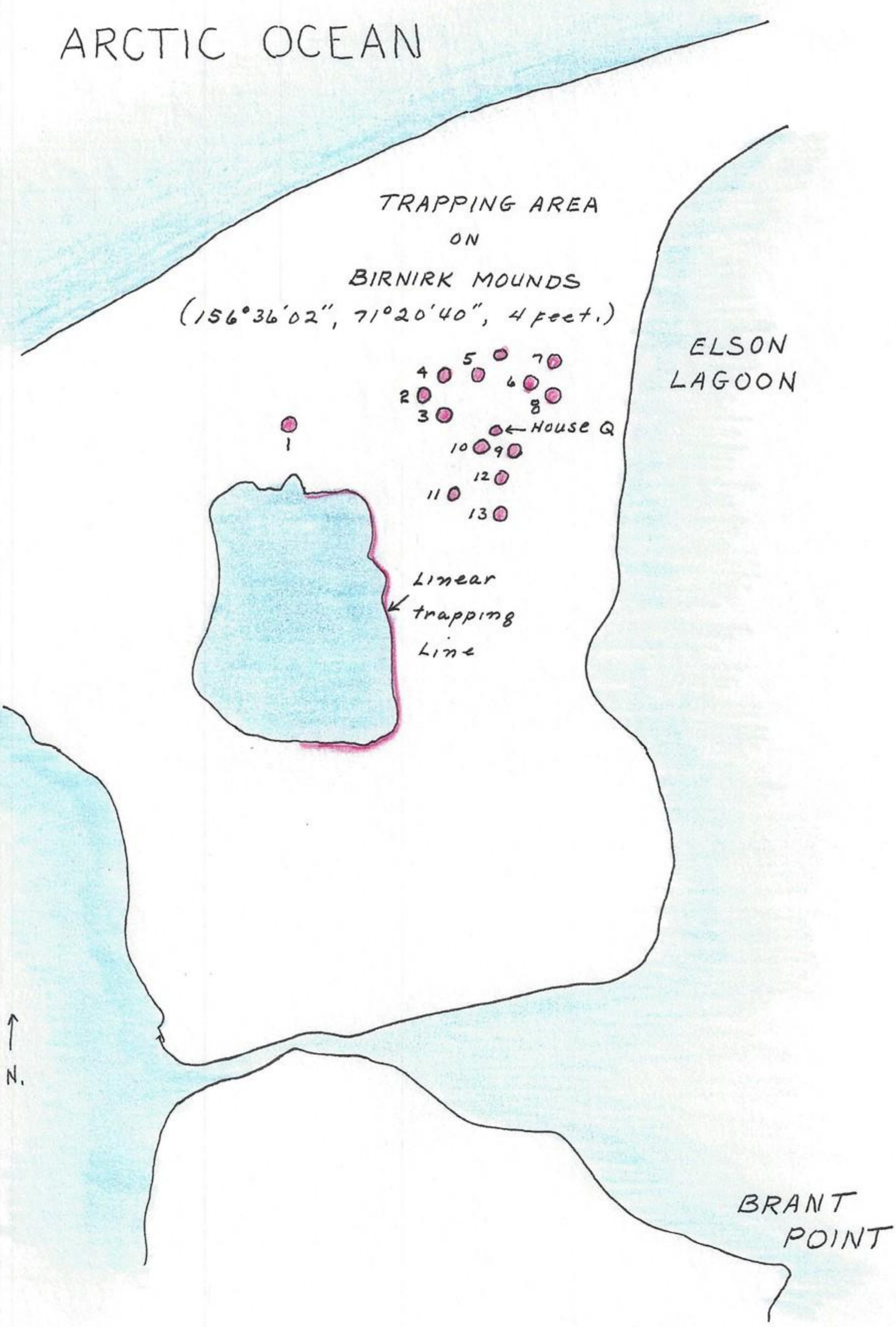


Ice pack more rugged and more of it than last year. Ice-pressure ridge nearer shoreline. White surface of snow with bluish ice in some places. no open water between shore and pressure ridge. Less beach ice piles than last year. This evening set traps at Birnirk mounds and along edge of lake to the SW of mounds at 6:30 P.M. One tree sparrow on mound. Snow about 85% coverage, all mounds with broad apron of deep snow surrounding base of mound and sloping upward thus:



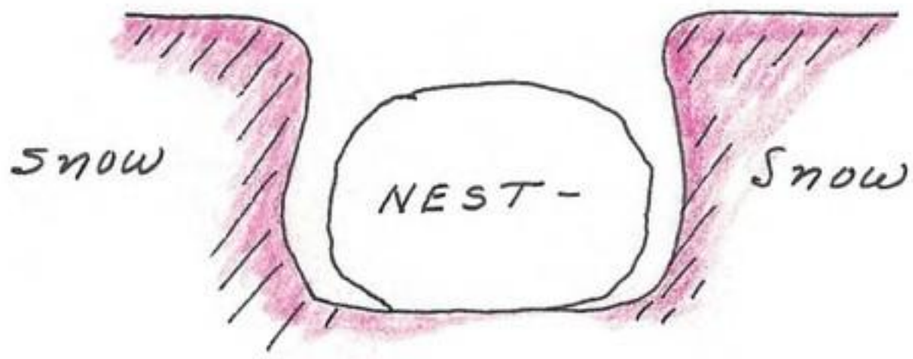
Standing water in many places between mounds on flat surfaces. The upper part of mounds free of snow. The lake to the S.SW of the mounds now completely frozen with slush confined to middle and northern end only. no open water.

520614-33


ARCTIC OCEAN
TRAPPING AREA
ON
BIRNIRK MOUNDS
(156°36'02", 71°20'40", 4 feet.)
ELSON
LAGOON
1
2
3
4
5
6
7
8
9
10
11
12
13
House Q
Linear
trapping
Line
N.
BRANT
POINT

Snow sealed in edges of lake and has made a good winter retreat for lemming. a cross-section of this lake is thus:

As is usual in other places, the wind has filled in the depressions and has exposed the high points. Set traps on mounds and along 1/2 of the north shore, all of the east shore and 1/2 of the south shore of the lake SW of the mounds. no 1 and 2 mounds, 10 traps each; no 3 mound to no 12 mound with 5 traps each and no 13 mound with 14 traps. Mound no. 13 was trapped last year in September (see records of 1951) and while there were numerous runways only one Lemmus was captured at that time. 65 traps 4 meters apart were placed along the shoreline of the lake. Examined several places on mounds where Eskimos had placed grass under or by old mammal skulls that had, in previous years, been excavated; as perhaps an offering to the departed mammals or their own departed. at one mound 2 pieces of old pottery were placed under a board of masonite. Several lemming trails were under 2 inches of standing water indicating that the snow, since winter, is melting and the general water level around the mounds is raising. nests of this year (lemming) are exposed in the snow because of the heat from the animals has melted the snow roof directly above or surface snows have melted and exposed the nests. One reason to believe the melting is due to the lemmings is because the area around the sides of the nest (some 2 inches) also is free of snow. Except for exposed mounds, this area appear much as it would in winter except area beyond mounds is about 20% exposed or free of snow. Snow bunting, longspur, jaegers in area as well as Baird sandpipers of the shorebirds. The Eskimos are already in tents NE of the mounds. They spend the winter at Barrow Village. Returned to Arctic Research Laboratary and made final arrangements for housing and logistic support.



520615-35

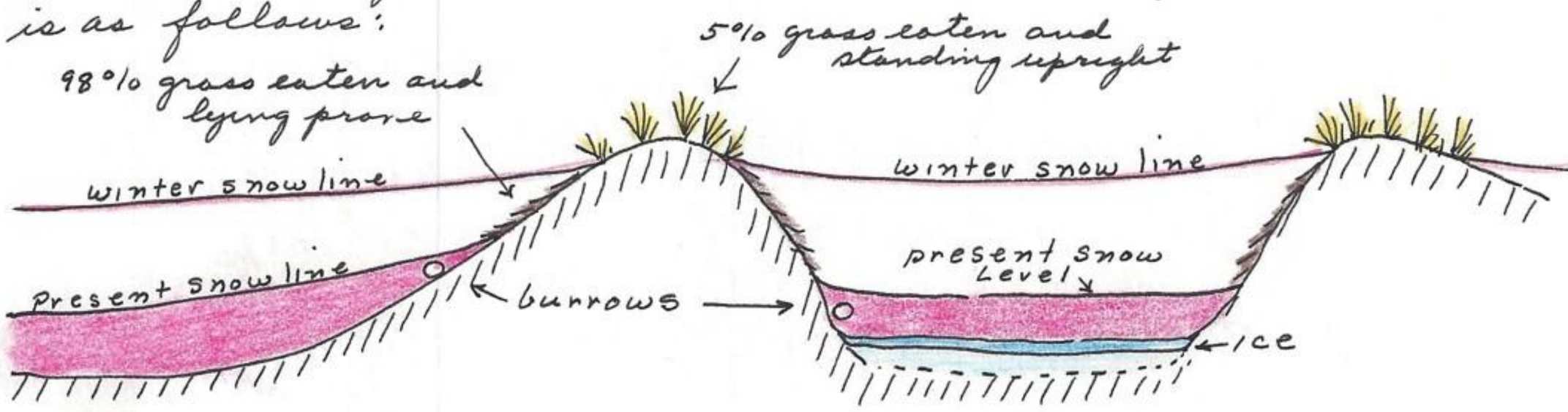
Point Barrow, Alaska

June 15, 1952

Checked trap lines at Burnrk mounds this A.M as follows: (only 5 lemming were taken from these mounds in 1951).

mound no.	Lemmus	Sprung	Observed	no. traps	Field no.
1	1	1	0	10	1
2	15	6	2	10	2 to 15
3	6	4	0	5	16 to 21
4	4	2	0	5	22 to 25
5	1	1	0	5	25a
6	2	1	0	5	26 to 27
7	2	1	0	5	28 to 29
8	2	0	0	5	30 to 31
9	3	2	0	5	32 to 33
10	2	3	0	5	34
11	5	5	1	5	35 to 39
12	1	1	0	5	40
13	12	6	1	14	41 to 52
13	56	33	4	84	

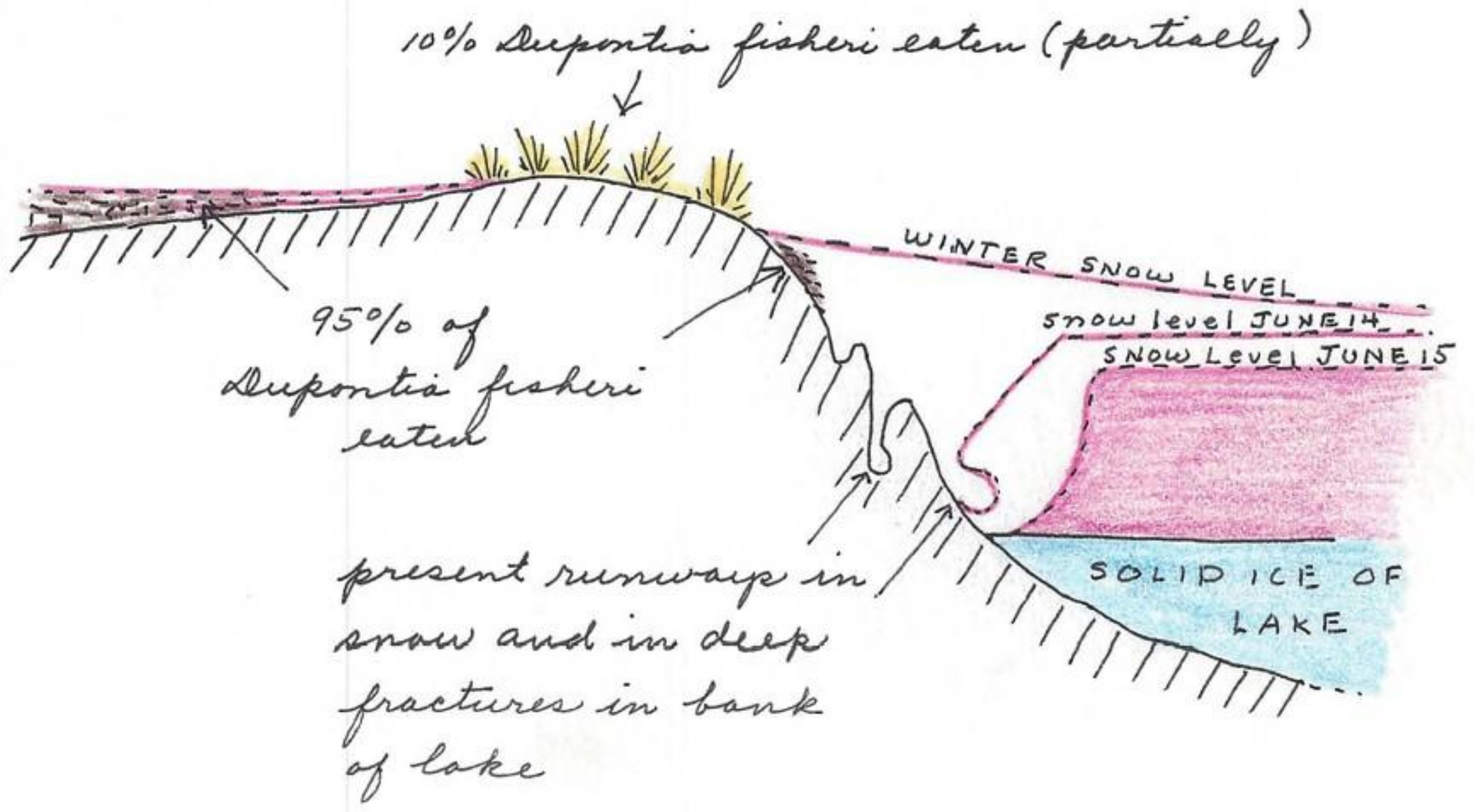
For 3 additional animals see notes of June 16. (no 510908-5 ♂ of last year was the lemming taken from mound no. 13). From trap line along shore of lake (65 traps) collected 25 Lemming (nos. 520615-53 to 520615-77). The 38 sprung traps would indicate a great percentage of larger lemming plus great activity and movement over the traps. A later check in the morning did not disclose other lemming in traps The condition of the mounds and lakeshore as of this date is as follows:



Mound no. 13 with elevated center.

The trails range over the entire mound from base of outside slope to ice surface on inside of excavation. In summer the

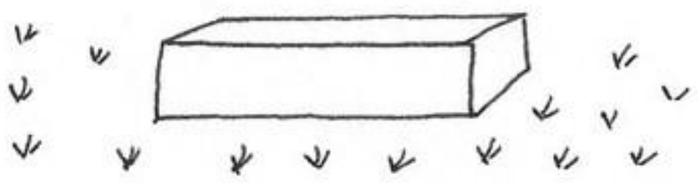
numerous grasses in bottom of excavation support runways. The grass (Dupontia fisheri) is 98% eaten (base only) from present runways on top of ice in excavation to near top of mound at a point where the winter snow line laid. It is assumed that the top of the mound was blown clear of snow and did not offer adequate protection for the lemming. The average distance of forage from main runway is approx. 1 meter. The upper grass now offers overhead protection and numerous trails. This mound is about 8×4 meters with about 34 sq. meters of grazed grass or about 3 square meters per lemming. The region beyond outside base of mound had runways leading outward but only limited in extent and distance from mound indicating the exclusive use of the mound for winter foraging and territories. When first approached counted 4 lemming running in trails at base of mound. The runways at base of mound are beginning to be exposed as the snow pulls away from the mound by melting. The lake shore area thus:



The present main runways varied from on top of the solid ice (80% of runways) of the lake to completely covered runways in snow, deep fissure widen at base and on unprotected shoreline. The main runway is at base level (level of water now ice) and appears to have been in the same position all winter. The lateral runways give access to foraging pastures on tundra beyond the shoreline. The bank averages about 2½ feet at the n end and grades lower to south end of lake. The foraging runways extend, in some instances, 50 feet out upon the

flat tundra beyond the bank of the lake, especially in slight swales or depressions which were used when the snow covered the ground. They are now abandoned because of lack of overhead protection and the greater part of the lemming population has retreated to the protective bank where they are actively digging and reexcavating holes for protection as the snow masses are now melting and destroying their winter overhead protection. The last few days and the next few days are going to be the critical period for these mammals and unless they find adequate hole retreats will certainly fall prey to raptors. This is the period when the lemming are exposed to the elements and the predators and the perod of great excitement among lemming. This is the condition that could lead to mass movement. The greatest change has occurred last night in that the snow covered runways at the base of the bank have been exposed (80%) and the lemming must either find shelter among the irregularities of the bank, among the 20% remaining protected runways (covered with snow) or perish. The valleylike area between the present level of the snow and the bank may have been created by either the activity of the lemming or by natural weathering of the west exposure of the bank. There is no doubt that these lemming have completely changed the original configuration of the shoreline with their deep runways and excavations. This is certainly a major reaction of animal on soil. Some runways are 30 cm deep and 12 cm wide. Considerably dry grass stems and debris have accumulated in the main runways at the bottom of the bank and here again an important coaction between animal and the fertilization of lakes with vegetation material. It is interesting to observe that the lemming were confined to the east and part of the north and south shorelines. The break in the distribution of lemming on the north bank was abrupt with no animals beyond to the west. It is possible that the mounds have been the source of lemming population during low years and the repopulation of the lakeshore has been accomplished more recently. Found one dead lemming at south end of lake, curled in grass runway as if dead from exposure (may have been hit by trap). One lemming apparently killed by trap spring yesterday (P.M.) and near trap and this morning flies had already deposited eggs in fur. This I could hardly believe with the weather as cold as it was. One lemming in trap and partially eaten by Pomarine jaeger (hind quarters). There did not appear to be any unusual concentration of predators here.

Found an Eskimo artifact 520615-1 from mound no. 2. Used for taking off blubber from whales. It fit on end of handle and used like a hoe. The two main grasses in lemming grazing area are Arctophila fulva and Dupontia fisheri. Examined Eskimo coffin just south of Birnirk mounds which held a skeleton without a skull. Bod placed on top of ground and had been opened. Other old mounds might indicate old burial places. One box about 2/3 meter square nodoubt held a small child. Returned to the Arctic Research Laboratory (ARL) and started to prepare material. It was quite a surprise at the lab. to see a bucket full of lemming that were, up to this moment were considered a rare animal in the Point Barrow area.



Arctic Research Laboratory, Point Barrow, Alaska

June 16, 1952

A Cleithrionomys rutilus, taken last year by Daniel Thompson is recorded as from 150° 35' 36", 71° 18' 15". Returned to Birnirk mounds this A.M. to check snow recession and possible lemming trapped. The snow is now critical as it is exposing the greater part of the main runways at the base of the lake bank. There were no lemming here as most of them or all of them were trapped or had left the area. The former explanation is probably the logical one. On June 15 lemming were running back and forth along the entire east shoreline. Collected 3 lemming from the mounds by hand and probably represents all of the mammals on these mounds except those that might have nests and runways under the snow beyond the exposed portion of the mound. It will be interesting to check again this fall to see if lemming have returned to the mounds. The three lemming were taken from the following mounds.

no. 520616-1 mound no. 2
" 520616-2 mound no. 9
" 520616-3 mound no. 10.

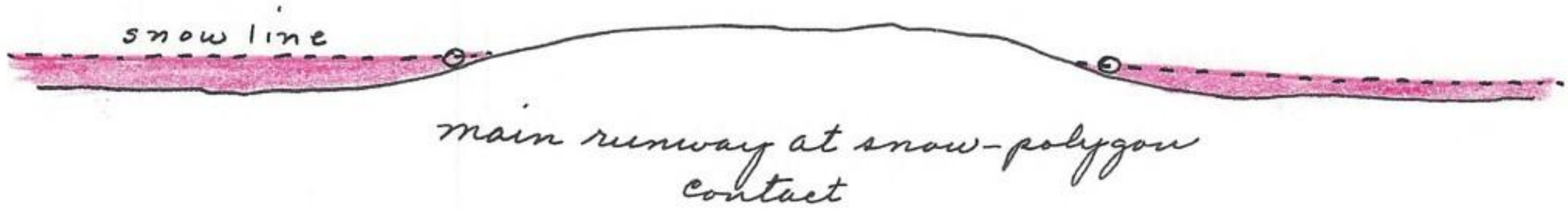
They were first observed standing in full view and when approached ran to holes. no. 520616-1 used the cavity (meckels' cartilage) of the lower ramus of a balaen whale, Balaena mysticetus. This cavity supported a floor of fecal pellets of Lemmus and was used rather extensively. All of the ramus was exposed above ground.

520617-39

Arctic Research Laboratory, Point Barrow, Alaska

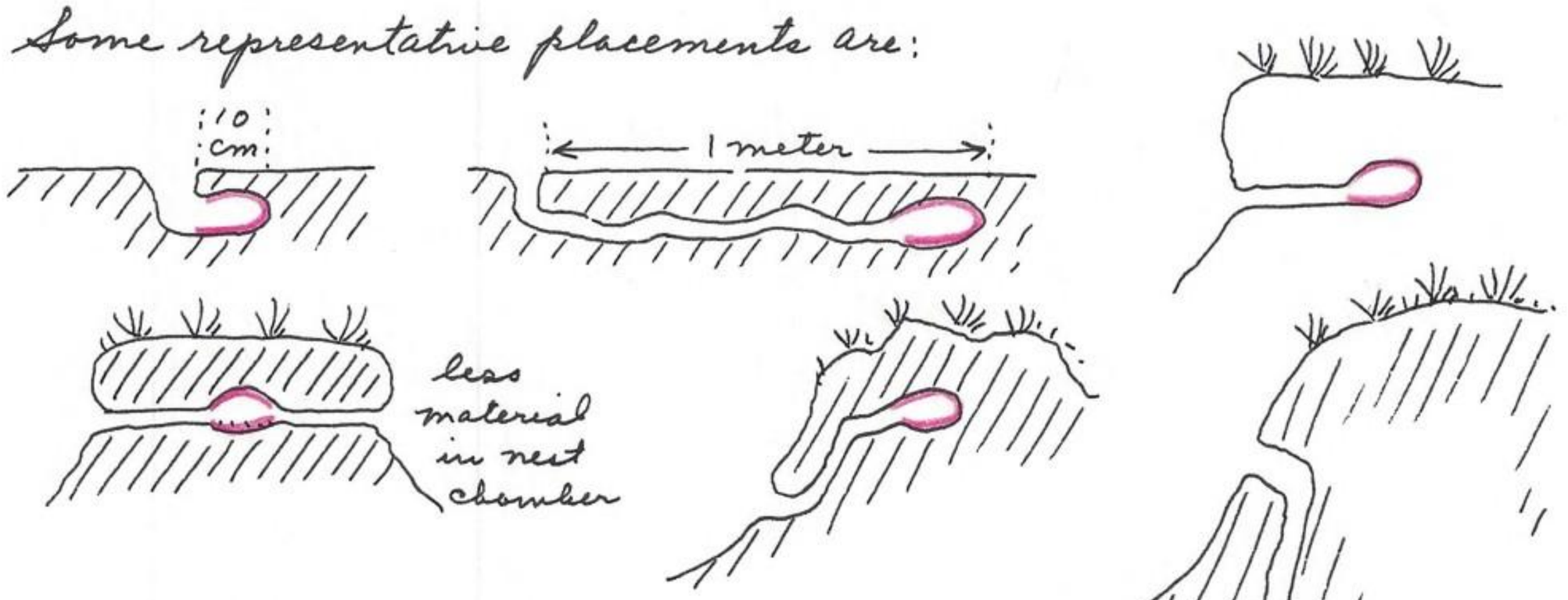
June 17, 1952

This evening set 35 traps west of Salt Water Lagoon on polygons about 1/10 mi inland from Arctic Ocean. This area is about 60% clear or exposed with remaining snow in low areas between the raised polygons. Main runways around polygons now at edge of snow with an extensive series of runways under snow and on polygons. Evidence of considerable new dirt digging as if the lemming were excavating nesting chambers or reestablishing old ones.



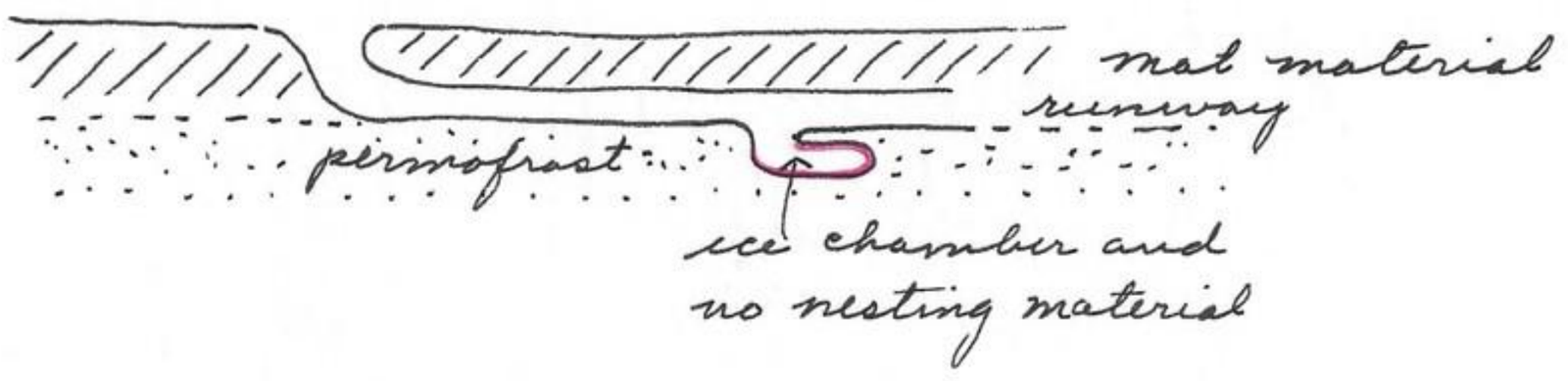
Examined several holes used as nests. They vary in size, length and placement but on the whole are about 220 mm in length, 8 cm below the surface of the ground and rest either on or in the permafrost surface. They are either on a flat surface or more usually in sides of elevated surfaces or mound thus:

Some representative placements are:

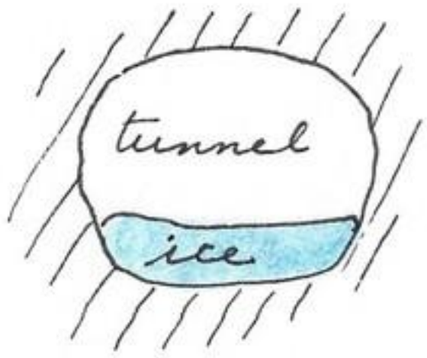


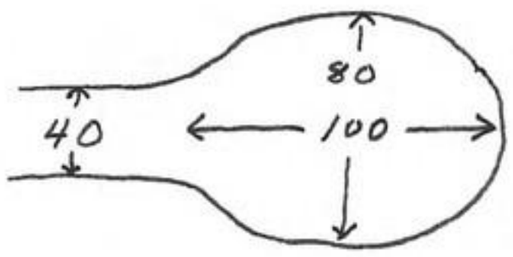
nearly all nests on permafrost and about 90 mm below surface depending on exposure. In digging nests one places 2 fingers in hole and lifts off the thin layer

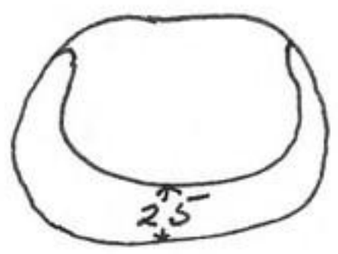
layer of tundra thus exposing the surfaceal runway which leads to the nest. At this time of year the nest can be easily excavated, as I say, with only two fingers. In no instance did I find a tunnel and nest that could not be easely excavated and the lemming captured. This system could produce more lemming than a trap line. Foxes would have no difficulty getting at the lemming. In some instances the lemming would escape to a blind tunnel which was not used as a chamber. In these cases the animals just fit the aperture and would have only a small area of the back exposed. If the dead end of tunnel was large enough for the lemming to turn around, it would face the intruder and fight with mouth and teeth. In several instances I found them retreating to an ice chamber which appeared to be used exclusively for protection or possibly as a place to escape from warm temperatures of the shallow overhead tundra.



Retreat chamber in solid clear ice. many runways with pavement of ice in bottom of runway as if water had settled in the already established runway. The pavements excavate as long ice slivers. A typical nest chamber would have the following measurements.



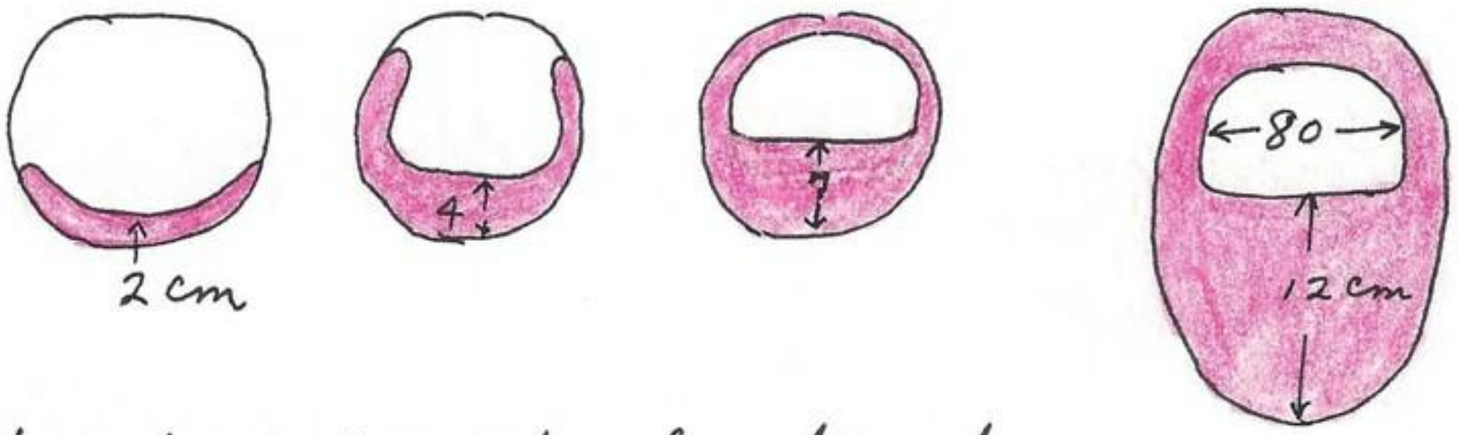




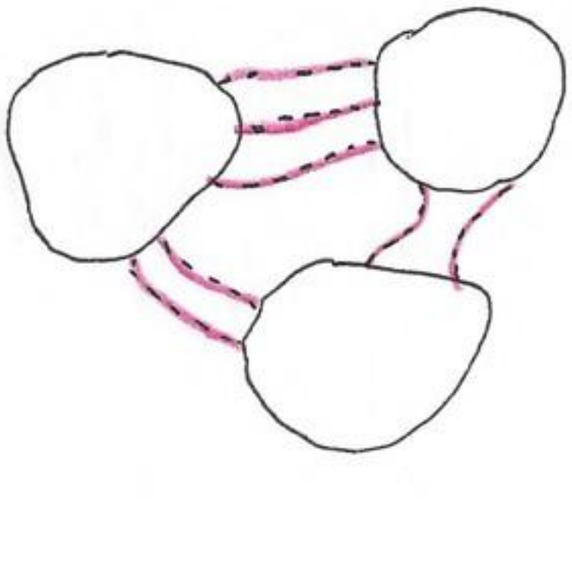
nest material generally lines the chamber thus with most of the material on the bottom.

Runways under snow are about ice level or on frozen ground. The trails pass through the snow in all directions, rarely coming to the surface. The trend is a curved line ~~~ but some are straight. Under snow between polygons are permanent winter habitations with well used trails and nests. Lemmings use one area for depositing feces and are generally

off to the side of the trail about 13 cms and slightly raised, some 6 cm high. They would cover an area 12 cm wide and 5 cm high. As no gross material was associated with these fecal mounds would think that they were used exclusively for depositing of feces. The nests proper were placed in all situations from high on polygons to low swales between. They were associated with main trails and had the following dimentions, however, the size varied consederably (all nests surrounded by snow).

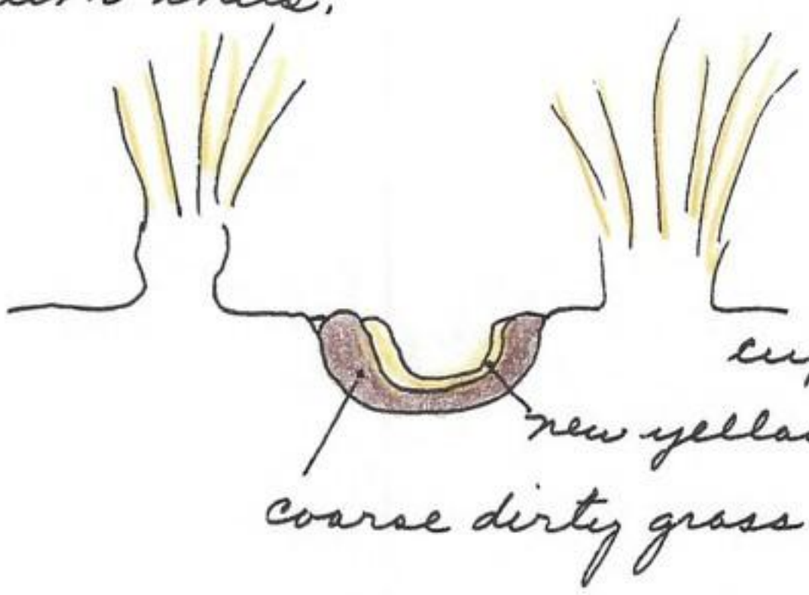


most roofs collapsed when found free of snow. The snow leaves the upper surface and gives the appearance of a nest that has sunken into the snow. Walls of snow surrounding chamber and especially runways are slightly lined with ice. After the snow begins to melt and collapse above the trails the lemming use as much of the trail as usable and then runoacross the snow surface from one entrance to another or from one mound to another.



Many runways come almost to surface of snow and one can see the lemming move along as a blurred darkened object in the snow. The greatest activity and signs of permanent summer habitation occurs on these mounds that support a suffecient stand of grass to give the lemming protection for runways and movement. I doubt whether they use the short grass beyond the grassy mounds in the early summer because of lack of overhead protection. In winter, however, they move out under the snow in all directions and, as far as I can see, use that area if the mound has been blown free of snow but return again to the mounds as the

at about this date (June 17) or when conditions are similar to those of this date. At this date the snow is in such a condition of recession that lemming must retreat to the protected mounds, dense grass or perish as the snow is rapidly removed from their winter areas beyond the mounds. I suspect that all those animals that can not find elevated areas and protected holes underground will fall prey to the jaegers, snowy owls, long-eared owls and other carnivors. One Pomarine jaeger was observed catching and eating whole a lemming. In tramping over the tundra found several lemming apparently sunning themselves in trails as they seemed to be startled when I suddenly approached them. The Salt Water Lagoon to the west has opened up at the south end about 10 per cent since yesterday. North end still covered with ice. Some blue water on ocean ice between shore and pressure ridge. Outlet of Salt Water Lagoon dry a few days ago but now running 15 feet wide and 3 feet deep. Located nest of 5 eggs of the Alaskan longspur placed between 3 bunches of Eriophorum thus:



nest flush with ground. ♀ chased ♂ away from nest. Examined a mound with entrals of a lemming. Snowy owl pellets on same mound. Caught 2 lemmings from the same mound and same hole at the same time; one a ♀ 520617-1 and a ♂ that measured 152-20-20-9-88 gms. The ♂ had 3 cuts on the lower throat and front left leg about ankle level as if bitten by ♀ during copulation. Digestive tract of ♂ with 30 fecal pellets. From observations would say that in the most favorable areas of elevated dissected polygons, the lemming occur about 50 per acre. Outside these areas would say about 20 per acre. We travelled for about 1/2 mile in flat low polygons and did not see any evidence of these mice nor runways.

From Robert McKinley, who remained at Point Barrow last winter reports:

1. Snow buntings at Barrow Village April 20 and perhaps even

earlier when there is very little exposed tundra.

2. Longspur come later than snow buntings

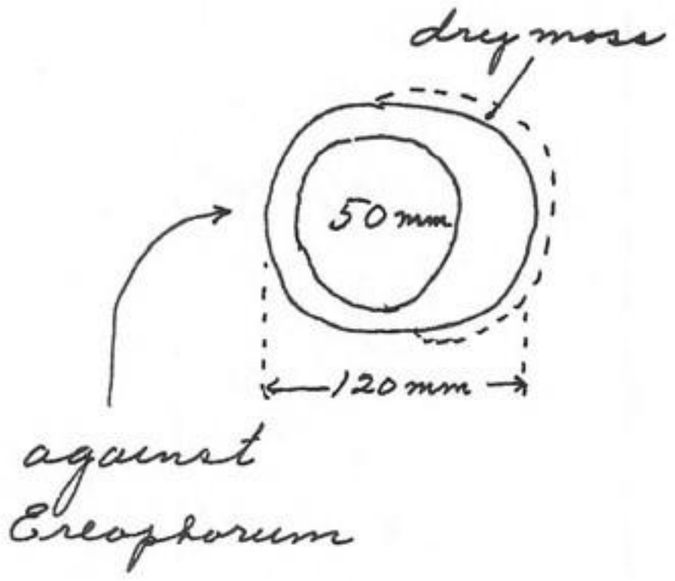
3. Gull come about 14 of may and are common and remain to about may 25 when they dissappear.

4. Eider in large numbers last week of April and continue to follow open leads for 3 weeks.

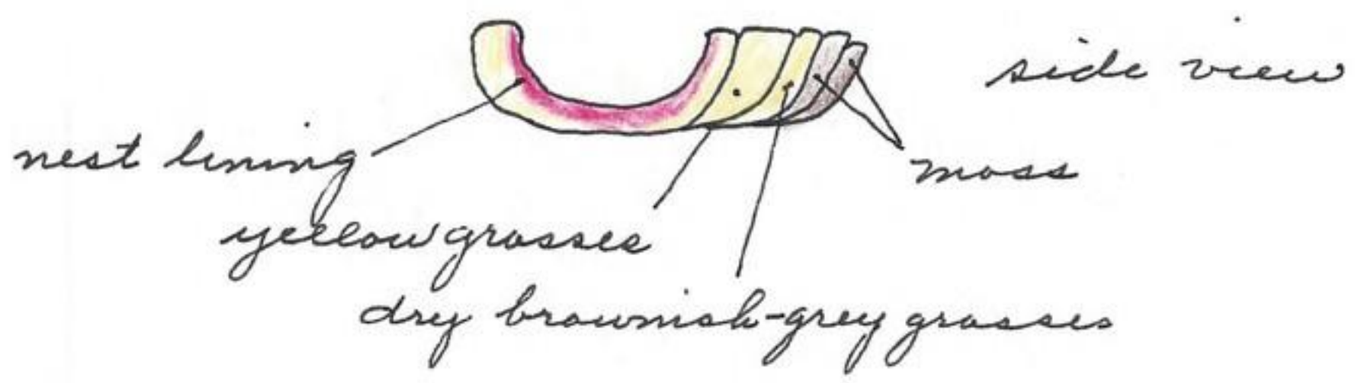
5. Clear weather from mid November to last of may when sun begins to warm to 0°. Low last winter 47° F.

6. Ice forms on top of snow and weasel vehicles make only slight marks on surface.

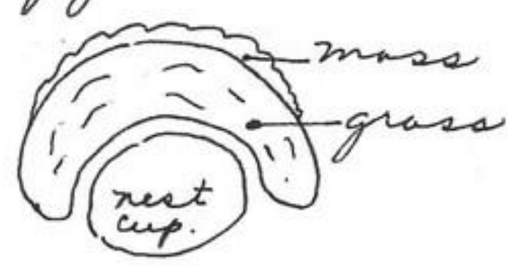
Collected nest and 6 fresh eggs of the Alaskan Longspur 520617-26 between 3 clumps of Eriophorum. Nest flush with ground in polygon area of raised mounds.

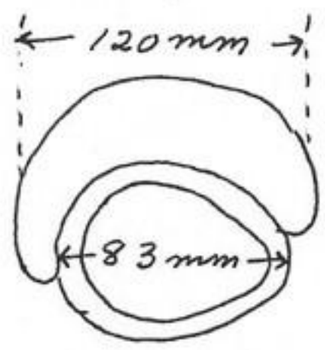


overall depth 60 mm; depth of cup 40 mm; cup sparsely lined with white feathers and dry lichens. Main nest of essentially Dupontia fisheri with yellow stems nearer nest and dry greyish stems outward.



Collected set 6 eggs of Calcarius lapponicus alascensis 520617-27 from ground on top of raised polygonal formation. Placed under overhanging sod with 100% protection of inner cup but outer rim of nest exposed. Nest elevated 100cm above general ground level. Nest facing NW. Outer rim of nest 10 gms of dry grasses and mosses with the latter against the ground edge. An inner cup of new yellow grass stems lined with feathers (3 gms) as a separate unit added to the outer part of the nest. Grasses finer and loosely arranged. 12 white down feathers of the snowy ow[illegible] lined the cup. The outer nest may be last years.



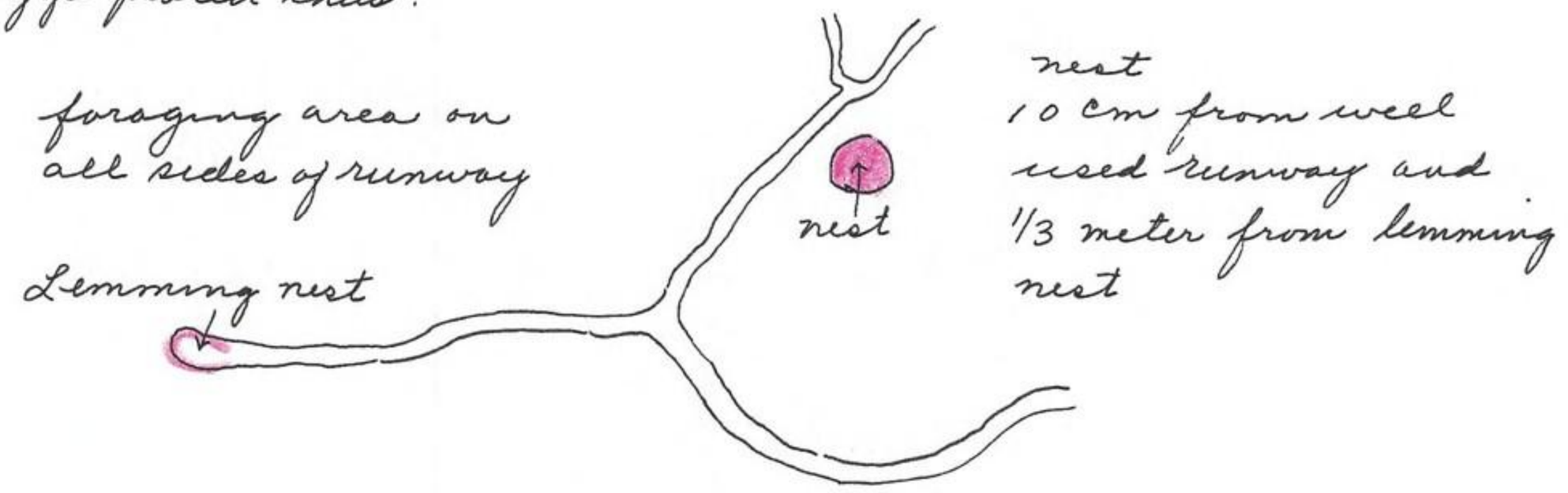


Cup 30 mm deep
nest 52 mm heigh

Placed a Alaskan Longspur nest 1 foot from original setting. Visited the old spot 3 times and then flew away, ignoring the misplaced nest. On return, the longspur carried a feather in mouth and started to construct the nest again. This nest was placed in an old lemming runway with fecal pellets under nest. Observed the following birds in area: 12 Pomarine jaegers, 3 snowy owls, 1 gull, 1 red-throated loon, 12 pintails, 2 old squaw ducks, 4 longspurs (nests of 5 and 3 eggs). Returned to A.R.L. Robert Rausch was here about May 28 and reported no lemming activity and just a few days later the Eskimos brought some in to the lab. The polar bears, eight of them, have been taken this ~~month~~ winter and spring from ice pack beyond the open water lead. The Eskimos claim the season is three weeks late this year. No whales at Barrow Village this year. 2 white whales at Wainwright, Examined a trap this evening under 2 inches of water which was set on dry land this morning.

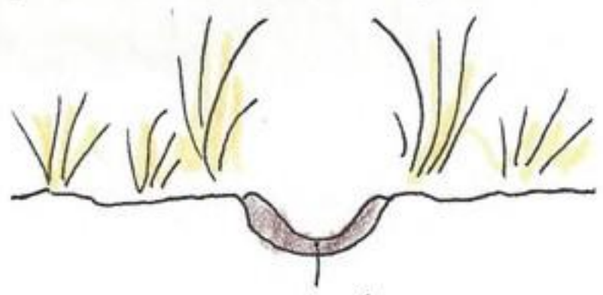
Arctic Research Laboratory, Point Barrow, Alaska
June 18, 1952

Inspected trap line set last night west of Salt Water Lake and caught 12 lemming in 35 traps, 10 traps sprung. There are larger lemming but traps not capable of holding them. Have observed two lemming crawling out of traps that had held them across backs. Observed one lemming swimming in the water with back legs only and turning with help of tail. Another one ran into shallow water and crouched low until I approached. This has happened several times. Some will remain in open situations and remain still. If cornered they will stand their grounds and fight back with a boxing action of their front feet and squeaking calls. In some instances they will lie on their backs and continue to fight with their feet, especially if in a small depression. Examined nest of Alaskan longspur of 6 eggs placed thus:



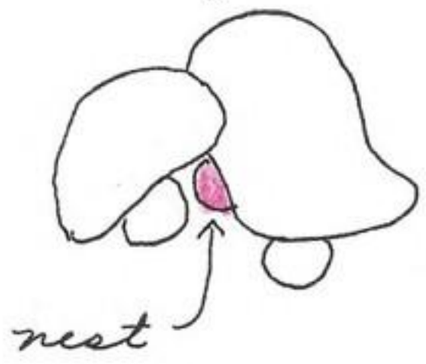
The nest of the longspur was bordered by 9 inch high grass and moss. In general low hummocky polygons. Inspected another nest of 5 eggs longspur thus:

Examined another nest of Alaskan longspur thus:

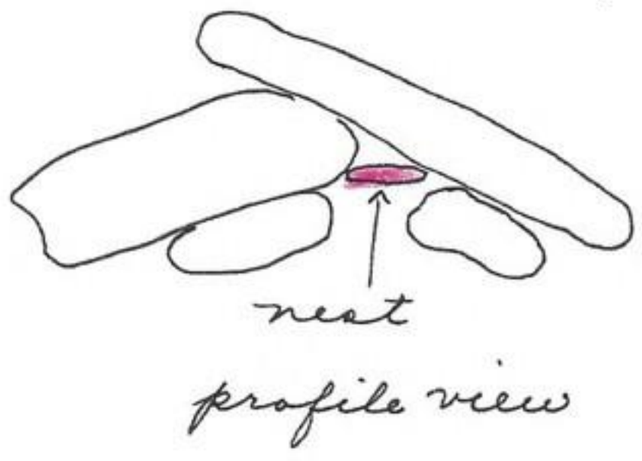


nest

grass Dupontia fisheri



aerial view



profile view

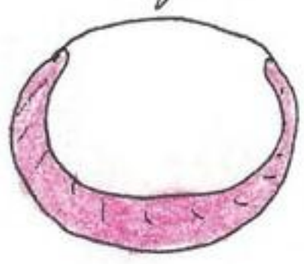
Cup of nest 100 percent protected overhead with outer edge of nest exposed. Set of 6 eggs in cup lined with white feathers and caribou hair. Returned A.R.L and prepared mammals. no. 520618-12 lemming with 10 scars across back as if bitten by jaeger or snowy owl. This evening set 20 traps along west edge of Salt Water Lagoon on partly exposed erosional bank bordering the lake.

Arctic Research Laboratory, Point Barrow, Alaska

June 19, 1952

Inspected trap line west side of Salt Water Lagoon and collected 6 from 20 traps, 12 sprung indicating several larger lemming in area. Drove vessel across tundra in an area about 3 square acres and collected 32 lemming. In most favorable areas there were approx 8 per 30x30 meters. In the flat low polygon area with water crowding most of the low ridges, there were no lemming present. The most popular areas are high center raised polygons with high and mat type grasses. As the vessel vehicle approaches the lemming which are under snow, they run across exposed ground rather than remain in snow tunnels. I am impressed with the ease in which these animals can be dug out of their chambers by merely raising the top 70-80 mm of soil and vegetation until the nest chamber is reached. I have found no evidence of these animals using deep holes. A fox or wolf could easily dig these animals by lifting up the ground over the tunnel with their mouths as if clearing sod. An Arctic tern and 2 Black Brant passed east at 6:00 P.M. With 6x30 glasses and surveying a 90° arc counted 12 Pomarine jaegers working over the tundra and 3 snowy owls. The jaeger capture lemming alive

kill by pressure from the beak. The one noted flew 50 meters with the lemming in its mouth and after alighting, swallowed it whole. Checked a longspur nest of 3 eggs of yesterday which now had 4 eggs. Examined several nests of lemming in solid ice and without dry grass. The usual chamber has about 30 mm of grass on bottom and grades to no grass near upper reaches of the excavated hole. Most of the main trails are found at what is now the low water contact.



At 6:25 P.M photographed the Arctic Ocean.

520619-1 Snow foreground, ocean ice and snow beyond.

520619-2 Ice and snow with open blue water beyond.

520619-3 Edward Campbell in distance with near shore ice.

520619-4 Angle ice and background of ice masses

520619-5 Ice ridge and ocean ice beyond. These ridges are reacting to the pressure of the wind to the north. On the beach proper are 5 successive overthrusts of ice

520619-6 Nest of Alaskan longspur.

At A.R.L. examined a lemming 520617-14 with 8 teeth scars on its back.

Arctic Research Laboratory, Point Barrow, Alaska

June 20, 1952

This afternoon at 2:00 P.M accompanied by James Knod, U.S.G. Survey to test drill hole no 4 south of Barrow Village at 156° 45'25", 71° 16'20", approx 30 feet. The Arctic Ocean has about 15% open blue surface water (on top of main ice). From Barrow Village to test hole 4 recorded the following: 2 snow buntings, one Pomarine jaeger, ♂ & ♀ red-phalarope, 1 lemming, 7 lemming (in good area of about 100 meters distance), 1 pomarine jaeger, 1 Pomarine jaeger, 1 Alaskan Longspur, 1 alaskan longspur, 2 snow bunting, 5 Pomarine jaegers far to east. arrived 2:45 P.M. The last creek we crossed had overflown its banks and onto the snow and wherever this occurred it left piles of grass clippings made by lemming at its headwaters. One mass of grass occupied an area of about 4x3 meters and 1/3 meter thick. The effect of lemming activity is expressed in many ways this spring. At test hole 4 collected by hand and by digging burrows 12 lemming in an area of about 1/4 acres. Ed caught 9 in a similar area. Caught a ♀ and ♂ chasing each other as if part of approach for copulation. These lemming were taken from polygon areas of well drained slopes and

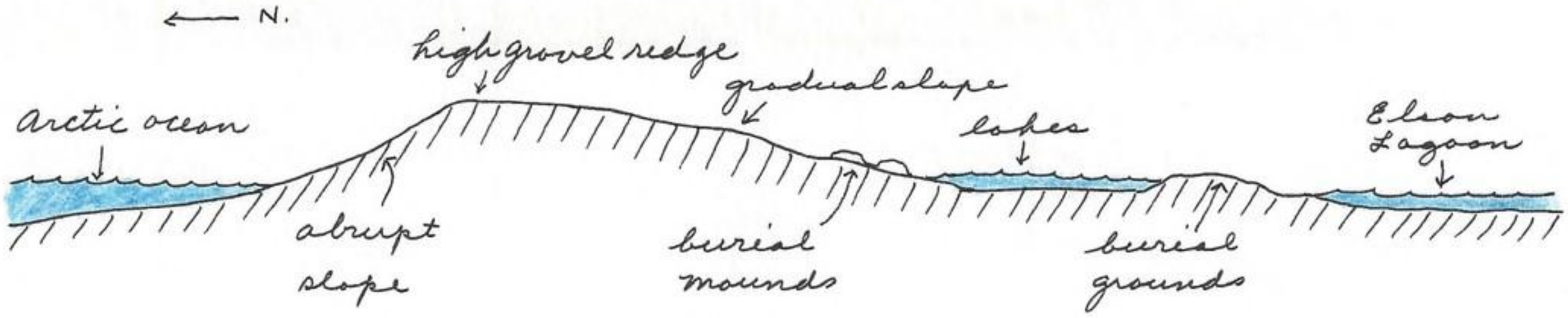
and adequate overhead protection of grasses. Nesting Chambers in slightly elevated irregularities of polygons. Kleparted test hole no. 4 and returned to Barrow Village. Observed the following enroute: 1 Pomarine jaeger (resting in water), 1 Pomarine jaeger, 1 longspur, 1 Pomarine jaeger, 2 pectoral sandpipers, 1 Pomarine jaeger, 1 longspur, 1 snow bunting, 1 longspur, 1 dead Pomarine jaeger. Just outside of village met two dog teams going 25 miles S to fish for salmon (lake trout). Knud reports 4 cm of snow melted since yesterday from top surface. Examined nest of Alaskan longspur with 5 fresh eggs. Nest 1/3 concealed. Collected set of 6 Calcarius lapponecus alascensis 520620-13, eggs fresh, nest from ground nest on raised polygon land. Nest circular with cup centrally placed, nest weighed 14 gms, 118 mm wide, cup 56 mm wide, cup 38 mm deep, 30 mm of old last years? nest material. Outer portion of nest more tightly interwoven with large grey grass stems and mosses. Inner cup and white feather lining 2 gms. Three old squaw ducks in fresh water lake on return to A.R.L. Attended first A.R.L. seminar this evening.

Arctic Research Laboratory, Point Barrow, Alaska

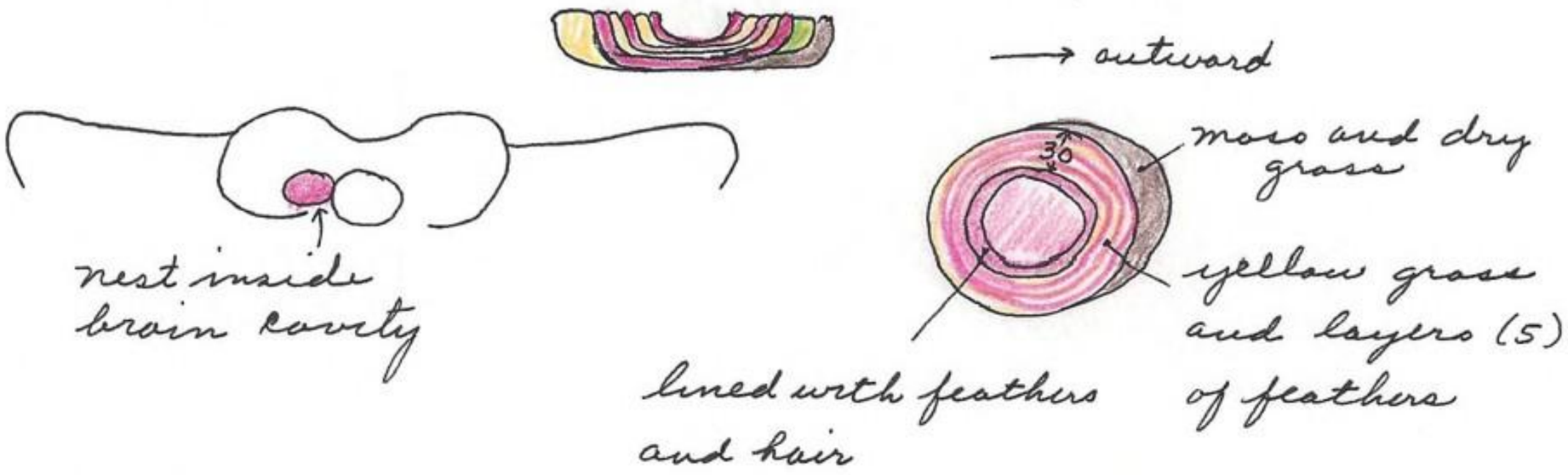
June 21, 1952

Eriophorum in yellow blossom. Most buds however, still carry green color. Practically all land surfaces have radiating heat waves, even in coldest weather. Departed 2:10 P.M for Point Barrow at the end of the peninsula. From Birnirk mounds to Point Barrow observed only 2 pairs of snow bunting the entire distance. Checked grass areas around lakes on light land side of peninsula about 1/2 way and found evidence of lemming of former years but no activity of last year, which would indicate that it requires a good high to push them into the isolated area. On both sides of this lagoon there is inhospitable gravel stretches without vegetation and except for exceptional wandering under snow for about 2 miles, there is little chance that they could reach this area. These mounds at this point support 3 surface Eskimo skulls and a dozen of partially disarticulated skeletons and misc. scattered human bones scattered over the ground. The entire peninsula has been the burial grounds for these people, particularly the south side of the peninsula. It would be interesting to speculate as to what lies under the area of present day high gravels which have gradually accumulated from wave and ice action of the Arctic Ocean.

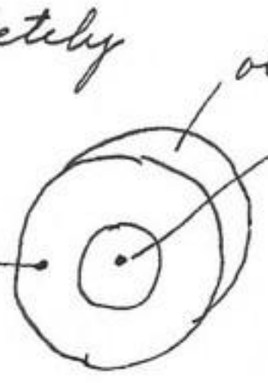
520621-48



at Point Barrow, 156°27'25", 71°23'11", collected 5 lemming by digging out of nesting chambers. Practically every mound supported good runways. The grasses to the south and west of the lower mounds also were supporting numerous lemming. Would estimate about 50 lemming in this area. 18 nests examined and were used but not inhabited. Runways beyond mounds on short grass show extent of feeding or migration but now all mammals have contracted their range to the deeper mat grass surrounding the mounds. Several skulls of Lemmus were found. Of the 5 lemming collected all were relatively small compared to our trapping of other areas on the mainland. They were, however, pregnant and carried embryos. Due to the isolation by peninsula gravels and the regors of the Point Barrow climate, they may actually be a small group than the mainland forms. Found 5 pairs of nesting snow buntings with sets of 5-5-5-5-5 eggs. Collected one set of 5 520621-1 from foramen magnum of Balaena mysticetus. This nest was completely protected by the



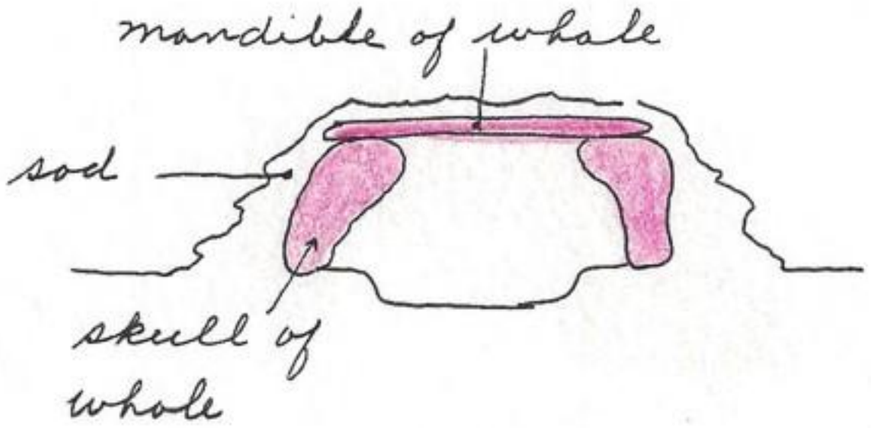
This nest built like longspur nests but with more insulation. Nest measured: 155 wide, 68 high, 38 cup heighth, 70 cup width. Another nest of 5 fresh eggs of Plectophenax n. nivalis from the inner protected structure of an ancient house used by Eskimos. Nest on skull of Balaena mysticetus. Completely protected from sun, rain or wind.



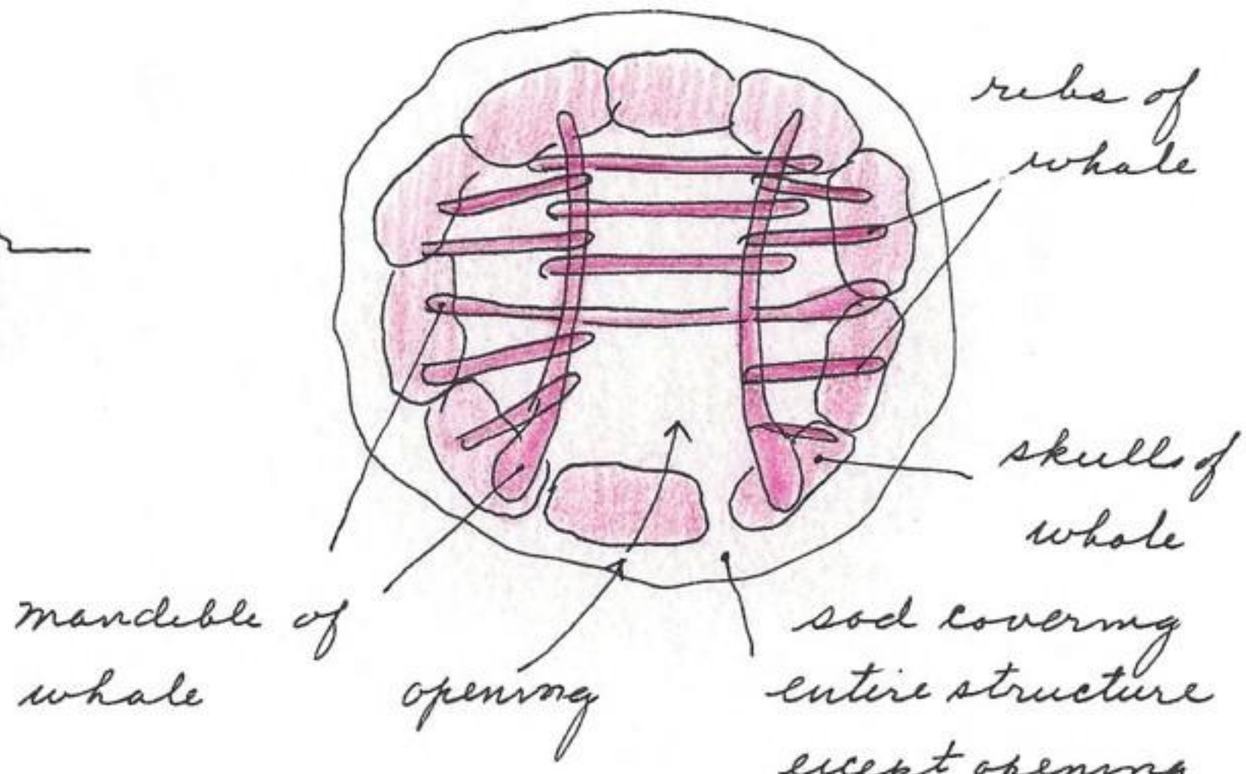
new yellow grass stems alternating with lining of feathers

nest 24 gms wt; outer nest rim 4 gms inner mass 20 gms.

These nests are certainly well insulated from the ground and sides. Several skulls of Balaena mysticetus available for measurement. most of the snow huts are formed by skulls and are not accessible for measurement. The Eskimo houses, now abandoned look like this:



side view

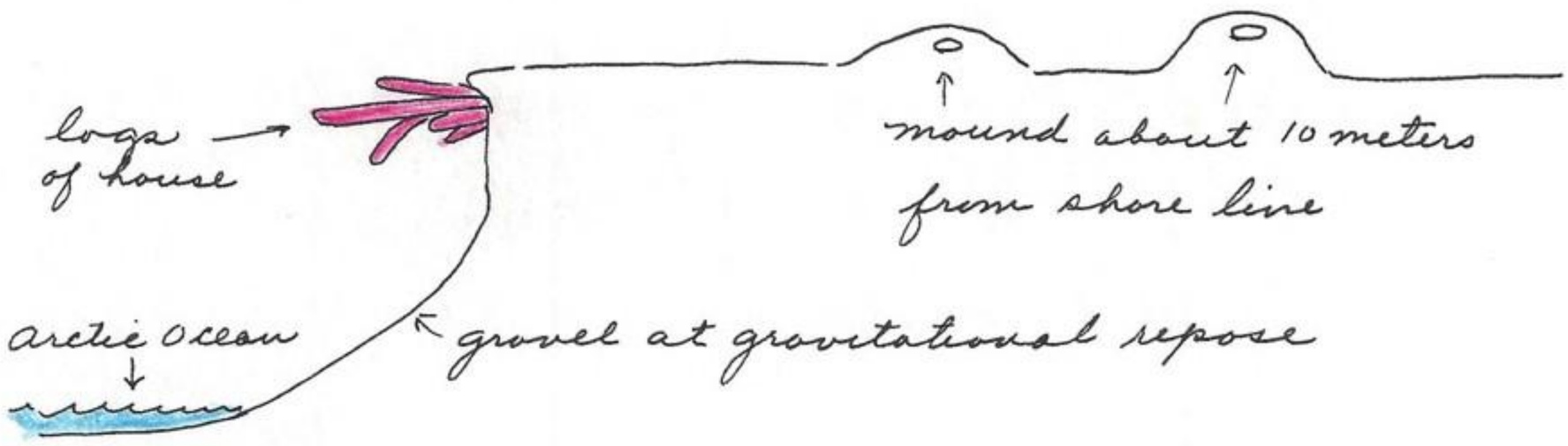


top view

The various mounds showed all states of deterioration from complete units to low, almost level mounds. In many houses, the side members were logs, driven into soil and replaced Balaena skulls Evidence of modern Eskimo in artifacts such as stove lids, bolts, wire etc. This area should be protected as a National monument. already considerable evidence is present of pot hunting and surface spading. From north to south the peninsula profile thus:

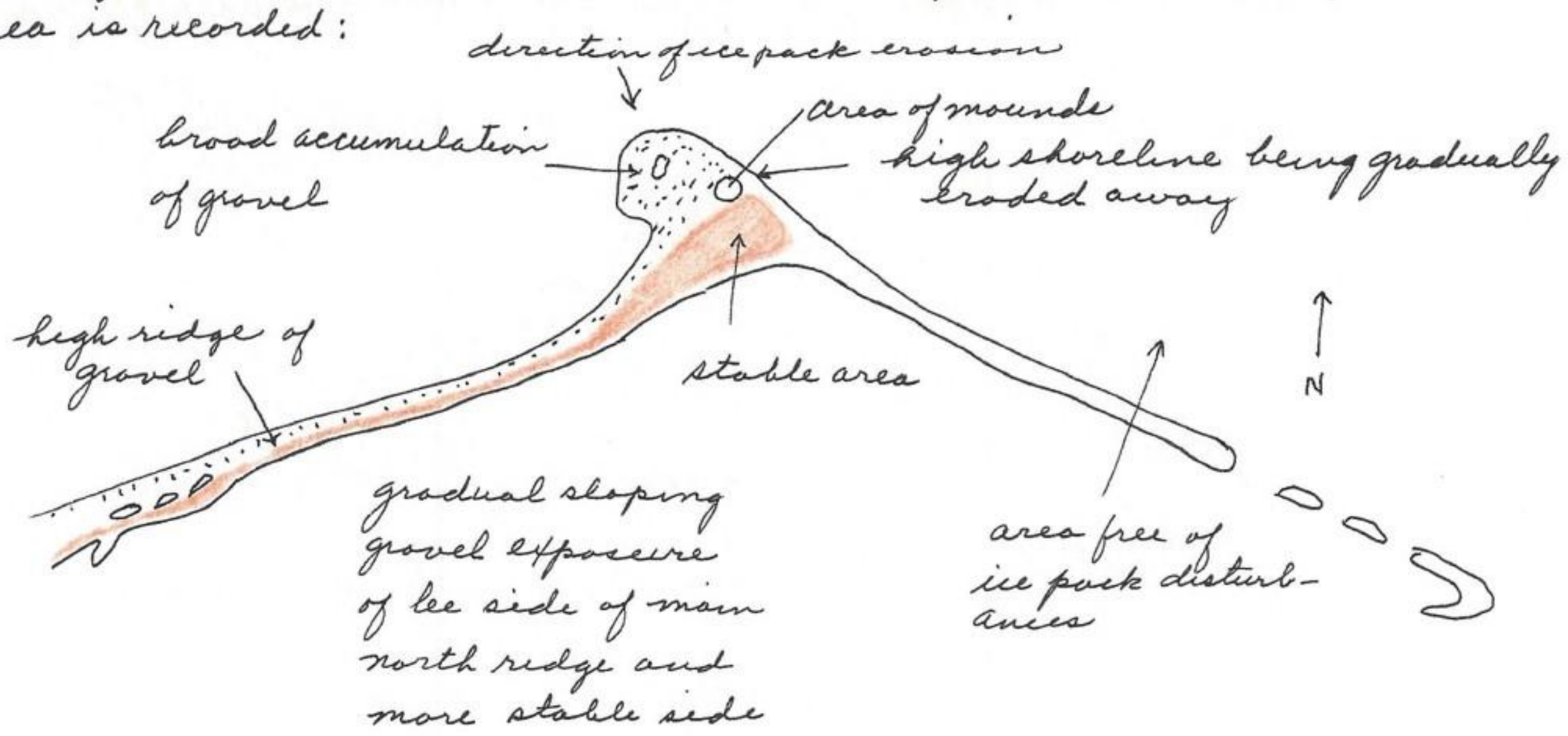
These mounds in better repair.

Along the N E crosional ridge structures protrude thus:



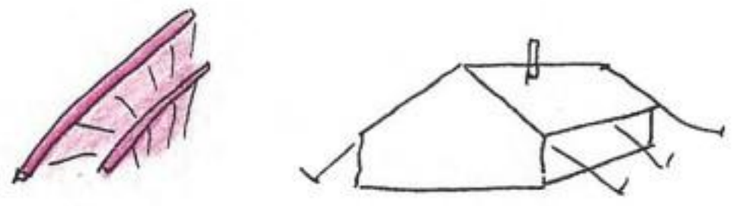
The ridge is gradually being eroded away by natural causes. This

presents an interesting problem of probable change in wind since the original inhabitation of the mounds by Eskimos. The general area is recorded:



15 red-throated loons in one loose flock flew east around point. 2 Pomarine jaegers flew out of sight to the north as if not realizing they were headed out over the Arctic Ocean. They may have been flying to ice pack. Collected head of an old ake 520621-96 used by Recent Eskimos. On return to A.R.L. found Eskimos of Birnirk using wind barriers on N E side of their tents which proves again that the winds that might be eroding the N. E side of Point Barrow mounds are in fact N E winds and that the gravel accumulations are due to ice pack erosion and piling of gravels from the north.

Wind barriers of Eskimos made of canvas and wooden supports thus:



The rain that started this evening, rain all night.

Arctic Research Laboratory, Point Barrow, Alaska

June 22, 1952

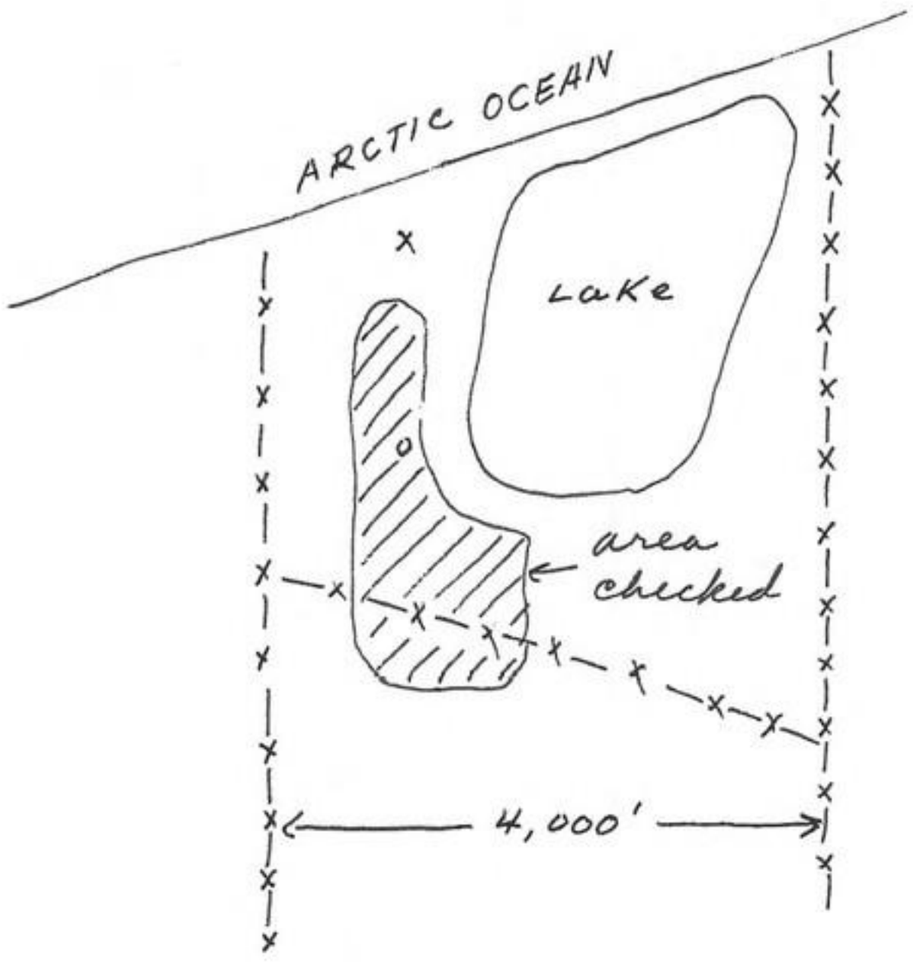
Rained + hailed all night to noon today. Prepared for field, probably Umiat. Checked beach at A.R.L. and snow gone leaving this profile

This profile is probably the result of 5 successive overthrusts of ice sheets blown in from the north. Wave action will later erase them. This afternoon prepared a Ursus horribilus richardsoni 520621-7 skull presented by Mr. Ira. L. Wiggins who received it from Umiat June 17, 1952. There is at present no information of locality. Mr. Wiggins suggested that it might have been brought in by Eskimos. Skull in perfect condition and the muscle tissue would suggest it had not been killed too long ago. Teeth worn down and is a very old animal. Will check at Umiat for additional info. According to Morvin Mangus, U.S.G.S., Washington D.C. and who spent the last 5 years in this area said that this bear was killed by a pilot of the Transocean airlines on April 10, 1952 at the convergence of the Chandler River and the Sic-sic-puk River, 152°00', 68°51', approx. 1800 ft.

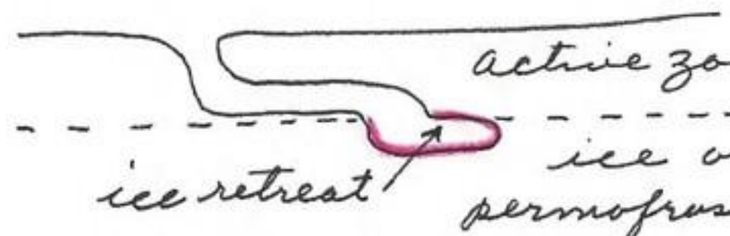
Arctic Research Laboratory, Alaska

June 23, 1952

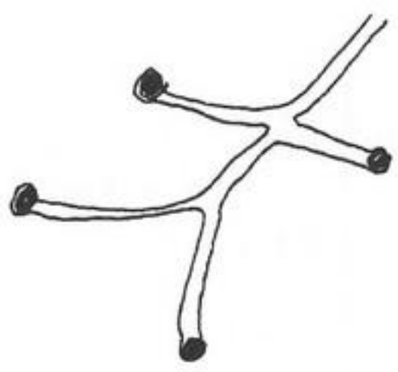
Checked area south of MRLZ Radio Station this A.M for Lemmus. The center of investigation at 156°44'15", 71°18'20", 8 ft. Captured 15 lemming by digging their nest chambers. Examined 45 nests in process. This area supports normal population but also evidence of depredation of jaegers and snowy owls as well as Eskimo dogs. Excavated one nest which held a ♂ Lemmus 520623-1 and a ♀ Lemmus 520623-2. The female had open vagina but normal uterus. Found another nest of 2, one a ♀ and one a male. An island in water surrounded by polygons found 1 large ♀, 2 medium sized ♂♂ and 1 small female. Grass area around centers of extensive runways are 100% clipped of grass. The base of the grass or sedge is the only part eaten with the upper part of the grass still standing upright and offering overhead protection. Well established runways are under this cut grass. 3 lemming chose to remain under this protective layer and while partially exposed, did not move until touched. Generally the lemming are seen moving about 10 meters ahead when approached. Some of the larger lemming



were in ice retreats even though grass nests were available. These ice retreats are generally a blind alley and just large enough for the body of the animal. Several of these retreats were actively being constructed in the ice. The only reason, outside of temperature control would be the escape of lemming from large mammals digging predators. When a lemming is found it is generally associated with well beaten paths radiating in several directions from the ground hole and numerous droppings and green fecal pellets are found near the entrance. Unused nests can be told from used ones by the condition of the runways and tunnel entrance. Grass lining of chambers nearly always confined to sides and bottom of chamber. Holes deg in active layer of tundra range from 400 mm to shallow 70 mm or less. Four such new diggings (in tundra mat & clay) were associated together

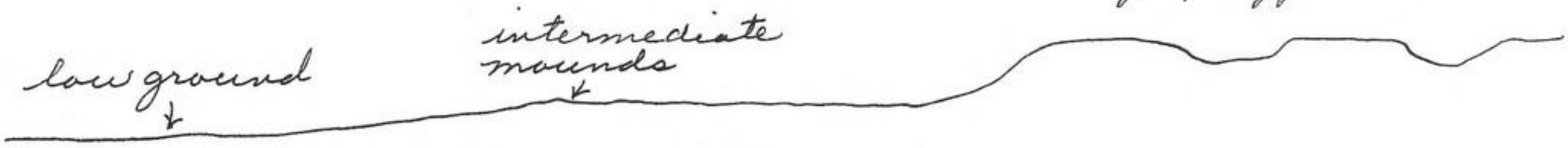


Some lemming in least expected places and in unused holes. No evidence of lemming under snow but well established runways in some areas. 1/2 mile of ground searching resulted in capture of 15 lemming and probably 5 times this number not excavated. Practically every raised polygon had lemming and every other one a nest and occupied. Lemmings were easiest acquired in intermediate mound about 1 1/2 feet high as tunnels were easily exposed below surface of tundra. The higher (1 meter mounds) had too deep and extensive and interconnecting runways for practical excavation



surface runways and holes

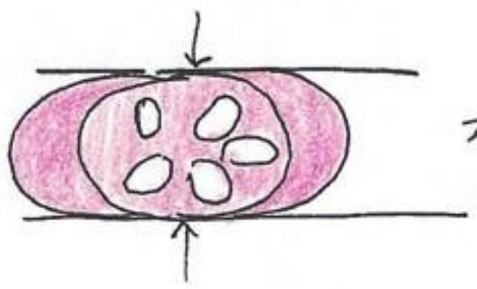
high polygonal mounds



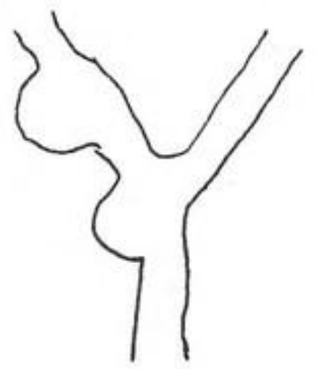
Best area for digging lemming as tundra is shallow and close to permafrost

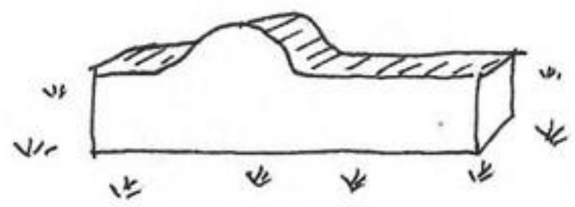
The high mounds are stabilized areas whereas the intermediate mounds are overflow areas for increased population numbers.

Pectoral sandpiper crouteched as 2 Pomarine jaegers flew by at 2 meter heegthth. Pectoral displayed puffed chest and cooing calls as part of nuptial display. Located nest of 5 fresh eggs of Calcarius lapponicus alascensis with as minimum nesting material as found so far.



nest placed in Lemmus runway, which in turn was enlarged from fracture of soil. Nest flush with ground. Watched Pomarine jaeger catch lemming while sailing over the ground at about 1 meter and then pouncing down upon the animal with bill only. The jaeger held the lemming by its back, adjusted to rear and then swallowed whole. They were also seen hovering above the tundra at about 7 meters heeghth. On lake ice (blue water intermixed with white snow or crystal covered ice, counted six single Pomarine jaegers and 2 pairs setting upon the ice and facing the wind from the N.E. Counted 19 Pomarine jaegers in an area of approx. 240 sq acres as outlined in diagram of first part of todays notes. This area is outlined by tripod communication line to west, T line to east and row of 50 gal drums following ground line to south. It also includes 3/4 of lake east of area. This area supports 1 jaeger per 12 sq acres. These birds were in groups of from 1 to 4. Other birds in area are: 1 snowy owl feeding, 4 Barrow gulls flying NE, 8 Arctic terns flying NE, 1 Pectoral sandpiper with or on nesting territory, 2 red phalaropes ♂+♀, 2 flocks small sandpipers flying NE. Examined lemming 520623-6 ♀ with 8 x 1 emb 1 mm length with one side so crowded that the last embryo was beyond the forks of the uterus and only a part of the embryo on the wall of the main uterus. Spent the remainng part of evening preparing for field trip to Umiat. Departure will be 8:00 A.M tomorrow morning. Eskimos still going out on ice of the Arctic Ocean with dogs + sledges. Lake of emerald waters still enlarging on ice surface but no sign of lead development. Noted coffin of Eskimo with elevated knee accommodation for body too long for box. These boxes are placed on surface of tundra as permafrost would force them to the top if buried.



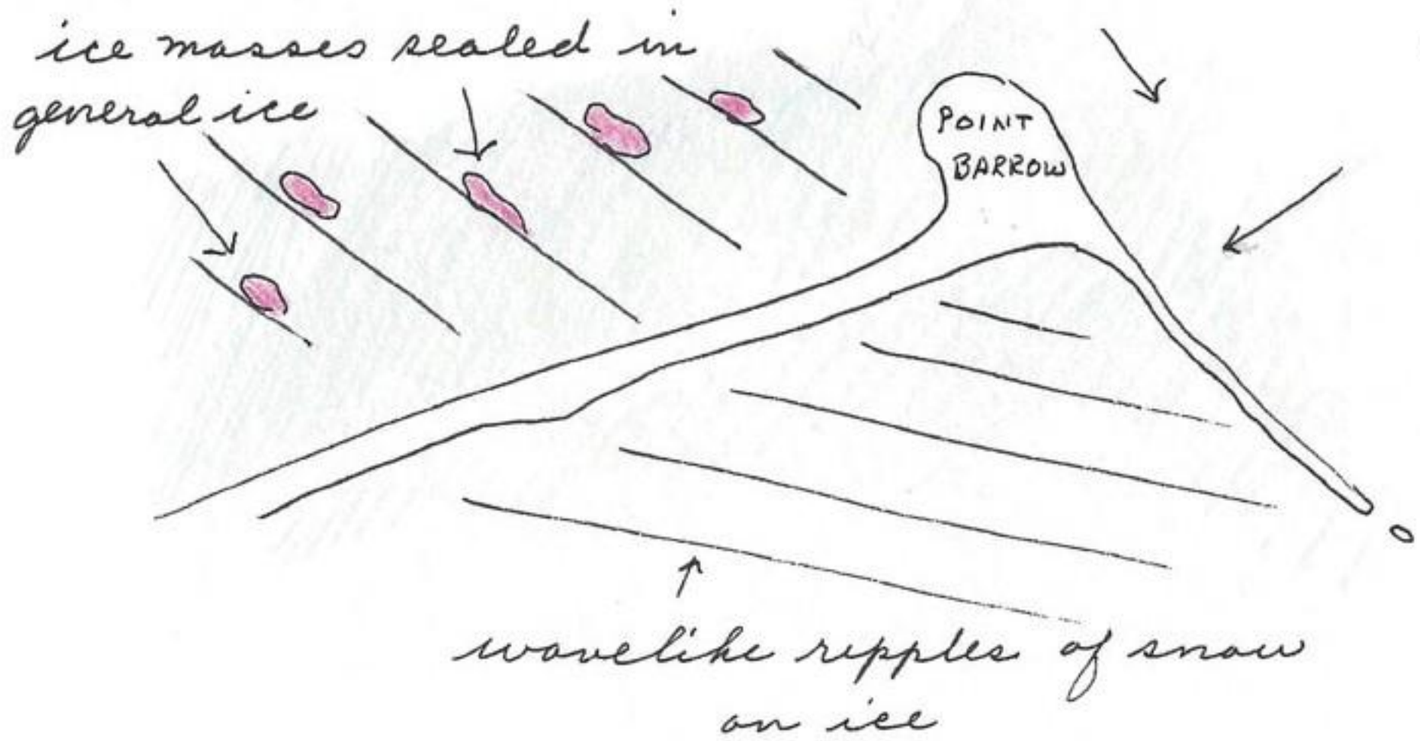


Birds observed so far at Point Barrow: red-throated loon, old squaw, pectoral sandpiper, red-backed sandpiper, red phalarope, Pomarine jaeger, glaucous gull, Arctic tern, snowy owl, Lapland longspur, snow bunting, black brant, pintail, tree sparrow.

Arctic Research Laboratory, Point Barrow, Alaska

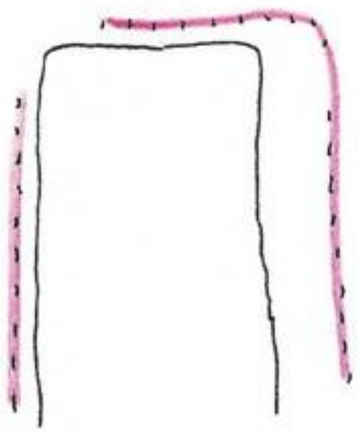
June 24, 1952

Departed for Umiat 4:07 P.M. Lead to pressure ridge. Ice bergs in lead. Main ice pack beyond. 70% shore ice pack covered with blue water.

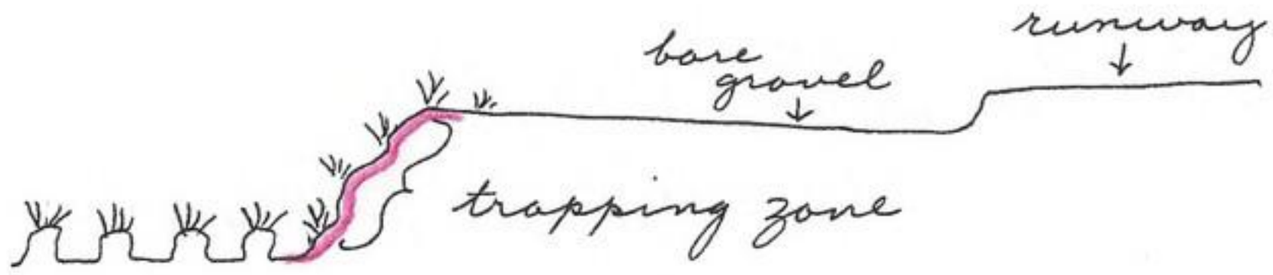


The Point Barrow area proper is sealed in with solid ice. The ridges of snow are produced by winds. About 10 minutes out of Barrow found similar alignment of snow ridges as those at Point Barrow. The direction of wind in late winter is from the NW or WNW and has no influence in orienting the lakes. It is wind action at a time when the lakes are frozen. The winds of summer, mainly the damaging winds from the NNW are responsible for the orientation of lakes. Now moving into clouds and fog and above clear bright sunshine and blue. Reflection of sun from clouds below intense. The clouds are oriented in the same direction as snow ridges Arrived Umiat 5:10 P.M through

clouds and fog. Set 150 museum special traps at west end of runway.



west end runway

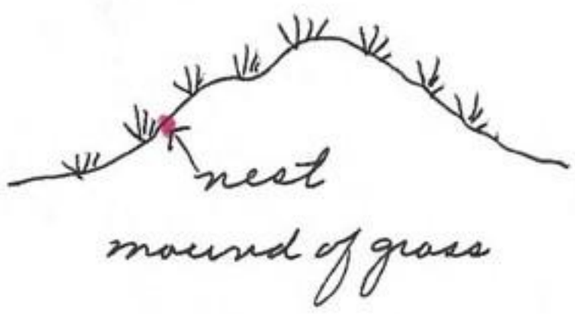


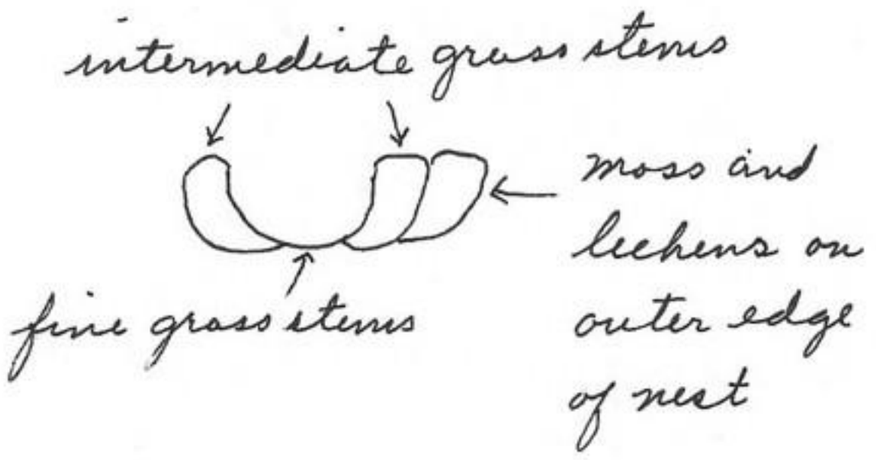
This area is successional and populated with runways of Microtus oeconomus. The dominant grass is a high yellow grass about 1 meter high. On return examined traps just set and caught 7 Microtus oeconomus and a few Microtus minurus. Heard 2 Sandhill Cranes and saw a flock of white-fronted geese. Return to Umiat.

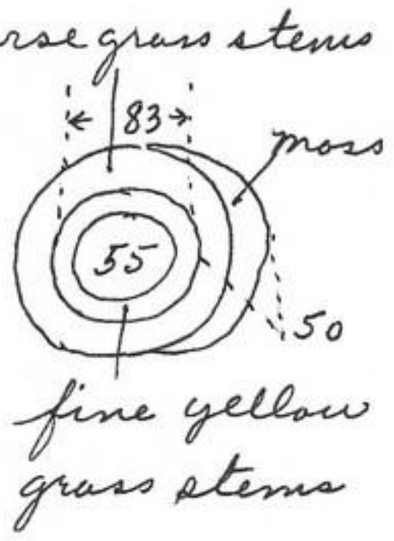
Umiat, Branch A.R.L., Alaska

June 25, 1952 (see also June 25 3 pages beyond) insert 1

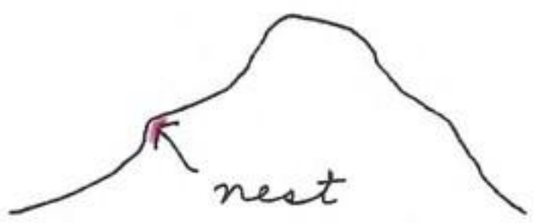
Inspected 150 traps last evenings setting and caught: 1 Clethrionomys, 2 Microtus minurus, 27 Microtus oeconomus, 18 traps sprung. This area would be a good source of different kinds of mammals for accidental transport to Point Barrow or Bettles by being picked up in cartons, boxes. equipete. Inversely, mammals from Bettles could easily be transported to this airstrip. Checked set 3 eggs of tree sparrow located last night at 6:00 P.M. Semipalmated plovers redpoll, Lapland longspurs in area. Checked 150 traps this evening and caught 6 microtus oeconomus, 1 microtus minus and 1 wagtail. Set 40 traps as continuation of above line in grass to north of ridge set. Wet but slightly elevated. Dwarf willows present. Capella delicata in nuptial flight at 11:00 P.M. & snipe in leafless tree near Sea Bee Creek calling. It was at least 70 meters from favorable nesting area. Heard three others calling. Collected set of 3 eggs (embryos) of tree sparrow observed yesterday 520625-31. Nest in bank of grass covered mound:

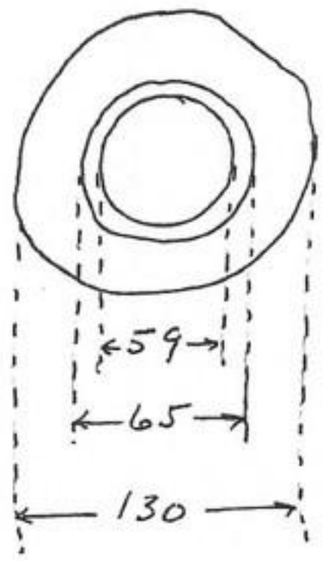






outer part of nest 9 gms, fine grass cup and feathers 4 gms, width 150 mm, depth cup 47 mm, depth nest 52 mm, cup lined with 1 inch feathers of ptarmigan and mixed with successive layers of fine grass stems (8 mm). Nesting ground of ptarmigan (7) on edge of runway. Birds nearby. Ed. Collected set of 4 eggs of the Wagtail 520625-32 from artificially piled tundra made by a bulldozer. This mound was 1 meter high and nest completely protected overhead.





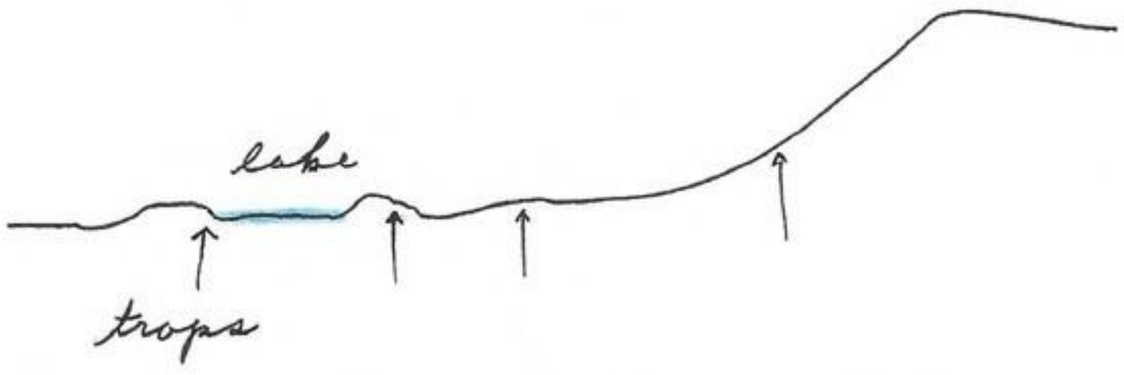
This nest lacks the fine yellow grasses used by the tree sparrow, snow-bunting or longspur with hair and feathers grading into coarser grass stems and few mosses. It is less effectively insulated. Has more hair of caribou and in large chuncks. Cup lined around edge with feathers and hair in bottom of cup. Cup 35 mm deep, 38 mm of material beneath cup of nest which is more than other birds examined. Moss beneath nest instead of at edge. Entire nest 14 gms. Cup lacks shape. Birds remained constantly in air above us for 15 minutes and when we left they followed us for 100 yards. Pair of semipalmated plovers on shoulder of runway.

Umiat, Alaska

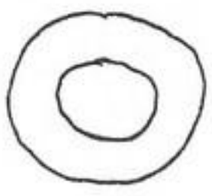
June 26, 1952

Inspected 150 trap line and caught 3 microtus oeconomus and 8 sprung traps. The 40 trap set held 1 Lemmus, 9 microtus oeconomus and 10 sprung. Westley Redhead, a carpenter and naturalist reports 9 eggs of ptarmigan, 1 duck nest. Gyrfalcon in area. His Eskimo helper reports that whales have stopped coming in at Point Barrow about June 1. (I am not sure of the previous statement). His story of 2 polar bear cubs at Barrow Village is: ♂ & ♀ killed about 1/4 mi N Point Barrow when outer ice mass closed in to touch shore ice. The young refused to leave the old ones and become restless until ♀ was skinned and the young were allowed to rest on it. These cubs were brought to Barrow Village and remained with hide until about a week ago. One escaped June 23, 1952. These cubs

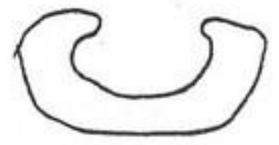
were captured when 700 mm long and 320 mm high (estimation). This evening after 6:00 P.M set traps at 152°05'30", 69°23',2" between longitude 00" to 60" beginning directly below the oil well to about 1/2 mi to west along base of bluffs.



most of the traps placed on ridges 1 to 2 feet high in the low marsh area. All traps in established trails, some may not have been too recently used. Collected set of 5 eggs (natal feathers) 520626-16 of the redpoll. Nest in dwarf willow 300 mm high in small 2 square meter patch. No leaves on willows and nest plainly visible. Nest small and compact and able to support itself. Nest of ground nesting birds not so firm. Nest circular.

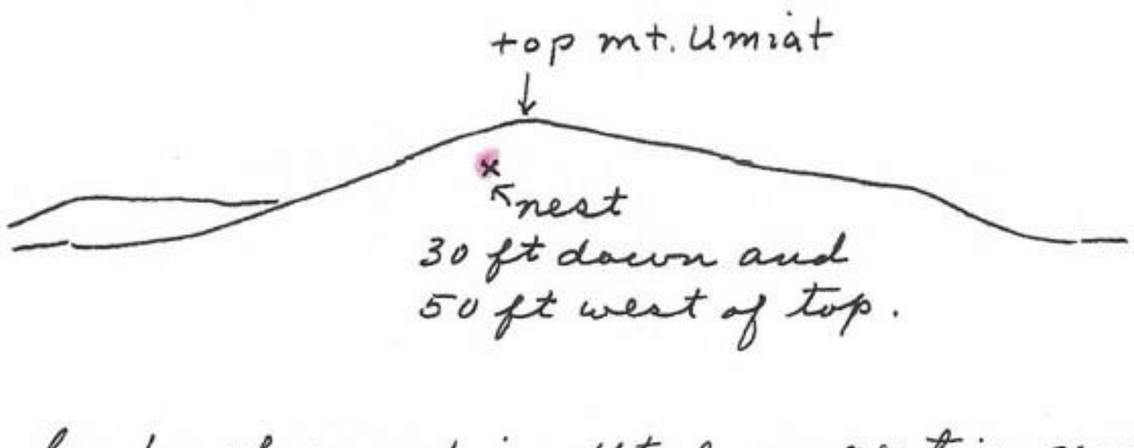


78 mm wide
42 mm cup diameter
38 mm cup depth
50 mm depth nest
9 gms wt.



rim of nest overhanging inward.

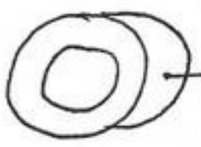
Outer structure various fibers and willow stems. Inner lining Eriophorum. Innermost lining white down feathers 15 mm. Nest well insulated. Ground squirrels on flat and many holes on exposed surface of slopes. 6 on one ridge. Westley Redhead reports duck hawk nest and 3 eggs on Mt. Umiat.



Both birds defend nest by calling and ~~oost~~ "standing on their tails in front of me". Saw 1 Sandhill crane along route to trap line. It seemed more brownish than birds observed in Utah on nesting grounds. It flew about 70 meters and alighted on edge of small lake. At Umiat Camp, Ed. collected set of 4 eggs of the Lapland Longspur 520626-17 from raised polygon on flat part of valley. Nest flush with the ground. Cup wide in contrast to redpoll ⌣ ⌣. Lining fine yellow grass, outer rim of coarse grass, mosses and fibers. Cup lined with brown white ptarmigan feathers. Entire nest 20 gms wt. inner cup 7 gms, width cup 65 mm, depth 30 mm, width nest 100 mm.

longspur redpoll

→ outward



— moss.

INSERT
Entered Sept 26, 1952

520626-57.1

Umiat, Alaska

June 25, 1952

The following is information from Dr. Ira L. Wiggins to George Lindsay, administrative aide, Umiat, dated June 24, 1952 and sent to Umiat from Point Barrow by plane.

"This will introduce Mr. James W. Bee and his assistant, Eugene Campbell. As you know they are working under the ONR contract with the University of Kansas. Mr Bee and Campbell will work in the near vicinity of Umiat for a period of approximately one week; and then travel by bush plane or LVT if that type of transportation is more feasible, to one of the order of preference: (1) One of the parties about fifty or sixty miles east of Umiat; (2) Etivuluk, where Tommy Cade worked when he first went out from Umiat; (3) Knifeblade. I will confer with Jim Dalton before sending the camping gear and food supplies and let you know what his recommendations are as to the exact locality where they would interfere the least with the work of the Contractors and other agencies.

After they have completed a period of approximately one week at one of these three localeteis, if that fits in with the local conditions and available transportation,

If they can get into the field work at, say Party 53, one week at Etivuluk, then it would be very desirable for them to get to Liberty Lake for a stay of a week or ten days. By the end of that time, the lake at Schrader might be open and if facilities and transportation are available, they would like to get to Schrader for a stay of 14 to 18 days, then return to Umiat and thence to Point Barrow to pack up some of their accumulated skins.

Please ascertain from Mr. Erickson whether or not there is lumber available at Umiat with which a work bench could be built along one side of the large work room in the ARL quonset. A shelf a little narrower than the top of the bench would be highly desirable as added storage space beneath the bench. If lumber is not available, let me know and we may be able to cut the stock to proper dimensions and send it to Umiat for assembling. This bench and shelf combination should give Bee and all other investigators sufficient room

to lay out their specimens and store them while they dry or otherwise cure preparatary to shipping them back to the states.

Camping gear and food supplies for Bee and Campbell will follow in another day or two and will be there before they move on.

The localities at which these men wish to work later in the season are Driftwood and Point Lay. Both of these localities can probably be reached from Barrow more readily than from Umiat, but later developments may change the whole set-up. It may not be possible to get them to Point Lay at all, but that locality is on the docket for a try if it can be made.

While at Umiat these two men will work within a reasonable distance of the camp, but will follow the same regulations about firing any arms (in this case light gauge shotguns) that are followed here at Barrow. In other words, they will not shot specimens within the confines of the camp nor within a half mile of camp. I expect that the most of their specimens will be taken with traps. The usual pattern for the use of weasel transportation which we discussed before you went to Umiat will apply in their case as in any others.

Dr Steere may be arriving at Umiat in a few days, but his field itinerary has not yet been worked out fully. Sincerely, Ira L. Wiggins.

5206 26-59

Point Barrow, Alaska

June 26, 1952

Frank Pitelka issued the following list of birds today.

Birds of Point Barrow, Alaska

Regularly breeding--
Arctic loon
Red-throated Loon
Old-squaw
Steller Eider
Golden Plover
Ruddy Turnstone
Pectoral Sandpiper
Baird Sandpiper
Red-backed Sandpiper
Semipalmated Sandpiper
Red Phalarope
Pomarine Jaeger
Parasitic Jaeger
Glaucous Gull
Arctic Tern
Snowy Owl
Hoary Redpoll
Lapland Longspur
Snow Bunting

Occasionally Breeding
Canada Goose
Black Brant
White-fronted Goose *
Snow Goose
Pintail
Greater Scaup
Pacific Eider *
Long-billed Dowitcher *
Buff-breasted Sandpiper *
Sanderling *
Northern Phalarope *

Regular migrants--
King Eider
Spectacled Eider
Black-bellied Plover
Kittiwake
Sabine Gull
Wellow Warbler

Plus species marked with * in left column.

Occasional visitants--
yellow-billed Loon
Whistling Swan
Red-breasted merganser
Gyrfalcon
Willow ptarmigan
Semipalmated Plover
Hudsonian Curlew
white-rumped Sandpiper
Pacific Godwit
Long-tailed Jaeger
Herring Gull
Short-eared Owl
Tufted Puffin
Wheatear
Tree Sparrow
Savanna Sparrow
White-crowned Sparrow.

* Also regular migrant

Species recorded in the Barrow area only as vagrants or rare visitants are excluded from this list.

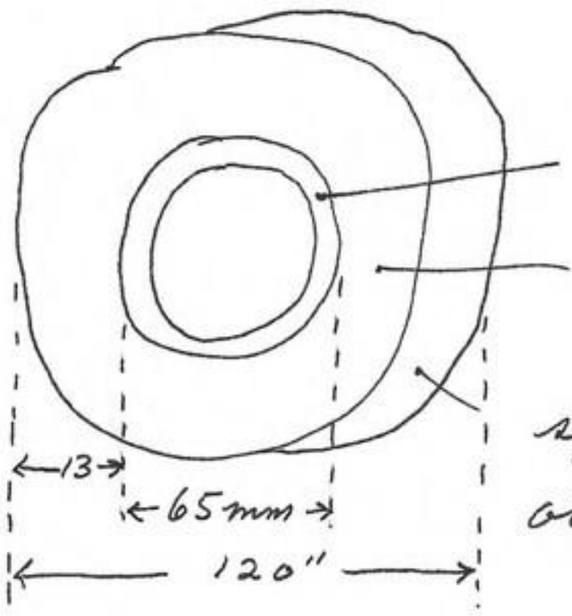
520627-60

Umiat, Alaska

June 27, 1952

Departed 7:45 A.M for Bearpaw Creek trapping area 1 7/10 mi. E. and 1 7/10 mi. N. Umiat, 152°04'50", 69°23'30", 550ft. From trapline of 43 in lowlands and 50 on open side hill caught 28 microtes oeconomus, 1 Sorex tundrensis and 1 Lemmus. All from trail sets in lowland. Hillside did not produce except 3 sprung traps. Redpoll nest of 3 eggs in willow 350 mm from ground. Leaves of this willow not out yet. The hillside N of Umiat is a symphony of songs of the white-crowned sparrow, willow warbler, grey-cheeked thrush and others. This would be an excellent area for bird study. Saw one red fox just under the upper ledge of bluffs 3/4 block west of the Bearpaw Creek oil well. This fox has den in rocks to north across canyon. 12 Citellus undulatus on ridge, generally active on top but retreating to side hill below among alder, willow and Betula. This south exposure is just opposite to north exposures in, say, Utah at high elevations where growth is on north side of ridge and bare on the south side of ridges. Examined 1 nest of redpoll 2 feet high in bare (leafless) willow with 6 young in feathers - probably 3 days old. This evening ascended mt. Umiat at 6:00 P.M and returned 10:00 P.M. at mouth of Bearpaw Canyon saw 3 American Robins, one singing as if on territory. At 6:20 P.M shot color movie of sandhill crane (3 feet and in error) This bird has been seen in general area on three different occasions. Called continuously, flew 100 yards and then alighted again. Examined nest of tree sparrow 520627-30 placed on ground in protection of grass and at base of willow. The eggs held embryos. Placed flush with ground on slightly elevated ground on hillside of Ledum, Vaccinium, small alnus and mosses and lichens.

Cup 36 mm, heighth of nest 63 mm, new yellow grass stems alternating with feathers of ptarmigan

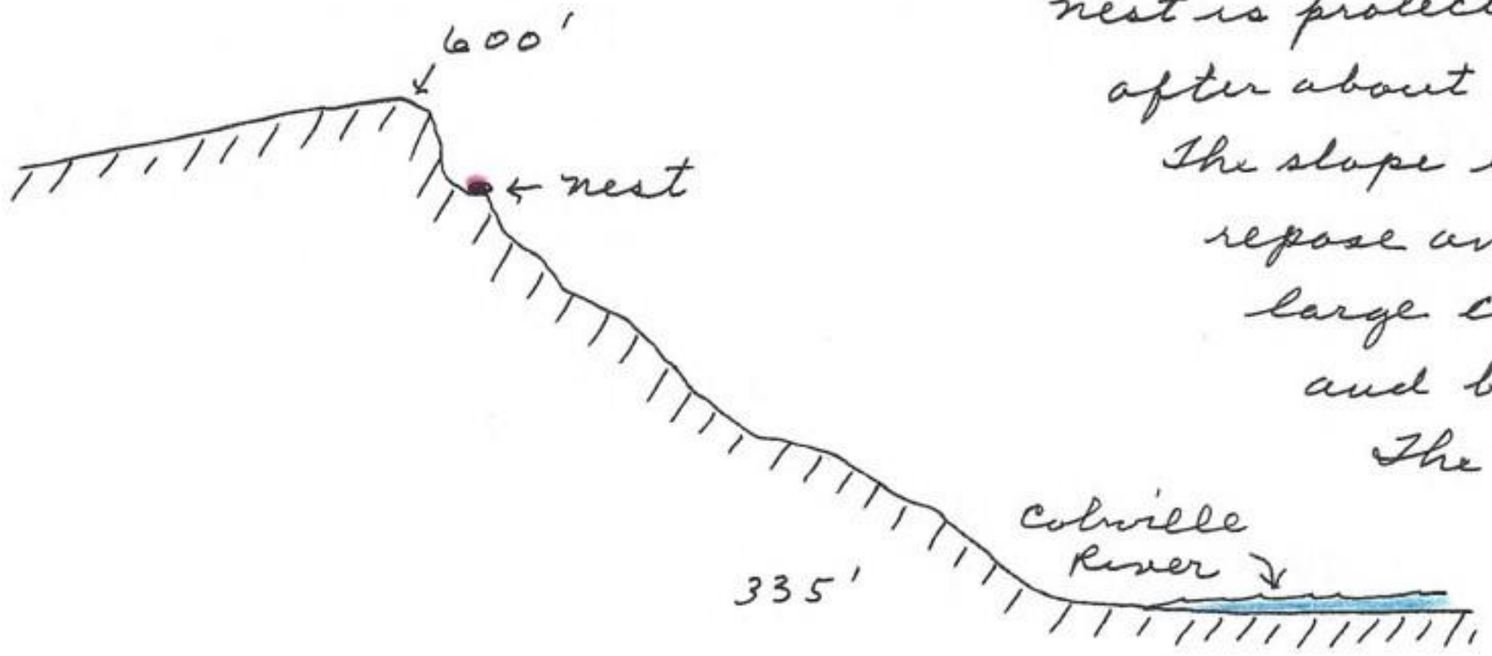


feathers 11 mm

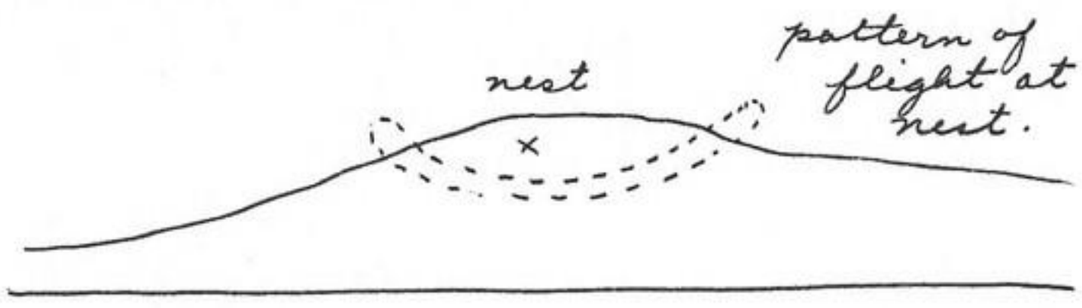
new dry gellow grass stems

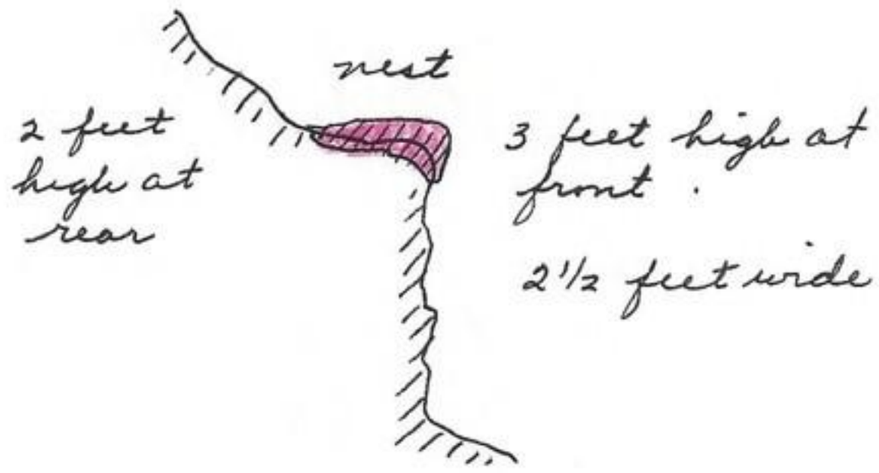
sphagnum and old grass stems and other dry plants.

Few Citellus on denuat mt from bottom to top but did not see animals. They could have been underground at this hour. at top of mountain and about 40' down and 30' west from top found the nest of the duck hawk with three eggs which were collected 520627-1. One egg unfertile, 2 with skeletal elements. The nest is protected from sun after about 5:00 P.M by ridge. The slope is at gravitational repose and consists of large clay landslides and bare of vegetation. The Colville River is directly below and with th



brood valley makes an ideal hunting territory for the duck hawks. ♀ on nest and remained in area when flushed the entire time of 1 hour we were investigating the nest, generally flying back and forth and occasionally alighting on ridge to west of nest. When we were actually getting the eggs the bird dove at about 10' but never nearer.





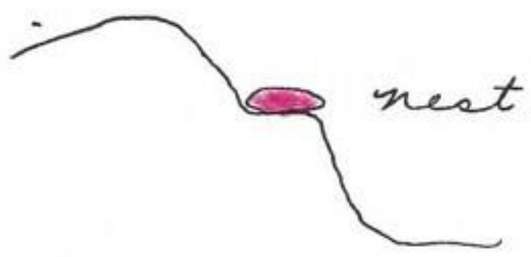
nest made of sticks of many years accumulation. Ledge 12 feet in heighth. ♂ not present. Good cliffs to immediate east and more beyond for several miles where the american rough-leg, gyrfalcon and raven must surely nest. Took movies of the duck hawk and general area of Colville River valley. On return, dropped down into canyon to north and thence to Bearpaw. Small mammals rare on broad slope of tundra but fairly common along edge of draws supporting willow and damp vegetation. Noticed two species of willow which have different ecological preferences in that one species is on slopes to bottom of swales and the other occupies the canyon floor proper. The latter has brown leaves of last year which give it a reddish color to the swale while the former is leafless and greyer.

The canyon floor, 150' wide, is completely vegetated with willow and Arctogrostis and very wet at this time of year. Mammal mainly at edges. Collected tree sparrow nest 520627-30 of 4 eggs at base of willow on ground. No leaves on willow. The catkins are present and the leaves are just visible. On trip to mt. Umiat found 2 ptarmigan kills, both on canyon floor.

Umiat, Alaska

June 28, 1952

Inspected trap line and collected 11 microtus economus and 1 Lemmus. Shot 8 Spermophilus undulatus kennicottii (other names may have been listed as Citellus parryi.) from among rock outcrops beyond first ridge. Each rock had about 4 or 5 mainly subadults and small adults. Old ones control their own areas. Found redpoll nest of 2 eggs and 3 young. Heard sandhill cranes and saw 3 pairs of willow ptarmigan. Old duck hawk nest in rocks on second ridge used about 3 years ago. Rock 13 feet high and nest 8 feet from ground and easely accessible to fox, wolf or any mammal that cared to inspect it. Spermophilus adult more warry than young and remain below ground when we are in the area. Recorded the following information of some of the squirrels collected:



520628-1 ♀ 6 placental scars, pelt 126 gms, skull 47 gms, intestines 300 gms (viscera below diaphragm), body 349 gms or total wt of 822 gms.

520628-3 ♀ pelt 128 gms, body 386 gms, guts 260 gms, skull 40 gms = 816 gms

520628-5 pelt 138, skull 56 gms, guts 196 gms, body 345 gms or 785 gms total weight.

520628-4 pelt 114 gms, skull 42 gms, guts 175 gms, body 330 gms. or 661 gms total.

William L Wyatte, surveyer at Umiat reports:

1. 3 wolverines at Wolf Creek at Camp June 11, 1952
2. Grizzly at Wolf Creek Camp June 8, 1952 about 700 lbs.
3. 3 or 4 groups of 12-15 Caribou at Wolf Creek Camp June 15, 1952
4. Single raven at Umiat during winter and only bird present.
5. First of June, no water running in Colville River.
6. 17th June water in Colville free running.
7. Coldest temp at Umiat 53° F
8. Raven active when all moisture in air freezes to ice Crystals.

9. High water at Umiat June 14, 1952.
10. 3 wolves seen at Umiat in December.
11. 36 moose at Grandstand Camp in winter of 1951-52
12. Snow hard enough to run weasel vehicle on top.
13. Frank Spinning reported 2 moose with locked horns 20 miles down river from Gubic. The wolverines are now using the caribou as food (December)
14. When sun comes up for first time ice cryptals in air disappear
15. Fish and wildlife trappers killed 74♀ wolves and 86♂ wolves between Umiat and Gubic about March 1952. He claims that their take of 275 (Feb + march) included foeti. Some days they would bring back as many as 20 per day.

Measured a caribou antler as 136 mm long and 106 mm from base of horn (skull base) to tip. Temp today 34° min & 51° max. Mr. Tom Cade and George L Schaller of the Univ of Alaska just arrived from river trip on Colville from Ctivluk River (mouth) to Umiat. They report:

1. Found 3 gryfalcon nests with young almost ready to leave.
2. 2 raven nest with young ready to leave.
3. 17 duck hawks nests all with eggs
4. American rough-leg hawk most common nester and eggs are laid to about 20th June and then young in nests after that date.
5. Gryfalcon eat ptarmigan in river bottom and squirrels and other birds outside confines of river valley.
6. 7 Stelt sandpipers collected at Umiat June 8, 1952
7. Collected set, 4 eggs of Wilson snipe June 30, 1952 at Umiat and grey checked thrust of 1 egg and 3 young July 1, 1952.
8. Canadian geese use old cliff nests of raptores along Colville R.
9. He has collected the following at Umiat: Wellow warbler, June 20; Stelt sandpiper, June 8; dowitcher, 6 June; ptarmigan; black bellied plover, June 7; red phalarope, 11 June; golden plover, 4 June; grey-checked thrush, June 14; northern phalarope, 5 June; savanna sparrow, June 10, all in 1952; fox sparrow, June 13; pileolated warbler, 13 June; pectoral sandpiper, 14 June; redpoll, June 4; semipalmated plover, June 5; Baird sandpiper, June 8; tree sparrow, June 14; Lapland longspur, June 11, 1952.
10. Saw many caribou, few moose, sign of bear & fox along Colville River.

This afternoon collected a set of eggs (skeletal elements) of Lagopus l. alascensis 520628-21 at Umiat near Seabee Creek. The nest was in a cavity of sphagnum moss. There was apparently

Progress Report for June 1952
(June 30, 1952

Arrived at Arctic Research Laboratory June 14, 1952. For 6 days investigated the lemming populations in the immediate vicinity of the Point Barrow area. In comparing quadrat studies of 1951 with those of 1952 found approximately a 70% increase. Two hundred and fifty specimens of Lemmus trimucronatus alascensis were prepared as specimens showing a graded series from embryos measuring 26 mm in length to adults, indicating a continuous breeding period for at least 2 months preceeding our arrival. No other kinds of mammals were collected at this station.

Between June 20 and July 3 collected at Umiat with headquarters at ARL Branch Division where all associations were sampled and compared with data of the previous year. Sorex appeared to be outstanding in population decrease for this area. In addition to collecting Microtus miurus, Microtus oeconomus, Sorex tundrensis, Sorex cinereus, Citellus parryi, Clethrionomys rutilus and Lemmus trimucronatus added several skeletal bird-bird specimens which were not taken during 1951. A barren ground grizzly skull, collected by Dr. Ira L. Wiggins, was presented to us from this station.

no attempt at adding material to the sphagnum depression. Placed among dwarf willow and dwarf birch (Betula nana). 1 1/2 feet high. Photo of bird in movie. It refused to leave the nest until physically forced by pulling it off by its tail feathers. Movie of waif dog also.

A set of 3 american rough-legged hawk presented to me by Tom Code who collected them about 15 miles west of Umiat on the Colville River. They were cold when taken and were addled. (see June 30 for old squaw nest)

Min temp today 34° F and max. 50° F.

Umiat, Alaska

June 29, 1952

This evening set 200 traps at 9/10 mi. W and 9/10 mi. N Umiat, 152° 10' 58", 380 feet. On return saw 2 golden plovers together. Set traps around the east edge of lake and among alder, willow, Ledum, Eriophorum etc. Also one line down from lake to marsh area of flat river valley.

June 30, 1952

Inspected trap line of last night setting and caught 1 Sorex a. tundrensis, 2 Lemmus, 10 Microtus murus, 6 Clethrionomys 1 red-spotted bluethroat. The bluethroat was taken in a trap along edge of lake in fracture 1/2 foot deep along bank. Nest of fox sparrow with 4 young about 5 days old. Nest flush with ground among leafless willows and alders. One fresh egg in nest of redpoll. Collected old squaw nest of 7 eggs (1 infertile, 6 with reoccurrence of blood) 520629-27 at the south side of trapping lake 20 feet from water. Photo of this nest with same number. ♀ flushed and joined male in lake. Yesterday no birds observed and nest and eggs covered with down feathers. Nest placed at base of alder tree (bush) on 1 foot high hummock. Nest placed in natural depression in mosses.

(see opposite page for progress report)

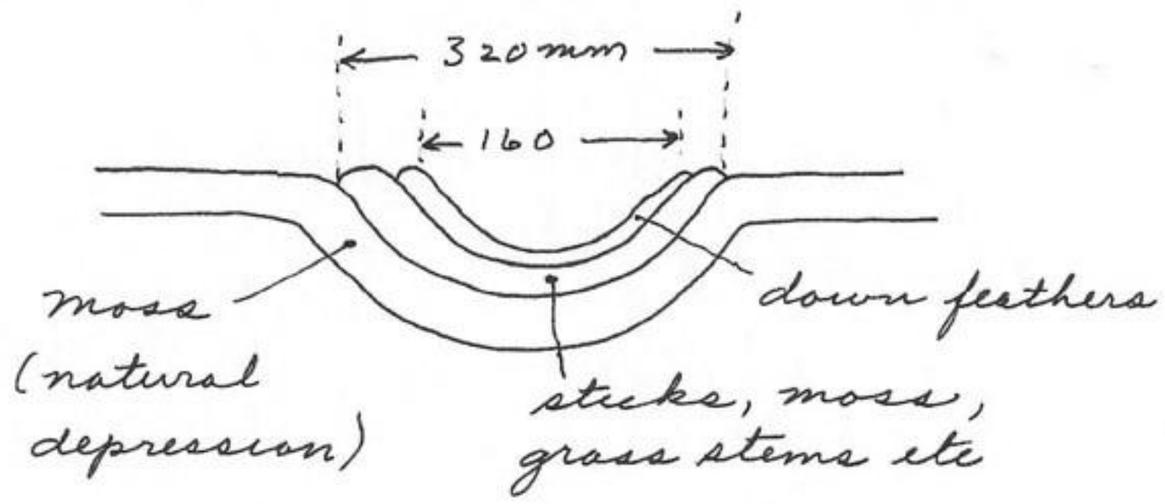
Add June report

July 1, 1952

Inspected trap line of yesterday and collected 4 Microtus oeconomus, 6 Microtus murus, 2 Clethrionomys, 1 Sorex a. tundrensis. Collected set of 6 eggs (natal feathers) of the white-fronted goose 520701-14 from 300 feet south of collecting lake. Nest 160 mm across cup which was lined with down feathers. 80 mm wall of nest made of dry trash. Depth of cup 80 mm. Nest on mound of polygonal area with Vaccinium, Arctagrostis, mosses and lichens.

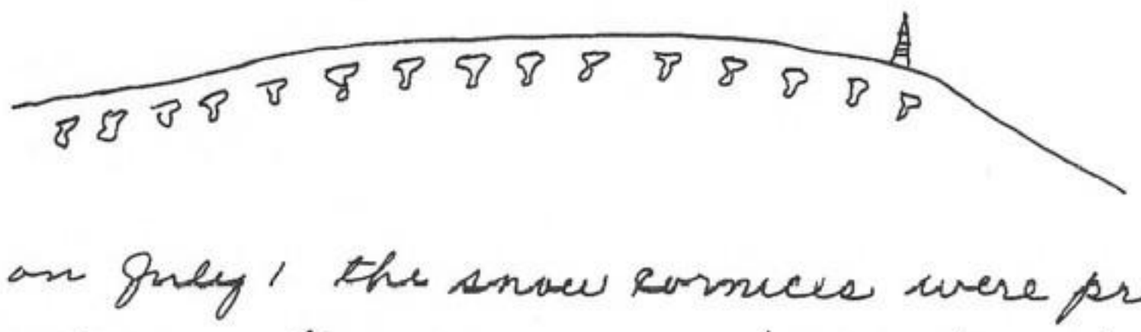
nest 1 1/2 feet above water.

nest and bird exposed but difficult to see even when veiwed at 30' with glasses. Flushed at 25'. nest in depression of moss. which could have been made by compression from body of goose. It was not excavated as the original moss surface present. Photo 520701-14 of this nest and eggs.



Plants in general area around lake: Betula, Ledum, Vaccinum vitis-idea, Arctogrostis (articgrass), alnus rugosa, Salix, Empetrum nigrum. This evenng measured the skull of polar bear collected at Point Barrow Nov. 1951, now in paccession of worker at Umiat. Zygomatic width 180; width brain case 104; width rostrum P^3 82 mm; basioccipital 52; basal length 310 (⌀——⌀); greatest length 385; interorbital crest 75; post orbital constriction 72; nasal 100.5; width ex. m to ex. meatus 108.5; basisphenoid 45.5; palate 88.5; mastoid width 134; mental foramen to condyle 180; depth jaw at 2 m 38. Photograph of this skull 520701-14.

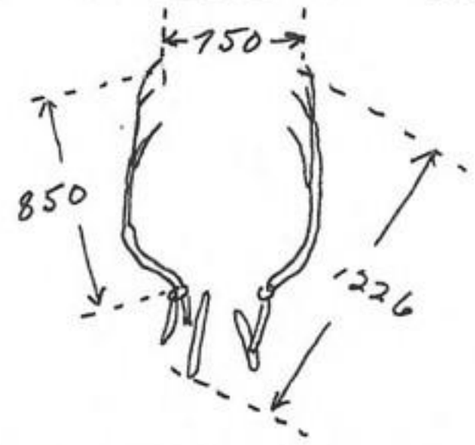
Snow on June 24 on ridge north of Umiat about so: but but but on July 1 the snow cornices were practically gone with 5 snow segments remaining instead of the original 15 when observed June 24

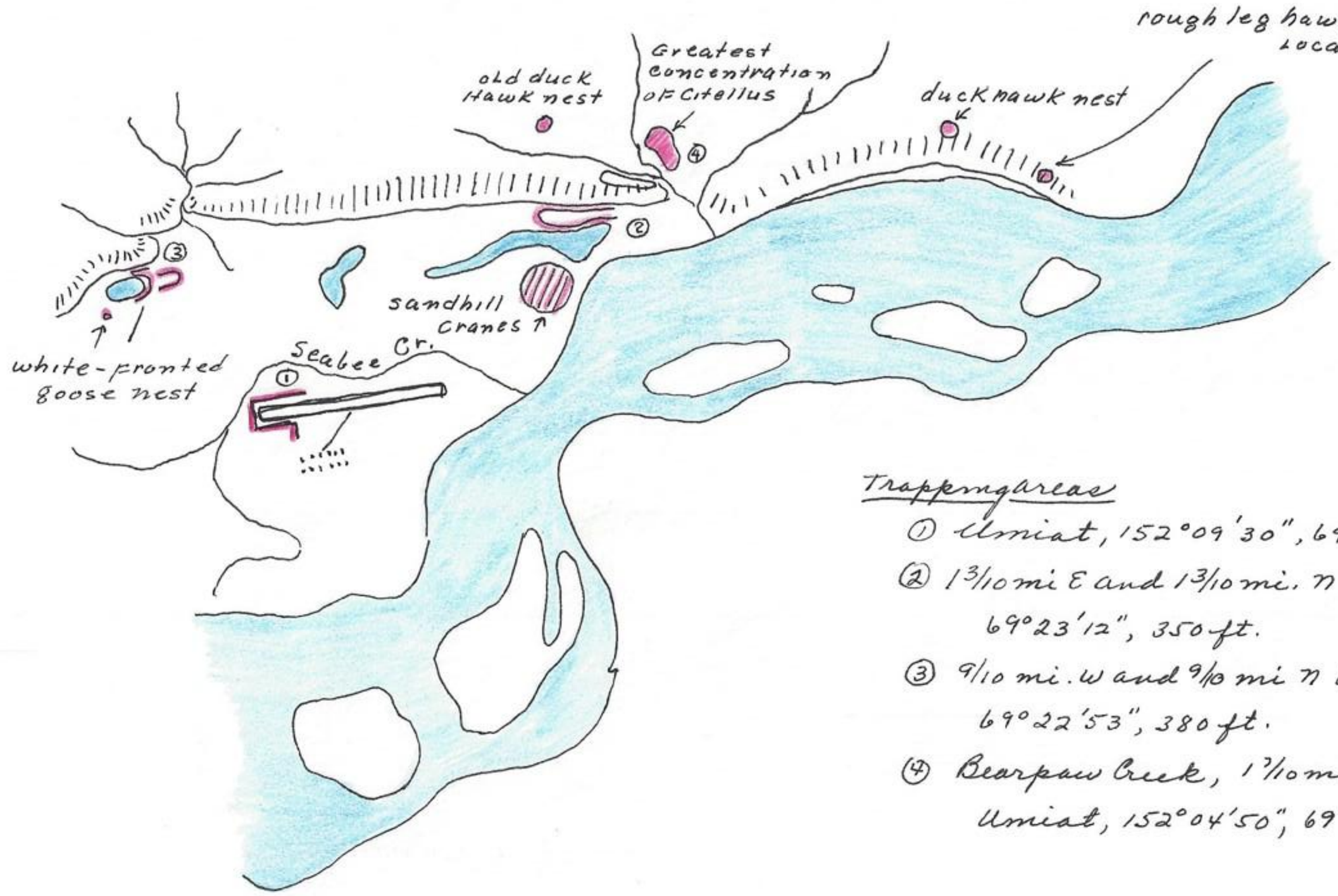


Umiat, Alaska

July 2, 1952

Prepared for field today. all equipment organized and will leave tomarrow morning by horseman, 1 load. This afternoon set of caribou antlers collected by Westley Redhead at Umiat. Collected at 1/2 mi. W Umiat. RedHead also showed me a photo of wolf paw and animal measuring 19 cm in length and approx. 1100 mm body length. weight approx 86 lbs. This animal was collected near Umiat last winter.





Trapping areas

① Umiat, 152°09'30", 69°22'08", 352 ft

② 1 3/10 mi E and 1 3/10 mi. N Umiat, 152°05'30", 69°23'12", 350 ft.

③ 9/10 mi. W and 9/10 mi N Umiat, 152°10'58", 69°22'53", 380 ft.

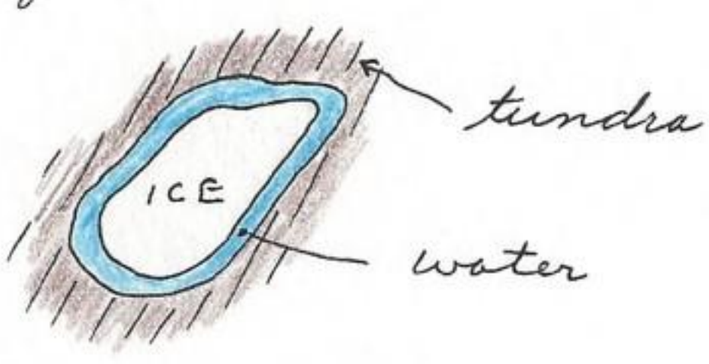
④ Bearpaw Creek, 1 7/10 mi. E and 1 7/10 mi N. Umiat, 152°04'50", 69°23'30", 550 ft.

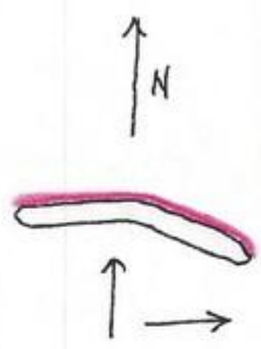
520703-67

Umiat, Alaska

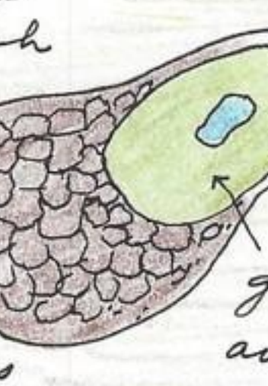
July 3, 1952

Departed Wahoo Lake at 9:25 A.M. Temp at Umiat this hour 63° F in shade. Flew east across rolling tundra intercepted by braided stream channels trending north from the Brooks Range. Plain green tundra marked with green stream course and lakes. At 9:35 A.M 2 loons in lake below, nearly all N and E exposures indicating winds from south and west. The larger lakes are covered with ice.

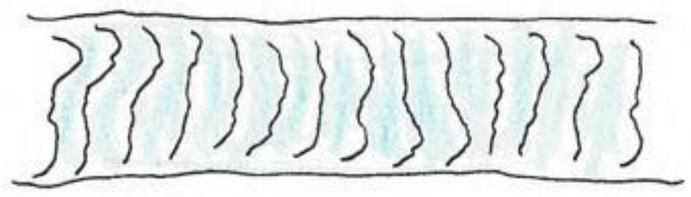




Some have the edges free of ice. The ice was pushed on to east shore but shows evidence of shifting position according to wind direction. The small lakes are free of ice as is the tundra in general except cornices on ridges and occasionally in deep gullys or protected bank. There is a general tendency for appearance of less snow and green vegetation. at Umiat the alder and willow are leafless or just beginning while here the leaves are well developed. This might indicate a milder climate in this area. At 9:42 A.M large river convergence. 9:50 second large braided river. At 10:00 the caribou trails both new and old trending E and west while at first part of trip the trails trended N.S. At 10:07 3rd large river, no snow or ice in area except in braided river channels



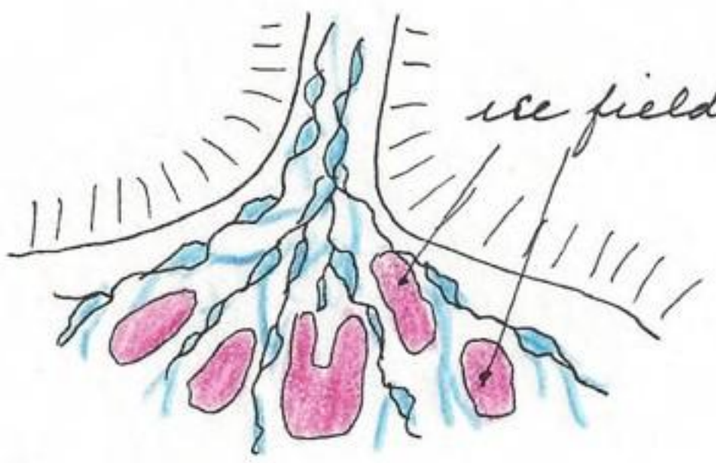
a typical lake, on its way to extinction might look like this as viewed from the air: The polygons are oldest, the grasses and sedges second in age and then the present open water of lake.



The old river channels are now filling in with segmented lakes and especially with palatinelike transverse ridges of grass, moss and lichens.

10:13 A.M. 4th large river. The Brooks Range with long streamers or streaks of snow only, except the more destent ones to the south which are snow packed. Snow filling gullies and cornices. willow and alders getting greener as we proceed to the last. 10:20 A.M

approaching base of mountain which begin as an abrupt front with a rolling tundra topography to the north. The contrast is great with towering mt ranges arising from the gently rolleng tundra beyond. At the mouth of the canyon the rivers have deposited a broad fan of braided stream channels and ice fields with the white gravel contrasting to the bordering areas of greenish grey. There is no-doubt that recent activety and erosion of the Pleistocene elevated land mass. 10:24 A.M now over ice fields and at 10:25 A.M at mouth of the canyon of the Sagavanirktok (Ivashak) River. The Ivashak is a beautiful canyon with high intricately dissected peaks

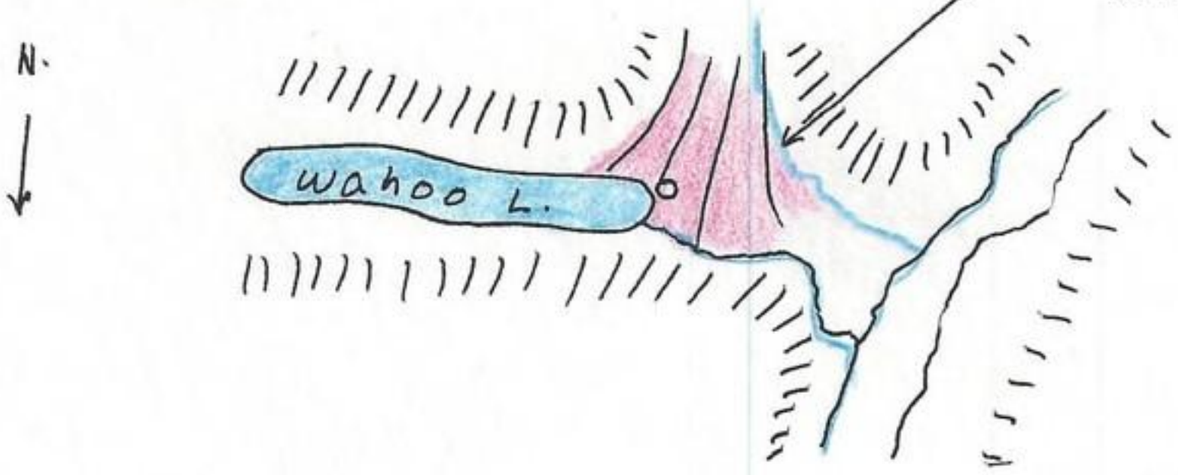


braided channel in white gravel outwash plain

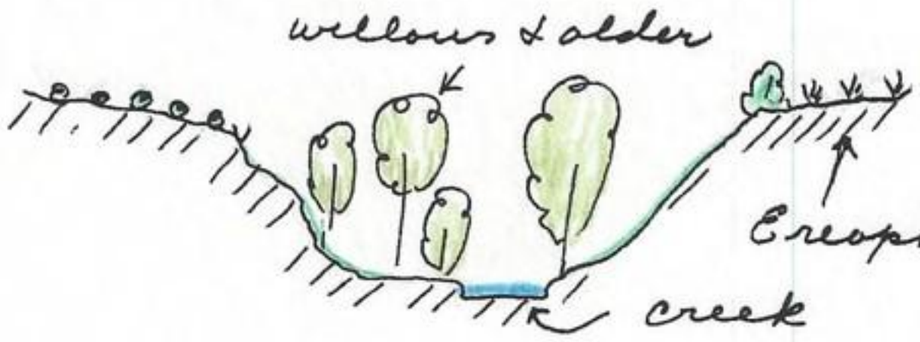
and compact form. It is an area that certainly is of national Park caliber. It compares with any canyon I have seen in the Brooks Range. The mouth of the canyon is covered with approx. 80° ice fields with superficial system of blue water in channels on top. The upper limits of the mouth of the canyon has less ice. It is certainly a marked contrast against the surrounding areas. Several of these ice fields were observed en-route to Wahoo Lake. At 10:43 A.M we passed a barren ground grizzly on left side of canyon about 4 miles out of Wahoo Lake.

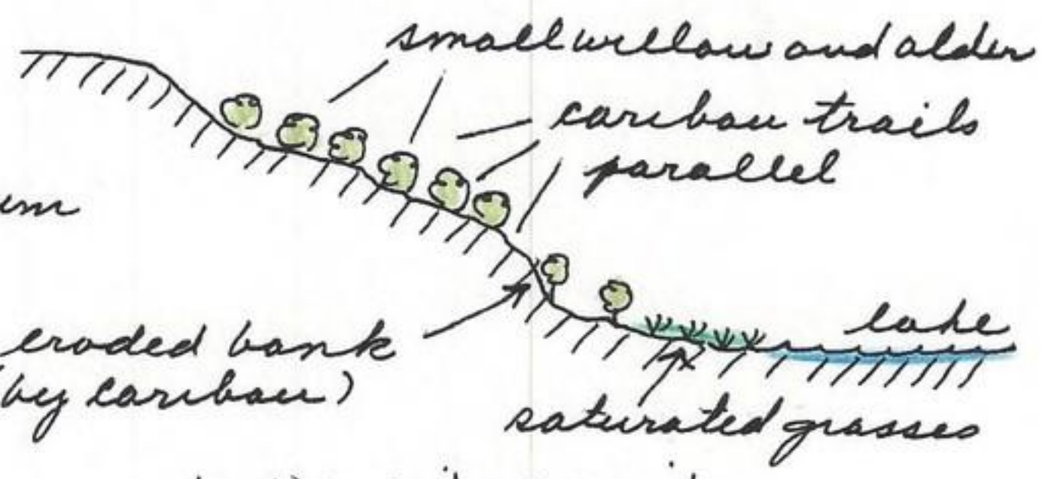
It was running up the slope when first observed. It weighed approx 750 lbs. Arrived Wahoo Lake 10:45 A.M This lake was named today by Bill Brogse, U.S.G.S. who arrived yesterday. This lake has never been on maps and was discovered by aerial maps last summer. It is named for Wahoo, Nebraska where the wife of one of his friends lives. Wahoo Lake camp is located at 69°08', 146°58', 2350 ft. A barren ground grizzly was observed by Brogse at 69°11', 146°55' yesterday. The lake is 5025 feet long

and lies in a synclinal valley of Sadlerochet (Permean) rocks with high rugged Lisburne limestone to the south. It appears to be a divide lake with one end (west) sealed by alluvium from canyon to the south.



Set up camp at SW end of lake. Dick Olson, the cook for U.S.G.S reported a wolf (white) and 2 mountain sheep, yesterday. Members of this group of U.S.G.S. are; Bill Brogee, J.T. Nutro Jr, Hellard, and Dick Olson. Set 150 traps along creek that drains Wahoo Lake and also along n shore line east for about 1/2 the length of the lake. Creek set good for shrews and lined with tall willows, grasses, mosses and is entrenched. Willows on





edge of creek 10' high and some with bases 4" in diameter.

Wahoo Lake, Brooks Range, Alaska

July 4, 1952

Bill Brogee reported seeing 1 adult and 1 calf moose 2 miles down East Fork of Ivashak River. The feces of the Barren-ground grizzly is green and full of plant material. Found yellow-billed loon nest at NE end of Wahoo Lake. Will photograph this nest when light conditions are favorable. (see catalogue for mammals collected last night including): 8 microtus oeconomus, 12 microtus mururs, 1 Clethrionomys rutilus and 2 Sorex obscurus. In 8 traps set in holes and runways on hill slope NW 300 ft from camp collected 8 Spermophilus undulatus. Will leave these traps in same position for the period of our stay at Wahoo Lake which should give me an idea of total population for one knoll

segment of the mountain, influx from adjacent areas and other predatory associates. These squirrels were frequently heard calling from lake level to top of first bench knoll 300ft up slope. Area mainly in willow clumps and rock outcrops. The activity of the squirrels perhaps accounted for the willow alder growth. This evening at 11:30 P.M observed a large barren-ground grizzly working down tundra alluvium from the canyon to the south. It came toward camp, inspecting the various 3' high hummocks for evidence of mice and ground squirrels. At one mound (ice heave mound), it started to tear off the top of the moss and dwarf willow covering. Each dig removed about a gallon capacity of sod. It stood on its hind feet and used both front feet as if in a human upright repose. The digging or rather clawing was rapid and at 4 or 5 spots on top of mound above a ground squirrel hole, not into it. This pounding was apparently intended to confuse the squirrel and shake it from its hiding place. As it turned out, a small rodent (could be M. murks or Clethrionomys ran from the mound to another one about 15' away (later trapping on the mound disclosed the rodent as a Microtus mururs as inhabitant). The grizzly ran after it and after the mouse ran into a hole it turned (the bear) in dis-quest, expecting a squirrel. It continued walking NE directly toward camp and I mean directly! Bill Brogse returned to his tent to be nearer the 30.06. From the position of this bear, as it worked toward our tent and at 70 yards away, it could very plainly see all three white tents and movement of our personnel. At 70 yards it stopped and acted as if it smelled something but soon continued directly toward our tent. At 65 yards it stopped again and stood up and with its front feet on a mound, sniffed the air for several seconds. It then left via the same course as it entered the valley, running as fast as it could for at least 3 1/2 minutes and possibly more until out of sight in the canyon to the south. Wind blowing our scent directly into bear. It is evident that the bear fears man even though unlikely it had ever come into contact with people before and secondly it is not capable of seeing or hearing with any great acuity. It depends on its size and fighting ability to defend itself and undoubtedly never has an occasion to give way to competitors. The reports of bears charging is the result of confusion of bear, and charging or actually running away sometimes is into or towards the intruder. Except for meeting a mother

grizzly. I do not think that one should fear this animal in nature. Light of sky at this time 50 candle power (weston exposure meter) and about 13 on ground. Sunlight (direct rays) only on top of high mountains. Even at the risk of underexposure, took movies of this grizzly as it approached our tent. Retired this evening with front of tent securely zippered!

Wahoo Lake, Brooks Range, Alaska

July 5, 1952

Collecting the following mammals (see catalogue) from 150 traps of first nights setting (20 feet apart): 3 microtus mucrus, 1 Passerculus sandwichensis. Steel traps held 6 Spermophilus. Photograph 520705-40 and 520705-41 of a squirrel at trap. These animals squeel when handled. Set 120 traps south of camp up wet draw on alluvial deposits and at bear digging area of last nights activity. Vegetation mainly grasses and sedges among willow (1½ feet high) and Ereopharum clumps bordering and mixed. Pulled 75 traps along creek as they were not producing much. This morning they yield 1 microtus mucrus only. At midnite temp for the last 24 hours, 36°F min, 70°F maximum

July 6, 1952

From trap line collected (mainly from 120 traps set last night): 17 microtus oeconomus and 1 Spozella arborea. From steel traps 1 Spermophilus indicating community is rapidly being reduced, this one being the 15th since 2 days ago. On the 3 of July located a robin nest in willow along creek NW of camp with 4 eggs. ♂ & ♀ close at hand within 6 or 7 feet of nest. This morning at 8:00 A.M the nest contained 2 eggs and 2 young. Also observed robin about ⅔ adult size in canyon (bear canyon) south of camp and some 50' away from nest of this year. This nest was built over last years nest. Adult birds present. These robin are about every block up this canyon, nesting in willows. Today the wind has been blowing in restricted channels from the SSW. One tent will be rattling while another one 50' away remains still. This evening wind from N.E. 2 mt. sheep on west exposure of rugged rock outcrop N of camp. Yellow billed loon called on lake for first time this P.M since our arrival. Temp. at 11:00 P.M for 24 hours, 40°F min., 75° F max. (all max. in shade) At 3:00 A.M loon called directly in front of tent. Recording here on this date a letter received from Dr. William Steere, a botonist at A.R.L.

520706-72

July 6, 1952

Dear Jim:

Just a note to let you know that I saw 2 whistling marmots on an isolated, combed, conglomerate ridge about 5 miles NW of the first camp of the Keys Project, on the Kurupa River, on July 1. This ridge is marked (approx) on your aerial navegation chart. The regular ground squirrels are abundant in this area.

I would appreciate information concerning any areas visited by you that appear to be of special botanical interest. We go to Driftwood next week, and after that — ? Perhaps Chandler Lake if it is thawed

Most sincerely
Bill Steere.

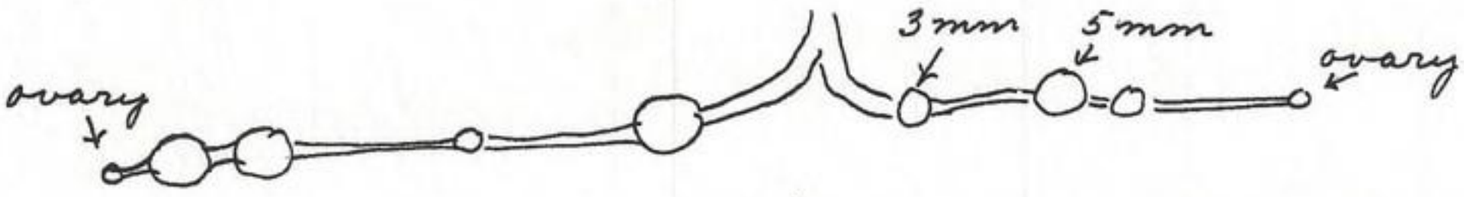
[The area is Kuparuk River, 155°00', 68°30', Alaska.]
Wahoo Lake, Brooks Range, Alaska

July 7, 1952

From traps collected (see catalogue) 10 microtus oeconomus, 17 microtus muurus. From steel traps, 4 Spermophilus bringing the total to 19 from the 8 traps which have remained in same position since July 4. There is a full complement of insects here with the following common representatives: 5 or 6 species of butterflies, one black 1½ inch and black and yellow swallowtail without tail one white 1¼ inches; blow flies; 2 species crane-flies; imago grasshoppers first observed 5 of July; 2 species of bumblebees; Tabanida; deer flies; spiders, unlimited variety; mosquitos; red and yellow mites; water beetles; carabid beetles; black flies; horse flies; and others. Young ptarmigan continually calling day and night for first time since our arrival. Temp at midnight 50°F; min in last 24 hrs, 42°F; max. 74°F.

July 8, 1952

Inspected trap line this A.M as: 1 Dicrostonyx g. rubricatus, 10 microtus muurus, 1 Clethrionomys rutelus, 2 microtus oeconomus, 1 tree sparrow. No Spermophilus this A.M for first time



Microtus muurus 520708-2 with uterus of abnormal development of foeti. Two sizes of embryos, one 3 mm and the other 5 mm. Drawing natural size. This condition

has occurred infrequently. There are some, however, that have different sizes of embryos but these are due to absorption or differential development of the embryo. It would be an interesting problem to study the embryology of rodents as related to variation of reproductive systems. Some of the problems are:

1. ratio of 1 to 9 (one on left and 9 on right side) and other extremes

2. differential growth. 3. two stage of growth.

4. various conditions of absorption. 5. large numbers of foete or embryos.

6. placenta on uterus and embryo in vagina.

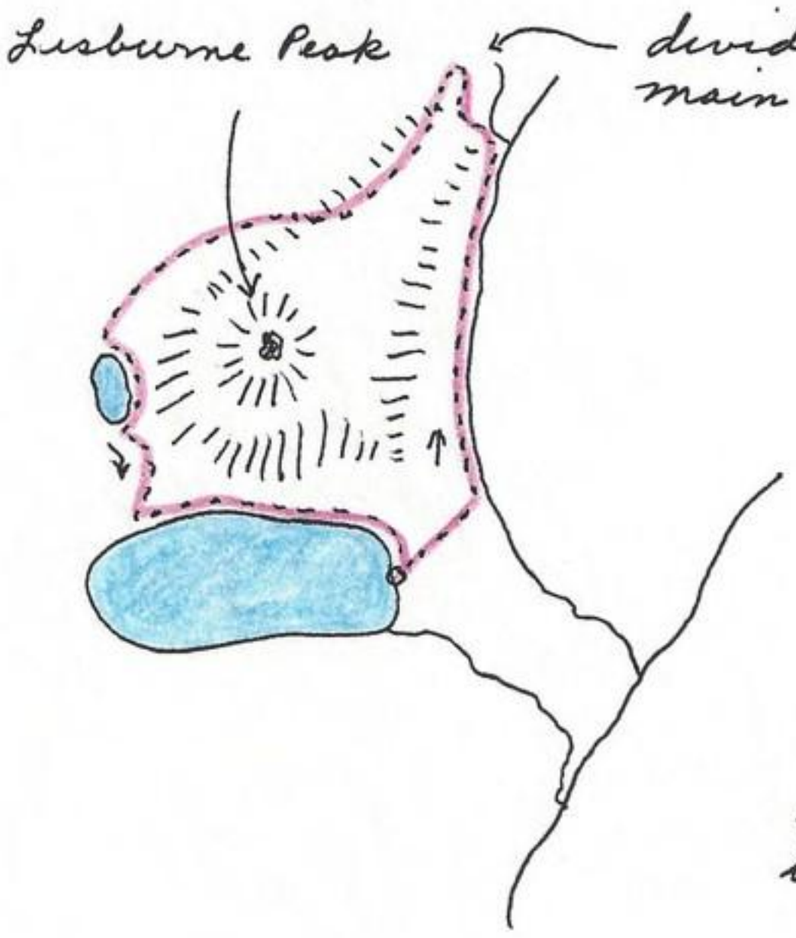
7. complete stages of development from conception to parturition and subsequent readjustment to normal condition.

8. suckling females with embryos.

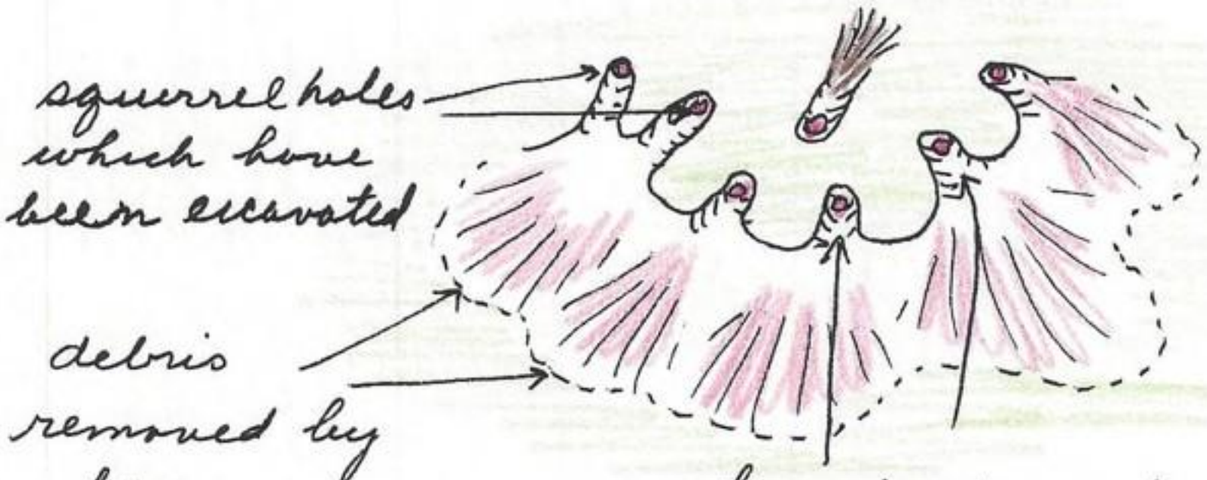
9. abnormalities, disease, placental scars.

10. vagina plug and condition of uterus. Also many other histological examination at various stages and phases or seasons of the year - winter versus summer etc.

This afternoon we took trip up canyon to south to check on possible mammal habitat (talicles) which are ideal in this canyon.

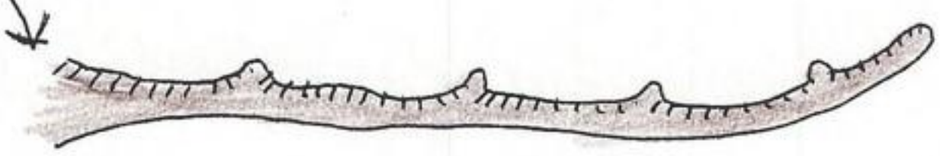


Barren ground grizzly bear sign on all exposures from canyon floor to top of ridge in form of dug out Spermophilus excavations; about one every 200 ft. These diggings are about equivalent to 8-12 bushels of earth removed



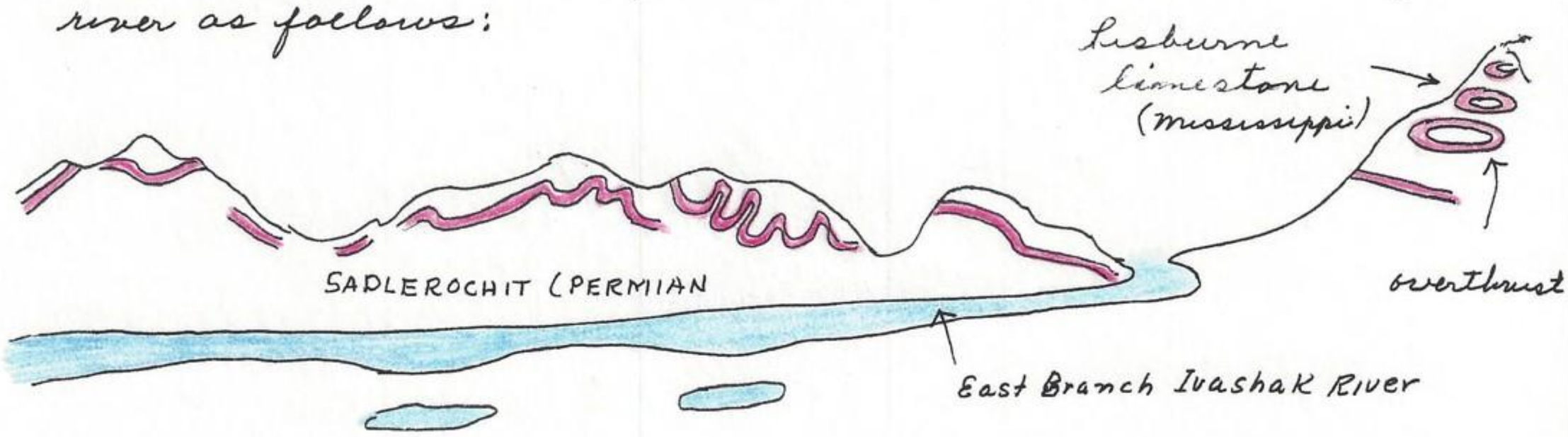
trench excavation

typical trench type excavation

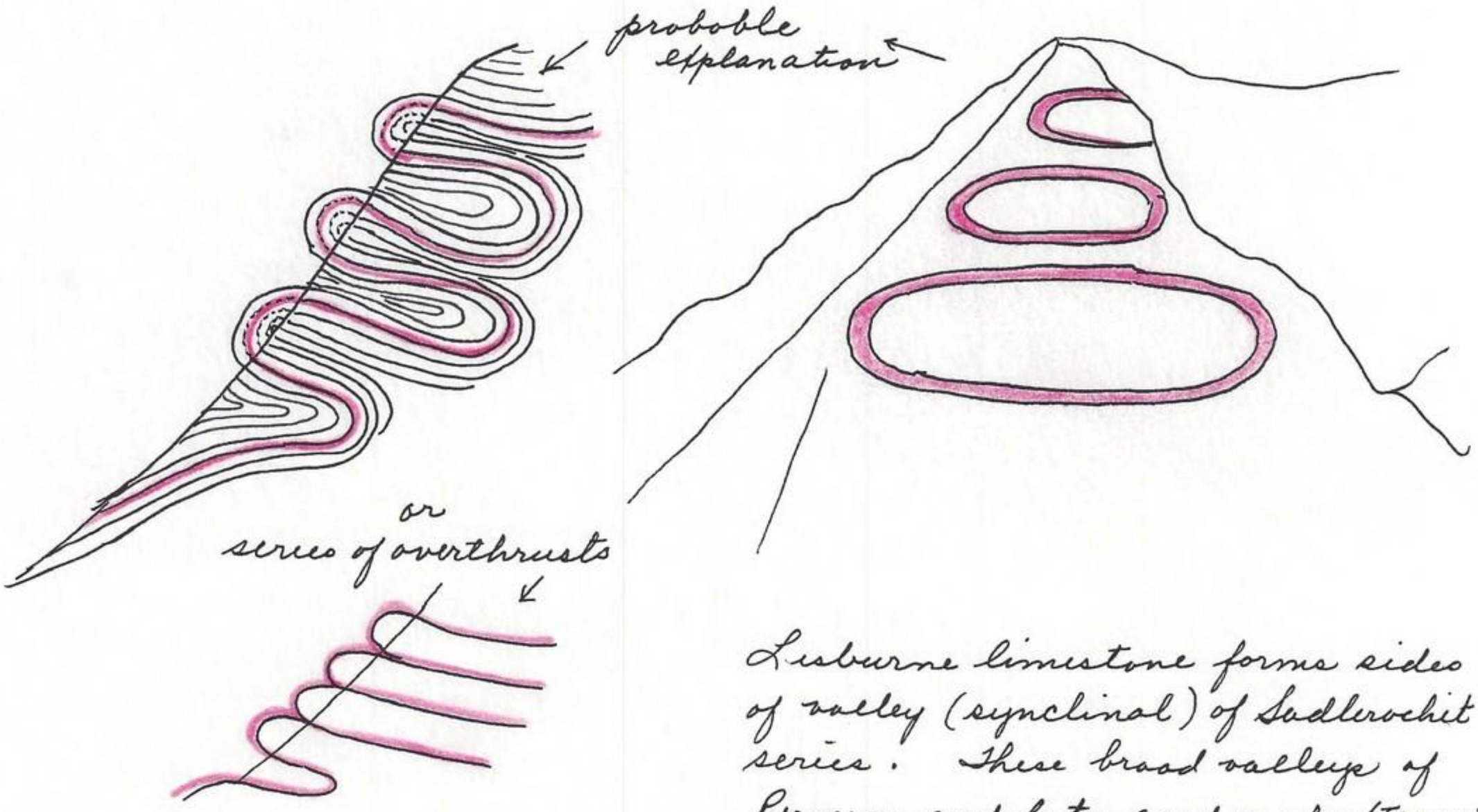


Some large boulders removed in excavation.

wolf dropping about 1 per 2 blocks (2/10 mile). Tracks of both these animals and caribou in mud along creek. From point east of divide found an American pipit feeding young which could just fly and measured 114 mm total length. Baird sandpiper on high ridge and concerned with one particular area. From divide recorded transect of outcrops to east on east side of river as follows:



north - south transect across valley of Sadlerochit showing highly folded but still in tact the Permian formations. Lisburne contact may be overthrust.



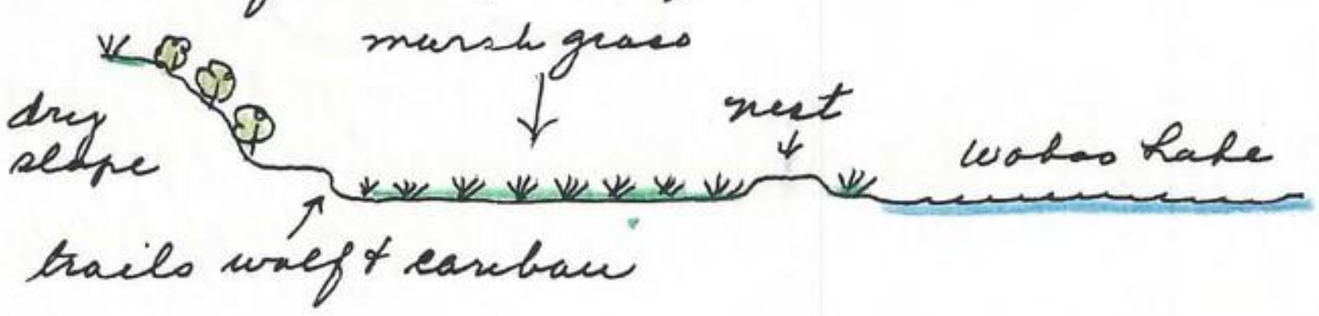
Lisburne limestone forms sides of valley (synclinal) of Sadlerochit series. These broad valleys of Permian and later aged rocks (Triassic) are conducive to rank growth of vegetation, green in color. The outcroppings of rock are dark brown and the confining mountains of Lisburne limestone a white. Continued to small lake directly below bald mountain S of camp. The descent is abrupt. Nest of 7 eggs of the greater scaup in grasses at edge of lake. 3 ♂♂ on water. 1 pr. old squaws swimming together at NW end of lake. Continued up canyon to

divide into Wahoo Lake. At divide noted general hummocky condition which is probably due to ice heave. These divides do not receive erosion from side hills and may retain land form for great periods of time. I wondered about the possibility of larger mammals like the mammoth having form this particular type of divide topography. Watch 2 yellow-billed loons at east end of wahoo lake which means that the eggs are not being incubated by the parent birds. They swam close together. A wolf sat on a ridge to north of lake. Returned to camp. While on top of mountain today photographed general area to east 520708-16. A wandering tatler, Heteroscelus incanus inhabits the creek which leads from the west end of Wahoo Lake to the main river channel to the west. It has been flushed from willows in entrenched creek every day I have checked the area. It is in the dense willows along creek and when flushed flys to top of willows and perches like a passerine I could not find a nest or young of this bird but it was evident that it had one or the other there. At midnight temp 40°F, min last 24 hours 40°F, max 63°F. Photos today: 520708-17 horseman plane; 520708-18 Spermophilus and hole retreat in outcrop; 520708-19 Close up of above; 52078-20. Ed. Campbell fishing.

Wahoo Lake, Brooks Range, Alaska

July 9, 1952

Pulled all traps except 20 thru the area that caught a Dicrostonyx south of camp. Collected 3 Clethrionomys rutilus, 12 Microtus miurus 1 Microtus oeconomus and one Calcarius pictus. This afternoon took boat and collected ♂ + ♀ yellow-billed loon and set of 2 eggs 520709-28 ♂ and 520709-29 ♀. Set of 2 eggs 520709-30. The nest was 40cm from edge of water and among grass and hummocks saturated dud surrounded by water. About 20 feet of such wet ground separated the nest from the dry shoreline, setting up a barrier for wolf and fox.

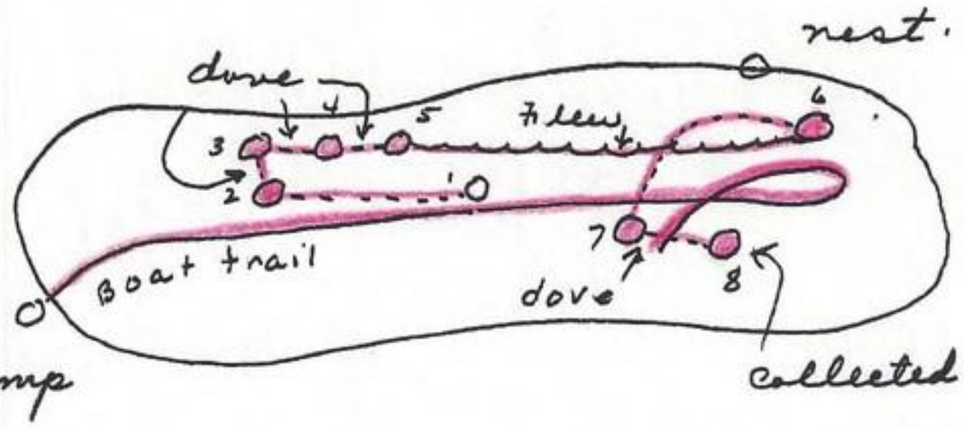


overall diameter of nest.

nest

cup of nest 1½ inches

nest of sedges, grasses and general vegetation debris. no ♀ present in area. ♂ incubating when we approached by boat. Took movie just as bird started to leave the nest. Bird aterally shot about 10 feet out on water of lake. The bird is very conspicuous as it sat upon the nest. Head generally held low. at 30 feet bird showed signs of nervousness before leaving. Photographed nest and eggs 520709-32 and 520709-33 in still and 520709-34 in movie. no 520709-35 of bird on nest. Eggs reversed in position for photographing. While bird was still alive but injured evacuated a direct line 2½ feet long which has been performed at several points on land around the lake from shoreline to as far as 4 feet from water. ♀ still not in area but at 5:30 P.M observed it from camp (½ hr later or from time we collected ♂ & eggs) so returned and collected it. This bird drew us down lake from nest for about 2 blocks and then, after working over to edge of lake (N.) dove and came up about 300 feet beyond and in opposite direction from which she had been leading us. She made 3 such attempts and when fired upon with .22 left water and paddled with feet and wings for about 2½ blocks to east end of lake. We followed and collected it as she attempted to pass boat in leading us. as these birds are going into final death, their tails moves up and their wings continue to adjust to their body.



no attempt at calling at any time. Pulled bird into boat still alive and it hit the edge of the boat and my knee with a flow of wing (trailing elbow) with a force of a hammer. It uses its wing as a tool of defense - plus its sharp bill. After collecting bird ~~travelled~~ trolled for 2 hours with spoon (1 inch) and caught 7 lake trout (Cristovomer nay-may-cush) weighing from 1 to 3 lbs. One with slender body 18" long and large head from undernourishment.

Photo 520709-40 of two extremes of fish types of the same species of lake trout (Cristovomer namaycush). Photo 520709-41 of trout that weighed 2¾ lbs and 385 mm long (dark specimen), and 520709-42 2½ lbs and 391 mm (large body).

Of 14 trout caught measured the following:

520709-50 ♀ standard length 420 mm, 2 1/4 lbs, red buttrot spotted
520709-51 ♀ " " 450 " , 2 1/2 lbs., red fins & center
520709-52 ? " " 480 " , 2 3/4 " , " " " "
520709-53 ♂ " " 430 " , 2 1/2 " , red.

On return to camp noted a wolf (see map) as we were about 50 feet from shore at 10:30 P.M. U.S.G.S. men in tent and talking loud and we were also talking and rowing boat but wolf did not seem to object but actually seemed to crave company. It sat on small bench 6 feet high above area used for human toilet and first appeared more like a fox than a wolf. It rolled over twice before descending to lower level at base of bench where it rolled over again. By this time Ed. was within about 80 feet at which time he fired once and missed. The wolf paid no attention but rolled over again. A second shot moved it about 10 feet but no panic. The third shot brought the wolf to attention and after Ed. moved slowly up to bench level from the lake shot him in the back and caused the animal to plunge forward at a rapid speed for 300 feet at which time it fell down because of a paralyzed back. It breathed heavily and raised head twice fe before dying. At one instance it picked up a stick 3/4 inches in deameter and bent it in its mouth. Now at close range it became normal in size in contrast to the foolike size at about 80 yds distant. This wolf (193 E G.C) ♀ measured 1500 total length, 390 tail, 280 foot, 120 ear, 69 lbs wt., uterus normal. Pelage greyish white, carried distinct odor. The wolf was in area 15 yards from where bear stopped the other night.

Wahoo Lake, Brooks Range, Alaska
July 10, 1952

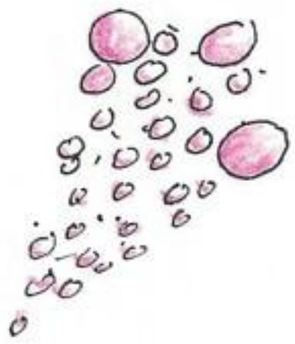
Caught 1 Spermophilus 520710-1 in trap no 5 set in hole in rock ledge. no 520710-2 in trap no 3 and Mustella erminea in trap 7. Yesterday caught a willow ptarmigan in the trap that held a mustela today. Robin still with 1 egg and 3 young. Reaction of robins like robins in States. Young of tree sparrow 85 mm in length - could not fly but ran on ground. ♀ adult with worms in mouth. Photo 520710-6 of wolf, 2 yellow-billed loons and a weasel. Movie and still 520710-7 of camp. Ed spent entire day skinning the wolf. Temp. at midnight 40°F, 36°F min,

max. 66°F for last 24-hr. period.

Wahoo Lake, Brooks Range, Alaska

July 11, 1952

Steel traps with 1 Spermophilus only. measured and prepared yellow-billed loon 520709-28 and 520709-29 as: ♀ 850 total length 380 wing, 1500 wing spread, 10 lbs wt., ovaries ♂ 900 length, wing 390, wing spread 1570, wt 15 lbs, could not find testes. Measured bear paw at comp (imprint) as 255 mm hind foot from claw, front 165 from claw. Had breast meat of loon for supper. Good tasting and meaty as result of close arrangement of muscle fibers. No fish odor or taste. Breast muscles small, leg muscles large. Saved head and neck feathers. Water leaving lake reduced 60% since arrival. Ericophorum and sedges growing noticeable into good green stands. Ericophorum now becoming conspicious with white flowering units which have developed in the last week. 4 mt. Sheep on NW hill all afternoon (2 ewes + 2 young). Temp midnight 44°F, min 36°F, max. 66°F in last 24 hours



natural size.

July 12, 1952

Collected grasses and sedges 520712-1 to 520712-15 from Wahoo Lake along erosional creek, along edge of main canyon of Ivashak and side canyon leading into canyon to south, mainly in areas where there was less competition with mosses and lichens:

520712-1 Carex membranacea
520712-2 Carex lugens
520712-3 Carex aquatilis Wahl. var. stans (Drejer) Boott
520712-4 Carex lugens Holm
520712-5 Poa glauca Vahl.
520712-6 " " "
520712-7 Bromus pumpellianus Scribn.
520712-7a Arctagrostis latifolia (R. Br.) Griseb.
520712-8 Calamagrostis purpurascens R. Br.
520712-9 Festuca scabrella Torr.
520712-10 Trisetum spicatum (L.) Richt
520712-11 Carex consimilis Holm.

520712-79

TRAPLINE

Grizzly bear excavated mound

route of barren-ground grizzly

outlet 2

Trapline

S. Mound

Dicrostonyx - Ereophorum community.

bear picked up odor of camp 200' from camp

CAMP

WOLF (260 feet from camp)

SNAIL MOUND

SNAIL MOUND

WAHOO LAKE

U.S.G.S. camp

present outlet

River channel of rocks

trapline

5 foot eroded bank of lime-marel snails

snail mound

SINK

W

Trapline

ROBIN nest

LEVEL 6

outlet 1

Trapline

WAHOO LAKE

(AERIAL)

Syncline of SADLEROCHIT IN LISBURNE

MISSISSIPPIAN - LISBURNE LIMESTONE

SADLEROCHIT (PERMIAN)

DALL SHEEP

SADLEROCHIT (PERMIAN)

4 DALL SHEEP JULY 1-4

elevated benches

Best feeding area Christavomer

wolf July 5

Route of bear

trapline

willows

WAHOO LAKE

camp

wolf

vegetated river floor

wolf July 4

NEST OF Y.B. LOON

trapping line

willows

Boulder outwash

wolf July 8

Citellus Slope

W

2 DALLSHEEP JULY 7, 1952

WAHOO LAKE - (TO SOUTH.)

520712-12 Carex aquatilis Wahl.
520712-13 Eriophorum angustifolium Honckn.
520712-14 Trisetum spicatum var. molle (Michx.) Beal
520712-15 Carex aquatilis

Photo 520712-21 of masses on edge of creek where micrates mirus was common. Collected masses and lichens 520712-22 from this area along creek. Checked robin egg of last week inspection and found it to be infertile. Golden eagle flying above ridge to south. In summary of dominant forms of the Wahas Lake area.

Willow ptarmigan! 3 frequently observed in area, one with young not too many hours from nest. Fecal pellets in entrenched willow lined creek N of west end of lake every 2 or 3 feet spaced as if the area had been used during the winter. The entrenched creek would offer relief from winds.

Caribou. Tracks of a few animals in area but no evidence of large migrating herds.

Golden eagle. One observed in flight or soaring nearly every day.

Redpoll. not common but observed every day.

Grey-cheeked thrush. Occasionally noted along edges of creek.

Robin. Observed every day, some feeding away from creek channels onto flat areas covered with small willow. nest about 1 per 800 feet of creek bottom. Activity like in States but less fearful of man. Generally sing about 10:00 P.M which is about equivalent to 7:00 p.m in states.

Sandpiper. (Wandering Tattler) observed every day (except one) in dense willows in creek west of camp. Has loud call.

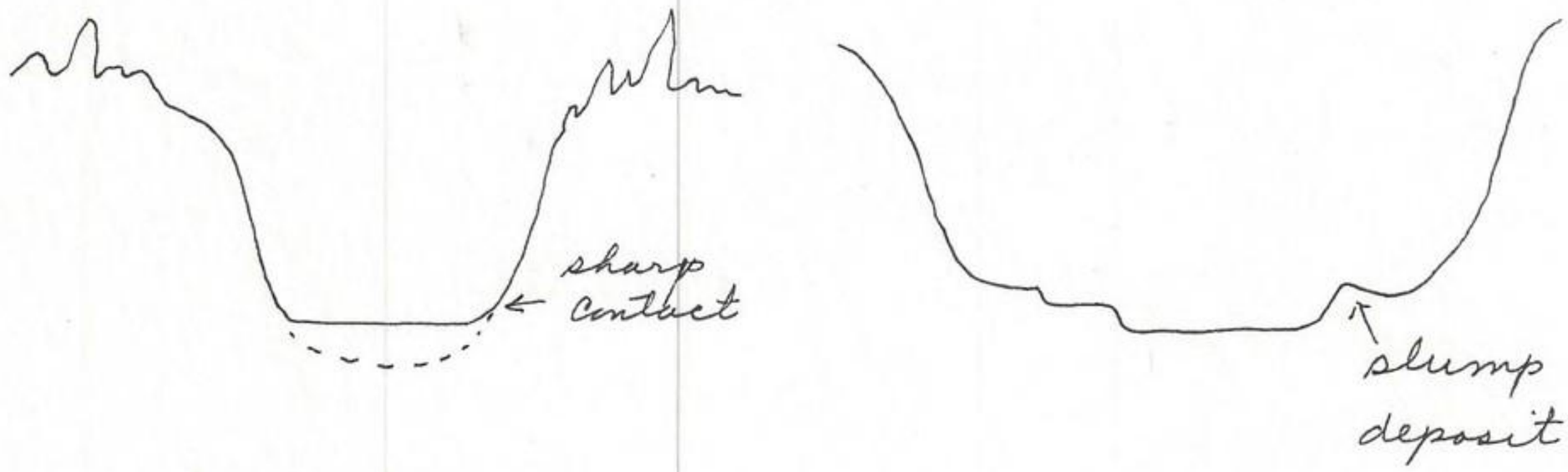
yellow-billed loon. 2 on lake

Old squaw male alighted near camp every night about 10:00 P.M and appeared as if it had been incubating as it washed and preened feathers.

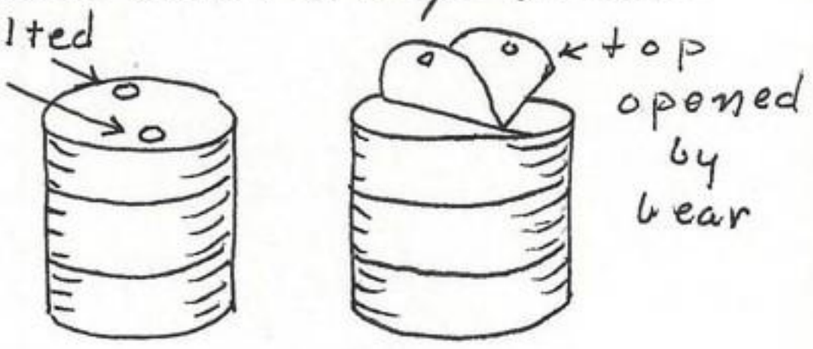
White-crowned sparrow. Occasionally heard singing on south exposure N of lake.

Collected series of snails 520711-24 from lake SW and constructed map of snail mounds at W end of camp. These mounds are probably ice pushed or ground heave after lake was cut off by alluvium from canyon to south. Several species of gastropods and cephlopodd present. Prepared for departure Porcupine Lake and left at 5:30 P.M. Enroute canyon with alluvium filling in with sharp contrast with mountain slope (see digram on next page). Stream channels widely braided. Caribou trails on braided system, along edge of contact or on mt. slope, depending on avail-

availabelety of nagigatable slopes. many places show evidence of slumping with accumulation at canyon edge.



All peaks jagged and in sharp outline above a certain elevation. Arrived Porcupine Lake about 6:00 P.M. Camped at SW end of Lake. Bell Brogse reported a porcupine on the Ivashak River near our camp. Set traps (150) in creek and along side-hill at the south end of lake. Examined cache about 200 feet from edge of lake placed this spring. The barrew ground grizzly had opened one 50 gallon steel drum which had a tap bolted down but enough room for the bear's claw to get at edge of lid to pry open. I could not bend this lid. The 5 gal. waterproof cans were chewed and the contents eaten. Itemized, the following foods were either eaten or not eaten:



NOT EATENED	EATENED
1 pt. jam (lid off but jam not touched), canned green beans, canned gooseberries, canned corn, canned peaches, canned pinapple juice, canned grapefruit juice, canned asparagus, dry beans (sacks open), dry peas (sack opened), candy bars tasted by the bears but not eaten, all stove fuel cans punctured and drained, kerasene cans punctured and drained, dill pickles.	white flour canned rye bread crisco butter in cans dry eggs aunt Jemima flour pie mix (crust) corn beef hash canned chicken Food mainly within 15' of cache but some beans 50' from cache.

The cache at Wahoo Lake also raided by the barrow g. grizzlies.

3209 13-82

Porcupine Lake, 68°51'57", 146°29'50", 3140 ft., Brooks Range, Alaska

July 13, 1952

Examined trap line in willow stream and along dry sidehill and main outlet. 1 Sorex cinereus, 6 microtus oeconomus, 7 microtus miurus, 1 Clethrionomys rutelus, 2 Passerculus sandwichensis.

The three sets are:

① produced all others

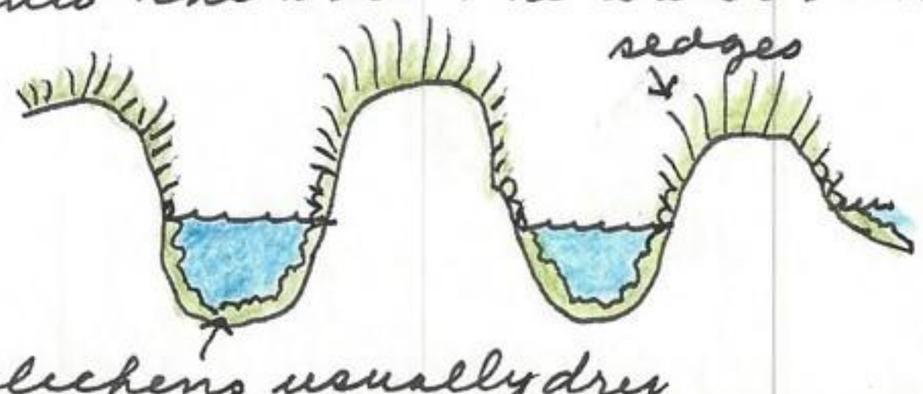
②  produced 2 M. miurus. area looked like Zapus community of States

③  produced 2 microtus miureus

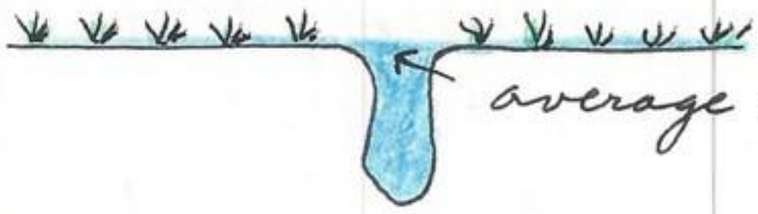
I can not understand why no 2 and 3 sets did not produce as it looked like it would yield at least a 50% catch. Examined Capella delicata nest of shell fragments at 10 feet from west end of lake on mound elevated 150 mm from water level. Dwarfed willow on top of mound. Bird feigned at 75' from nest and nodoubt had young. At midnight temp. 42°F, min. 37°, max. 65°F.

July 14, 1952

Last night rained from 3:00 P.M to midnight with 90% traps sprung. In addition to traps in no. 2 and no. 3 also had 75 in no. 1. 2 and 3 yielded nothing. March set of 10 mammals in spite of rain include: 8 microtus oeconomus, 2 M. miurus, 1 Savanna sparrow, 1 tree sparrow. One M. oeconomus was caught by hind leg and had built a nest of grass overhead measuring 150 mm wide x 100 mm high which served to shed rain. Standing water in prevously dry fissure lone thru the marsh area. most of the traps were in standing water and the area that looked so favorable among the hollows in creek were entirely flooded which explains the paucity of mammals. as there is no soaking or penetration of water into the soil the water runs off into the creek. The water inundates the mosses and lichens. After a rain the water increases in heighth for about two days.



Set 8 squirrel traps on hill SW of the w end of lake in used burrows. Sign of bear diggings in area. Heard several Citellus calling from high on ridge but none on lower elevations. It may be that the low areas are used for periods of overpopulation. Five ptarmigan in entrenched stream at end of trap set and always found in same spot where willows thin out. Fished this evening in small creek below outlet and found a trout like fish with 2 series of red dots. Ed. collected some. In one hole caught 10 fish in area 6'x 8'. Stream narrow but deep,



average 2 1/2' wide and 1 1/2 to 8 feet deep.
Largest trout 10 inches long, most of them 6 to 8 inches in length. Temp at midnight 42°F, min. 38°F, max. 70°F for last 24 hours.

July 15, 1952

Rained all night to 2:30 P.M today - cold. Nearly all traps inundated from some just covered to as deep as 1 1/2 feet. Creek set of traps and alluvium all flooded. Water flowing in main caribou trails that were originally free of water 3 days ago. Last night flushed a tree sparrow from blind pit but no overhead protection.

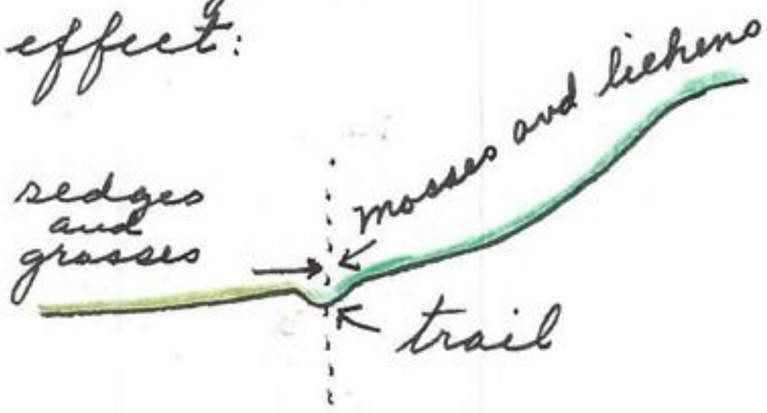
bird

Golden eagle soaring over ridge to N. Raven flying to south of lake. Examined one snow patch (last one to remain) 8 x 12 feet at south side of lake at east end (just above lake). Watched a Mustela erminea running along bank of lake at alluvium on N side of lake for 60'. It was moving rapidly but searching all possibilities for food. It jumped up onto bank 2 feet in height. Two surf scoters at south side of lake near shore. When approached by boat they flew 180 feet but returned when we passed. Ed. returned and collected them - both males. Collected weevil in tent (520715-20). Mammals and birds picked up today in traps: 9 Microtus oeconomus, 2 M. murus, 3 tree sparrows, 1 Dicrostonyx g. 1 Capella delicata (immature). See catalogue for measurements and field nos. Mountains to north with low clouds and clear above. Temp. midnite 46°F, min 34°F, max. 50°F in last 24 hrs.

520716-84

July 16, 1952

Clear weather to 12:00 noon. From trap line along edge of outlet stream and associated grass meadows collected: 16 microtus oeconomus, 1 microtus miurus, 1 Passerculus sandwichensis, 1 citellus parryi (steel trap line of 8 traps). Observed golden eagle hunting north ridge. Made actual observation of one young microtus oeconomus eating dead body of another microtus oeconomus caught in trap. Watched one immature M. oeconomus swimming across 1½ feet of deep water. Water level in drainage system increasing to maximum after second day or third day after rain. No fly eggs on specimens during inclement weather. When small covey of ptarmigan are flushed, the ♀ herds them on by flying back and forth behind them. Small segment of ice in first mound crevasse while entire country free of snow ah ice. Caribou trails have effect of controlling water runoff and hold in depressions. At base of mountain or ridge the trail or trails direct runoff and produce this effect:



mosses and lichens on slope end abruptly at trail, grasses and sedges beyond (down slope) Photo (5-20716-18) and (5-20716-19) of surf scoters shot on lake (S side). Photo (5-20716-20) of Porcupine Lake and (5-20716-21) of the western skies. At 11:30 caught Citellus (5-20716-22) in trap 7 on bank of creek. At midnight temp 42°F, min 33°F and max. 46°F for last 24 hrs. period. Day has been cold but promise of a nice day tomorrow.

Porcupine Lake, 68°51'57", 146°29'50", 3140 ft., Brooks Range, Alaska

July 17, 1952

The morning observed the golden eagle soaring and hunting on ridge to NE of camp at 11:30 A.M. The yellow-billed loon has a call like a tom-cat ready for battle on a high fence. It also has a long drawn out wail as well as the raucous, hilarious call. Departed late this morning for peak south of camp at 12:00 noon, returning at 8:00 P.M. This range is now designated as Mount Annette (peak at 68°50'38", 146°28'51", appx. 5700 ft in elevation) for my wife and young daughter and is so recorded on the offeceal field map of the U.S.G.S. This range assumes a prominent and commanding position in respect to the surrounding terrain. The highest peak permits

observation of the larger mammals and birds in several major drainages with the broad valley to the east and west and the high rugged range to the south. The lake lies below in full view. Because of its importance as a guiding peak and the unusual occurrence of green expanse of vegetation in an otherwise mountainous country, fund the new name significant. The lake was named 'Porcupine Lake' this trip because of the occurrence of one of these animals not too far distant from the lake. Made ascent of this peak via main drainage canyon, leading south from west end of lake. At the upper reaches made traverse to lateral ridge, thence up to main ridge leading upward to peak. Considerable signs of fresh caribou trails across shale and talus slopes. Some main trails are well beaten. The area just below the main crest of the range extensively used by caribou. Made final ascent from south side From the top of Mount Annette made the following observations as recorded on the accompanying map. All observations were made the same moment except the ♀ grizzly and 2 cubs to west and the single grizzly on the lower reaches of the Canning River. In all could see 7 barren ground grizzlies, 500 caribou, 2 golden eagles, 2 ravens and many smaller birds and mammals. The range is of Saddlerochit formation of the Permian age. Collected several hand rock specimens for U.S.G.S and several small specimens for own collection (F 20717-1). Included in this collection are fossils and two chert chips, one of which has been partially fashioned as an arrow point which places early man on this peak (mt. Annette) for the same purpose for which I was on top – to check the position of the larger game mammals. Carex podocarpa R. Br. (F 20717-3) to (520717-8) dominant sedge on top of mountain from those areas where there was less competition with mosses and lichens, particularly along rock slides and wind swept ridge. The north exposure with dwarf willow and other dwarf deciduous and coniferous like plants. The contrast is good as one views the more distant ridges with green on south exposures (willow, alder, dwarf birch) and paler color on north slopes. At highest peak found the American pipit and wheatear feeding young 3/4 size of parent. Collected one ♀ wheatear no. (520717-9). Citellus (520717-10) from top of mount Annette and no. (520717-11) on ridge at base of peak to north. There is a

Preliminary Copy Naval Petroleum Reserve No 4. Compiled USGS MAY 1949 ALASKA K6 1 mi = approx 1 1/3 inch

SCALE
APPROX. 1 MILE

Barren-ground grizzly

146° 30'

146° 20'

Golden eagle hunting area

concentration Citellus

PORCUPINE LAKE

No drainage here

trapping area

CAMP

Drainage to west

concentration of Citellus

Barren-ground grizzly bear

Barren-ground grizzly bear

Raven territory

Am. Golden eagle hunting area

Caribou herd (300)

MOUNT ANNETTE
Approx 5700 ft elv.

146° 30'
68° 50'

68° 50'

Barren-ground grizzly bear

200 caribou herd 1/2 mi. east of here

146° 20'

68° 50'

52071-86

IVASHAK RIVER

porcupine and red FOX

Barren-ground grizzly bear and 2 cubs

Barren-ground grizzly bear and 3 cubs

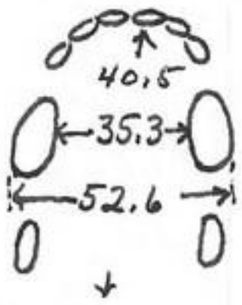
CANNING RIVER

Citellus Lole on the very top of the highest peak of Mount Annette of the Annette Range. Caribou have made a trail on the crest of the entire ridge. Eagle soaring and hunting in what appears to be Citellus country to the east. On descent estimated approx. 175 Citellus on N.S. ridge trending north from peak. They prefer bare areas or knolls with willow growths. Families of from 3 to 7 occupy certain restricted areas. Considerable evidence of grizzly activity. While on top watched a barren ground grizzly alternately dig and rest for a period of 4 hours from 3:00 to 7:00 PM while digging roots along a willow lined stream. While watching this animal, another one worked up same stream toward the digging bear. At about 80 feet it stopped and stood up on its hind legs and sniffed the air, then worked up side hill for 20 feet and again extended its head up & forward as if investigating the animal ahead. It returned to the creek bottom and then returned again to hillside where it tried again to pick up the odor of the bear beyond. The bear, which was digging roots, left its pit and walked toward the invading bear for about 10 feet and then return to continue digging or at least to defend its hunting area. The bear on the hillside after about 45 minutes to an hour of loitering moved on around the other bear and then continued up side branch of the main stream. It inspected all situations but mainly the edge of wet stream channels. The ♀ and 3 cubs moved about 300 ft in 2 hours and finally disappeared from plateform below glacial eroded dome. On return to camp saw weasel running down stream along bank of creek just below the main concentration of Citellus. The tree sparrows are more common at mouth of canyon than higher on mt. slope. Redpolls flew by on top of mt. several times. Photo (5 20717-10), (5 20717-11) and (5 20717-12) of Therofon richardsoni, a conspicuous flower below peak in canyon. These flowers are usually in groups and are higher than adjacent vegetation. Took several shots of surrounding country showing general topography and variation of vegetation according to altitude and exposure. no. 5 20717-12 to north, 5 20717-13 to NE, 5 20717-14 to SE, 5 20717-15 to S, 5 20717-16 to E, 5 20717-17 to SE, 5 20717-18 to SE, 5 20717-19 to E, 5 20717-20 Ed to W near camp. Noted that caribou form close herds on exposed slopes, generally of Sedimentary shale.

They may be responsible for their barreness. One fecal pellet of wolf from top of peak (annette peak) had skull of Citellus. 12 droppings between top and lake below. Grizzly stopped digging activity at base of uppermost peak of Annette mountain. Two fecal piles of ptarmigan on top. At camp yellow-billed loon called for first time at 8:00 P.M and continued until midnight. Temps at 12:00 midnight 37°F, min. 33°F, max 85°F. The steam in air above lake forms first on edge of lake.

July 18, 1952

Pulled all traps from area. In general can say that Microtus oeconomus is in wet grass and sedge areas along more permanent bodies of water or creek beds, Microtus mucrus also in the lesser wet areas of marsh but mainly on side-hills among dwarf willow, alder and birch and mossy hell-side hummocks. These mice occurred to the very upper limits of hellside vegetation. Clethrionomys mainly prefers rough terrain of cut banks or rock areas with interstitial areas of overhead protection. Photos (520718-40) and (520718-41) and (42) of Annette Peak of Annette mountain of Annette Range taken from N side of valley N of Porcupine Lake. Annette Range is the Remain rocks that form the center range of this east-west valley in the Brooks Range. Departed Porcupine Lake 5:30 P.M for mouth of Canning River, thence to Umiat. Going down Canning River saw 1 grizzly near lake, group of 1, 5, 10, 7, 2, 3, 3 mountain sheep (Dall). The Canning River is not as spectacular as the Ivashak in grandeur of scenery. Took movies in color of ice fields in canyon and at mouth and from mouth of Canning River to Umiat took representative patterns of tundra landscape below. Noted more birdlife as we approached the Colville River, including ptarmigan, gulls, loons, old squaw ducks, jaeger etc indicating a certain dependability upon the Colville drainage for support and protection. Last movie shot of water trailing from plane upon arrival at Umiat. Mr. Redhead of Umiat, allowed me to measure teeth of wolf taken last winter (February) between Umiat and Gubic. It measured;



upper mandible

This wolf is described earlier in journal.

On last day before leaving Porcupine Lake shot 9 Citellus parryi for specimens from NW of Camp. Would estimate approx. 70 squirrels in this area, mainly on upper slopes of hills rather than down on the floor of the valley which supports Porcupine Lake. The bare slopes may give them better chance to escape or recognize their enemies than the more brushy areas. Squirrels seem to have used the lower areas at one time or another as possible expansion due to population pressure on upper slopes. Many new holes had been excavated but without occupants (on upper slopes).

Umiat, Alaska

July 20, 1952

Prepared for 8:00 A.M departure tomorrow morning for Schrader and Peters lakes, Romanoff mt. This area, in conjunction with the Wahoo-Porcupine stations will offer us a good representation of the typical mountain forms. With two stations in the lowlands at Anderson Point and in the White Hills should give us an excellent transect of the eastern segment of our study area with Driftwood to the west as representative of that part of the slope. One of the main objectives of the Schrader lake trip will be to get some information on the marmot and any possible southern form which may come in from that direction.

July 21, 1952

Rain and bad weather socked in Umiat as we could not get out today to Schrade Lake. Dr. Storker Leopold and Dr Frank Darling arrived today to follow us into Schrader Lake. Leopold (Univ. Berkeley) reports:

1. The most important relationships of reendeer fluctuation is range and annual. The reports of wolf depredation and Eskimo neglect of herds have only local influence as the reendeer on islands have undergone a decrease in numbers without the predation factor or Eskimo influence. He thinks it is a natural low in their cyclic trend.

2. Fires destroy mosses and lichens and thus eliminate caribou from certain areas. As much of Yukon area has undergone fire, it is only natural that the caribou

are decreasing.

3. Wolves have been increasing in last 20 years.

4. Moose may be moving into N side of Brooks Range as a result of a change of climate.

5. Fires on Kenai Peninsula have destroyed caribou range and have produced a succession of willows more suetable for moose.

6. The small 8-11 inch fish like Eastern Brook trout are Arctic char characterized by white edge to fins. The sea run are large fish of several pounds. The small fish, 3 to 5 inches do not have white on fins near red spots along sides.

Dr Leopold and Darling (from England) are here to make recommendations as to the suetability of making this area a retional monument or primitive area:

Tom Cade reports:

1. Duck hawk one pair per 10 miles of river. It will not tolerate other birds except lesser Canada goose which may use the nearness of the duck hawk as possible source of protecton.

2 Gyrfalcon like prairie falcon in uncontralled disposition of nervousness and feeding habits of striking game on the ground.

3. Duck hawk permits handling without concern.

4. Citellus parryi all along Colville River except about 10 miles from the Arctic Ocean. They are very common all along this river especially in sand dune area where willows have taken hold. Many young present.

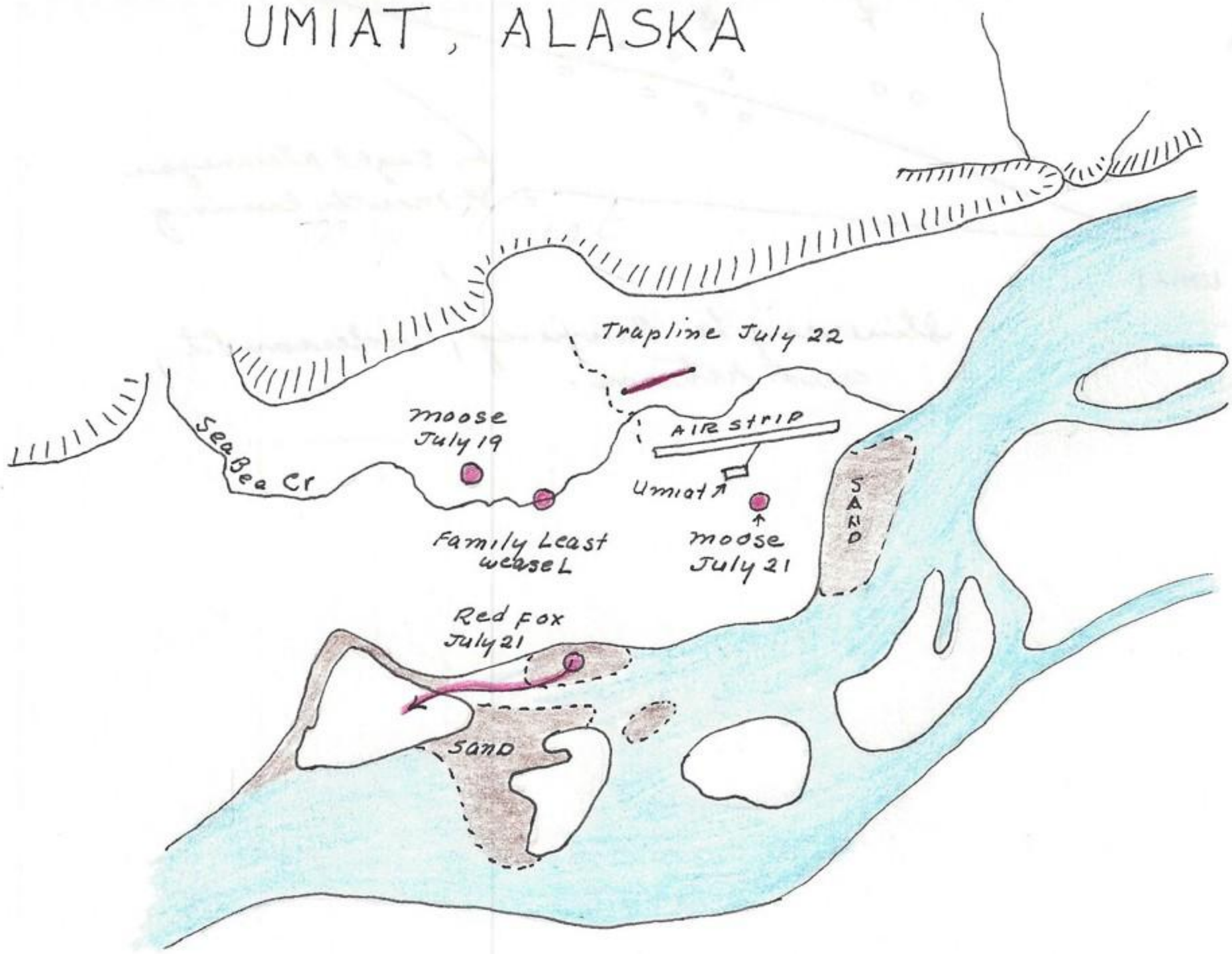
5. Caribou common only at edge of ocean.

6. Only one sandhill crane between Umiat and mouth of Colville River.

7. Duck hawk strikes large birds at a glancing blow only. Starker Leopold observed a red fox (brown head, black body, tip of tail white) 5W of Umiat (see map on next page). He also observed an Am. golden eagle carrying a fawn mule deer to nest in California. also a hind quarter of a deer. Thomas Cade also reports rabbit population fluctuates from area to area by a 2 to 3 year leeway with highs every 10 years. 1916 to 1919 were high; 1924-1926 high; 1934-1936 high with the dying off in 1926 and 1936. no highs in 1940's which it possebly missed. In last two years (1950-1951) the rabbits have been on the increase in Alaska general and specifically in the area around Fairbanks.

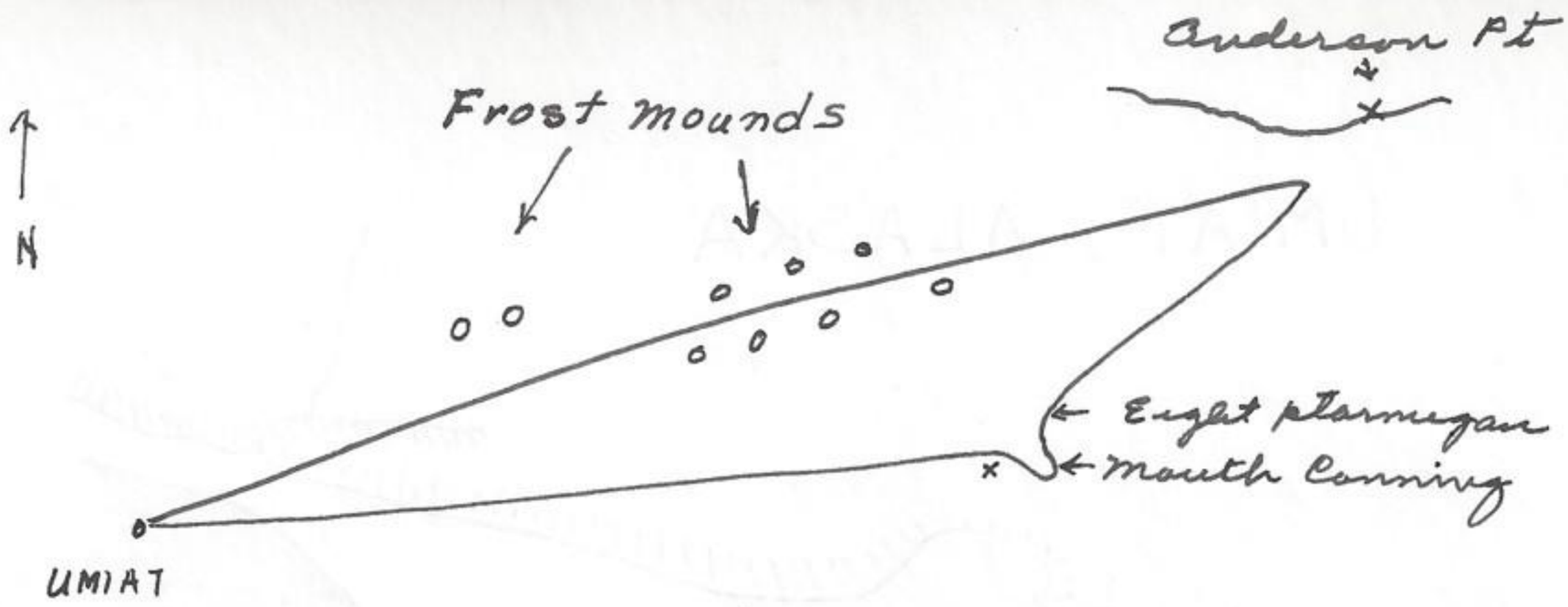
520721-91

UMIAT, ALASKA



From the Colville River valley near Umiat collected the following grasses and sedges. (152°09'30", 69°22'08", 352 feet.)

520721-4	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer & Schreb.
520721-5	Carex aquatilis Wahl.
520721-5a	Carex lugens Holm.
520721-6	Arctagrostis latifolia (R. Br.) Griseb.
520721-7	Luzula confusa Lindeb.
520721-8	Poa arctica R. Br.
520721-9	~~Agros~~ Arctagrostis latifolia (R. Br.) Griseb.
520721-10	Carex lugens Holm.
520721-11	Carex physocarpa Presl.
520721-12	Carex lugens Holm.
520721-13	Luzula rufescens Fisch.
520721-14	Arctagrostis latifolia (R. Br.) Griseb.
520721-15	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Schreb.
520721-16	" " " " " "



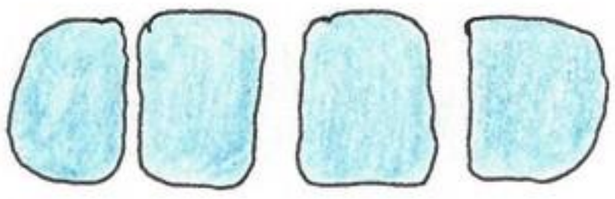
Itinerary to Canning, Anderson Pt and return.

520722-92

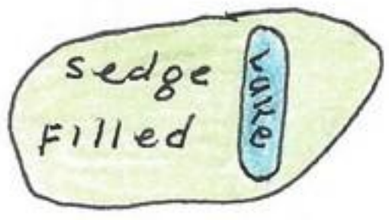
Umiat, Alaska

July 22, 1952

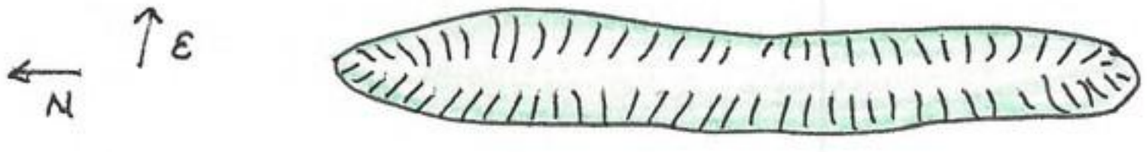
Departed for Schrader Lake 2:10 P.M by horseman. Bad weather ded nat allow us to reach distination (see accompanying map to left ^). near eastern limit of trip found this lake:



The lake suggest a segmentation of a east west lake or orientation of small lakes from a larger lake. Another lake showed N S orientation of axis of a lake that was filling in with vegetation.

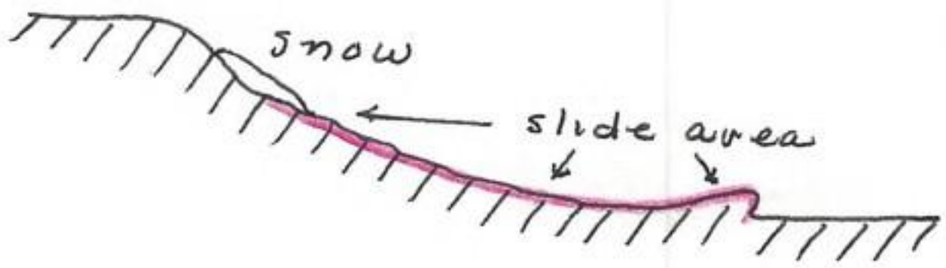


There were more shore and water birds in eastern part of area nearer the coast than elsewhere. Moose lying down among willows in small lateral canyon 3 blocks west of Canning River (at front of Brooks Range). One flock of 8 ptarmigan. On return noted frost mounds of about 15 feet high and 30 or so feet wide. These mounds are on lower tundra and are distributed evenly about 1 per every 3 or 4 miles. The mounds are conspicuous elements of the landscape and are refugia for small mammals during periods of water inundation. One ice ridge, as if it had just been produced about 300 feet by 15' high.



← areal views

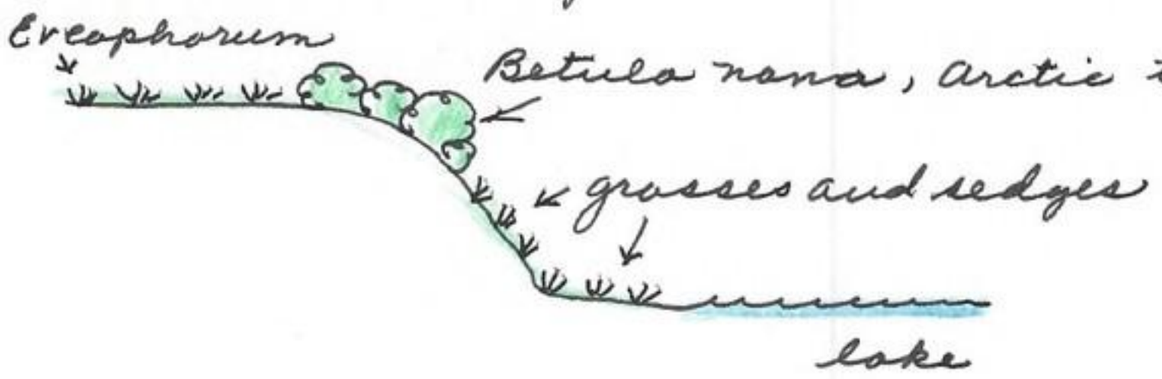
After failing to get to the mouth of Canning and or Barter Island, turned back at 4:10 P.M. At 4:35 P.M passed eroded bluffs of the Sagavanirktok River. The front ridge (drawn above) passed at 4:42 P.M. About 10 miles east of Umiat found slide from river bank thus:



Several other slides of soil were present. They were of the low angle slide. At Umiat 4 raven feed near landing area east of Umiat at river edge.

This P.M. collected (520722-1) Plumalis dominicus which had young. (520722-2) P. dominicus and (520722-3) of a

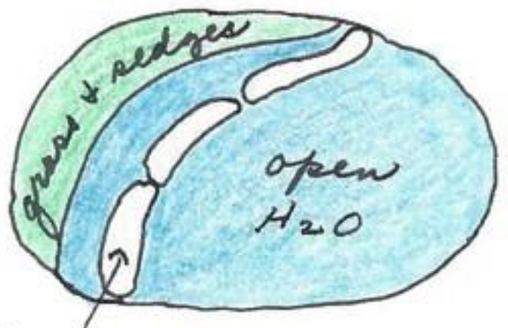
semipalmated plover which also had young. Set 50 snap traps along bench ridge just beyond Seabee Creek.



Umiat, Alaska

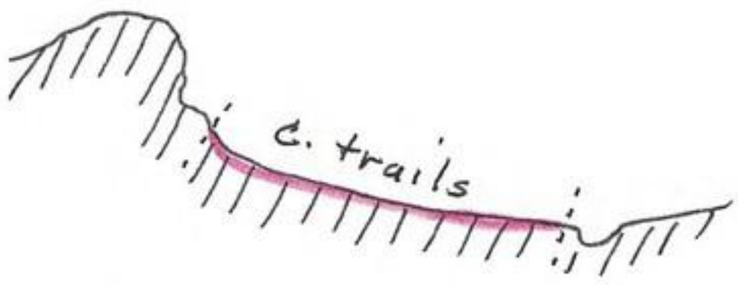
July 23, 1952

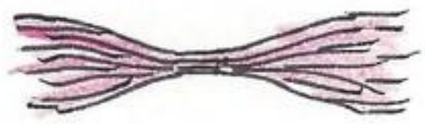
Depart for Schrader Lake at 1:57 P.M by Norseman plane. Weather just lifting after several days of low ceiling and rainy weather. Will keep a time record of events. 2:05 P.M Lake at bend of Colville River and on upland with deeply entrenched lake with diggings in banks (could be wolf). 2:12 P.M Anaktuvuk River with muddy water (Chandler River with clear water). Snow cornices on east exposures. 2:17 P.M Itkillik River high and muddy; water filling 90% of river channel. 2:21 P.M West Kuparuk River clear and more willows in valley (a good moose valley). 2:28 P.M Next small stream clear and many willows. 2:33 Second lake of this type →



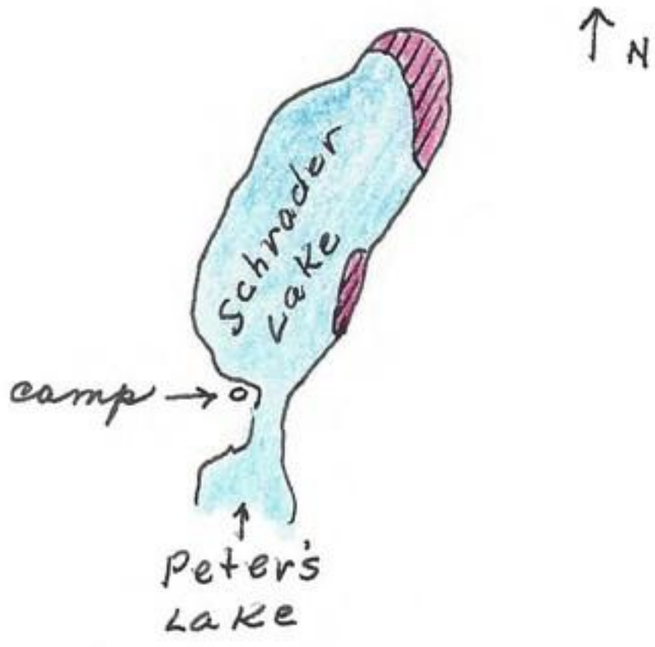
2:35 E Kuparuk River clear. Discontinuous snow cornice on east exposure of river bluffs. 2:42 Sagavanerktok River muddy and 80% of channel in water. 2:50 Middle Sagavanirktok. not muddy.

areas of river valley filled with channel barriers at right angles to flow of water and between barriers filled with water. 2:55 P.M Ivashak River clear. Green vegetation sealing islands in river. Good ice field. 3:07 P.M Middle Shaviavik River clear. 309 P.M East Shaviavik River clear, icefield, cornices of snow on east exposures. 3:03 P.M Canning River muddy but only moderately. 3:17 P.M Now in east west valley of Shubelik Mountains. Rocks colorful with purples, oranges and reds of Sadlerochit formation. Recent caribou trails mainly on south side and on gentle slopes a number of individual trails vary from 5 or 6 single trails thru constricted areas to 88 on broad slopes





These trails foelow the entire valley from the Canning River to divide mto Sadlerochit River. 3:24 P.M Conspicuous arrow-like formation in bottom of canyon. Caribou trails passed by to south of barrier. 3:27 P.M divide mto Sadlerochit River. 3:39 P.M main Sadlerochit River. 3:34 P.M N end Schrader Lake. no grasses or sedges on shoreline but water in direct contact with tundra. Ice on lake thus: Arrived camp site at constriction between Schrader Lake and Peters Lake at 3:37 P.M, Mr. Mangus of U.S.G.S. reports lake (Schrader) covered 60% with ice 3 days ago and now only 2 small patches remainmg (see diagram of lake to right)



The disappearance of the ice is abrupt. Mangus also said that Chandler Lake was covered with ice on July 2 and on July 4 was gone. Mr Richard D. Olson, age 31 from 2559 Corrvalitas Drive, Los Angeles 39, Calif (U.S.G.S cook and etcellent informant and now at this camp sete between the two lakes) offered the following information:

1. Approx. 15,000 caribou (Rangifer arcticus stonei) were in the Lake Schrader area the 19th and 20th of July, 1952.
2. There were nat many big caribou but mainly medium sized ones. Abaut 1 in 20 were large caribou.
3. 70% lacked antlers or were very small ones.
4. 1 in 20 had antlers 8-10 uches long.
5. Calves 1 in 15 adults and averaged less than 3 feet in height. They were capable of keeping up with the herd.
6. Nearly all caribau were ~~mottled~~ in new hair (molted); generally larger ones, some dark brown in contrast to the spotty light buff or grey hair.
7. Went into the valley to S faster than they left the area.
8. No caribau on lake level but on sidehills.
9. Cross stream in groups of 4 or 5 which creates a congestion behind. All cross at same point about 40' wide.
10. Weather for this period.

19th July. Wind from north, cloudy and rain at night

20th July Cloudy A.M to 10:00 or 11:00 oclock afterwhich it cleared. Warmer in afternoon but clouded at night.

21st July Clouds and intermittent rain.

23 July. wind from west for first time. the other days the wind has been from the north.

11. The following is an authentic description by Mr. Richard Olson of the activities of the caribou at Schrader Lake July 20 and was recorded at the time of observation. "More than 1,000 caribou in a compact herd, its front accosting me with curiosity across the stream at 30 yards distanced. They were mangy and of very drab color - a motley annual at this time of year - some were buff, dirty yellow, deep brown, but most were spotted and mangy, as the heavy winter's fur sluffs off, revealing a shorter, smooth new coat. They were grunting, snickering, puffing, coughing wheezing, waggling and shaking their rumps, scratching with a hind leg or biting their sides. They ran fast one moment as if in escape or pursuit, then the next moment idled over a tuft of grass chewing and shaking and wiggling biting and scratching. Many limped carrying a broken leg or damaged leg clumsely, obveously unable to keep pace with the great migration for long. Most of them with but a pair of small hornbike antlers rising 6 or 8 inches over their thin flopping ears. Some with huge, treelike, branching growths of antlers - the size of racking chairs. Many calfs trotting and stumbling by at the heels of the does.

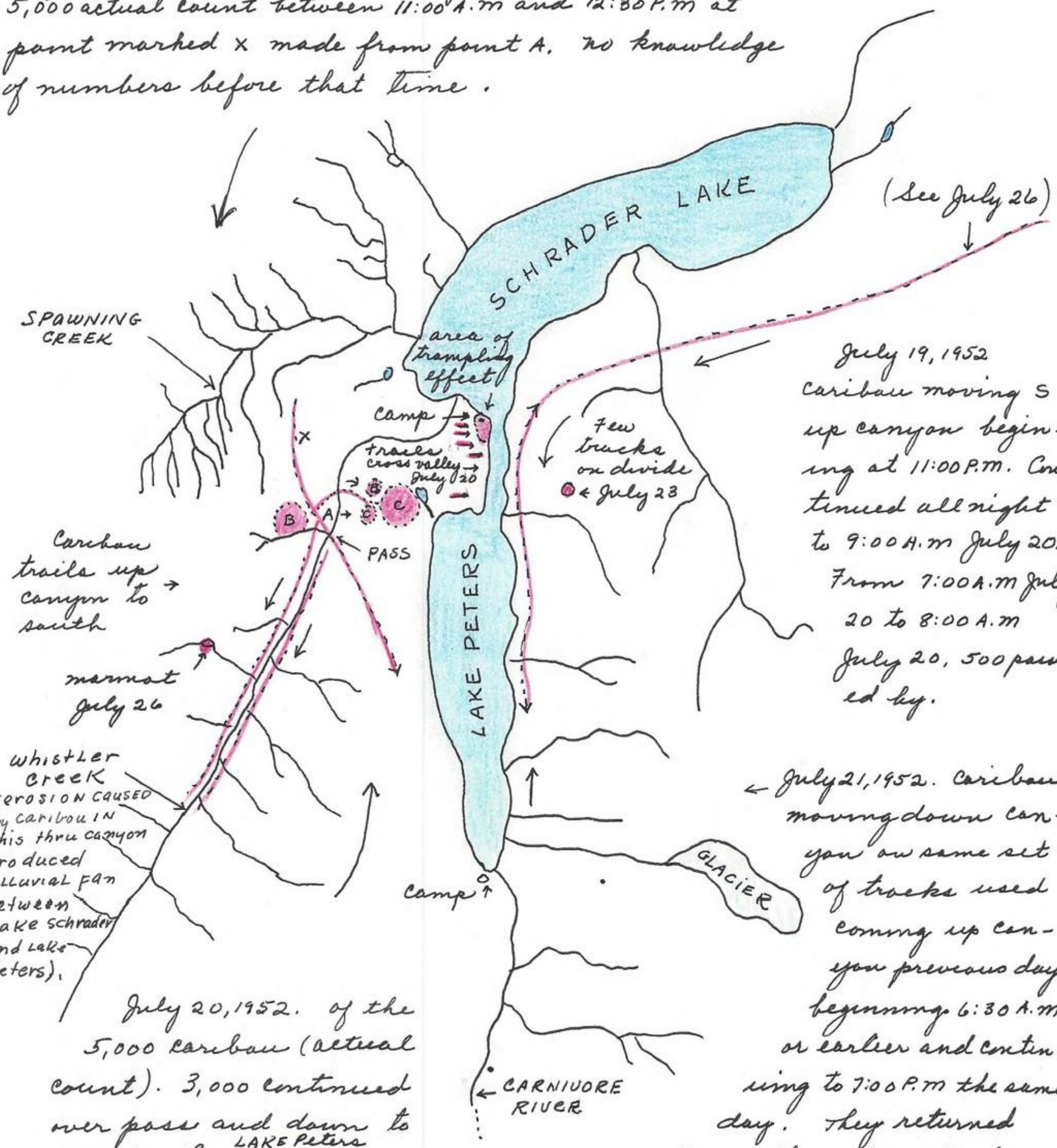
I count 5,000 in the space of 1 1/2 hours while I sat quietly on the stream bank. They are passing along the opposite side of the canyon, then wheeling across the river 100 yards above me. But they are startled, then confused when I remove my jacket as the cloudy sky breaks open and the sun streams down. They mill uncertainly in one direction then another, but fear the crossing. Eventually they mill down the canyon until the front is but 30 yards from where I sit quietly. The stream continues to flow into this herd - 2,000 or more, I calculated, although I have stopped counting them now and am watching the caribou front, as it watches me, with curiosity only. Finally, the herd crosses the river. Others follow and the stream is once again in motion.

Now they collect on my side of the river where there is less space. Then numbers increase but they still seem undecisive as to direction. Now they are only 20 paces away - immediately behind me - seemingly at ease, unconcerned by my presence - perhaps not aware of it now as they have

520722-96

MOVEMENT OF CARIBOU IN LAKE SCHRADER-LAKE PETERS AREA.

July 20, 1952 Caribou moving south up canyon 5,000 actual count between 11:00 A.M and 12:30 P.M at point marked x made from point A. No knowledge of numbers before that time.



July 19, 1952 Caribou moving S up canyon beginning at 11:00 P.M. Continued all night to 9:00 A.M July 20. From 7:00 A.M July 20 to 8:00 A.M July 20, 500 passed by.

← July 21, 1952. Caribou moving down canyon on same set of tracks used coming up canyon previous day, beginning 6:30 A.M or earlier and continuing to 7:00 P.M the same day. They returned slower than they entered canyon. Groups of 2 to 100 passed continually with always a few in view. Few still in area early morning of July 22 in some trail corridor as used to enter the canyon.

July 20, 1952. of the 5,000 caribou (actual count). 3,000 continued over pass and down to Schrader Lake, LAKE Peters valleys. 1000 were diverted to area B and 2,000 including those subsequently arriving after the 5,000 moved east over divide to zone C where they remained. This group movement ended 1:30 P.M.

they have become accustomed to my scent. They feed as they mill about, waiting for the whim of one or another to set the pace and direction.

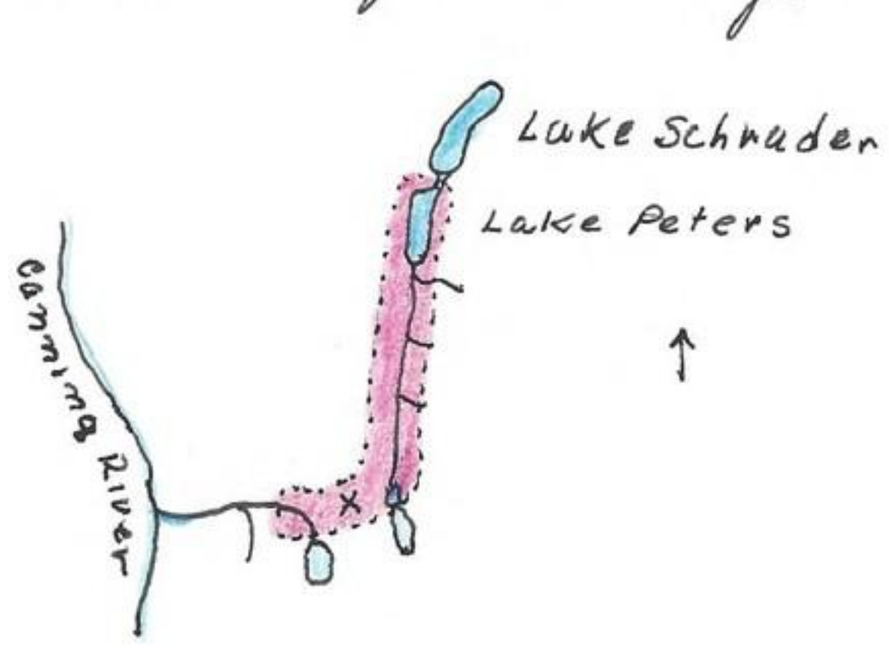
Across the canyon I can see the deeply rutted streaks cutting diagonally down into the canyon from the higher open land beyond - ruts worn through the moss and grass by these animals prone to follow one behind the other.

I finally stood, to see what the effect might be. The movement causes instant alarm among those at the fore front and the alarm spreads as quickly throughout the thousands and they swarm in front of me toward the new pass.

I sit on the pass and watch them as they stand continued idleness down the other side - the wind and tundra-affording them a luxury from which they were disinclined to despair even when I walked toward them.

I could approach very near. The fringe of the herd balked and undulated, but the herd itself remained intact. ~~I could approach very near~~ I moved around them, rattled down the talus at the other side. They watched but did not move. They became more distant as I walked toward camp, leaving these beasts and the rest which it afforded after the long weary and as yet unended migration to an unknown direction and objective". This is a true copy of my description Richard D. Olson. BB.

12. On the 18th of July and until the arrival of these animals there were no migration trails in the area from the divide at the upper end of Peters Lake valley into a branch of the Canning, down to camp on Lake Schrader. Mr. Marvin Mangus (U.S.G.S.) reports tracks of caribou and droppings of moose on ridge east of Lake Schrader at about 145°08'00", 69° 24'30". This evening set 100 traps in the immediate vicinity of camp in polygon area These polygons are of limited occurrence in typical form. Traps set 20 feet apart and in an area approx. 3/4 acre. Nearly all sets in runways both in polygon ridges and in center. Rained slightly all night. The pectoral sandpiper, Baird sandpiper, Pomarine jaegers and short billed gulls active all night. Jaegers occurring only at night. Temp.



520722-98

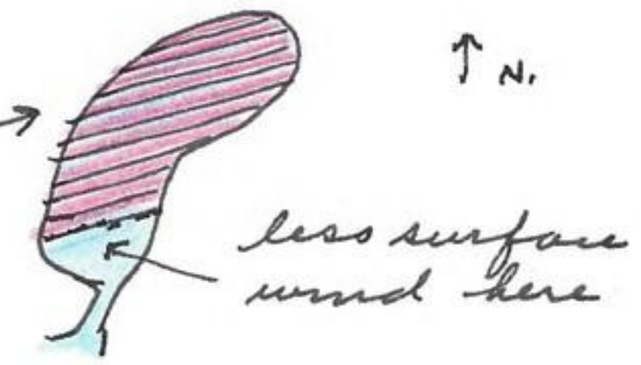
at midnight 35°F. Mod. since 4:00 P.m 47°F.

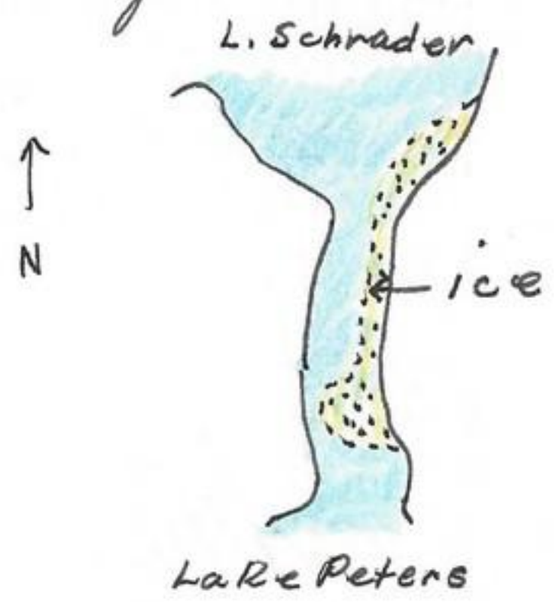
Lake Schrader, 145°09'50", 69°24'28", 2900 ft., Brooks Range, Alaska

July 24, 1952

Inspected trapline of 100 traps set last night at 7:00 P.m and caught: 21 Lemmus t, 11 microtus oeconomus, 2 Baird sandpipers, 1 Smith longspur. Day cold, heavy wind and occasional sunshine. Low fog clouds. Snow 2/5 distance down from higher peaks, most of it melting today. There is a high wind always blowing across lake from the west.

Lemmus no 520724-11 with embryos 5x4 at 25 mm, weight 26 gms, body 32 gms. Ice from Lake Peters started moving through channel between Lake Schrader and Lake Peters at approx. 4:00 P.m and through at 6:00 P.m The ice moves about 3 feet in 15 seconds. At 7:00 P.m to 8:00 P.m gusts of wind lasting 1/2 minutes from the south. Local wind tracks on water only about 50 feet wide. Ice melted as fast as it flowed into Lake Schrader. The gusts of wind from the south were timed as follows:





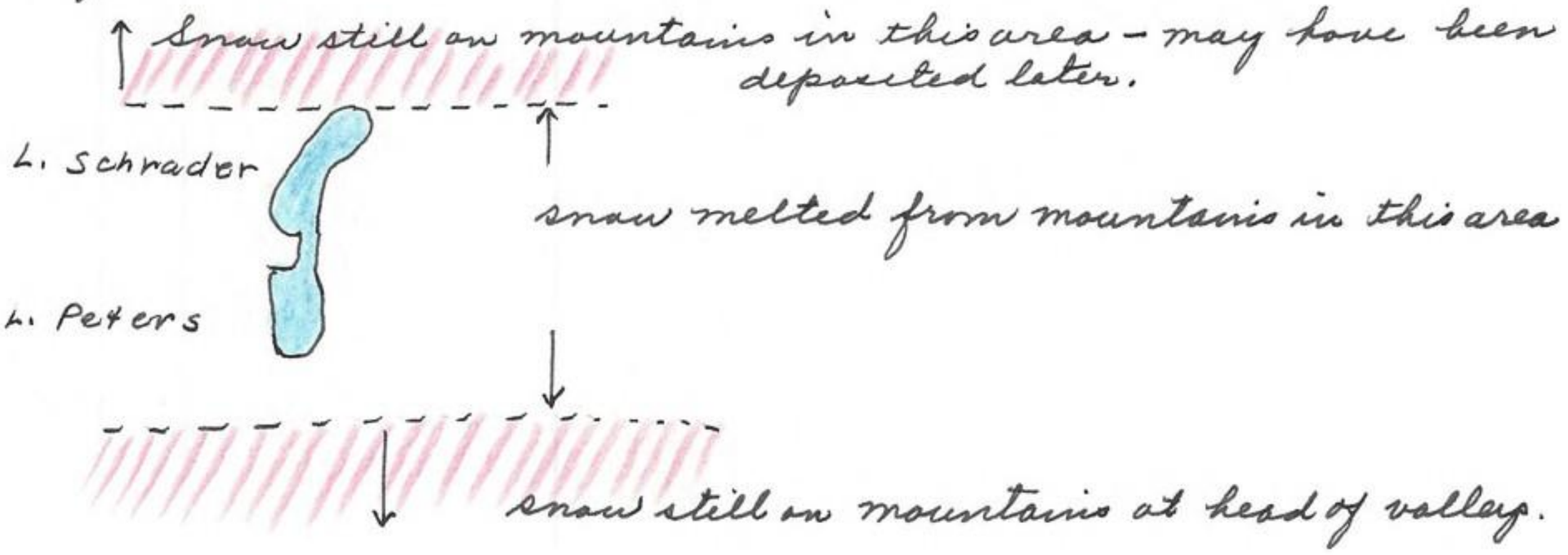
8:12'30" P.M
8:18'30" "
8:23'00" "
8:27'00" "
8:35'00" "
8:44'00" "

After 8:44 occasional wind and at 9:00 P.m relatively mild but general wind and few gusts. Ed. caught large lake trout at 11:30 P.M in old abandoned river channel 60 meters from its mouth into Lake Peters. It weighed 12 lbs including a fish in gullet and throat of the trout. Length 72 cm (standard) and 81 cm in greatest length. Scales no. (520724-36). Temp at midnight 42°F; max 46°; min 32°F (in last 24 hours.

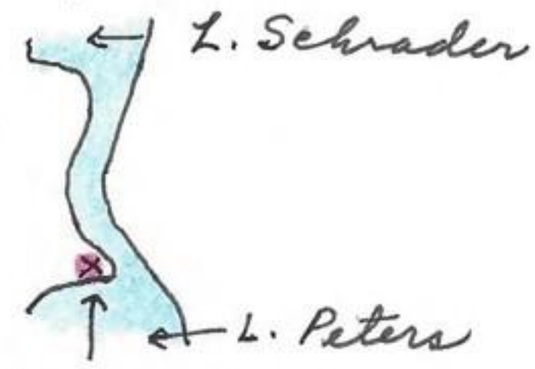
July 25, 1952

Inspected trapline (2nd night of same trap line) as: 19 Lemmus t., 5 microtus oeconomus, 1 Baird Sandpiper. Temp. of lake at noon 44°F at shore 2 inches deep. Day clear, warmer than yesterday, wind moderate. Unusual cloud effect of archlike low clouds above lake area. Recorded the

areas of the Lake Schrader - Lake Peters environs where the recently melted snow had melted:



Long. tailed jaegers passed north over camp. Mrs. Leopold Lud Darling and Sumner arrived 5:30 P.M this afternoon. Bear tracks (hind foot about 160 mm minus claw marks) and wolf tracks at north end of Lake Peters. Temp. at midnight 40°F, min 35°F, max. 50°F for last 24 hours. Set 50 additional traps in same area of polygons as of previous set.

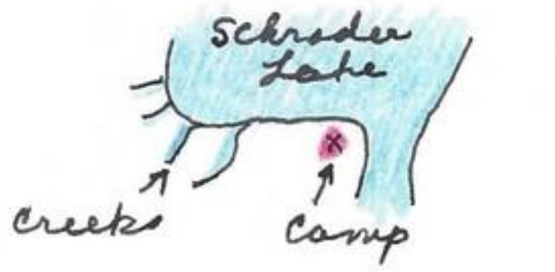


Lake Schrader, 145°09'50", 69°24'28", 2900 ft., Brooks Range, Alaska
July 26, 1952

Inspected trapline this A.M as: 26 Lemmus t., 9 microtus oeconomus, 1 pectoral sandpiper. Pulled 50 traps around immediate vicinity of camp. These traps on 3rd night produced only 3 Lemmus t, 1 microtus oeconomus indicating that the area of polygons have been nearly trapped out. Nearly all specimens fly blown for first time indicating flies are not active in cold, windy, rainy days. This morning bright, fairly warm, mosquitoes out in full force, yesterday a few - previous day none. From new trap line of 50 traps caught 23 Lemmus t, 8 microtus oeconomus, 1 pectoral sandpiper. From traps in polygon are caught 3 Lemmus t, 1 microtus oeconomus. In summary - from polygons at camp (3/4 acre) 100 traps set 20 feet apart for three nights trapping caught:

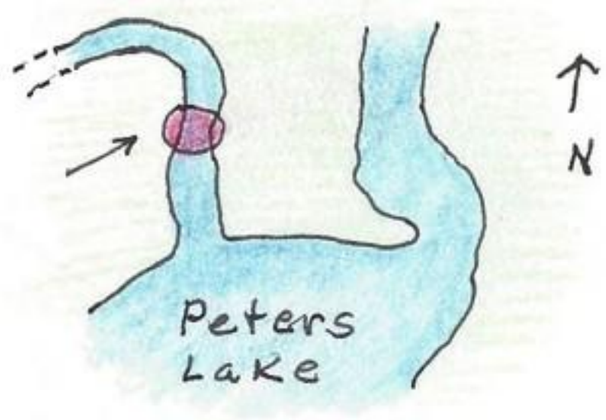
43 Lemmus t.
13 microtus oeconomus
1 Calcarius pictus
3 Baird's sandpiper
1 Pectoral sandpiper

Dr. Leopold caught a large trout, irregular spotted, 32 inches long. Also caught 3 other small ones at mouth of creeks west of camp.



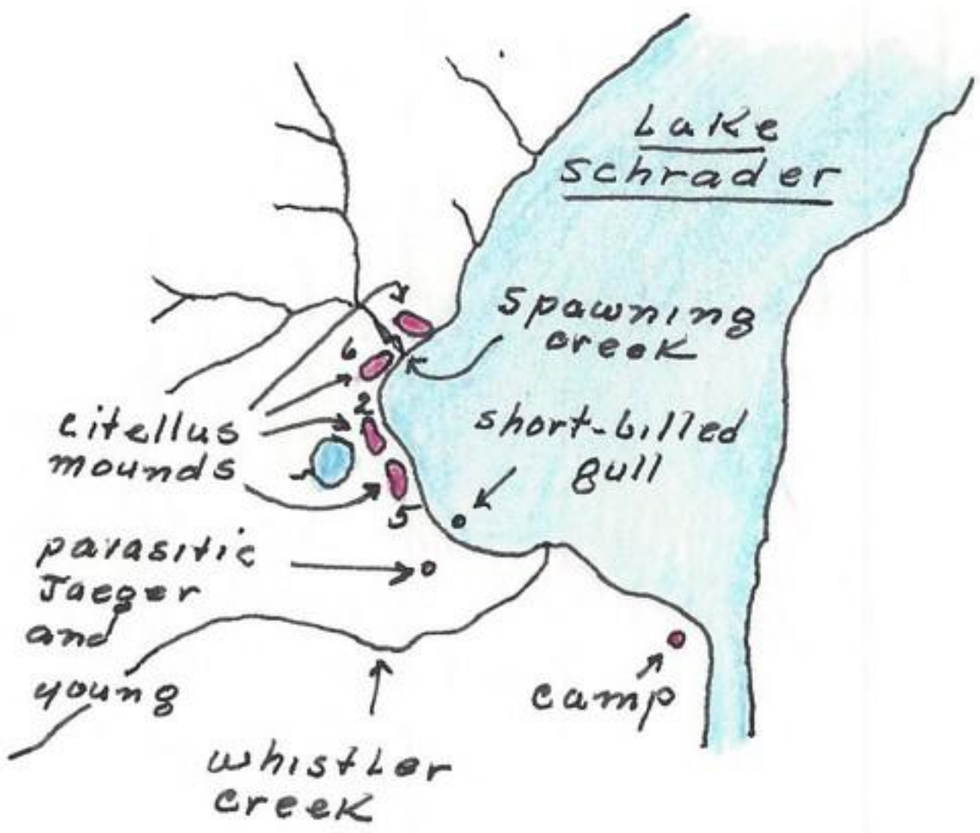
Mr. Marvin Mangus, U.S.G.S, reported 2 marmots and caribou trails continuing up (or down?) valley to west of Peter Lake (see caribou map) all the way to the divide - trails mainly in bottom of canyon where the rich growth of tundra moss has been flattened in surface trail like a Persian carpet. The trails leading east (or from the east) are indicated also on map, connecting with Hula-hula River. marmot hue (see map)

Yesterday I observed 2 dall Sheep near top of Mount Marcy. Ed reports 3 ~~sheep~~ trout (8 to 12 lbs) in 50 casts at old river outlet between 10:00 P.M and 11:00 P.M. This stream is an abandoned stream which drained Whistler Canyon to the west. The present stream goes into Schrader Lake. Temp. midnight 43°F, min 38°F, max. 56° for 24 hour period. Rain started 11:30 P.M.



July 27, 1952

Rained all last night. This A.M. set 14 steel traps for squirrels and weasel on mounds west of Schrader Lake and at the mouth of Spawning Creek as indicated on map below. Enroute noted that Whistler Creek (named for marmots found in canyon beyond) rising and muddy. Yesterday I could walk across this creek with shoe packs but now is knee deep. Near this creek saw the Baird sandpiper, pectoral sandpiper and Smiths longspur in close association. The parasitic jaeger put up a defense in area marked and both ♀ and ♂ darted down over my head. They then alighted about 60 feet

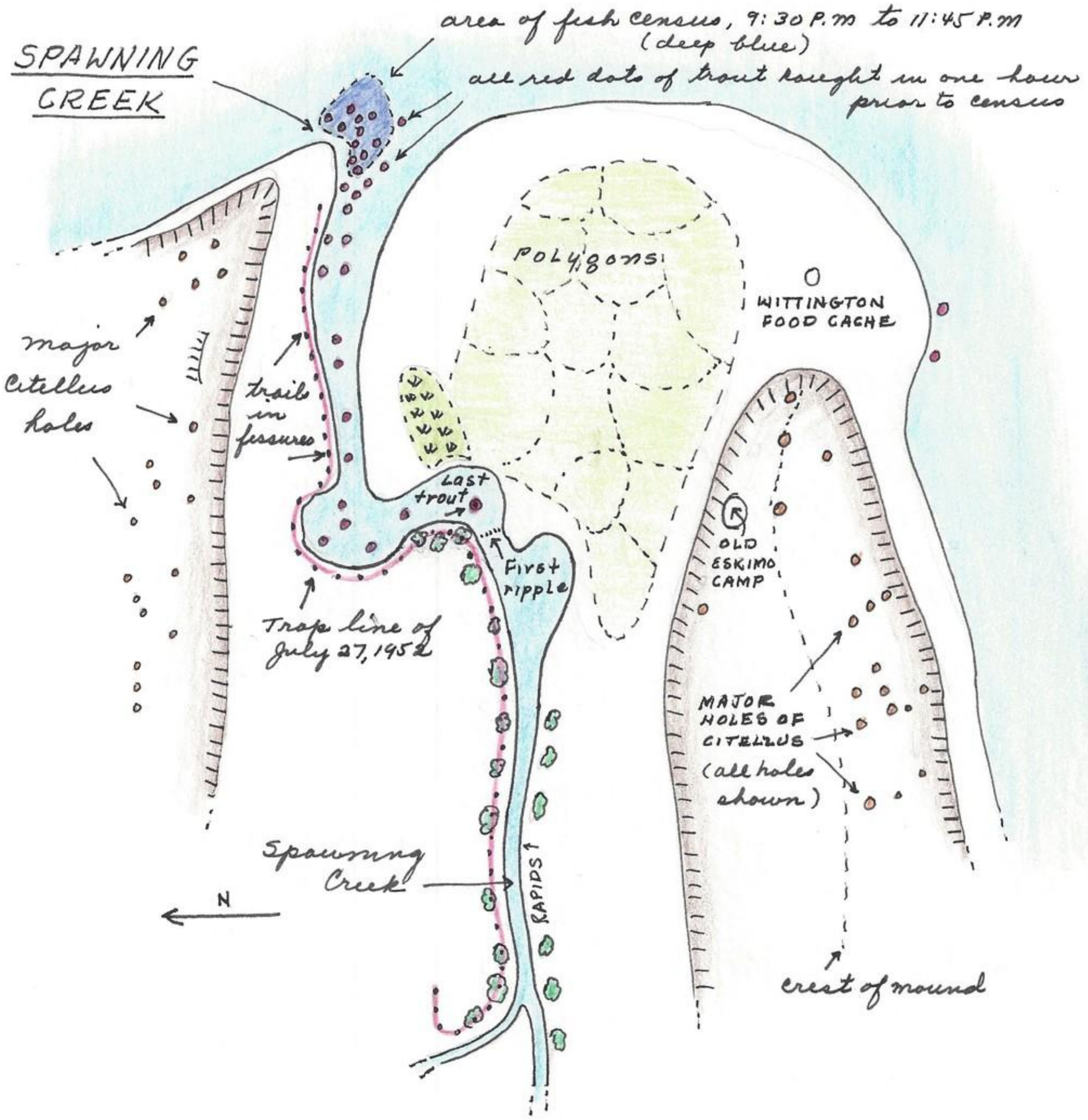


away and feegned the cripple act for abaut 50 feet. Both ♂ and ♀ performed. The ♀ acted as if heading the young but was only part of the act. These birds defended an area each day gradually moving to the south for abaut 1½ blocks in 4 days. The short-billed gull put up greatest defense at point marked and nodoubt had young in grasses and sedges or along the shoreline. They gulls were concerned with one general area on each of several occasion when visited. Fifteen surf seaters used the SW part of Schroders Lake; fine of them showed white wings and could have been either the white-winged seaters or the greater scaup duck. After setting steel traps at 2:00 P.M continued to mouth of Spawning Creek. Here are larger runways and grass cuttings that might be either Citellus or muskrats. These runways are along the creek and developed in fracture systems that paralell the creek. In Spawning Creek fish for trout from mouth of creek to first ripples and first turn of creek to south (see map to follow). In one hour caught 33 trout indicated in red dots on map. The largest 820 mm (standard length) and the nedt largest 760 mm. The last trout caught was just below the last ripples of creek before the still waters that led to lake. The distribution of these catches indicate these fish are truely lake forms and do nat move up creeks beyond the quiet waters of the lower reaches of creeks. The trout in the last hole, as indicated, hit the small Colorado spinner 4 times in precisely the same direction in relation to the water current. The average depth of the still water abaut 3 feet with deep holes occasionally. Bottom of stream rocky. After fishing & releasing all fish (used barbless hooks) returned to camp and packed up museum traps and returned to Spawning Creek to take a sample of fish population. Ed. & Richard Olson accompanied me. The area indicated in deep blue is area where fish were taken for census. The following fish (lake trout) were taken between 9:30 P.M and 11:45 P.M with spoons (dare devils, 4 inch and small 1 inch Colorado spinners). Each fish collected was released after being weeghed, measured & a sample of scales taken. Average depth 3 feet, max. 4½ feet. Weather clear, cool, fog clouds at N end Schroder Lake, wind in irregular gusts.

Citellus trails entrenched in fracture systems.

520727-102

SCHRADER LAKE



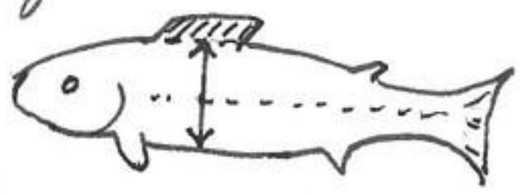
Map of the mouth of Spawning Creek on west side of Schrader Lake showing position of Citellus burrows, position of lake trout in Spawning creek, census area of lake trout, position of trapline and other information.

520727-103

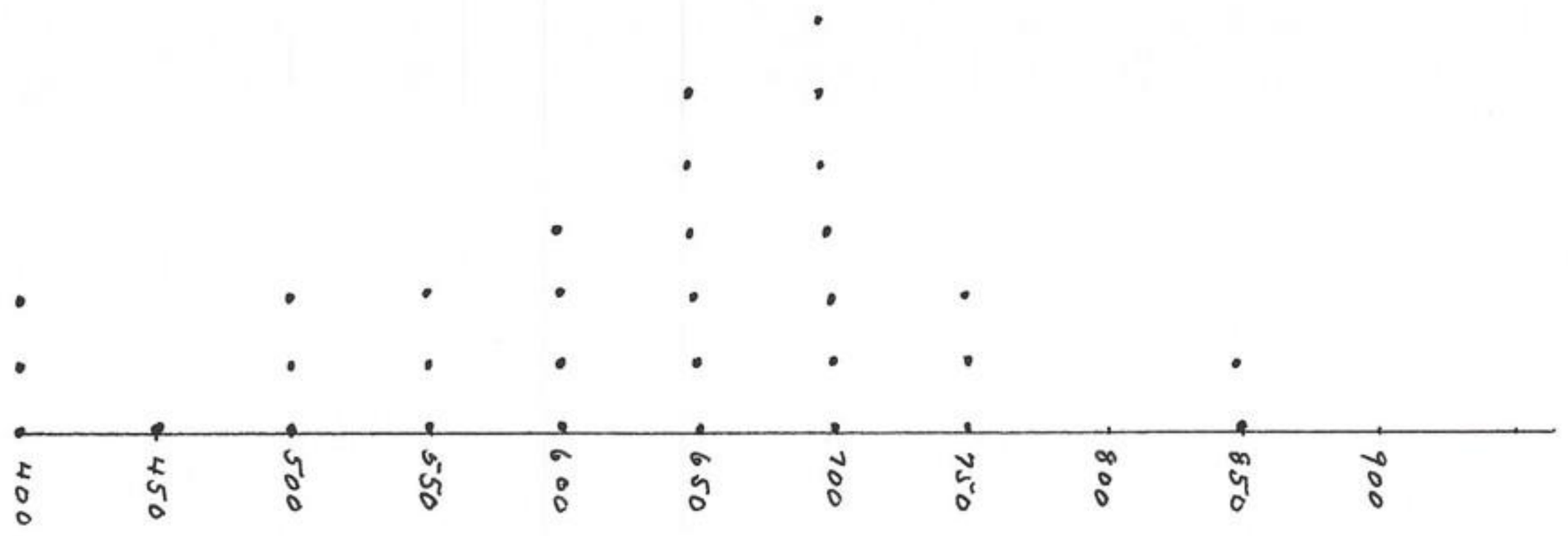
Lake trout caught at mouth of Spawning Creek for population census.

Catalogue number	standard length	weight. (in lbs.)
520727-9	420	3 1/2
520727-10	430	2 1/4
520727-11	430	3
520727-12	460	3
520727-13	510	5
520727-14	530	4 1/2
520727-15	540	5
520727-16	550	5
520727-17	560	4 1/2
520727-18	580	6 3/4
520727-19	610	6 1/2
520727-20	610	7 3/4
520727-21	630	8
520727-22	640	8
520727-23	650	8 1/4
520727-24	650	9
520727-24a	650	9 1/4
520727-25	660	8
520727-26	670	8 1/2
520727-27	680	8
520727-28	700	10
520727-29	720	13
520727-30	720	10 1/4
520727-31	730	10
520727-32	730	12
520727-33	740	12 1/4
520727-34	740	12 1/4
520727-35	750	12
520727-36	750	12
520727-37	760	17 1/4
520727-38	850	20
520727-39	830	20 1/2

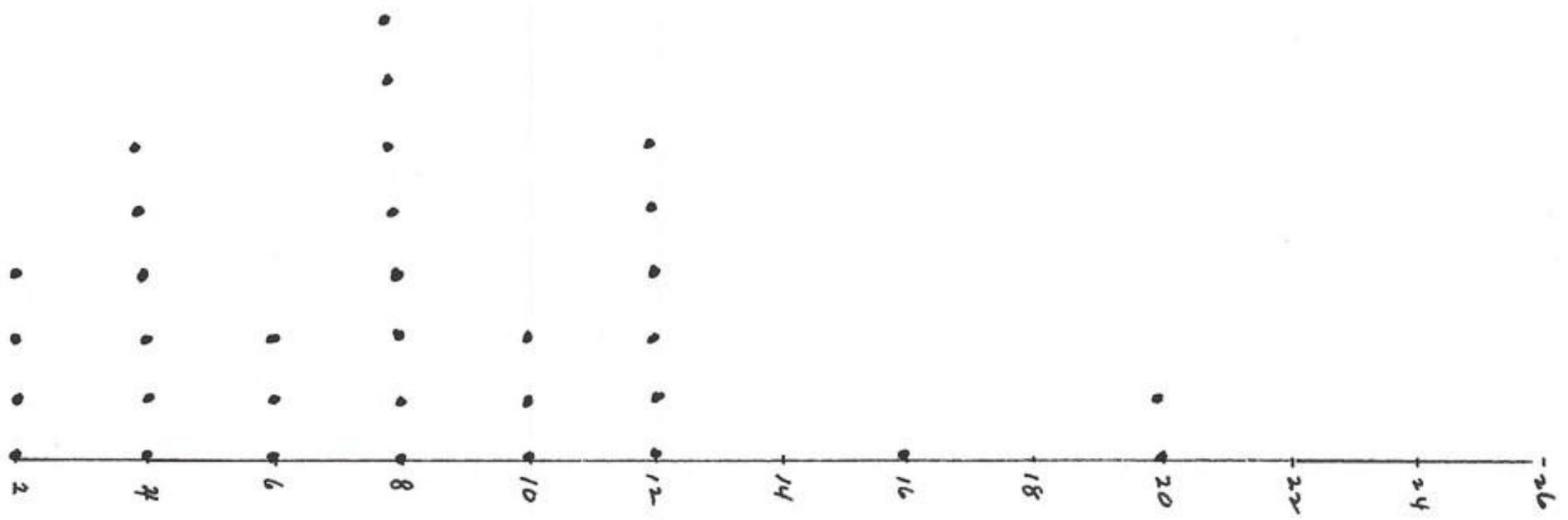
The pattern of mottled brown-black and white in some specimens extended down across the venter but most specimens showed white in this zone. Some specimens of destinct markings had a greater depth to body measurement.
All specimens in good condition.



520727-104



standard length in mm.



weight in pounds

The trout no. 520727-39 which measured 850 mm standard length, held the following egg mass which completely filled the two sides of the body cavity measured 320 × 80 × 40 mm. The egg mass on the right side the egg mass ~~measured~~ weighed 600 gms and the left side 581 gms. In 100 grams of egg mass there were 700 large developed eggs with smaller ones in proportion to 2 small eggs to one large egg. Small eggs in mesentery. Large eggs nearly uniform in size and averaged 6 mm in diameter. The other eggs were all small and about 1.5 mm in diameter. On the basis of 700 eggs (large developed eggs) per 100 grams weight, there are 8,302 large eggs in ovary of this fish. Trout number 520727-38 had eggs in the following numbers. 1900 in 10 grams or 19,480 eggs in total weight of ovary which weighed 103 grams. All eggs averaged 1½ to 2 mm in diameter. It is interesting to note that while the total weight mass in one case is much smaller than the other, the number of eggs remain constant and only half of the total number develop. It is apparent that of the 19,480 eggs only ½ will develop and the other half will remain small (1½ to 2 mm in diameter). Photo 520727-40 and

520727-40a showing lake trout nos 520727-39 and 520727-38, the latter being uppermost in photo. Photo 520727-41 close up of larger fish head 520727-40. Temp at midnight 43°F, min 39°, max. 62°F (max. of this date may have been influenced by direct sunshine striking the thermometer - all temps have been taken in shade and about 6 inches from ground). From trap line today found one Lemmus in trap which had built a dry grass overhead nest much of the type used as normal nest. The differences between sexes of Citellus parryi are sometimes difficult as both ♂♂ and ♀♀ have mammary patches and the ♀ has a clitoris as distinct as the baculum of the male. The ♀ has a large external orifice

clit. of approx. 6 mm wide whereas the ♂ has one vag. opening of approx. 3 mm wide 

Lake Schrader, 145°09'50", 69°24'28", 2900 ft., Brooks Range, Alaska

July 29, 1952

Rained all night. Snow 1/2 way down mountain side. Pulled all traps at 9:00 P.M and set 30 in willows and 50 in polygons. At midnight temp 38°F, 38°F min and 62°F max.

July 30, 1952

Wind from east for first time. Collected grasses and sedges from the ridge of polygons which are slightly drier than the wet centers of polygons. These ridges (few inches higher than centers are extensively used by Lemmus and M. oeconomus.

520730-1 Calamagrostis neglecta (Ehrh) Gaertn. Meyer and Schreb.
520730-2 Arctagrostis latifolia (R. Br.) Griseb - approaches C. purpurascens
520730-3 Calamagrostis neglecta (Ehrh) Gaertn. Meyer + Schreb. approaches C. purpurascens
520730-4 Poa arctica R. Br.
520730-5 Luzula confusa Lindeb.
520730-6 Carex liegens Holm
520730-7 Hierochloa alpina (Swartz) Roem and Schult.

From damp to saturated centers of polygons collect these grasses + sedges.

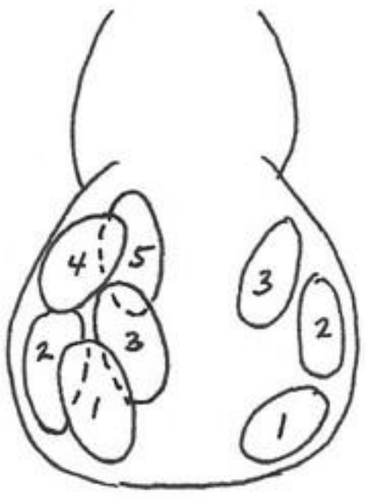
520730-8 Carex aquatilis Wahl.
520730-9 Carex physocarpa Presl.
520730-10 Eriophorum angustifolium Honcken

On bench across channel between L. Schrader and L. Peters which is a dry situation and south exposure collected these grasses + sedges

520730-11 Carex liegens Holm
520730-12 Hierochloa alpina (Swartz) Roem and Schult.
520730-13 Poa arctica R. Br. (?)
520730-14 Calamagrostis purpurascens R. Br.

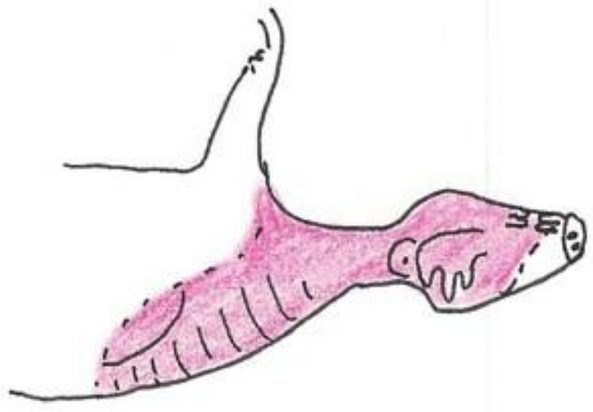
520730-106

A female Lemmus (520729-4) had the following arrangement of embryos:

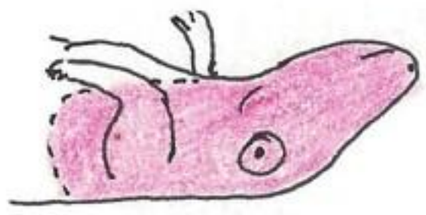


weight of Lemmus 98 gms
wt. Lemmus without embryos 69 gms
weight of embryos 29 gms.

From trap line collected two microtus oeconomus which had been partly eaten by other small mammals.



microtus oeconomus (520730-35)
lungs, one side chest, meat of neck, muscles of side of head. Back of head not affected.



microtus oeconomus (520730-36)
Fur and superficial meat gone, muscles still intact at back of head.

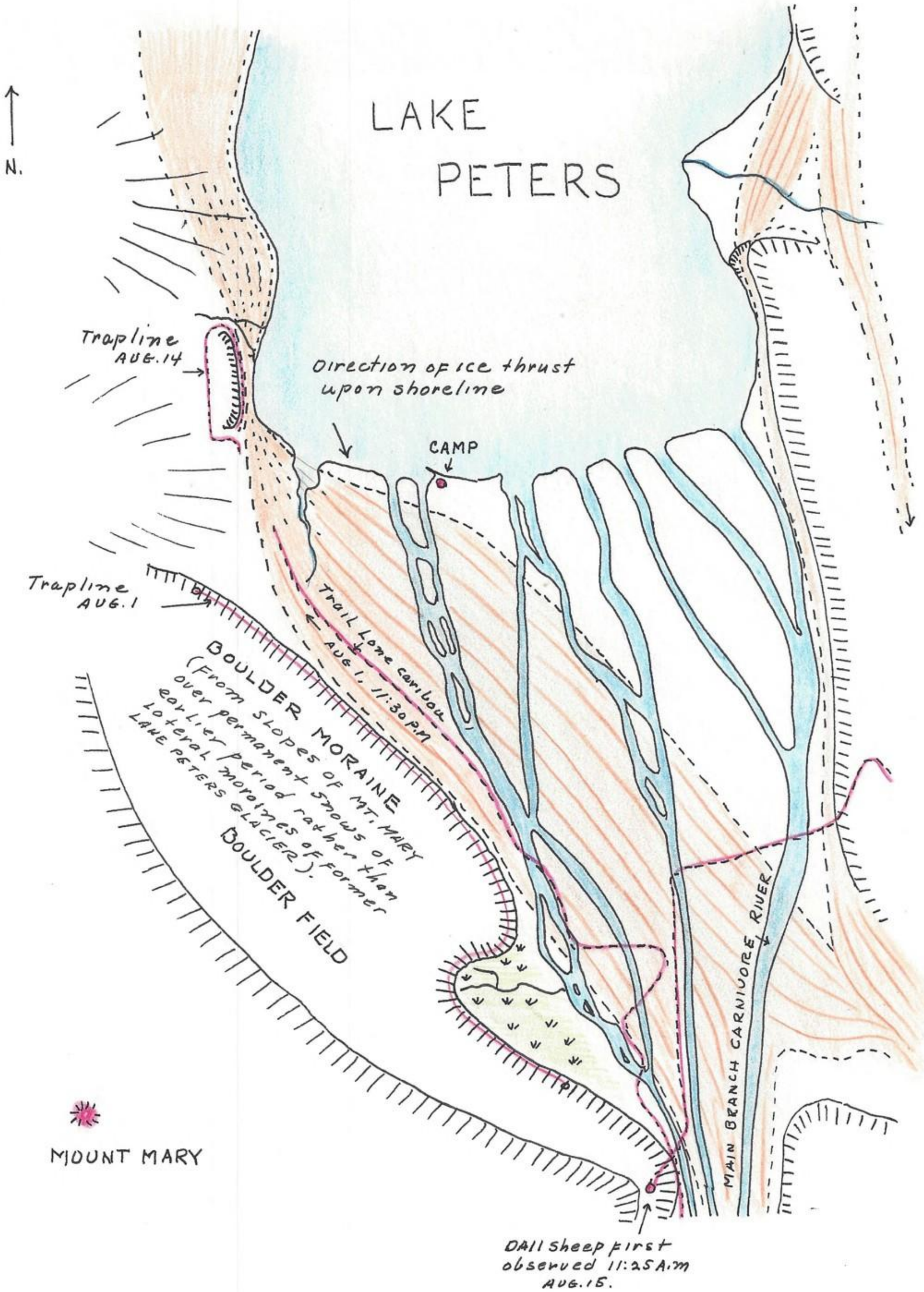
Pulled all traps in preparation for horseman shuttle to S end of Lake Peters tomorrow.

Mount Mary, S end Lake Peters, 45°10'02", 69°20'30", 2900 ft., Brooks Range, Alaska

July 31, 1952

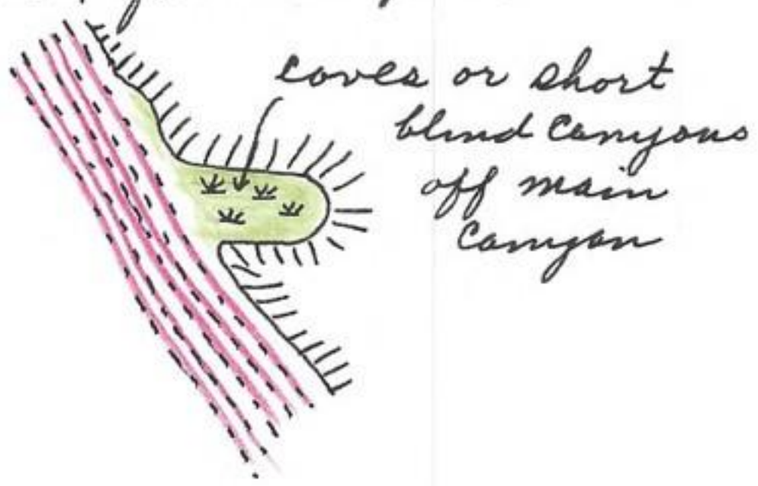
Moved to new station at S end of Lake Peters (see map). This new station is ideally situated to mt. slopes for Clethrionomys and Microtus mucrus and also marmota caligata. The immediate area consists of a broad, vegetated alluvium with braided river system. The camp is upon a high segment of the alluvium that has not been flooded for many years. Evidence of early Eskimo sites on this segment indicates freedom from erosion or inundation from river. Plotted the trail systems used or created by carload of movements south and north in this canyon at the south end of Lake Peters. (see previous map for dates of these movements.

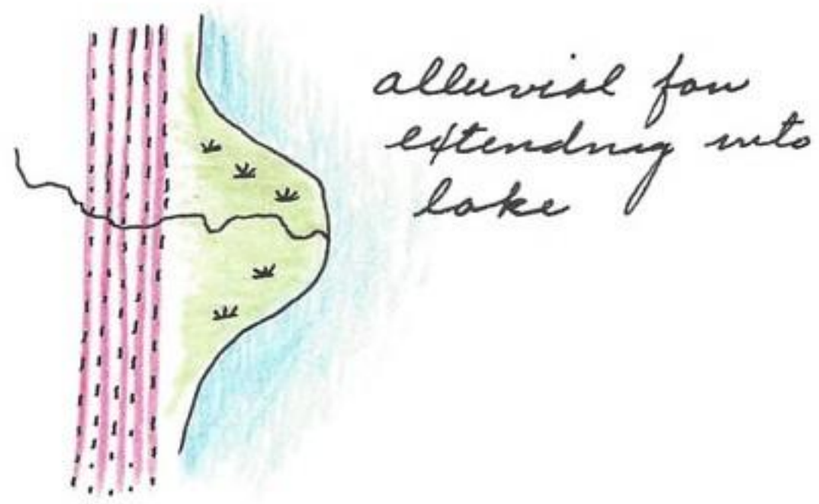
520731-107

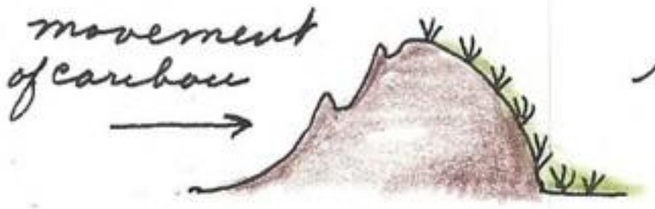


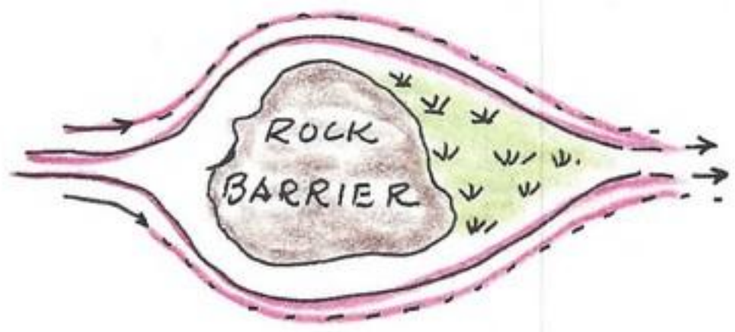
GENERAL TOPOGRAPHY SOUTH END LAKE PETERS.

upon arrival at this lake saw 2 golden eagles soaring on upper 4/5 slope mount mary and in twenty minutes later at base of same mountain. These eagles were nated on two other occasions, first high on mountain and then on lower slopes. Eight pactoral sandpipers on shoreline in front of camp. Caribou have completely utilized canyon floor. Areas not in direct line of march not effected except by an occasional resident caribou or one which might have wandered from the herd. Such refugia from caribou trampling are, for example:

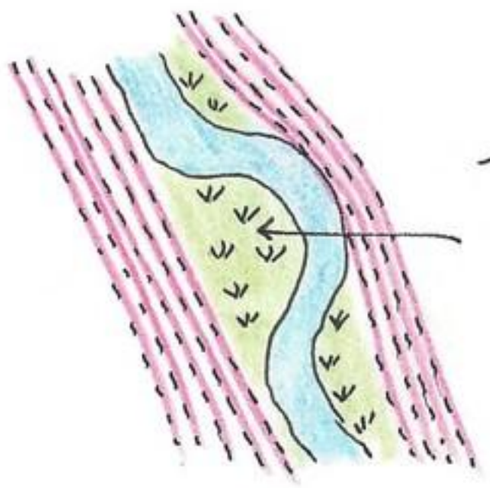






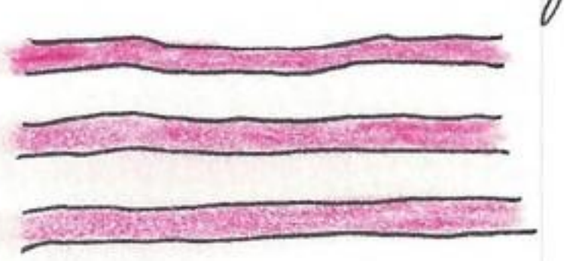


rocky barrier, vegetation on lee side



inside bend of creek

Wet marsh areas completely trampled to mud or all grass lying in one direction and mixed with mud. Areas on slopes originally in grasses and sedges now without signs of vegetation and mud knee deep. Mud carried onto rock slopes in direction of movement of caribou. Gravel and rocks in dry river bottoms smoothed and of different color. Trails crossing established rock slides sealed with lichens and mosses now show original yellowish colored rocks with all black lichens removed. These trails can be seen at a distant as lighter than surrounding rocks. Trails are directional and if a willow patch is in the direction of movement it is trampled to bare ground.
There is a tendency to form paralell trails of abaut 1 1/2 foat spacing. Converging of trails completely trampled by the hooves of caribou which overlap one another. From camp to moraine (600 feet corridor) there is not



new trail thru willow

one area of ground as large as 6x6 inches which was not effected by the foot imprint of caribou. Within the overall zone of migration lanes there are one or two trails which are used more than the rest of the trails. Some trails at edge of bank 1½ feet deep. Trails, imprints and droppings of caribou are in practically every conceivable slope and as far as the end of the Chamberlin Glacier in canyon to the east. Many trail of caribou are in direct competition with the Dall Sheep. Temp at midnight 38°F, min 34°F & Max 58°F.

Mount Mary, Send Lake Peters, 45°10'02", 69°20'30", 2900ft., Brooks Range, Alaska.

Aug. 1, 1952

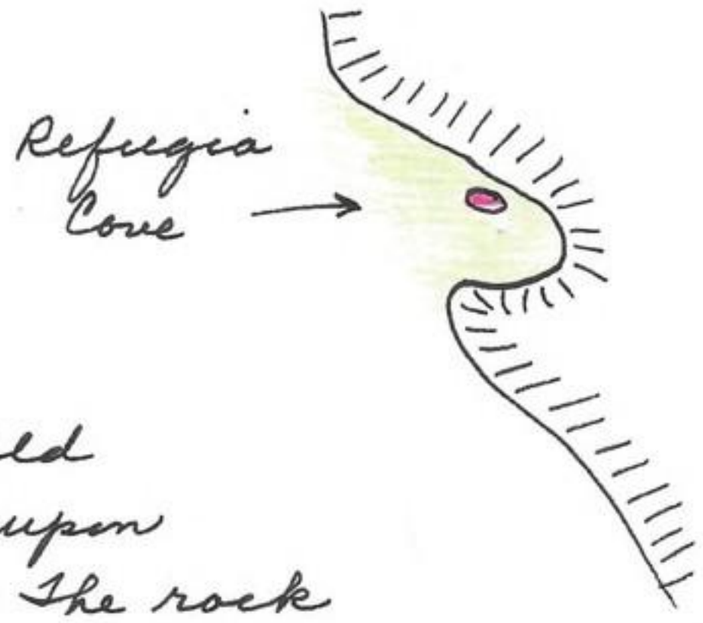
Organized camp and set 50 traps along base of moraine SW camp 600 feet of above coordinates. At 7:25 P.M photographed (520801-10) Lake Peters to N showing typical conditions for this time of day. At entrance of main stream near camp caught a trout measuring 840 mm (standard) and weighed 20 lbs.

Photo 520801-12 of Lake Peters to N at midnight. Every night this scene had a different color combination. Temp. at midnight 44°F, Max 56°F, min 36°F in last 24 hours.

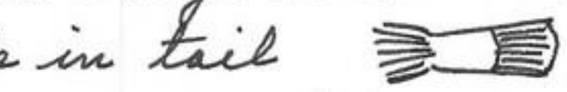
Aug. 2, 1952

Photo (520802-1) of caribou trails through grass and sedge fields at camp. Converging points in background at base of moraine segment. Some trails above to base of steep slope of mountain. Some of these trails were cleared down to bare soil, others with grasses trampled flat. Creeks of smaller size and many larger one offered no barrier to movement of caribou when travelling in herds. Photo (520802-2) of grass lying down and partly trampled into soft soils of wet meadows. This area had suffered complete trampling with Eriophorum refugia in background. On this refugia caught Lemmus and Microtus miurus in same trap and in numbers suggesting an increase in abundance. The wet grass and sedge meadows had been used by small mammals but these had apparently been destroyed except those moving to refugia by the passing caribou. Other areas of trampled soils were also affected, a coaction of decided importance for valley or canyon floor inhabiting animals. Photo 520802-3 of caribou imprint made in mud July 26 in one segment of the

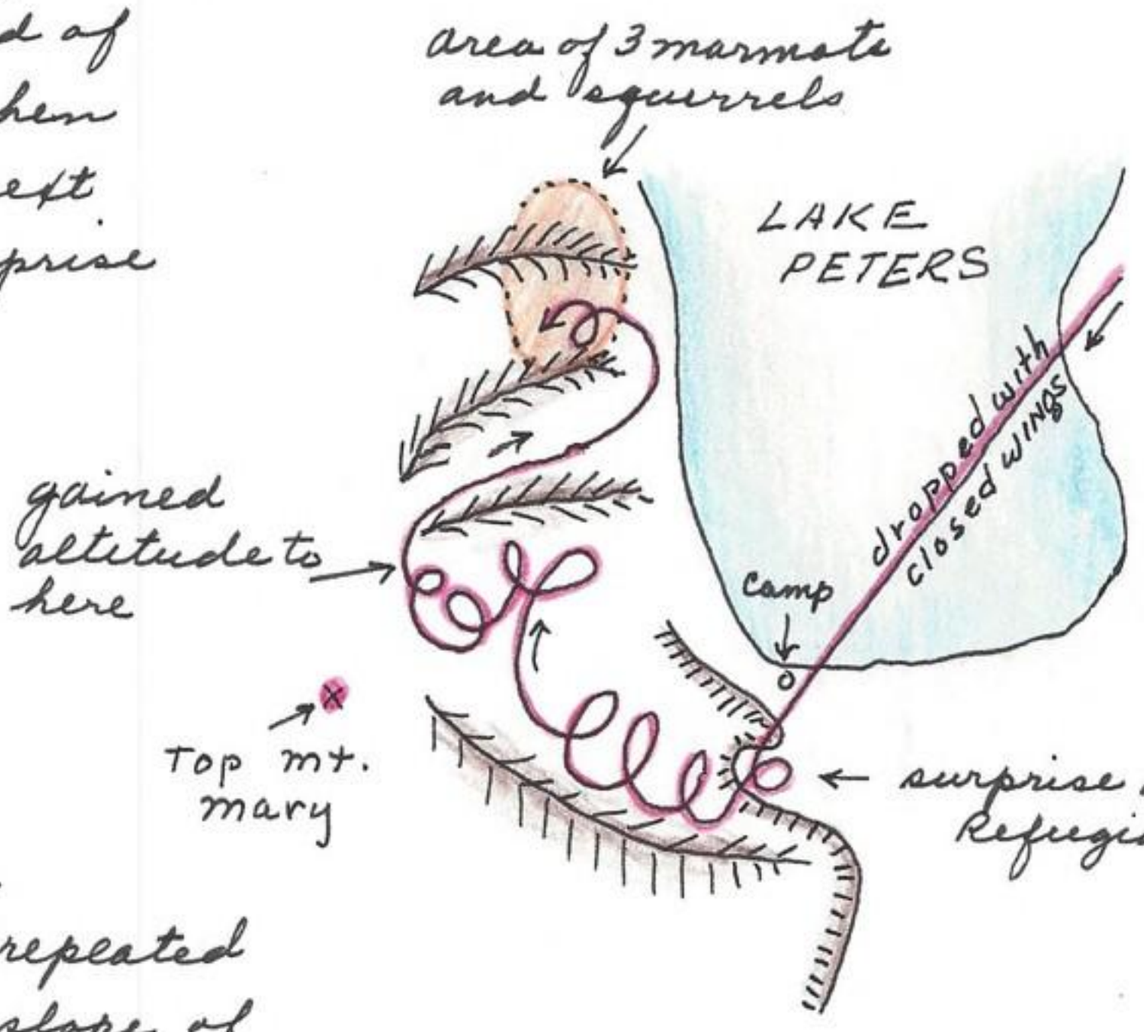
trail corridor. The concentration of imprints extended at least 600 feet in wordth where freedom of lateral expansion waspermitted. The largest imprint was 120 mm, the smallest 50 mm. Nodoubt others exceeded these figures as no exhaustive search was made. all prints trending up canyon. The above photo taken at 8:30A.M. At 10:20A.M photographed (520802-5) the surface of a rock about the size of a table top which had come to rest on a marsh at the base of Mt. Mary 5 of Camp.



The Refugia Cove was not too severely affected by caribou as it was to the right of the caribou movement up canyon. The rock should grow mosses and lichens upon its new sheared surface. The rock can be check periodically for rate of growth of vegetation on an new rock surface. This rock has the texture of slate and originated from the NE side of mount Mary. Photo 520802-6 of cascades just beyond Weasel Point and west of rocke moutonné. Carnivore River which drains the canyon south of Lake Peters results from all glaceers to the south. as a result the water is a greyish rock flour. at times it becomes clearer with lower atmospheric temperatures when rock flour is not being produced by the melting glaciers. This river cannot be conveniently forded except at alluvium where Carnivore Liver enters Lake Peters and at the headwaters. Photo (520802-7) same as above but close-up. Taken at 11:30 A.M - 500th second and F. 3.4. Photo (520802-8) up canyon from mouth of first main canyon from Mt. Mary showing partly meandering stream or lateral moraine. Photo (520802-9) of canyon south of Chamberlin Peak showing elevated alluvium scars from period after glacial retreat. This formation is Devonian. Photo (520802-10) of yellow mosses and lichens on rocks in creek that is periodically used but now dry. These mosses are generally in greatest abundance in these ephemeral streams and mark the course of such streams as far as vision permits. a bright red plant which looks like moss also appears along the edge of the running water. ~~near hoo~~ found evidence of bear or wolverine digging out a colony of Microtus mices some 700' south of Camp. An area of about 1 meter x 2 meters was completely turned over

with shallow excavations. The mice had reestablished runways and had dug new runways thru the freshly excavated dirt. Observed one microtus miurus active at 11:20 A.M, day clear. They have the life form of the pika. Wind down canyon for the first time. Specimen (520802-11) Lemmus and (520802-12) microtus miurus from grass-sedge refugia and taken shortly after setting. Today at 11:30 P.M these same traps were not effected by other mice. From 4:00 P.M to 5:00 P.M wind gradually subsiding. At 5:30 P.M to 7:00 P.M wind increased to this A.M as an intense wind. Golden eagle eating dead caribou this morning on delta on 2nd alluvium down east shore from S end Lake Peters. Observed an am golden eagle also up canyon. These eagles favor the Lake ~~Sebrader~~ Peters area and are frequently are seen at all times of the day probably hunting marmots. This predation might account for the weariness of the marmots. One large dark bird and one smaller one with this degree of white in tail  flew and sailed in high wind on the NE face of mount Mary at 8:30 P.M thus:

The method of hunting was to circle up steep canyons to head of canyon and then drop down next canyon to surprise animals at bottom of canyon and the entrance of the next adjoining canyon. The same act is repeated on down the slope of the Mountain range.



Temp. at midnight 52°F, min 32°F, max. 70°F.

Aug. 3, 1952

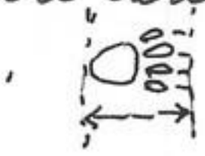
From trapline collected the following:

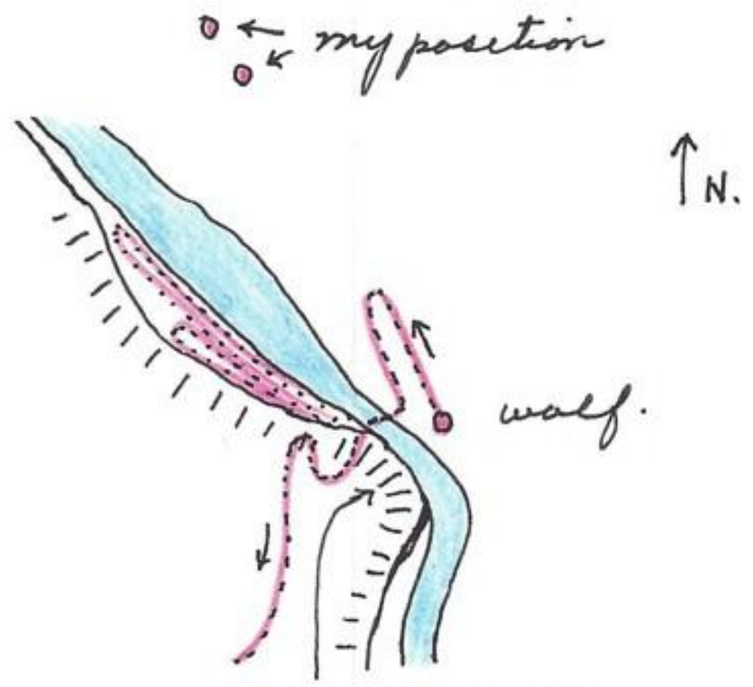
520803-1 Lemmus from refugia area of yesterday trapping indicating some mice are still wandering around after having been displaced by caribou trampling.

520803-2 Lemmus from 2 square yards of grass & sedge refugia. Traps in this area have been unsprung in the last 3 days which again indicate some degree of wandering.
520803-3 Lemmus from a refugia.
520803-4 and 520803-5 micratus muerus from 2nd 50 traps set last night along base of moraine.
520803-6 to 520803-9 Clethrionomys. Same line as above.
520803-10 wheatear. Ibid
520803-11 White Crowned Sparrow. Ibid.

This evening set 50 traps as ettension of moraine set and at base of cliffs to weasel Point. at 11:30 P.M this evening with night cloudy and rainy and dark, a short-billed gull worked the beaches at camp. This adult gull is probably the parent of young ferst nated at S end of Lake Schrader. Few semipalmated plovers in caribou trampled areas and drier parts of the alluvium 600 feet S camp. The Baird sandpipers (?) have not been seen on shores since yesterday. This evening at 11:00 P.M had interesting experience with a wolf at Weasel Point 2000 feet S camp. As I was going to inspect weasel trap at Weasel Point I saw a light object standing on this side of creek 400 feet away. It looked to me like a barren ground grizzly so about faced and started to return to camp. At 20 feet looked back and saw that it was following me but was not a bear but a large wolf, at which moment I stopped and put up a bluff. The wolf continued toward me for about 50' and then after looking things over, turned around and walked back to the point where first observed and forded the small creek beyond. In the meantime I advanced 100 feet closer thinking that the wolf was leaving the area. but instead he started to come toward me again and approached to within 200 feet of me, then returned to Weasel Point. At no time did the wolf run or act afraid. It turned again and came toward me for about 50 feet and then again returned to Weasel Point where it jumped up through a fissure in the cliffs where I had set my weasel traps. and walked behind the ferst redge 20' away. I continued to inspect my traps at the base of the cliff and looking up saw the wolf standing on the top of the ledge only 15 or 20' away and above me. It left immedeately and Continued up the canyon to the south of Lake Peters. These wolves are absolutely unafraid of man or gun and do not run as they usually do on contact with man. The ferst movement of the wolf toward me

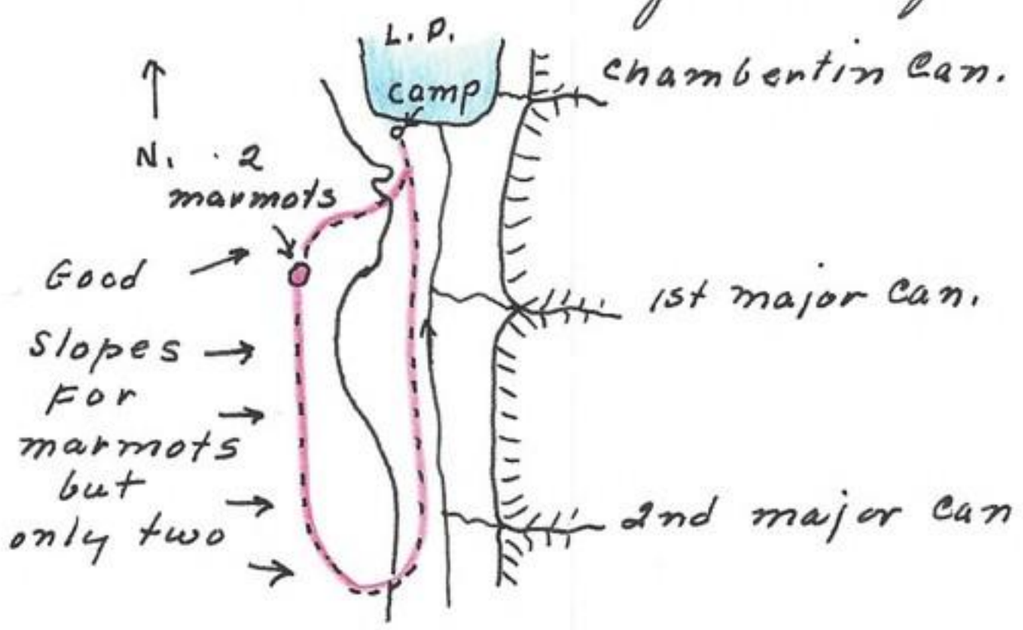
was a charging spurt of about 10' but after that stopped. This charging act is to test the intention or physical condition of the object being investigated. With wet pants and coat and parka pulled down over my head I looked anything but a human and with a yellowish brown trap bag on my side may have been mistaken for a caribou. The track of this wolf (front foot) measured 120 mm.





At 500 feet S of camp found a young caribou almost completely eaten except meat between the vertebrae and ribs which the ravens will nodoubt clean. Killed or died July 24. Length 900 mm, Ribs clewed off. Hind limbs still intact but flesh gone. Most of hide gone. Front leg bone 700 feet from kill. Located among rocks.

In field 6 hrs for marmots on west side of Carnivore Canyon south of Lake Peters. Saw 2. They called about 200 meters away. Then again at 100 meters. Stalked to within 40 meters and shot at one of the 2. It remained for 2 more shots and then dropped into rocks - hit but not dead. The other followed into same entrance area among rocks of slide. The other marmot called under rocks as I was trying to find the injured animal. Waited 1 hour at 30 meters but the marmots did not reappear. On subsequent visits to this area did not see more than one marmot so presume

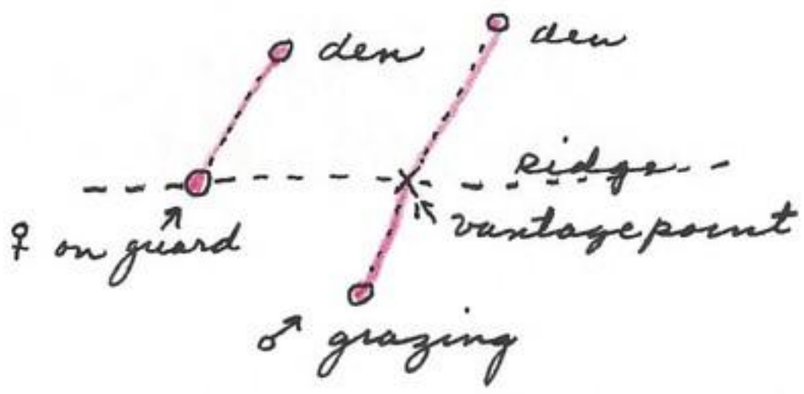


that it was killed. while they enter rocks as one approaches at about 50 meters, they will remain on surface of slide at 20 meters if one is injured from gun shot. Day cloudy, cool, rain. Wind about 6:00 P.M from N but some let-up. Temp midnight 43°F, max. 70° (influenced by direct rays of sun), min 43°F. Short-billed gull still feeding at S end of Lake Peters near camp at 1:30 A.M (Aug. 4).

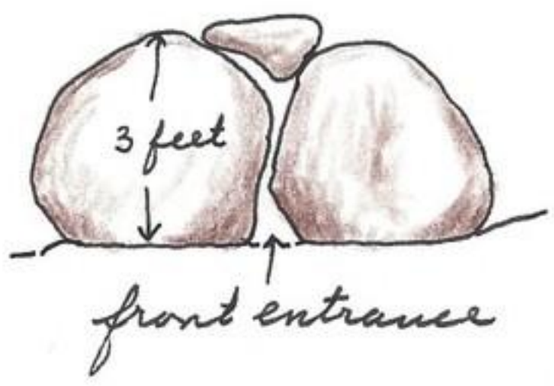
Aug. 4, 1952.

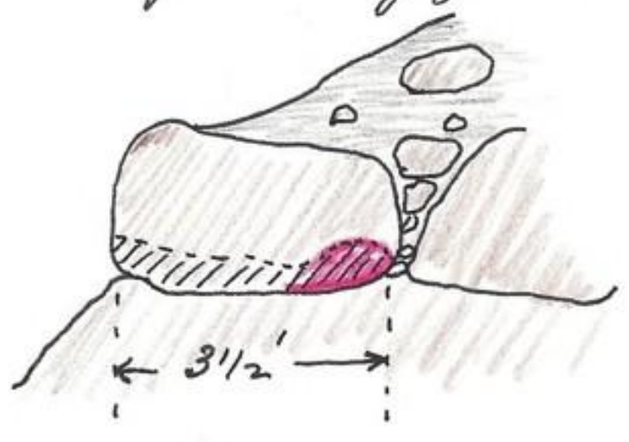
yellow-billed loon 100 meters N of Camp at 9:00 A.M. This bird frequents this area and carries fish north into Lake Schrader. Worked sidehills on east side of canyon for marmots this A.M. Golden eagle give marmot more concern than any other animal in the area. When a marmot is approached by man, they call about 4 times and then stop. Some, however, call for 2 or 3 minutes when a person is low on slopes and the marmot well out of danger. Generally they can be located by binoculars if one can determine the general area of the calls. They disappear at about 200 feet and on 3 occasions at 3 hours wait, the marmots did not reappear, but when approached again at nest or hole site they can be heard beneath the rocks. While waiting, on two accasions, saw a weasel working rocky slopes, both animals within 50' of marmot dens. While approaching one marmot at 3773 foot den (altitude on slope of mt) a Citellus came up to the marmot to within 3 feet as if in curiosity. The marmot at the time was standing up. The marmot disappeared first and then the Citellus which left for 60' and they gave a sharp call and disappeared. The Citellus returned to the marmot den in rocks in 20 minutes but the marmot remained below for 2 hours and at that time I left. There is some definite relationship between the marmot and Citellus which appears to be a compatable one, each offering warning calls that are mutual in benefit. On another occasion found a Citellus on rocks that had consistently been used by marmots. At a den of marmots at 3690 ft elevation just north of Chamberlin Canyon east of Lake Schrader came upon 2 marmots by surprise. Stalked to within 60 feet before one spotted me. Instantaneously the other marmot not on guard ran to vantage point and remained until I shot with 16 gauge. The marmot on guard had left but the grazing animal had not apparently seen me until I fired the gun. The female (520804-26) ran 40 feet and stopped

520804-115

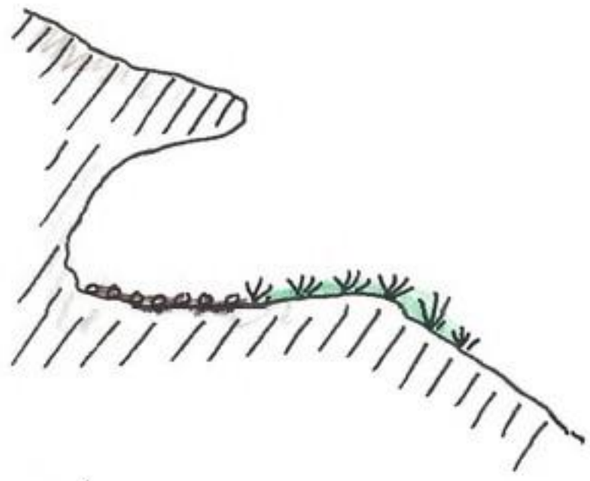


dead only 3 feet from its den. while I was at the position where the female was on guard the ♂ stood up at the den at a distance away which a marmot would normally be under ground for protection. That the ♂ (520805-11) but it was able to run into a den only 2 feet away. This den was examined and opened but could not get the marmot until the next day. It was so excavated that natural enemies such as the wolf, fox, wolverine could not possibly get at this animal.





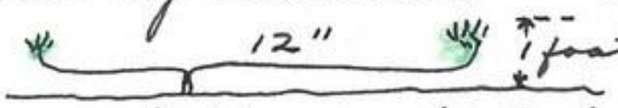
The entire chamber was lined with solid rock except a small 2 inch hole which was sealed with 2 yards of overhead rocks and dirt. The main chamber at back of corridor was about 3 times size of marmot and lined with mat of dry grasses which could be seen from front of hole. Den faced west with a vantagepoint 20' away. Examined several ledges used by Dall Sheep thus: The ledge giving rain protection overhead. The soil made of solid fecal pellets which had given rise to a luxuriant growth of grasses. The ledges in many cases were only 3 1/2 feet high which would exclude the large caribou as being involved. The fecal pellets were small, round and black. Inspected trapline of 50 set last night at 8:00 P.M. and caught 11 Clethrionomys, 7 microtus mucrus, 1 Lemmus (from refugia area). Old trap line produced 3 Clethrionomys. It has been my experience that most of the Clethrionomys are caught the first night of trapping and show complete coverage of the mice of their community. Temp. midnight 42°F, min 42°F, max 52°F.



Aug. 5, 1952

made trip up Chamberlin Canyon to glacier to determine whether marmots go beyond the valley slopes of Lake Schrader, Lake

Peters and Carnivore Canyon and invade the lateral canyons. Enroute photographed (520805-1) willows which had been trampled by caribou. One willow 12 inches long in prone position

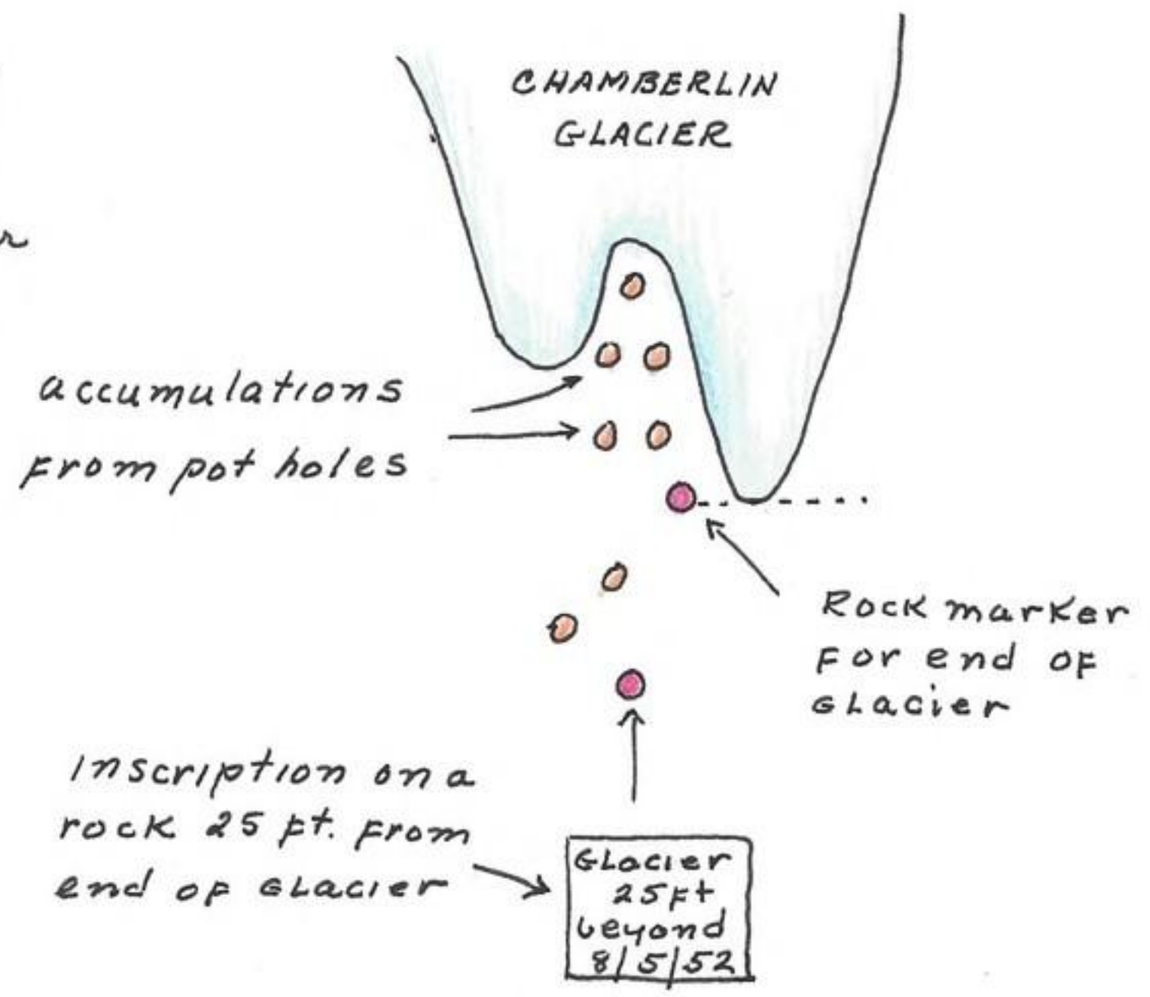


. most of the willows which grew low are better protected than those from 2 to 3 feet high which are easily grazed by caribou. Some willow, however, are grazed to complete barreness while others 20' away are almost in full leaf and flower. Most areas in main line of migration are completely denuded of vegetation. Noticed some branches broken at great elevation as they show effects of continual prying back and forth and around, looking more like bear activity than caribou.

Photo 520805-2 of caribou trails leading north down off rocke mountonné to alluvium in a more or less straight line. Some ledges require a jump down of about 3 feet. Photo 520805-3 of marmot den area (3773 foot elevation den) and Dall Sheep protective ledge. Snow peak of Chamberlin beyond. Photo 520805-4 up canyon beyond Lake Peters. Photo 520805-5 up Chamberlin Canyon with peaks and glaciers in background. Photos of the Chamberlin Canyon area taken about 2:00 A.M. Continued up canyon on north side among rock slides. Arrived base glacier at 4:00 P.M. Photo 520805-6 of glacier wall and high glacier beyond. Dark lines show fracture and stratification lines. Photo 520805-7 Close-up of pot hole in ice at end of glacier (500th second) Photo 520805-8 same as above (end of roll). The pots show about 9 deposits from the last moraine. Photo 520805-9 of outwash plain between no. 3 and no. 4 terminal moraine and presumably area previously occupied by the glacier mass.

Placed a marker of stones at the end of the glacier and in case glacier advanced, another inscription on a large rock 20 feet beyond the end of the glacier. As far as I know this is the first time this glacier has been defined and marked.

Mt. Chamberlin can be more easily ascended from the south ridge.



520805-117

520805-4

Photo 520806-4 of Carnivore Canyon to S of Lake Peters (lower right leads into lake over a broad delta. This photo is from the "mammals of northern Alaska" and does not have the contrast of the original print from which it was taken (no 520806-4) a color transparency.

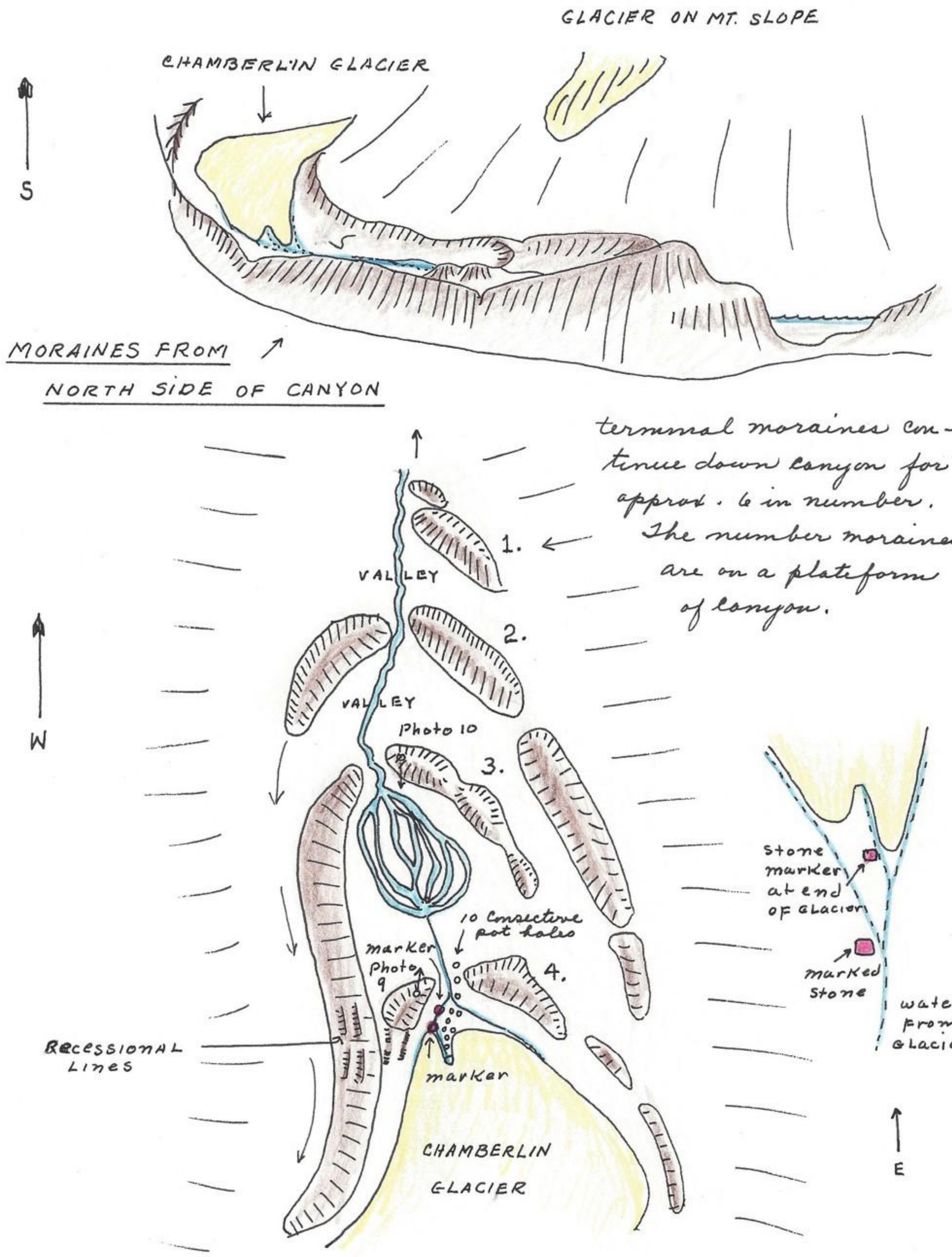
mount mary Range is on left hand side of phato of which mount mary is the highest point. The northern end of the range cannot be seen in this photo. Several glacier and hanging valleys can be seen. It is assumed that these hanging valleys represent the height of glaciers that originated at the head of Carnivore Canyon.

James Robert Glacier and James Robert Lake are at the head of Carnivore Canyon, both out of sight in the photo. Note that dranages of the delta of the canyons from mary Range are at present on the north or downward side of the glaciers.

The abovephoto was sent to Terry Vaughan, Oct 21, 1971 who used it in his book on mammals. Also sent slide no. 520802-3.

520805-118

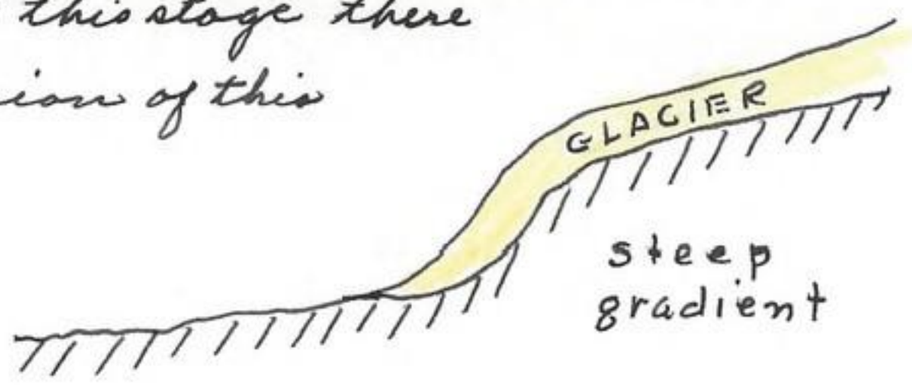
CHAMBERLIN GLACIER
BROOKS RANGE



AREAL VIEW OF TERMINAL MORAINES BEYOND CHAMBERLIN GLACIER

520805-119

Photo 520805-10 from top moraine 3 shooting east up canyon. Because of the angle of the glacier at this stage there will probably be a decided recession of this glacier in the nedt 50 or so years.



In the valley immediately below the glacier, did not see the tracks of bear, wolf wolverine or see or hear a marmot or squirrel. Caribou tracks only and these fewer in numbers than on the lower reaches of Chamberlin Canyon. Re return elevated wounded marmot from den placing a trap as far back in chamber as possible. Even when marmot was caught by leg it could not be removed because of its forceful resistance and ability to brace body against corridor. It was only by strangulation with a pole that I was able to remove it. This male marmot is no 520805-11 (see notes of yesterday). At mouth of Chamberlin Canyon 3 golden eagles sailed south over marmot area on N side and solicited calls from 4 marmots. They flew at about 3800 ft elevation. Last night temp. at midnight 33°F, min. 33°, max. 52°F. Sky at this hour 7 candlepower (Weston reading) to north and sky directly above 1.

<u>Mount Mary, S end Lake Peters, 45°10'02", 69°20'30", 2900 ft., Brooks Range, Alaska</u>

Aug. 6, 1952

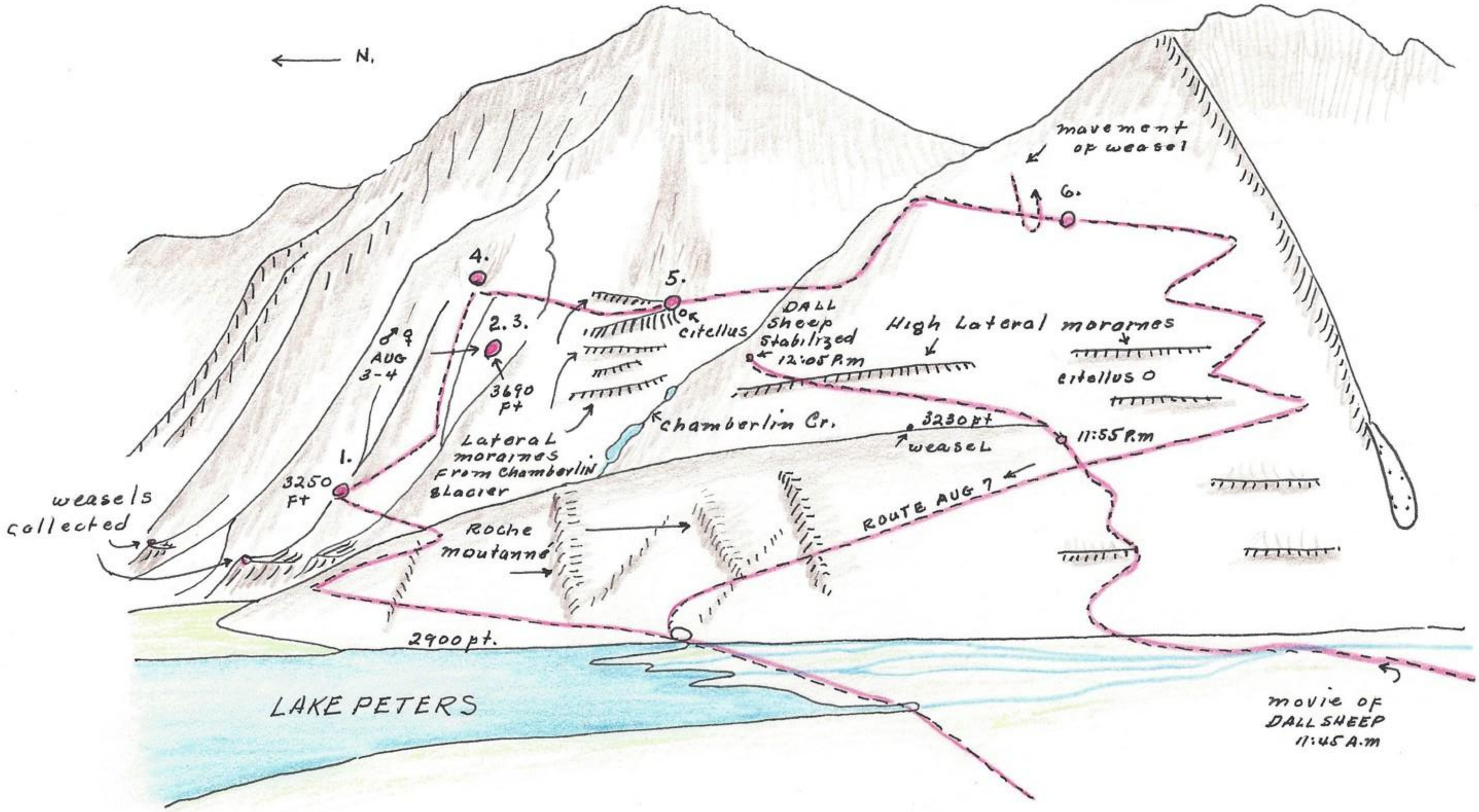
At 9:30 A.M 2 caribou, one grey and one small black one passed N on east side of canyon. They moved slowly and were bothered by flies. Original flock of 8 pectoral sandpipers now seven after having collected one yesterday. White snow melted off glaciers for first time since our arrival at Lake Peters area. The glaciers are now stained and are greenish blue in places. Ed. observed one wolverine on east side of valley just north of Chamberlin Canyon. The two immature short billed gulls arrived for first time at south end Lake Peters. They called frequently. The adults flew higher than the young and were concerned and acted by calling and diving. Ed caught 2 weasels on brink of moraine bench which seemed to be a favorite place for squirrels and for weasel movement.

Aug. 7, 1952

morning clear. Bald cumulus clouds for first time this

MARMOT LOCALITIES

As seen from camp at Lake Peters



5208807-120

afternoon. Wind from N and moderate in speed. Bill Irving and Joash Tuckle (Inuk) left for N end of Schrader Lake. Spent 8 hours on mountain for marmots (see map). There were no marmots seen in areas where I always had seen or heard them. The situation can be explained thus:

1. Marmots do not spend time on rocks when mosquitoes are extremely numerous and are biting, and which is the case today which is the greatest mosquito concentration since I have been in this area. These dipters would drive most any animal into dew quarters.

2. The day is warmer than usual and at times windless which may not be suitable for marmot activity. The usual favored atmospheric conditions for marmots are cool, cloudy days with slight wind.

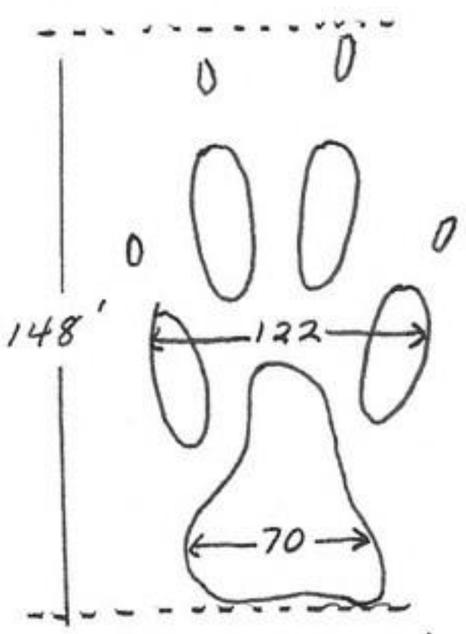
3. Atmospheric pressure preceding unfavorable weather.

4. Continual molestation by man.

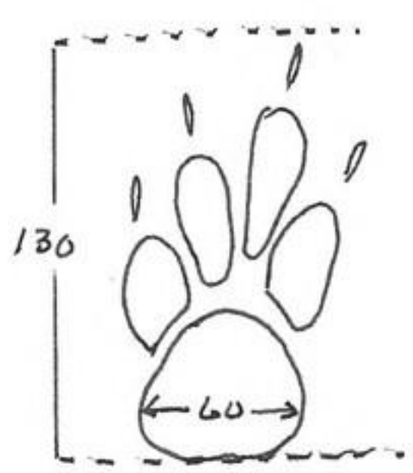
The mosquito factor seems most likely as the cause of marmot inactivity. When the first two marmots were collected and place aside, they were completely covered with mosquitos in about 5 minutes, especially around the eyes and nose. At 4:00 P.M. watched a microtus miurus in shade of west mountains move about like a pony. They are more pruned to move about than other microtines in the area. Temp. at midnight 42°F, Max. 58°F, Min 28°F. for the last 24 hours.

Aug. 8, 1952

Trip up Carnivore Canyon south of Lake Peters to James Robert Glacier, starting at 12:20 P.M. (see 2 maps). At mouth of first major canyon, to top of Mount Mary, found a wolf track in direction of movement of last group of caribou going south up Carnivore Canyon. Most recent wolf tracks going down canyon toward Lake Peters. Measurements of these wolf tracks are: (in mm)



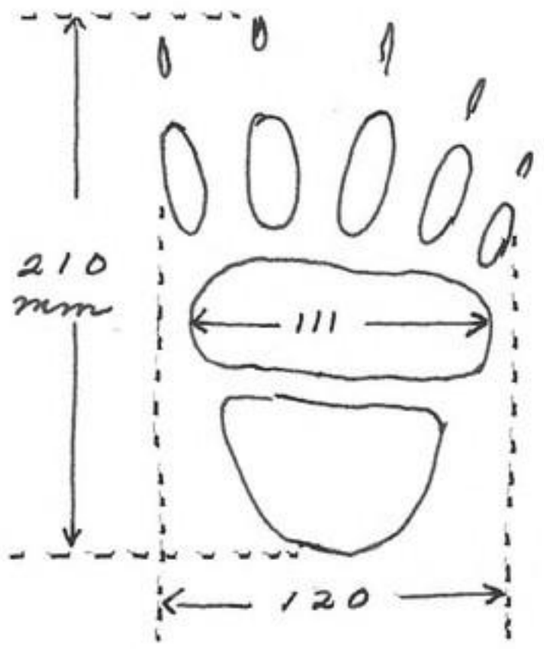
Front Foot

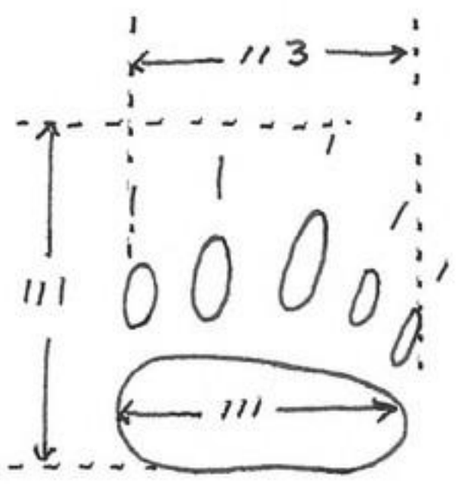


Hind Foot.

measured water level (highest) above present water level along edge of Carnivore River at 520mm. All debris consisting of dry plants, fibers and white caribou hair which had been introduced into water during fording of the river by caribou. Creek at 3125 feet elevation muddy and smaller

than main creek from east. at 3175 feet elevation (1:25 P.m) measured front foot imprint of wolf as 120 mm. at 3330 ft. measured track of grizzly bear (tracks going up canyon):

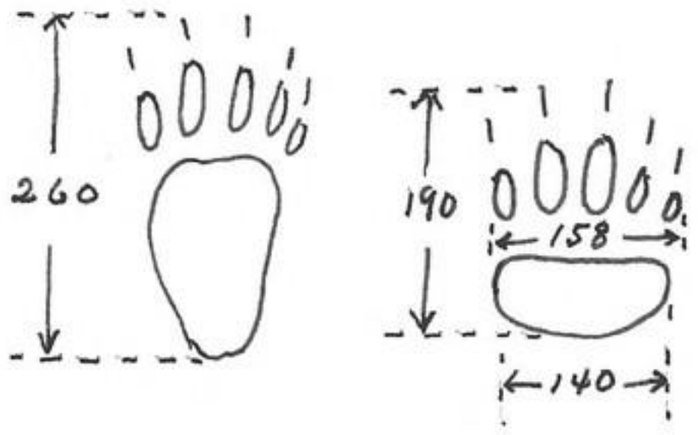




measured two other grizzly bears front paw imprints as
130 total length
120 width of pad
155 " phalanges

145 total length
125 width of pad
170 width of phalanges.

The wolverines, like bears go across muddy places without selectivity of dry ridges or rocky footings which the wolf will generally choose. at 3280 ft. took photo 520808-3 of caribou trails, river and distant mountains. Photo 520828-4 at 3340 ft. (3:12 P.m) of creek and canyon (3rd major on east side of Carnivore River from Lake Peters) with elevated glacial benches. Imprint of grizzly bear here (front paw 160 mm long) and trending up canyon. Old track but since caribou passed by July 26. First of Carnivore Lakes at 3:35 P.m at 3385 ft. Wolf and wolverine tracks around lake. Photo 520808-5 head of Carnivore Lake at 4:00 P.m at 3482 ft. Bear tracks more numerous than at lower reaches of Carnivore River near Lake Peters. Wolf tracks with front paw 140 mm. These lakes are called Carnivore Lakes because of the number of carnivores inhabiting the canyon. The caribou hair & debris left from high water of river is 260 mm above present shoreline. Lakes 3400 feet supported a bear track measuring 260 total length and 150 mm wide near caribou killed July 26. All meat gone. At 4:25 P.m at first gate above last of Carnivore Lakes measured front and rear bear paw as:



Wolf imprint in same area 120 mm length front and 130 front paw.
Photo 520808-6 of Cascades and glacier in background at 4:45 P.m at 3585 ft.
Photo 520808-7 of James Robert Lake and James Robert Glacier beyond at 4:50 PM at 3600 ft. From the outlet of lake (solid rock) collected

520808-123

Photo Bar 436-033, obliques of Schrade - Peters Lakes area (either U.S Navy or army - used by Brosgue)

SCHRADER LAKE

LAKE PETERS

WHISTLER CREEK

SPAWNING CREEK

citeltus areas

15 CARIBOU JULY 15 1948

polygons

WOLVERINE JULY 15 1949

CAMP NO 1

WOLVERINE JULY 15 1949

MOUNT MARY

CAMP 2

CARNIVORE RIVER

MOUNT CHAMBERLIN

MARY RANGE

3000 ft.

3125 ft

3170 ft

3230 Ft

3260 ft.

3285 ft

3600 ft.

JAMES ROBERT L.

JAMES ROBERT GLACIER

Barren-ground grizzly June 28 1948 (2 inches off map to east)

690 20'

69° 20'

145° 10'

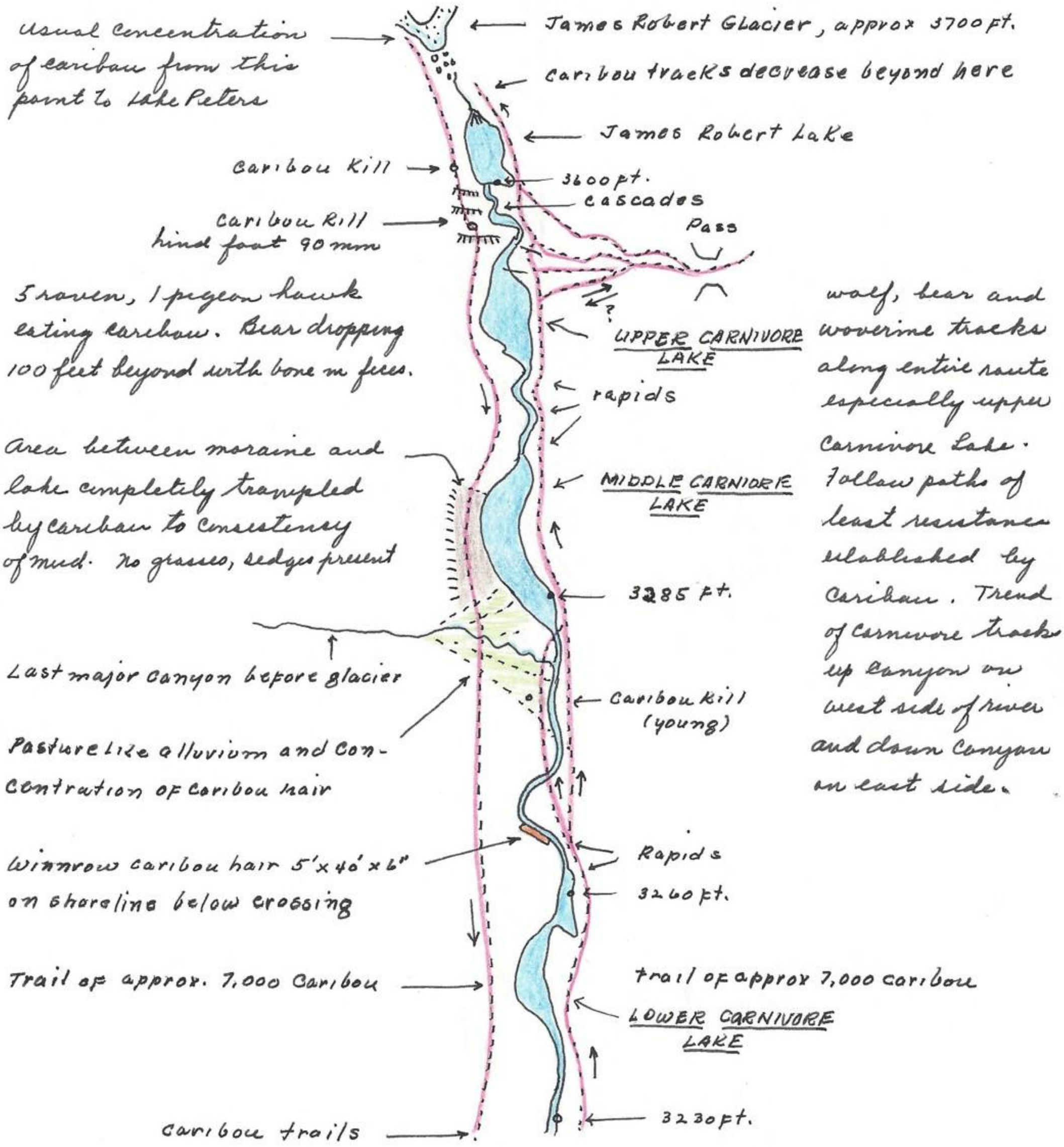
145° 00'

69° 15'

SCALE 1-9600

MAP FROM: PRELIMINARY COPY, NAVAL PETROLEUM RESERVE NO. 4. MARCH 1948, USGS.

520808-124



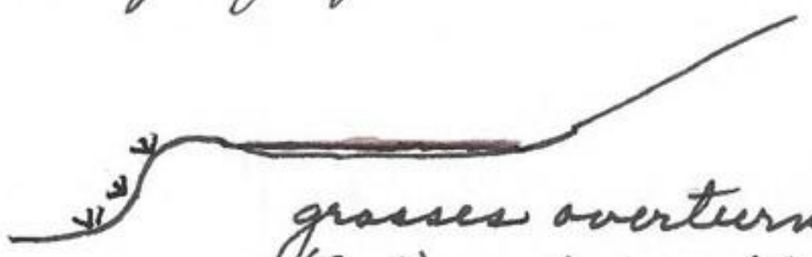
CARNIVORE LAKES

Upper limits of Carnivore Canyon and river south of Lake Peters showing caribou trails and other observations. Elevations establish with sensitive altimeter with base of 2900 at Lake Peters.

three specimens of grasses and sedges, no (520808-9) Carex montanensis (520808-9) Trisetum spicatum var. molle (richt.) Beal and (520808-10) Poa arctica R. Br. The only birds observed at James Robert Lake were some sandpipers of about pectoral size. One island in lake is green and may be near complete inundation at this time. Crossed river at braided river system below outwash plain of glacier. This lake appears to be rapedly filling in from glacial sediments. James Robert Lake and James Robert Glacier is a new name given to these physical features.

Departed James Robert Lake 5:30 P.M. It would appear that a main movement of caribou came down from glacier area in full numbers while the up canyon group depreciated in numbers beyond the lower edge of James Robert Lake. This would imply that a certain number of these animals had moved up over the divide or had joined the group coming down the canyon, crossing over at about the second rock gate below James Robert Lake. On the west side the bear, wolf and wolverine tracks became as numerous as the caribou tracks. The tracks are, in general, up canyon on the west side and down canyon on the east side of Carnivore River with occasional crossing over when creeks provide short cut. At 6:00 P.M at first main rock gate found 5 raven and 1 pigeon hawk feeding on a caribou kill. The pigeon hawk was first seen as it darted back and forth at the raven. This kill was an old animal and probably had fallen from steep slopes between gates. A fresh bear dropping with bone includes was 100 ft from the kill. 6:20 P.M bear tracks going up canyon measured 190 mm total length, 145 greatest width, 116 width of pad. most bear tracks on this side (east) are going down canyon. 6:25 P.M small bear track down canyon 170 length, 100 width. a bear track going up canyon (east side) measured 250 length (including claws), 130 pad and 150 width at ~~phlanges~~ phalanges of back foot and 150 total length, 130 pad and 160 width across phalanges. 7:10 P.M young caribou kill and broad alluvium from major canyon from east. This animal had probably died of injury or disease and was then eaten by wolves.

Found evidence of soil creep which was instigated by caribou. Caribou could be a factor in soil creep or solifluction terraces



grasses overturned (sod) and overflowed by mud created by caribou

Citellus first seen at 3100 ft opposite Cirque canyon on west side of Carnivore River. From this point found evidence of Citellus to Lake Peters. I did not see Citellus south of this point. Eriophorum is the only plant that is able to survive the trampling of Caribou. Eriophorum will stand out as unaffected with mud ankle deep between each hummock, other sedges adjoining will be flattened out completely. Arrived camp 10:00 P.M. no marmots heard on this 18 mile trip. Temp. midnight 50°F, max —, min. 38°F. for last 24 hours.

Aug. 9, 1952

Pulled 150 traps set for Clethrionomys left untouched since Aug. 5. (see catalogue for catches). Collected conspicuous mosses and lichens from north exposure of moraine 600' south of camp and hill slope (N. exposure) at Weasel Point. Taken mainly from among rocks and recesses among cliffs, 30 x 30 meters area. The area is mount Mary, S end Lake Peters, 145°10'02", 69°20'30", 2920 ft., Brooks Range Alaska.

520809-52 Cladonia coccifera (L.) Willd. by E. Dahl
520809-52 Sphaerophorum globosus (Huds.) Vain.
520809-52 " fragilis (L.) Pers.
520809-53 Cladonia gracilis v. chordalis (Flk.) Schaer.
520809-57 " amaurocraea f. otyceras (Ach.) Wain
520809-57a " gracilis v. chordalis (Flk.) Schaer.
520809-57b " pyxidata (L.) Hoffm.
520809-58 " sylvatica (L.) Hoffm.
520809-58a Rhytidium rugosum (Hedw.) Kindb.
520809-60 Stereocaulon paschale Hoffm.
520809-65 Cladonia sylvatica (L.) Hoffm.
520809-66 Parmelia separata Th. Fr.
520809-68 Cladonia gracilis v. chordalis (Flk) Schaer.
520809-71 Peltigera membranacea (Ach.) Nyl.
520809-75 " " " "
520809-76 Cladonia gracilis v. chordalis (Flk) Schaer.
520809-80 Peltigera polydactyla (Neck.) Hoffm.
520809-83 Cladonia gracilis v. chordalis (Flk) Schaer.
520809-87 " " " " " "
520809-94 Cladonia sylvatica (L.) Hoffm.
520809-95 Cladonia alaskana
520809-98a Cladonia sylvatica (L.) Hoffm.
520809-100 Stereocaulon paschale Hoffm.
520809-103 Cladonia gracilis v. chordalis (Flk) Schaer.

Clethrionomys, and to a lesser eftent M. miurus use this plant community, not because of a faad use, but because it just happens to be available as accessory to grasses and sedges. Collected conspicious grasses and sedges, from area from slopes and alluvium just sauth of camp.

520809-13	Eriophorum Scheuchzeri Hoppe.
520809-14	Carex podocarpa R.Br.
520809-15	Poa arctica R.Br. (?)
520809-16	Carex aquatilis Wahl. var. stens (Dreyer) Booth.
520809-17	Hierochloa alpina (Swartz) Roem. + Schultz.
520809-18	Arctagrastis latifolia (R.Br.) Griseb.
520809-19	Carex misandra R.Br.
520809-20	Alopecurus alpinus J.E.Smith.
520809-21	Carex podocarpa R.Br.
520809-22	Luzula
520809-23	Carex podocarpa R.Br.
520809-24	Carex membranacea Hook
520809-25	Carex lugens Holm
520809-26	Juncus
520809-27	Festuca ovina L.
520809-28	Trisetum spicatum var. molle (Michx.) Beal
520809-29	—
520809-30	Poa arctica R.Br.

These grasses and sedges occur at very conceivable place wherever moisture conditions are favorable asdas water is in all situation because of permafrost interference with drainage, the plants are not confined to the usual drainage pattern beyond the permafrost zones. Except for certain grasses and sedges predominating as extensive coverage in valley flaors, the grasses are generally distributed as individual clumps on slopes. Temp at midnite 42°F, min 42°F, max 70°F. Fog developing at Channel between Lake Schrader and Lake Peters and at lake where Chamberlin creeks enter. (see Aug. , 1952 for insert)

Aug. 10, 1952

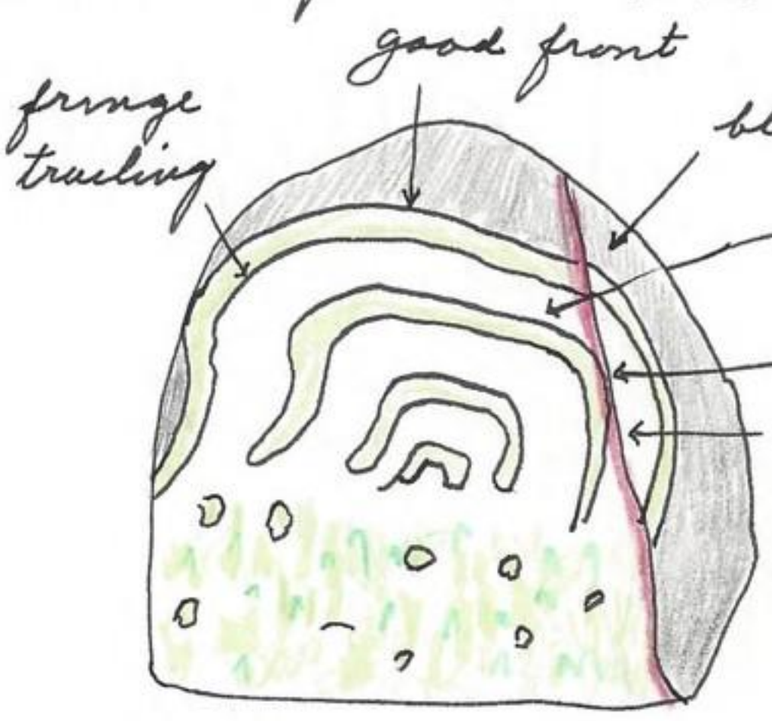
Movie up canyon from marmot den at 3773 ft on east slope east of Lake Peters Photo 520810-1 of mount Mary shore lines and camp. Of the birds in area would rate their frequency as: Pipit most common around lake but only 5 or 6 in a short trip from camp. Wheatear uncommon and in rocks. Redpoll occasional. Raven occasional. Eagle every day.

520810-128

Observed 14 pipits today at rock shelter on SE side of Lake Peters. They are collecting into flocks and at this point were bathing at the edge of the lake. At camp (300' to west) measured wolf track going up canyon and passed by last night or today (back paw 125 length x 93 width; front paw 140 mm length (including claws and 100 mm wide). Caught grayling 520810-2 at camp. If a grayling gets caught it pulls line into current of stream entering lake; if lake trout pulls line lakeward. Trout caught this P.M 520810-4. Temp. midnite 50°F, min 40°F, max. 63°F.

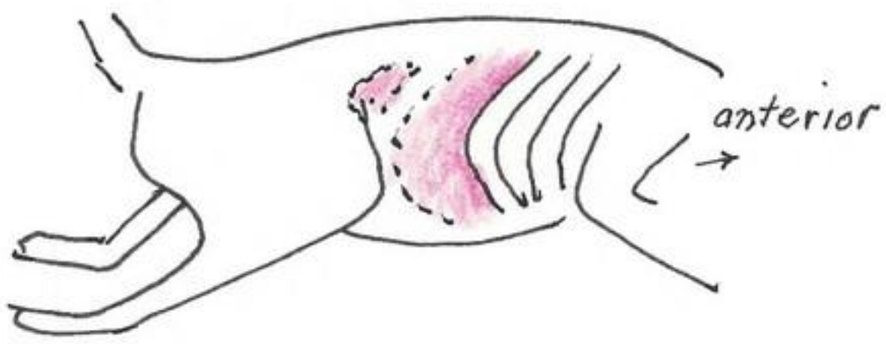
Aug. 11, 1952

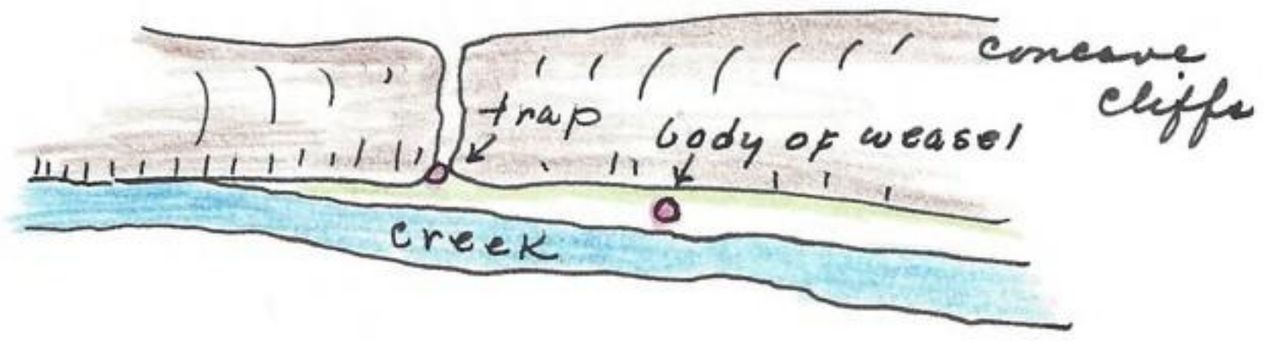
Recorded peculiar mass-lichen pattern on angular rock



when the successive layers of lichen reach a sharp edge (red) they continue as if on a continuous flat plane although going sometimes in an opposite direction. Caught a mustela ermnea 520810-1 from weasel trap which had been pulled from the trap (hind part of body and front leg) 10 feet away and partly eaten by another ? weasel. The body had been prepared for eating but had stopped before actually starting on the vital organs.

all organs exposed but not eaten including lungs, liver, heart, stomach (hair gone in area exposed). The head, neck, one front leg still in trap and not touched.





Checked marmot on west side of canyon. It called at 1½ blocks 3 times, then again at ¾ blocks. Approached unnoticed to 100 ft

INSERT
Aug. 10, 1952

520810-128.1

ARL Junior
Umiat, Alaska

9 August 1952

Mr. James W. Bee
Peters Lake, Alaska

Dear Jim:

George Gryc told me that you proposed to go to Anderson Point when you leave Peters Lake, for a stay of about five days, and then to come into the White Hills area for another station.

Anderson point is impractical for ARL operations, Jim. It is even farther from Umiat than Schrader, and the pilots tell me that a refueling stop would be necessary at Schrader each flight. In addition, in making flights there we would have to contend with not only the higher clouds in mountain passes, but also the coastal fogs which might be at Anderson Point. Even with luck, and no abortive attempts to get you there and back, we would still have at least six or eight extra hours flying to make. There are a number of reasons a station at Anderson is out of the question.

I took the matter up with Dr. Wiggins over radiom. Reception was bad, and he couldn't understand clearly, so he came to Umiat that night. He discussed the proposal with ArCon and Alaska Airways, and all felt it inadvisable.

I assume that you will come from Peters lake directly to some lake in the White Hills area. Please advise the pilot when you want to be picked up from that station. Being in lower country, weather should not be such a problem.

Livingstone and Leahy are here now, will go to East Oumalik in a day or two. Rawson is here also, and is about to go south to Fairbanks. A number of investigators have departed for home. Steere is going the 18th. We hope to close Little ARL by the 25th. Cade and Schaller were spotted on the Colville about ten miles below the Awuna river, so are well on their way to Umiat. Flew down to the Delta with Leopold, Darling, and Treichel, and left a message for Irving. He has answered that he will be ready for pick-up. So things seem to be under control.

The weather here this last week has been perfect. Too hot, up to 75, and not a cloud in the sky. Hope it has also been good for you fellows. Looking foreward to seeing you, and hope that the stay at Peters and White Hills will net you some interesting things.

Yours sincerely,

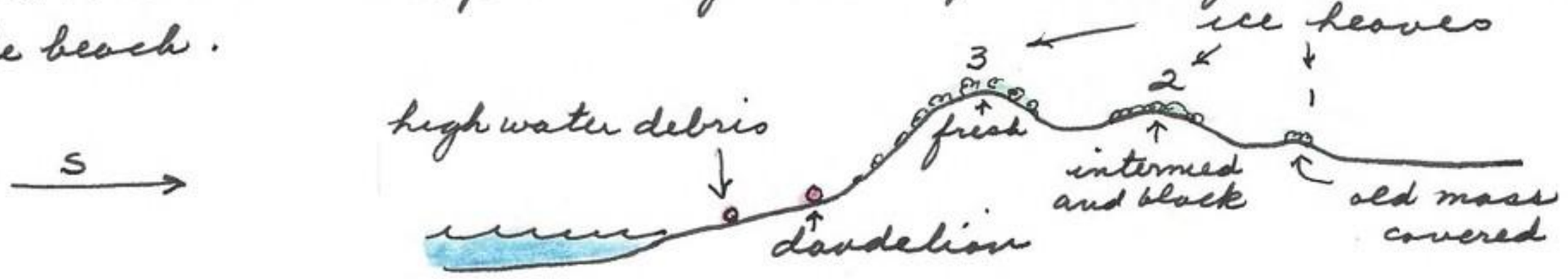
Gryc

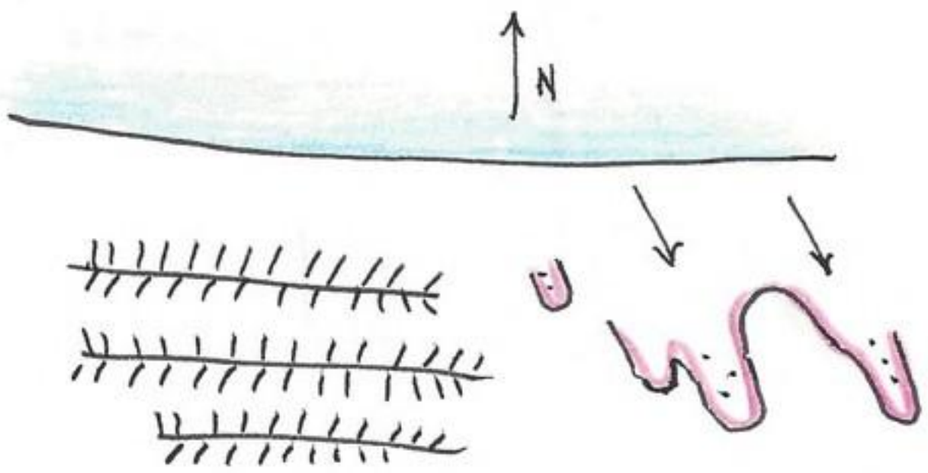
and just as I raised above rocks it passed down into rocks. Waited 2 hours and marmot did not reappear. Walked over to den among large boulders and heard it directly below. It called as long as I remain near den. Returned to camp and did not hear the marmot again. The second animal, hit by .22 some few days ago did not appear and must have died leaving only the one. Temp. midnite 44°F, min 42°F, max. 52°F.

Aug. 12, 1952.

Rained last night and today. Collected following grasses along drainage creeks flowing across the alluvium at camp. no 520812-1 and its various life forms from edge of creeks and on islands, where it is in many cases the dominant grass, Arctagrostis latifolia (R. Br.) Griseb. This grass, wherever it occurs, gives adequate overhead protection for Lemmus and microtus murus. Grass no 520812-2 Poa arctica R. Br., associated with Arctagrostis l. but not dominant. The sedge 520812-3 Carex podicarpa R. Br. is generally distributed in damp situations. no mammals in 30 traps set in Refugia Cove but there are a few trails there. water is flooding nearly all inhabitable areas of this cove. About 24 Cottids (fish) in small spring traversing the marsh of the cove. Occasional rock falling from N. E. exposure of Mt. Mary and on east side of canyon because of excessive moisture from rain. Caught a lake trout ♀ which came out of water as a normal colored fish but with extra greenish back and when exposed for 3 minutes in the air it changed to a ghastly white, loosing the black dots and green back. Other lake trout have partially changed color but not as dramatically or so completely as this one. Snow down 300 feet in glacier fields. Since the ♀ short-billed gull and one of its young have been collected, the ♂ and other young have remained in area at south end of Lake Peters and tonight are active at 9:00 P.M. No sandpipers and only one semipalmated plover present. Heard raven up canyon this A.M. Rain started at 4:00 A.M & continued to 12:00 noon afterwhich rained intermittently until 7:00 P.M. Water now running out of most dry gulches and from all canyons originating on Mt. Mary. The dry gulch S E of camp on east side of canyon with a wide conspicuous ribbon of water from it head source to main river but not of proportions to cause mud flows which have occurred in the past and sent

several fingers of debris to the end of the alluvium. Collected a dandelion 520812-4 Taraxacum lacerum Greene. from gravel beach at camp. Only 5 other specimens of this dandelion on the beach.





This year ice leave on relatively low ground near mouth of Carnivore River but some years the ice has been force high on ground.

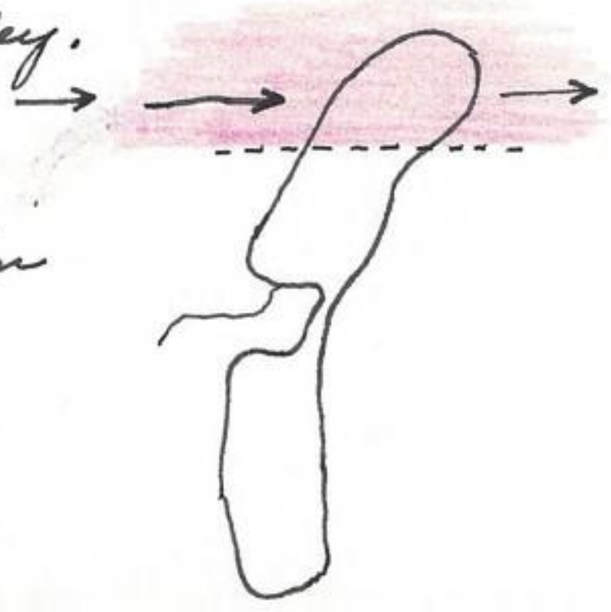
Wind last night from S at 1 P.M. Today from north. Visibility 10 miles. Water high in creek and water cloudy. Fish line set since yesterday at camp has caught 2 trout. Photo 520812-5 of Dall Sheep horns at camp (on no 3 ice leave at edge of the south end of Lake Peters.

Mount Mary, S end Lake Peters, 145°10'02", 69°20'30", 2900ft., Brooks Range, Alaska

Aug. 13, 1952

Rain began at 3:00 A.M and continued to 12:00 P.M. Clouds 1/2 down mountain to about 4000ft leaving snow. This afternoon rained all day. At 9:00 P.M clouds down to 3280 ft. Lake Peters clear of clouds but north beyond L. Peters clouds to ground and south of L. Peters to ground. This lake seems to be freer of clouds and snow than either N or S of the lake. This condition may account for destribution of marmots & Cetellus in the area and indicates a moderating influence of the lake. It is a common occurrence of clouds (ground level) to push east across the north end of Schrader valley.

This evening set 50 museum special traps on moraine west of camp and also 1 squirrel trap at entrance of a used hole. Ed. returned from cache at



N end of Lake Peters and reports: (route west side of lake)

1. golden eagle 4/5 way N along lake.

2. Approx. 50 Citellus and would be many more if trapped. Many colony sites.

3. Wilson snipe in polygons at N end L Peters.

4. 7 flocks of 11-16-20-10 Smiths longspur in meadows at N. end Lake Peters.

5. Pipit only bird along west side of lake.

This evening while setting for Lemmus, one ran out into sand and remained motionless for about 20 seconds and then returned to protection of grasses and sedges. The extensive grass and sedge field across valley SE of camp are all flooded and not likely used by mice. The areas along creek at base of mt. show signs of habitation. Temp. midnite 42°F, Max 58°F, Min 42°F.

Aug. 14, 1952

Snow now to 5,000ft. Rains continuously! Trap line produced Clethrionomys and microtus miurus. Collected fern from among rocks 520814-1. Cassiopia tetragona 520814-2 and the dominant plant on more exposed areas and general coverage beyond north exposures to damp situation. At 6:45P.M temp Lake Peters 39°F. main creek temp at camp 37°F. Present temp 43°F. at midnite temp. 32°F, min 32°F, max 53°F.

Aug. 15, 1952

Snow last night to valley floor. Until now the secondary canvas wedge pole fly kept out rain but now the snow is blowing between 2 layers and the melted snow is coming into tent. The distribution of snow in area is as follows:

1. 1:00 A.M 3020 ft.
2. By morning to valley floor
3. East on hills slightly above valley to north.
4. Entire valley up canyon
5. Best coverage NW Schrader Lake where it is pure white and no doubt the best deposit. Down to lake proper.
6. Whistler delta partially open (of snow)
7. At camp snow remained on ground until about 8:00 A.M and then started to disappear although still snowing a little.
9. Sphagnum masses and dwarf willow retain snow more than any other kind of vegetation.
10. North exposures retain snow longer than south exposures

because of vegetation cover and less heated rock potential.

11. Ice slush in some ponds on sidehill.

12. Lake about 4 to 6 inches higher. Creeks lower.

Exceptional differences in bird activity since snow of last nite.

1. 20 pipits at tent 10 feet or so away and on top of tent as if for social comfort.

2. no sandpipers in area.

3. Ptarmigan ♀ and 2 young in area for first time.

4. 8 wheatears on open alluveal fan but only 150 feet from rock retreat of moraines which they fly to when approached.

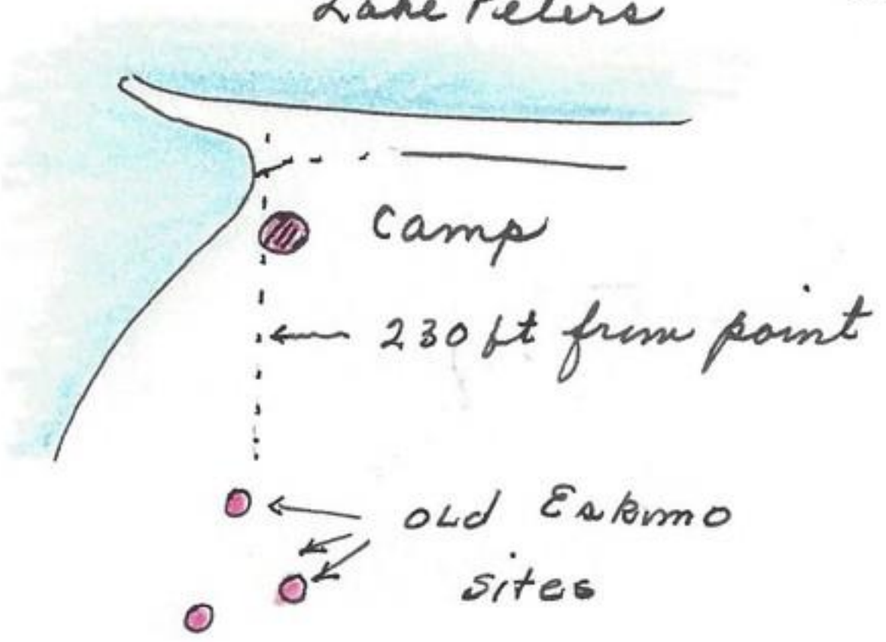
5. spotted sandpiper (immature) more consestently on shore-line.

Picked up fishing (Eskimo) spear 520815-1 at 30 feet north of old camp sete. The camp sites are not too easely found and represent a few irregularly placed stones which when removed shaw signs of charcoal and bones beneath. Usual masses and lichens completely covering old fire pits as on the surrounding area. Bill Irving trowled 2 inches deep and about 3 sq. yards and found a knife and a small collection of bones which he presented to us. no 520815-2 including three marmot skulls - 520815-3 520815-4 and 520815-5.

tent area

this

Other camps are on this alluvium at the south end of Lake Peters.



noon reading:

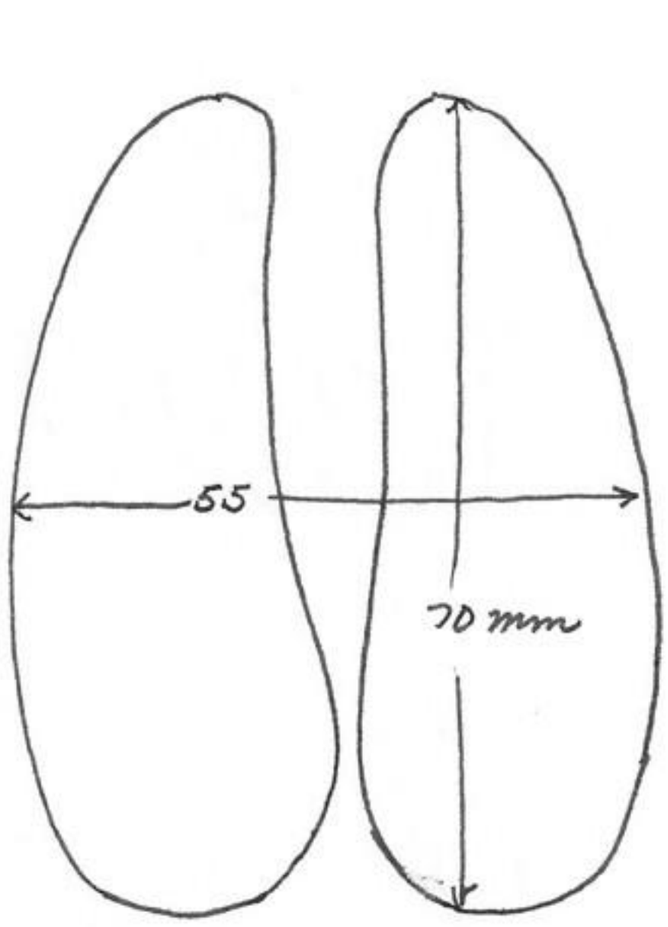
Present - 39°F

Max - 40°F

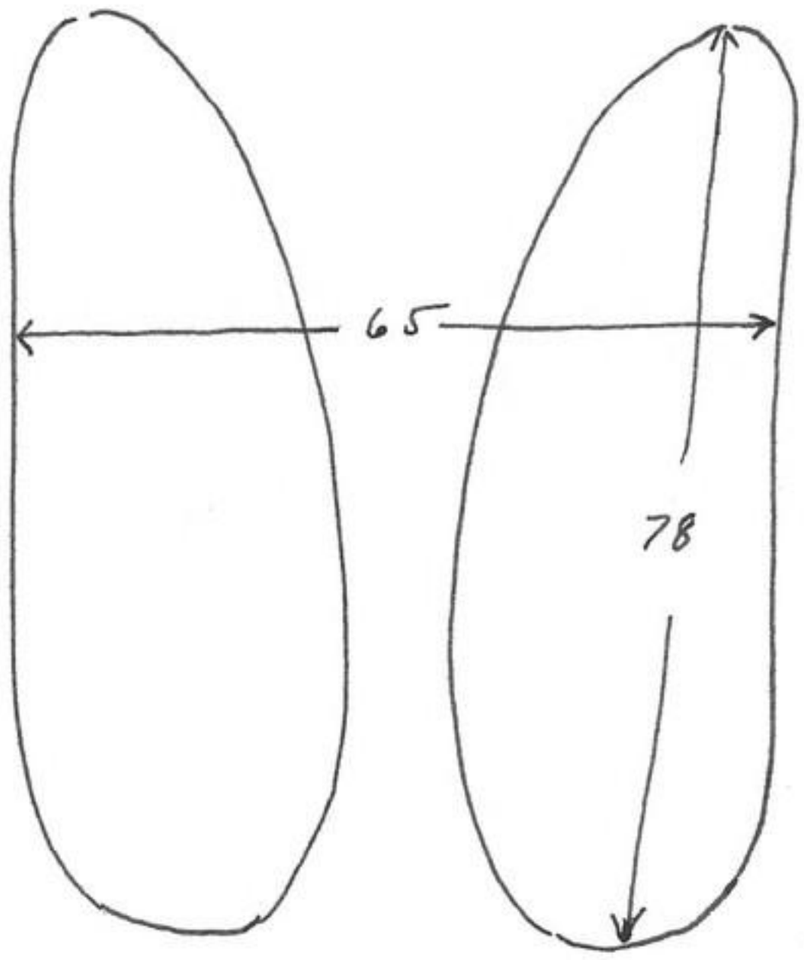
Min - 31°F

At 11:25 A.M observed one ♂ Dall Sheep on point at Weasel Point (see map) and dropped down to creek and thence to alluvium. It approached us at about 1800 ft at least 5 times, either walking or running as if testing in the same manner as did the wolf on a previous occasion. It crossed the creek at about 1000 ft and ran rapidly across alluvium to east side and after goining good elevation on mountain stabilized its movements. Crossing of valley from one mt slope to another is done only with great caution. Eagle alighted 150 feet from sheep at one time with a flock of small birds

circling around the eagle. Naturally the marmots were calling loudly but it would have been difficult to have determined just which animal they were most concerned with. The sheep forded the creek by 4 good jumps and after shaking itself continued on. It was last seen in snow just south of Chamberlin Canyon on about the hanging valley level. Copied the tracks of the sheep in sand along river. Back imprint turns out, front hooves turn in and less deeply inserted in sand.



Front



rear foot.

Lake temp 6:45 P.M 40°F, Creek 37°F. Temp midnight 33°F, min. 33°F, max 43°F. Snow line now up to about 3300 ft.

Aug. 16, 1952

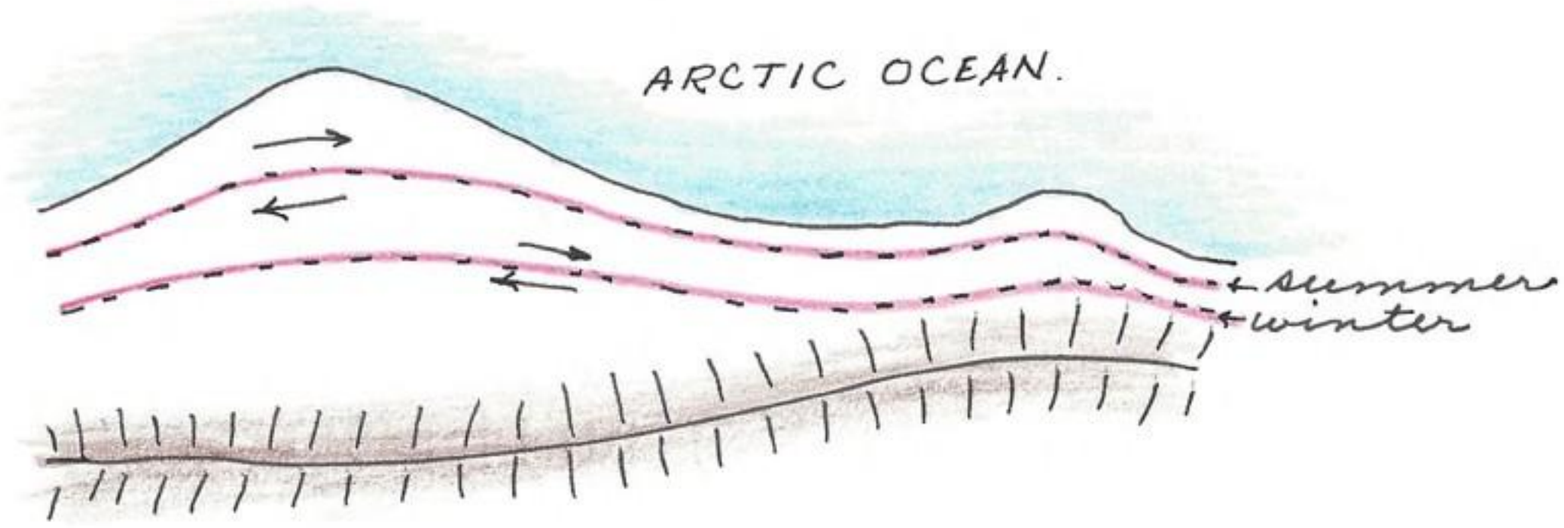
Snow line up to 4000 ft. Frost line lower. Harmon Helmericks arrived 4:00 A.M to pick up Irving and Tuckle. Departed 6:00 A.M after feeding them a breakfast. Helmericks reports: (see large field map for locations of sight records).

1. Barren-ground grizzly down to deltas of all rivers and along entire coastline (within 15 miles or so from the Arctic coast.

2. Some grizzlies almost black but with brownish hump always showing.

3. Caribou summer along the coast or along larger bodies of water inland. In winter, when ice forms on the coastal area, the caribou move back to a zone between the ocean and the plateau province where snow is powdry and ridges

exposed. There movements during both summer and winter are east-west or west-east rather than north-south.



4. In April the caribou are almost white in color and frequent high ridges like the Dall sheep, which they are frequently confused.

5. Pelage from yellow to shaggy greyish yellow, to black-brown to white according to the advance of the season.

6. In 1947 caribou moved up Shrader Lake valley (both sides) from flats to north of the lake, probably from Shubik valley or head Ladderachit.

7. Caribou segregate into age groups - bulls, cows, 3 years, 2 years etc. about this time of year (August)

8. no main herds in n alaska but continually breaking up and reforming into smaller or larger groups.

9. Eskimos can predict arrival of herds by conditions of mosquito population.

10. Dall sheep different at Schrader Lake from those west of Chandler Lake in being smaller and with black brownish horns. Chandler Lake forms have black horns and are larger animals.

11. Between Romanoff and Chandler counted 146 sheep. Best area SW Schrader country in the Romanoff mts.

12. Dall sheep in early winter form large herds in lower elevation in canyons. One Eskimo at Barter Island killed 140 sheep in one winter.

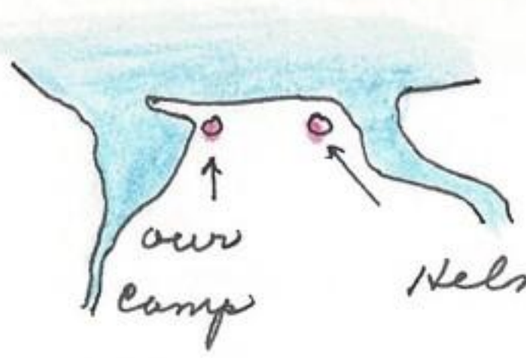
13. Ptarmigan high in population over entire country this year.

14. Alatna River most spectacular river south of Brooks Range.

15. Has ill feeling toward Pet 4.

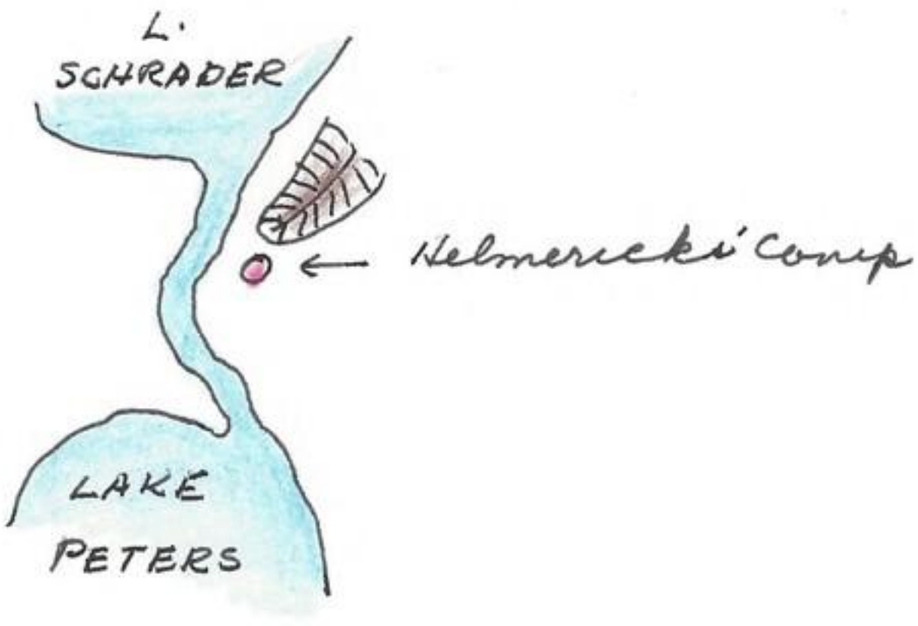
16. Thinks Hamilton in mountains due to motor failure, during change of belly gas to wing gas. Doubts ice crash as impossible to penetrate except in a lead.

17. While at S end Lake Peters camped east of our camp.

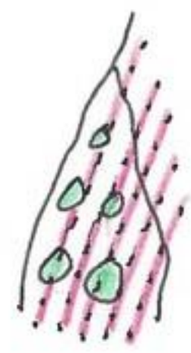


Helmericks' camp in 1947

and at North end of Lake Peters in old Eskimo Camp here:



Inspected trapline. microtus miurus has completed or constructed a pile of plants (2915 elevation) 520816-25 equivalent to 1 gallon in capacity. Other mice from 2 qts to 3 qwarts since yesterday. This increased activity is probably due to snow and extreme cold weather. Near each pile were from 4 to 12 test holes generally about 1½ inches deep and 1 inch wide. Many holes were excavated or cleaned out and represented by small dirt pellets, probably carried in mouth. The willow patch used by these mice had been completely stripped of foliage so they were required to use the next usable food. The mice (M. miurus) 520816-23 to 520816-28 all from area 30×40 ft and each building haystacks. At 12:00 A.M large cliffs were falling on east face of Mount Mary but before they came to rest at base of talus were almost completely fragmented. This situation caused by excessive rain and freezing weather. Marmots at 4000 ft level dew called this A.M. Collected 2 ferns 520816-1 from among rocks. Trapped weasel 520816-22 from squirrel trap on remnant moraine set. Yesterday caught a squirrel and placed it 10 feet from trap but weasel did not find it. 5 museum special traps were sprung in a row 150 feet from where weasel was taken and probably set off by this weasel. In new line of 50 traps up slope from set of 2 days ago, caught 19 microtus miurus, 2 clethrionomys. At 3:00 P.M. departed for Umiat. Took 50 feet of movie of snow covered ranges from



From: Dictionary of Alaska Place names. U.S.G.S. Prof. Paper 567, 1967 (reprinted 1971) Donald J. Orth.

Bee, J. W., and Hall, E. R., 1956, Mammals of northern Alaska on the Arctic slope: Kansas Univ. Mus. Nat. History, Misc. Pub. 8, 309 p.

Carnivore Creek: *stream*, heads at glacier, in Franklin Mts. flows N 9 mi. to Lake Peters, 9 mi. W of Mount Michelson, Brooks Ra.; 69°17′ N, 145°02′ W; (map 139). *Var.* Lake Fork Sadlerochit River.

So named by Bee and Hall (1956, p. 295) because the flat floored canyon of this stream is the frequent habitat of the carnivorous grey wolf (*Canis lupus tundrarum*).

Carnivore Lakes: *lakes*, three, along course of Carnivore Creek, in Lake Peters area, in Franklin Mts., Brooks Ra.: (map 139).

Name published by Bee and Hall (1965, p. 296).

James Robert Glacier: *glacier*, in Lake Peters area, in Franklin Mts., Brooks Ra.; (map 139).

Name published by Bee and Hall (1956, p. 296).

James Robert Lake: *lake*, in Lake Peters area, in Franklin Mts.; Brooks Ra.; (map 139).

Name published by Bee and Hall (1956, p. 296).

Mary, Mount: *mountain*, 2,920 ft., at SW end of Lake Schrader-Lake Peters Channel, in Franklin Mts., Brooks Ra.; 69°20′ N, 145°08′ W; (map 139).

Name published by Bee and Hall (1956, p. 295).

Mary Range: *mountains*, 7,700 ft., extend N 18 mi. from crest of Brooks Ra. to the mouth of Whistler Creek, between Whistler Creek on W and Carnivore Creek on E, in Franklin Mts., Brooks Ra.; 69°15′ N, 145°10′ W; (map 139).

Name published by Bee and Hall (1956, p. 295).

Weasel Point, *ridge*, near S end of Lake Peters, Franklin Mts., Brooks Ra.; (map 139).

Name published by Bee and Hall (1956, p. 295).

Whistler Creek: *stream*, heads at glacier in Franklin Mts., flows NE 11 mi. to Lake Schrader, 19 mi. NW of Mount Michelson, Brooks Ra.; 69°22′ N, 145°03′ W; *BGN 1960;* (map 139). *Var.* Snake Creek.

Named by Bee and Hall (1956, p. 295) in August 1952, for the whistlelike call of the hoary marmot (*Marmota caligata broweri*).

Spawning Creek: *stream*, flows NE 4 mi. to Lake Schrader, 20 mi. NW of Mount Michelson, Brooks Ra.; 69°22′ N, 145°04′ W; (map 139).

Named in July 1952 by Bee and Hall (1956, p. 295).

Right column: new name which I proposed.
Column above: Enteries in Dictionary of Place Names.

[INSERT] 520816-135.1

From: mammals of northern alaska. Univ. Kansas natural natural History, misc Publ. no 8, march 10, 1956 James w Bee, E. R. Hall.

Mount Annette, 146°28′51″, 68°50′38″, approximately 5700 ft. (Mount Annette is the name here applied to the previously unnamed mountain in the Annette Range—also a new name—south of Porcupine Lake between the Canning River and the Ivashak River.) (July 17, 1952.)

not included in dictionary of Alaska names but on recent (1956) USGS topo. map of Arctic, Alaska 1:250.000.

Carnivore Lakes (Carnivore is the name here applied to the three previously unnamed lakes at elevations of 3260, 3385 and 3400 ft. between 69°18′ and 69°17′ on Carnivore River (new name) which flows from James Robert Lake to Lake Peters). (Aug. 8, 1952.)

named a river but listed in Dictionary of Alaska Place Names as a creek.

James Robert Lake, 145°10′00″, 69°16′30″, 2600 ft. (James Robert is the name here applied to the previously unnamed lake.) (Aug. 8, 1952.)

James Robert Glacier, 145°09′, 69°16′, approximately 3700 ft. (New name employed for first time.) (Aug. 8, 1952.)

(Mary is the name here applied to the mountain in the Mary Range—also a new name—between Carnivore River on the east, Whistler Creek on the west, mouth of Whistler Creek on the north, and the crest of the Brooks Range on the south.) (Aug. 13-16, 1952.)

Weasel Point, S end Lake Peters, 145°09′30″, 69°20′15″, 2920 ft. (Weasel is the name here applied to the previously unnamed ridge of Mount Mary; the ridge is a resistant stratum dipping to the east.) (Aug. 9-11, 1952.)

For use of Whistler Creek see (mammals of northern alaska) p. 248 on map. Locality site p. 51 for whistler Canyon, p. 52 for whistler Creek. See also U.S.G.S topo, Mt. michelson, Alaska, 1956 for whistler Creek, Spawning Creek and Carnivore Creek.

Spawning Creek, W side Lake Schrader, 145°11′40″, 69°25′08″, 2908 ft. (Spawning is the name here applied to the previously unnamed creek.) (July 27, 28, 1952.)

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

Gavia Lake, N White Hills, 150°00′, 69°35′, 460 ft. (Gavia is the name here applied to the previously unnamed lake.)

name not included in Dictionary of Alaska Place Names.

from Lake Schrader down Igneck valley to the west and beyond. a few movies on tundra about 1/2 way to Umiat to the south. For the first 80 miles west of the mouth of the Canning River caribou (singles and 2's) about 1 per 2 miles. Their general direction was not determined as they all seemed to be grazing in all directions. Arrived Umiat about 4:30 P.M. There is a decided difference of tundra change since we last saw it some month and a half ago when at that time the willows were just coming in and the surface of tundra undeveloped. Now the tundra is mature with dense willows and alders, ponds and drainage systems with clear - brownish water and considerable more greens and yellows in the landscape color. Caribou trails still recognizable and generally with a north-south trend which may be merely coincidental to drainage pattern.

Umiat, 352 ft., Alaska

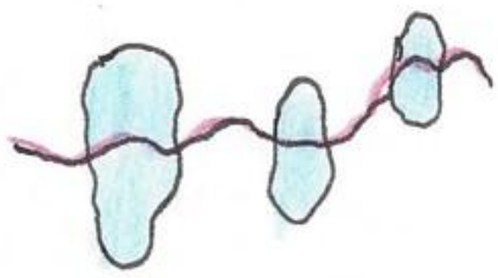
Aug. 17, 1952 (see letter insert next page)
Aug 18, 1952
Aug 19, 1952

George Beals Schaller, Univ. Alaska and associate of Tom Cade, collected Corvus corax from Umiat and presented to me. This bird is no. 520819-1. He has taken six from this area this season. measurements of this bird are: length 682 mm, wing 44, tail 255, wing spread 1215, wt 1360 gms. Skeleton only. Tom Cade reports: 3 gyrfalcon nesting between Nolerck Lake and the mouth of Colville River. These birds prefer ptarmegan. and are like prairie falcons in action, however they do not defend their nest like the prairie falcon. The american rough-leg feeds predominantly on microtus, Lemmus etc. The peregrine or duck hawk feeds mainly on small shorebirds and other small birds.

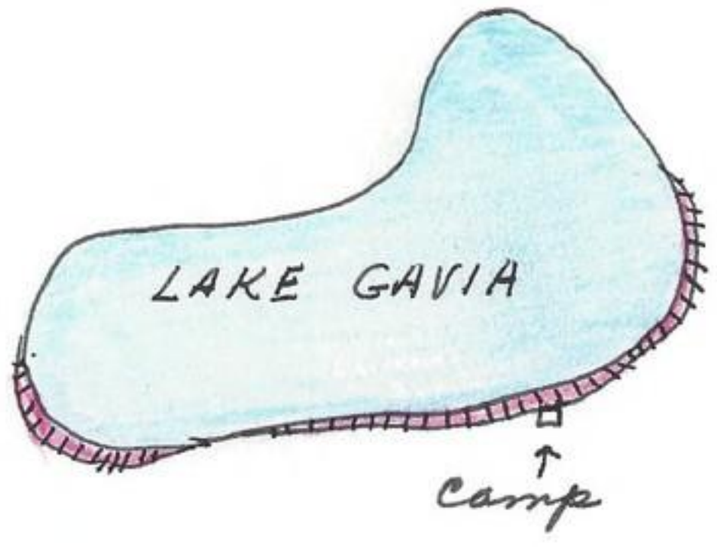
Umiat, 352 ft., Alaska

Aug. 20, 1952

Set 20 traps in back of Umiat (ARL) just as plane arrived to transport equipment to north of White Hills. Departed 6:05 P.M. by Norseman. At 6:12 directly east several lakes entrenched in surface of ground. Also a small creek traversing 2 old extinct lake beds which might indicate a land level disturbance.



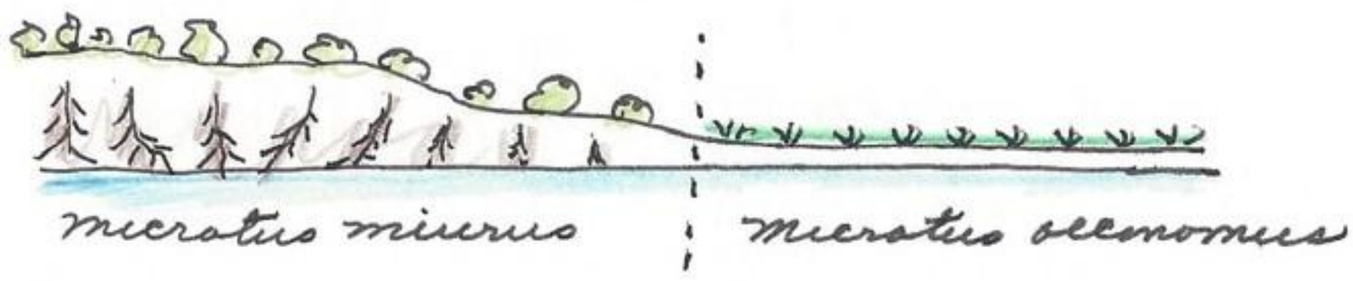
at 6:14 P.M first large River (Chandler) with slide on west bank, again perhaps adjusting to some sort of relief change. Several lakes have loons on them which dive forcefully when plane flys over. no caribou observed but a few tracks or trails present. At our White Hills Lake (Lake Gavia) observed one moose in river. Set up camp in a snow storm with sub-zero temperatures and then before dark set 60 traps along shoreline. Ed. continued east along shore and to the north. upon arrival and sled Squaw and arctic loon were on the lake. Snow covering nearly complete. Min. temp at midnight 24° F.



n White Hills, Brooks Range, Gavia Lake, 69°35', 150°00', Alaska

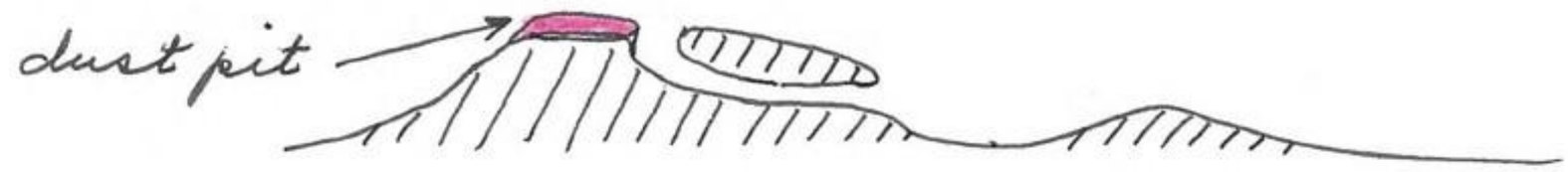
Aug. 21, 1952

Snow leaving ground at 8:00 A.M and from tent. North exposure still covered. Day clear and good sunshine. Inspected trap line of 60 traps set last night and caught: 16 microtus oeconomus, 13 microtus miurus. Traps set 20 feet apart. all mammals frozen solid. The M. miurus were almost completely confined to higher eroded slopes at SE side of lake. The microtus oeconomus were excluded from this area but took over on the low bank which was lined with sedges and grasses. Both areas had willow but the high bank lacked grasses or sedges, at least to the same eftent as the low area at edge of lake where m. oeconomus were taken.

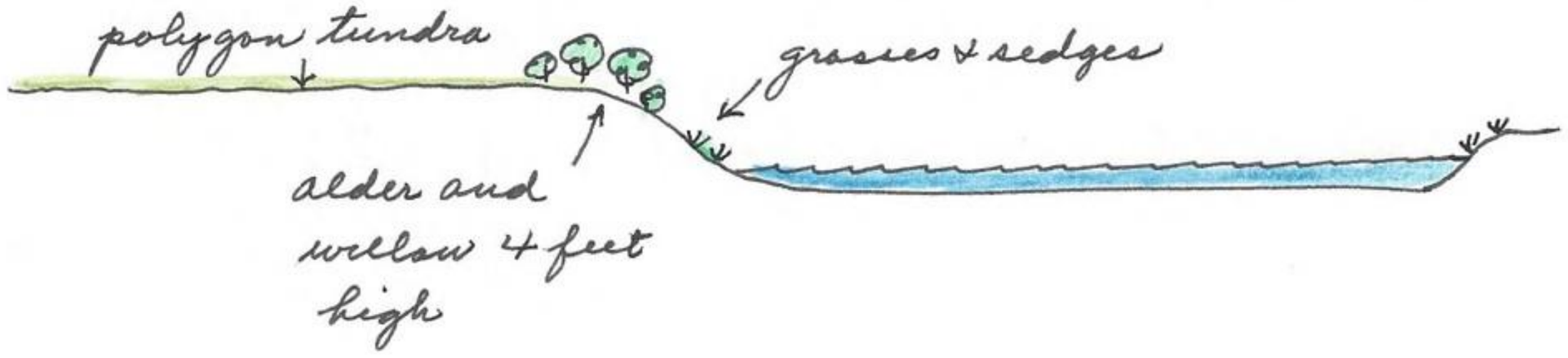


The microtus miurus were building haystacks including leaves of willow, Equiseteum, & leaved plant and others. All age groups appeared to be participating in building haystacks. Work continued all night in snow and subzero weather and all day today as 6 were taken between 9:00 A.M and 2:00 P.M. Haystacks placed at base of willows. Microtus oeconomus are less active during the day. This afternoon observed

2 Citellus on top of a maund. They would wrestle each other and while I could not definitely be positive, they appeared to be copulating at one time. The area they were using was 2 dust or dry moss pits about 1 foot in diameter at edge of hole.

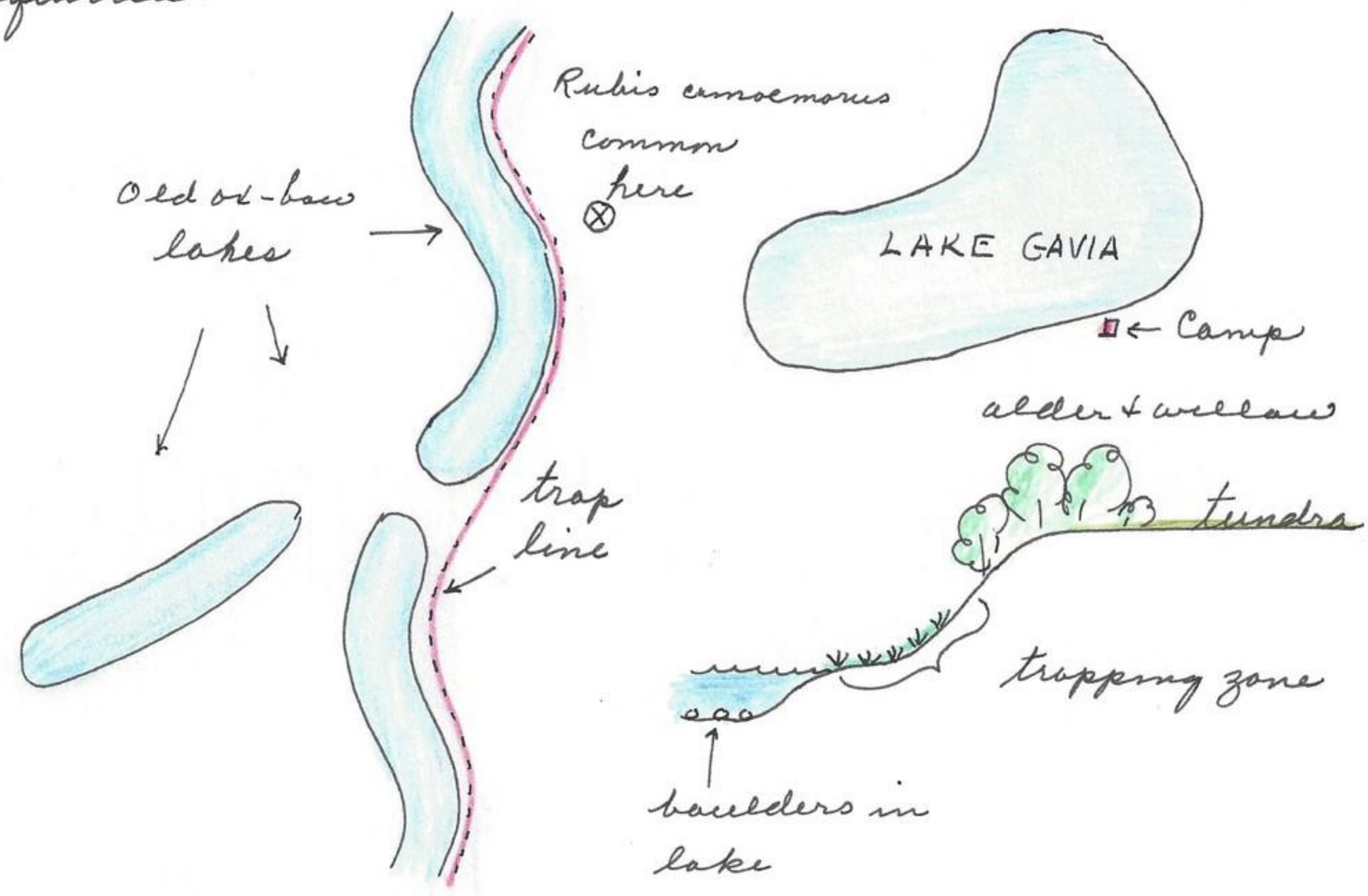


Set trap and caught one ♀ Citellus. 5 hours later, on inspection did not find affected by the second squirrel. 18 ptarmigan in this area including 2 old singles, group 7 + adult, group 4 and adult, group 5 and 2 adult. They were using area thus:



This area gave the ptarmigan wind protection, warm sunny SW exposures and tree (willow + alder) protection. An golden eagle flying and soaring 1/2 mile to west of lake. 2 ravens flew around lake from east and then returned to east side of lake, calling all the time. Long-tailed jaeger passed by once. 6 parasitic jaegers in area, 1 glaucous gull (sp?), few Lapland longspurs but not in flocks. Occasionally a pectoral sandpiper, 2 adult and one immature black-bellied plover. young of plover just able to fly but prefer to run. In lake 1 family 2 adult + 2 young old squaws, one adult and 6 young old squaws; 1 young old squaw that preferred to set on bank alone. At 8:30 A.M counted 6 prs. Arctic loon on lake, they leave and come, generally only about 6 present. They seem to be always in pairs. no young ones observed. Arctic loons call like cat continuously when out on shoreline. When they dive suddenly they call like a yelping dog that has been kicked (only one yelp). Watched one loon chase a young old squaw (3/4 size parent) of a group of 6 when they got too far from shore. The adult old squaw herded them back to near shore where they seemed to be found practically all the time. These loon may actually eat the young of these ducks or at least resent their hunt-

or feeding in the loons feeding territory. The catlike call of the Arctic loon can also be compared to the bleating call of a young lamb. This afternoon set 80 traps along edge of old river channel west of our lake and 7 steel traps set for squirrels.



Temp. midnight 23°F min, 26°F present, 44°F max. Day has been clear, windy, fog clouds blowing in at about 10:00 P.M. Fog leaving lake at SW end and blowing over tundra. Brilliant sunset.

Aug. 22, 1952

Snow this A.M on ground but disappeared by 10:00 A.M except on north exposures. Ice on water pail in tent, slush and ice on small stable ponds. Lake free of ice. Temp. last night 18°F. Inspected trapline of last nights' setting on edge of old meandering river lakes as: 6 adult microtus oeconomus, 15 immature microtus oeconomus, 2 adult microtus mucrus, 6 immature microtus mucrus, 2 Citellus parryi, 3 Savanna sparrows, 1 red-spotted bluethroat, 1 Lapland longspur, 1 immature old squaw duck. Heard and saw bird that looked like a curlew. 7 ptarmigan in area where 18 were observed yesterday. Mosquitoes rare but present. They were also out yesterday. 1 suck old squaw duck. 2 old nests of redpoll about 200 feet apart on river channel. Up to 12:00 noon weather

windy but sun out most of time. High cirrus clouds. Temp lake yesterday 42°F and also today at noon. One young caribou (blackish brown) passed camp. It was observed to run west 2 minutes without stopping. It disappeared and may have kept up pace beyond. It is remarkable how these animals are able to keep up this pace and at the same time traverse such rough terrain. Old squaw duck killed today for measurement. 390 mm length, 105 wing, 26 exposed culmen, 64 tail. The young of this bird (2 originally measured 300 length, wing 118, tail 49, ex. culmen 22, weight 320 gms. The young of these birds cannot fly. The meat on breast is practically nothing but a few layers of muscles as compared to the thick muscles of the adult ♀. The adult was molting and could not fly. I have wondered how precariously these birds live at this time of year, totally helpless, both adults and young, and no way to leaving country in case of a sudden climatic change to severe cold and freezing. Since we have been here these old squaws (4 adults and 8 young of 2 families have been frequenting the south shoreline. After shooting one old squaw today, the family of 6 moved to the north part of lake. Groups of pectoral sandpipers moving east today in what appears to be a trend compared to yesterday. They were in groups of 2-18-16-8-17-6-8-4-8. Caribou trail on west side of lake but not used this year. Evidence of about 8 moved from west to east having passed in the last week or so. Some large tracks which must be moose. Old trails south side lake through willows not used for several years. Owl (snowy or short-eared, the latter more likely) flew across lake from north and hunted south side. It dropped to tundra three times, once at a Lapland longspur. Ptarmigan calling at 11:30 P.M. many ~~old~~ odd sounds not heard during the day from lake. Caught second squirrel from mound where 2 were observed the morning of the 21st. Temp. midnight 34°F, max. 48°F, min. 16°F.

Aug. 23, 1952

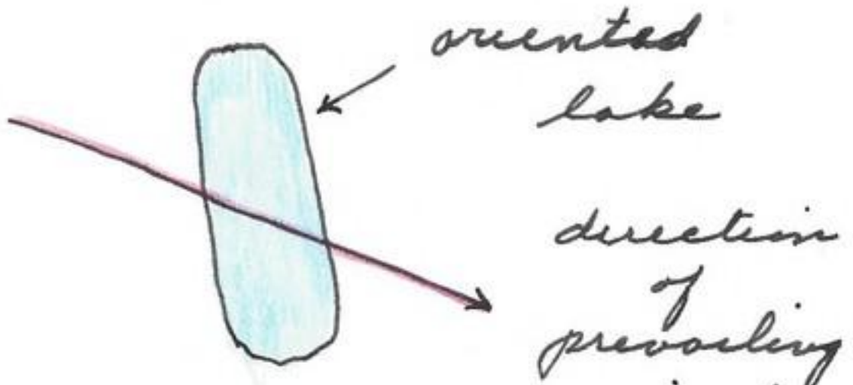
Collected all traps and prepared for departure for Umiat. 2 long-tailed jaegers fed on refuse pile 20 feet from camp. This lake has been designated as 69° 35', 150° 00', approx. 470 ft. Small ptarmigan again on east side of lake so they must follow parents across. Caught one 3/4 grown bird in trap by toe and released it. It dropped into water and could

swim and finally got confused and put bill under water and drowned. Lake on way to Umiat oriented E-W.

Umiat, Alaska

Aug. 23, 1952

Arrived Umiat 11:00 A.M and departed Point Barrow 1:30 P.M. Enroute photographed in movie and still several general lake shots nos. 520823-1, 520823-2, 520823-3, 520823-4. Sand pits across oriented lakes thus. Long trailing dunes indicate direction of wind and the sand dunes orient themselves much in the same direction as the snow lines observed earlier in the season. At Point Barrow photographed myself 520823-10 and parka used in the field.



Dr. Frank Darling discussed problems of the Arctic with me.

1. Russians hunted shorelines of Alaska but did not penetrate inland.

2. In 1900 and after mining and hunting extensively the whiteman penetrated Alaska inland.

3. The present problem is to appraise the biological problems before degradation of animals and plants takes place.

4. Decline of caribou in southern Alaska thought to be caused by shooting but main cause is reduction of range of caribou by fire.

5. Moose increasing in last 50 years because of change of vegetation of climax lichens to birch, willow and other shrubs in normal degree of succession. There is a biomass change from caribou to moose because of a change in this botanical complex.

6. Caribou live on 80% lichens and 20% browse in winter and reverse proportion in summer.

7 Caribou live on Cladonia and Centralia which grows slowly which in turn accounts for extensive migration of caribou.

8. Caribou wandering is nomadic and not true migration. They move as the spirit wills which does not permit overgrazing.

9. Reindeer introduced 1892. In 1932 there were 650,000 between Mouth Colville River and Alaskan Peninsula.

now only 24,000 in entire territory. The reason for the disappearance of the reindeer were: poor herding, wolves, straying into wild caribou herds.

10. Rise and fall of reindeer a normal change of cycles. St. Paul Island like mainland cycle. St. Lawrence from 15,000 to 2,000; Nunavak Island from 2300 to to 3000. This depreciation a botanical change and not because of Eskimo, wolves or straying.

11. Palmer says reindeer require 100 acres per reindeer. Darling says 4 per square miles.

12. Range becomes depleted and degraded before animals show sign of decrease.

13. Range in Utah show effect of overgrazing but in Arctic does not show effect of overgrazing but there is a change of plant life. The new botanical complex offers greater food potential.

14. Cannot burn successional tundra of above.

15. Quadrat of Palmer 1922 80% lechen, now 5% lichen.

16. Growth of reindeer must depend on moving inland and requires nomadic herders for up keep.

17. Yukon, Tanana herds going because of range degredation and not hunting.

18. not many caribous in eastern Brook Range.

19. Many more caribou on Arctic slope than 50 years ago.

20. Tundra supports 1 caribou per mile of effective range.

21. Less hunting now than 50 years ago (no Eskimo between Colville River and Barter Island).

22. Predation on caribou of no consequence. If marginal habitat may be a factor.

23. Wolves and man have same effect and can be substituted.

24. Wolf control good now but it is dangerous to introduce control north of Brooks Range because no one can control increase 336 wolves taken in 100 miles radius of Umiat.

25. Muskat can tolerate harder ground condetions than caribou.

26. In 1936 muskat introduced to nunavak Island and increased to 75. They are restricted to the coastal shore. Reproductive potential not great. 1 calf in 2 or 3 years of of the reproductive cycle.

520824-14.3

Umiat, Alaska

Aug. 24, 1952

The following taken from a letter from Dan Livingston, dated Aug 13, 1952 "Dear Jim, How's the manxmalogy at Schrader? From the looks of the lab here its been good, quantitatively anyway, elsewhere this year.

They say that you are aiming to head for the White Hills after having leaving your present camp-site. If being weathered in has not changed your plans, I wonder if you would do something for me while you are there?

The White Hills is famous for its Pleistocene (or earlier) wood, which alledgedly litters the tundra and bristles from every cut bank! I doubt that it is really very plentiful, but nevertheless some is found thereabouts. If you should run across some, I wonder if you could bring some of it back?

We managed to get a 1.5 meter core from Chandler this time, but still no peat for carbon dating. This probably means that the glaciation which formed the lake post-dates the warming which permitted forest to grow on the North Slope, but there may possibly be some forest advances reflected in the pollen of Chandler which could be correlated with White Hills forestation.

In any case, it would be very good to have enough North Slope wood for C^{14} dating. It should tie in with the dates for the Fairbanks permafrost unconformity.

It takes about 8 grams of carbon for any sort of a count at all, and a duplicate sample is highly desirable. Wood, when dry, is about 1/3 carbon, so if you should run across a log, and it is convenient to bring back a piece, you'd know about how much to bring.

Any information about the relation of a wood sample to the surrounding geological features, especially glacial ones, would, of course, be extremely valuable.

I know how hard you work in the field, and how much every hour counts, so please don't go out of your way to look for wood or anything like that, but if you should happen to be camped in the middle of a late-Pleistocene spruce forest, and are wondering whether anyone could use a piece of it, by all means bring some of it in.

Dont use any preservation on the wood, of course.

If there should be peat or wood of other kinds, associated with the forest, and you are able to collect some of it without deffeculty, a very small amount - a handful of peat or a few splinters of wood - would be enough to give an idea of the associated flora, upon microscopic examination.

Thanks very much. Even if you arent able to collect any wood, should you see some Id be very happy to learn of it when you come outside.

Happy hunting Jim. Ill see you when you pass through Barrow on the way outside, if not ~~later~~ before. Till then, dont work Campbell to death. Even though his family and mine took different views of the '45, Id hate to see a promising mammalogist burned out on the Brooks Range. Sincerely Dan Lumgton.

520824-145

Entered Aug. 24, 1952

DR. IRA L. WIGGINS AND WIFE DOROTHY

Ira - - - Dorothy

1952

520824-146

Eskimo Personnel at Arctic Research Laboratory:
POINT Barrow, ALaska
Entered Aug. 24, 1952

1. Chester Lampe Pt. Barrow Alo.

2. Andrew Benga Pt Barrow Alaska

3. Pete Sovalik Pt Barrow

4. Miles Itta = Pt. Barrow Alo.

5. Jacob A. Stalker = Noatak Alaska

1 2 3 4 5

photo by:

Printed
Dorothy B. Wiggins

520825-147

Arctic Research Laboratory, Point Barrow, Alaska.
Aug. 25, 1952

Spent 2 hours on peninsula to Point Barrow proper. Red phalarope have collected on all the ponds and ocean waters in unusually large numbers. Photo 520825-1 of this bird both in movie and still. They are feeding in the Arctic Ocean, fresh water ponds and lagoons of salt water. Many of them are resting on the masses bordering the ponds. Would approximate about 3000 in area covered. Black brant (60) flushed seven times on way out to Point and return. 33 glaucous gulls, 120 eider, mainly king and a few (30) Pacific eider. 130 Arctic tern and 250 Sabine gulls. At Point Barrow (end of peninsula) photographed in movie whole skulls and part of house and roof of house. East cliff gradually being eroded away and exposing house. Oil which has been permanently frozen is now soaking down into gravels and under lays to about 4 inches. Eider flocks passing over Barrick mounds about one per 20 minutes (each flock from 50 to 300 individuals). Collected one Somateria spectabilis from edge of inland pond, 520825-1 at the pond and which apparently had died from natural causes. The bill was slightly eroded on bottom mandible. Breast muscles practically gone as well as other muscles of body (see catalogue).

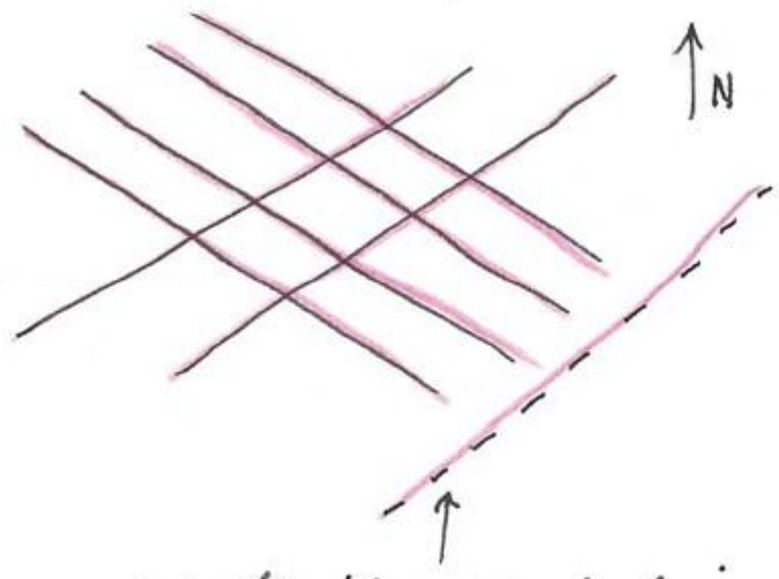
Aug. 26, 1952

Hall arrived today from Fairbanks by C47. This evening checked Pt. Barrow by weasel. Collected 2 old squaw ducks. Saw 58 black brant and about 200 king eider. Red phalaropes feeding on Arctic Ocean just before waves break. 28 snow bunting at Point proper. Returned to camp and visited with various researchers and prepared to depart for Driftwood on tomorrows schedule. Day as nice as it has ever been at Point Barrow (ARL). Drove weasel to Point Barrow (peninsula) and photographed Arctic Ocean 520826-1 at the most northern point at Point Barrow.

Arctic Research Laboratory, Point Barrow, Alaska
Aug. 27, 1952

Departed for Driftwood by C47 at 11:25 A.M. at 12:05 arrived at edge of Plateau Province. Plane adjusted to new air currents as we hit the rolling country. Just before we passed over

the contact between the lowlands and the hills found etensive trails of caribau trending nw to se and definitely of large mass movement with indurdual trails every few feet. There was no evidence of such movements between here and Point Barraw. From this point on the trails were common and a few scattered caribau but mass movement of mammals generally confined to central area. The general trend of trails where there was no interference of lakes or barriers was:



old trails sealed in with vegetation.

The trend was predominantly nw - se, however, the small groups of caribau seemed to be trending more directly to the south. Trails above mainly from 12:05 to 12:15 P.M. At 12:15 groups of 1-4-5. Between 12:18 and 12:30 P.M counted groups of 3-1-1-2-1-1-4-1-3-2-1-1-1-2-4-1-3-2-1-1-1. Color coming into landscape with some willow changing to yellow and Betula nana red. Snow cornices on south side of redges. Arrived Driftwood. Ctellus at camp as pets. Saw 1 red fox and 3 caribau. Photographs 520827-1 and 520827-2 of barren ground grizzly killed 2 weeks ago by Driftwood party. One wolf also killed here - neither justifiable. In evening 1 pigeon hawk at camp. It alighted on top of antenna pole. Lew Shawan, the pilot and one who has flown this part of Alaska for a long time reports to me the following:

1. Caribau can be divided into large herds which seem to retain their identity from year to year.

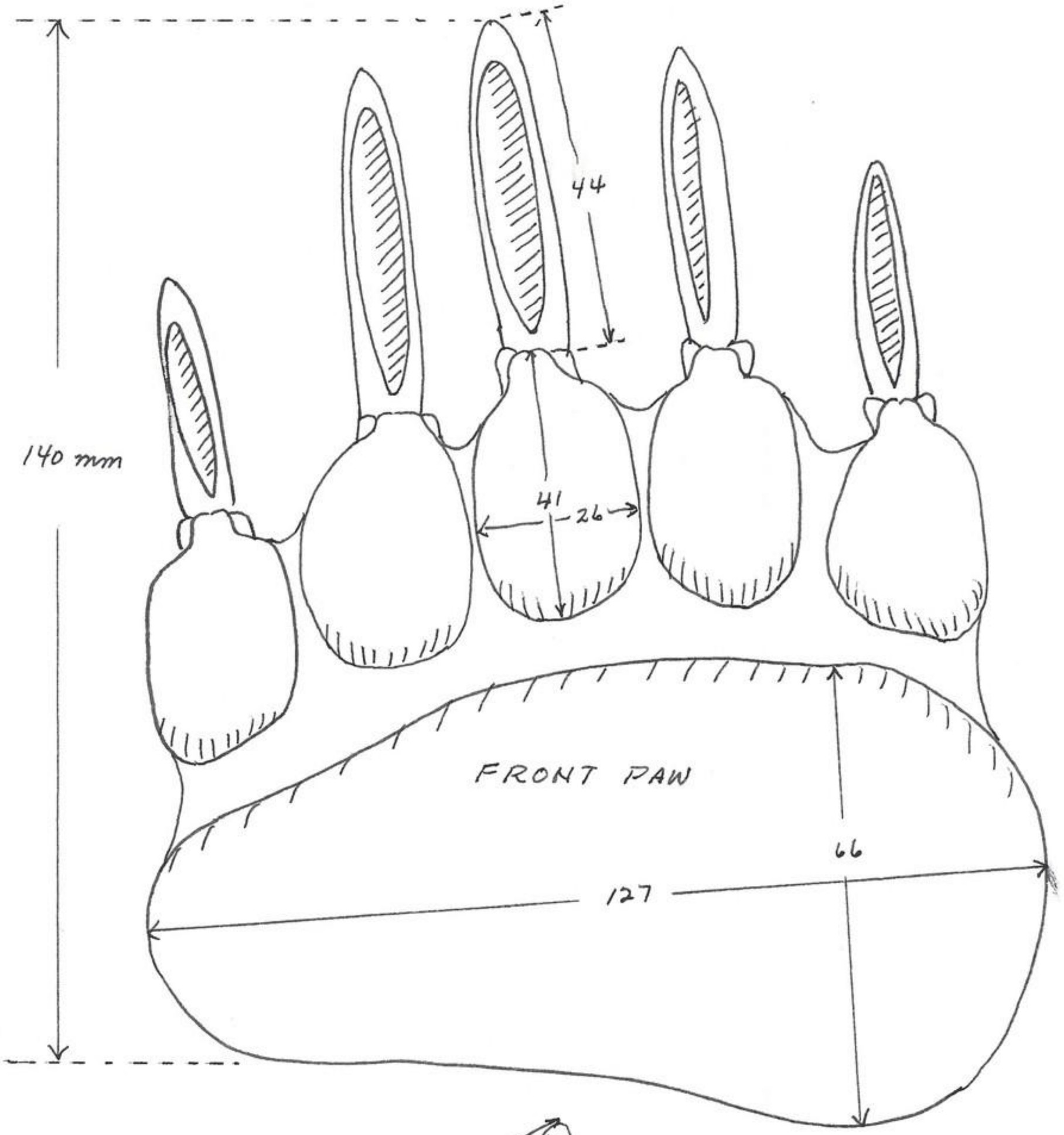
2. Caribau do not move too far from their territorial areas and remain both summer and winter in same general area. The herds ow the south side of the Brooks Range are different from those on the north side.

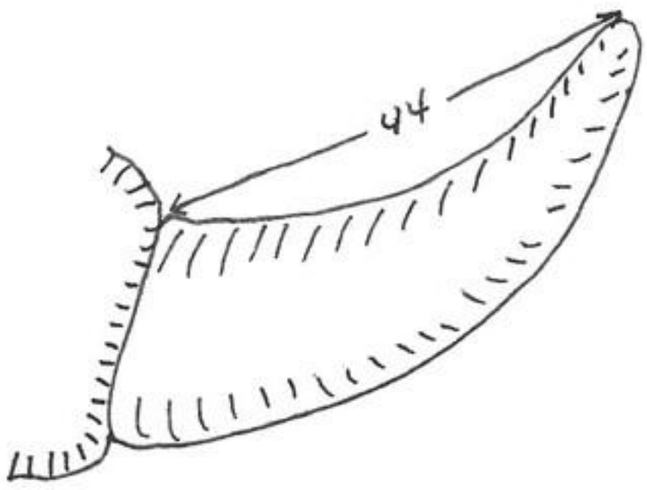
3. Herds in the east part of Alaskan slope (north of Brooks Range, go into Canada in winter.

This evening set 250 traps in area set for Microtus miurus. One half along Betula - Salix bank, 1/4 of traps along water course across willow valley and 1/4 through stand of willows 4 feet in hight. Traps 20' apart. Red fox tracks of groups of 4 or 5 travelling together. Ravens and glaucous gulls in area. The tame Ctellus come into camp and will eat and stand on your hand. Two

520827-149

Barren-ground grizzly killed Aug. 4, 1952 by Walter Messerschmidt at Driftwood. Photos 520827-1 and 520827-2 of this bear. (see notes)





DIGIT 3 front paw.

claw of hind foot 18 mm
testis - 50 x 30 x 20 mm
length 1570 mm
tail 70 mm
foot 242 mm
hind foot imprint 220 mm
hair at hump - 140 mm
hair on neck. 71 mm
ear 115 mm

other citellus were tame but had not appeared the last day or two and they suspected the fox had taken them. They call when fox is in area.

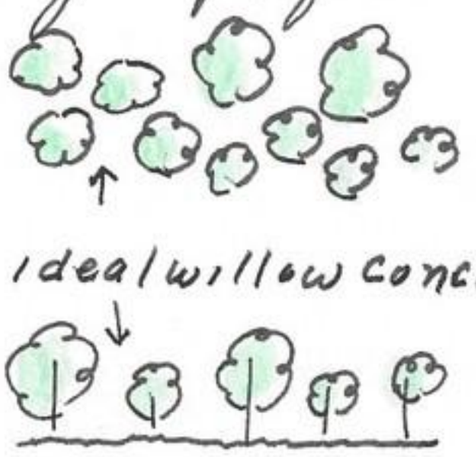
Aug. 28, 1952

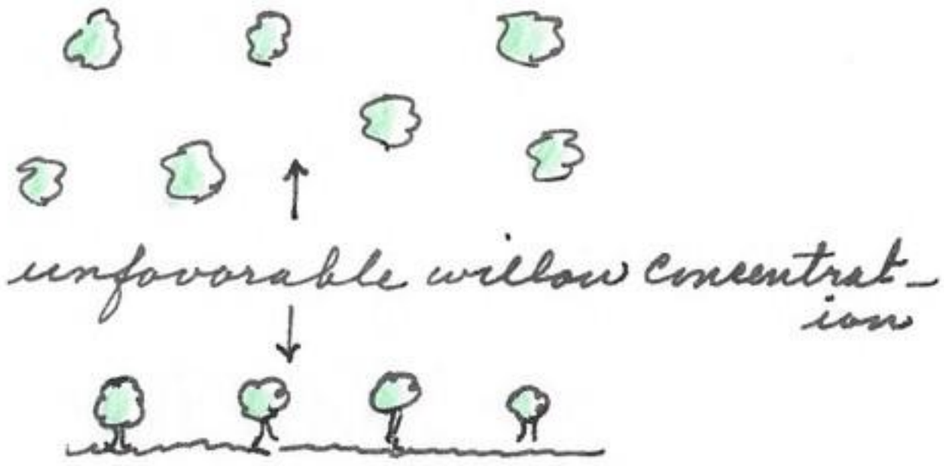
Checked trap line of 250 traps and caught: 52 microtus muurus, 20 microtus oeconomus, 1 Lemmus.

Forage stacks of microtus muurus well underway with same measuring about 500 mm in length. Several plants are used in addition to the dominant willow. Subadults are participating in nest building. Heard one microtus muurus sing as it left its forage stack and ran about 2 yards. It was a continuous chirping call which it offered and is clearly audible at 10 feet away. The note is the same one throughout the call rather than a modulating note or call. One trap at microtus muurus colony caught 7 singing males (microtus muurus). A greater percentage of willow now yellowish color, nearly all Betula nana red. One low leaved plant bright red. The full colors are yet to be expected. This evening pulled about 100 traps on hillside and base and put in wet marsh area to test for Lemmus and Sorex.

Aug. 29, 1952

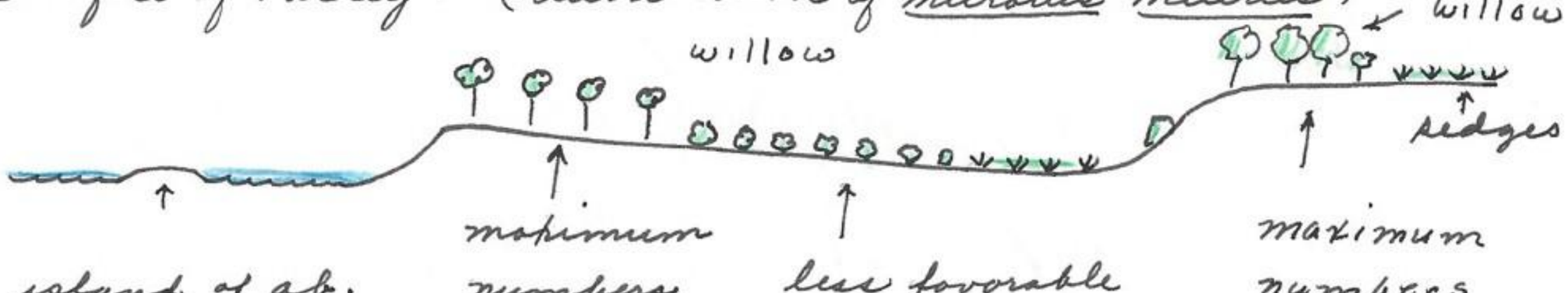
Inspected trap line of 100 traps set in Lemmus and Sorex community and caught 1 microtus muurus and 3 microtus oeconomus. The other trap lines left intact produced: 48 microtus muurus, 8 microtus oeconomus, 2 Lemmus. Measured 1 red fox track at 70 mm. Average size caribou 90 mm. microtus muurus in best populations in willow stands about 3 or 4 feet high and arranged (the willows) in nearly continuous stands. If the willows are spaced to far apart they do not seem to prefer it as a place to build their forage piles. They prefer, even less, a low willow spaced apart and not a continuous growth. The Sphagnum or some other moss or lichen floor covering is preferred to bare soils.





Some of the best developments of forage piles were at edge positions:

Profile of valley: (distribution of microtus meurus)



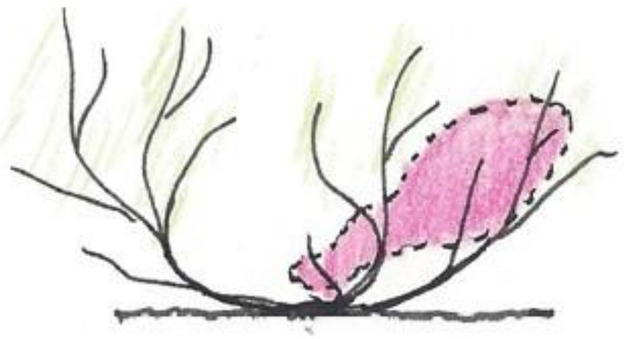
island of ab. normally high concentration

numbers about 20' from bank of river

less favorable

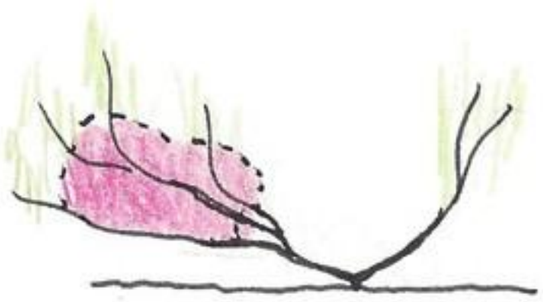
numbers

made census of forage piles of microtus meurus in 4 meter lane (width) and 200 meters long, and estimated capacity of each forage pile. The nests were placed in the following positions.

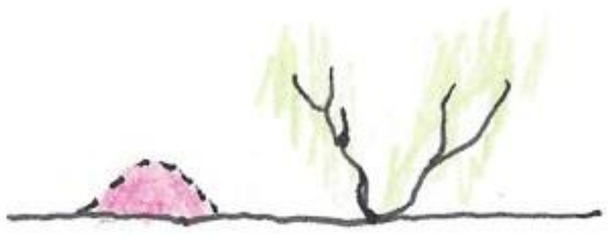


pile inclined and supported by branches. with animal approach on upper surface. Contact generally with ground.

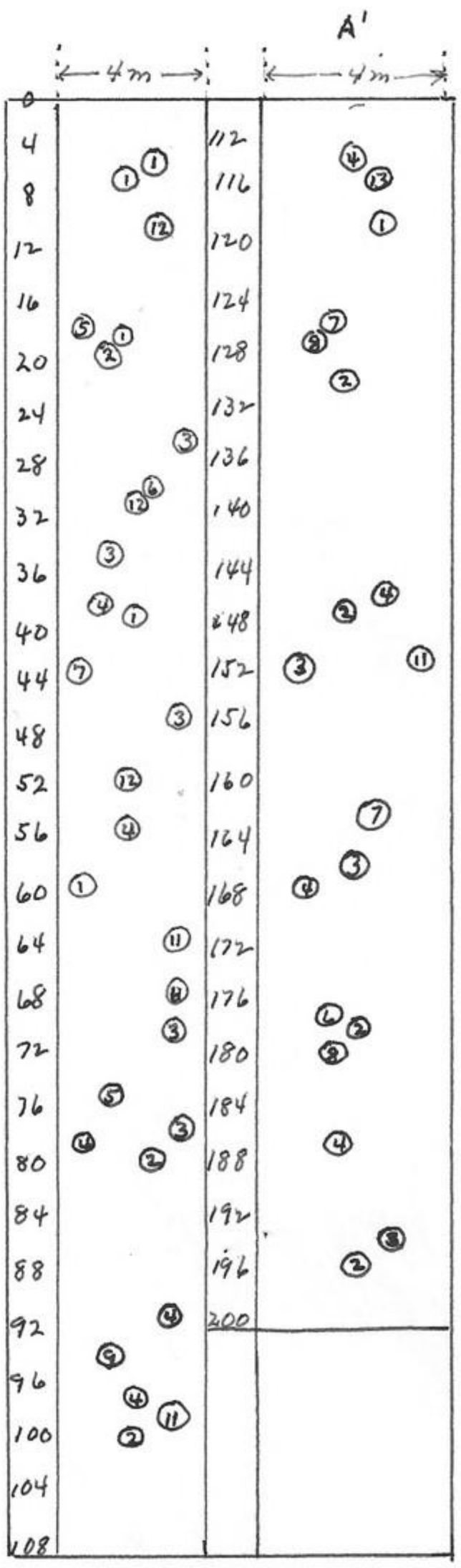
mainly a ground pile with center of willow stems for support. 500 mm at base and 400 mm high.



nest entirely supported by branches and stems. Approach by branch.



pile uncommon and independent of willows.



↓ A

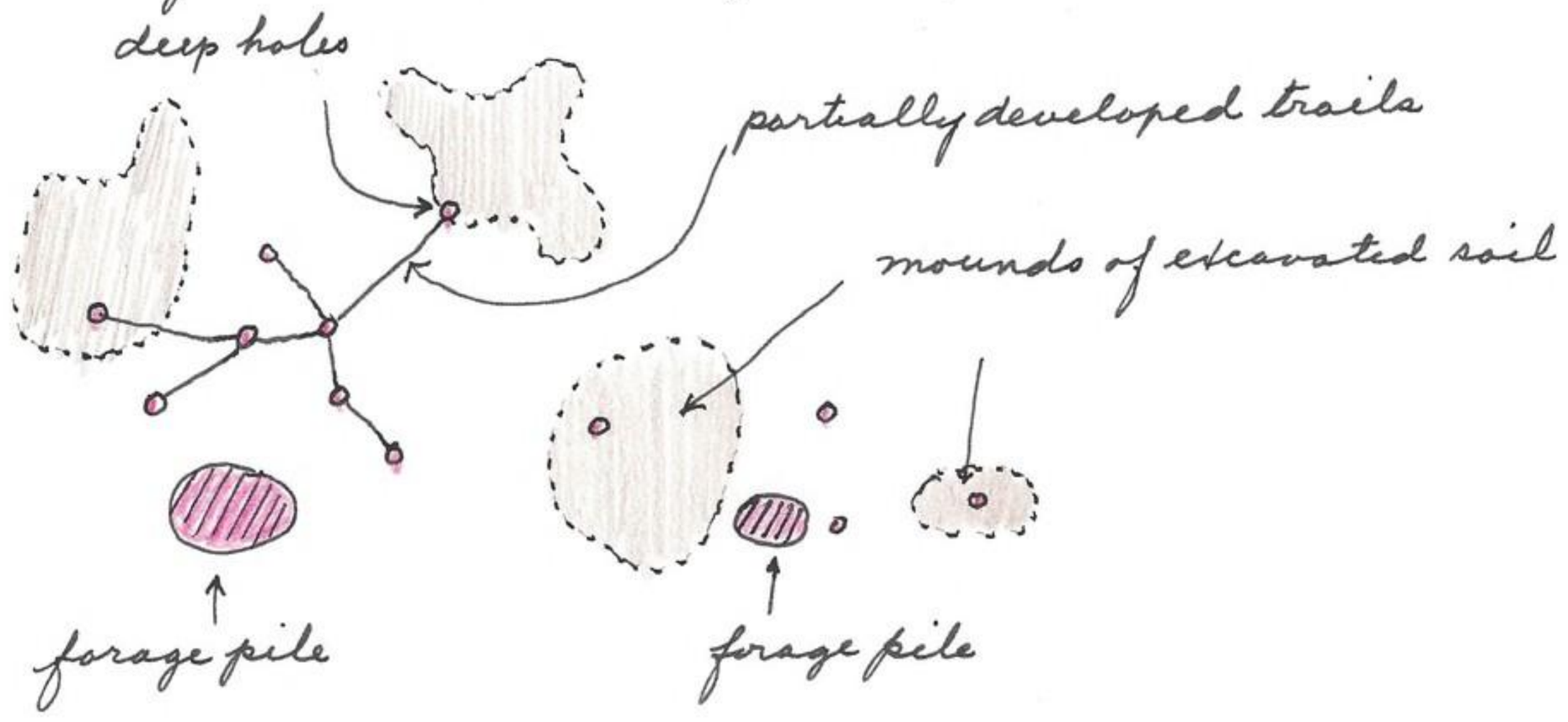
continued in straight line at top of next column

measurements of forage piles approximated in quarts of material. Quadrat 4 meters x 200 meters. In this quadrat there were 48 nests which were actively being constructed consisting of 237 quarts in the aggregate. The following plants 520831-50 to 520831-59 were identified from the forage piles. Some consisting of mixed plants while others nearly pure accumulations of one kind of plant. Equisetum a plant usually used as base or is stratified throughout pile.

Petasites hyperboreus 5%
Astragalus umbellatus 10%
Salix (large) } 40%
Salix (small) }
Equisetum 30%
Salix reticulatus 1%
Arctostaphalus alpinus 3%
Aster sibericus 1%
Lupinus 5%. One mass of this plant measured 200 x 200 x 100 mm and weighed 125 gms.

The largest pile examined measured: 450 at base and pyramiding 500 mm high. The smallest of only 4 or 5 willow stems. Associated with the forage piles were small test holes and generally one or two larger associations of about 1 gallon dirt capacity. Not all forage piles had these larger excavations but where they did occur they were rather extensive thus: (see next page). Trapping record would indicate a large percentage of sub-adults responsible for the building of forage piles and predominantly ♀♀ (differenced is probably due to predominance of females). The ratio of ♀♀ to ♂♂ in 3 nights trapping decreased from 64% to 50% to almost equal sexes. no large adults building forage

piles. These voles were in association with Lemmus and microtus oeconomus and in some trails particularly where trails were associated with willow. There may be less activity at night than during the day but active both day and night.



A trapper, now carpenter at Driftwood, who has a registered trapline of 100 miles between Tok Junction and Chicken on the east side of Dennison Fork gave me the following information.

1. In about 1942 for 3 years collected on the above line 15 wolverines.
2. Two, a male and female were taken from same trap on consecutive nights. Pelts worth $200.00 apiece.
3. Caribou fight trap until they get heated and then die.
4. Bear and wolves fight trap. All animals will fight man if in trap.
5. Walverines few in numbers and never travel together. Easy to trap out of area.
6. Snow loose and powdery until spring when it freezes & refreezes.
7. Scent for marten made of fish, meat, oil eroduum, beaver castors, honey, tallow & then boil. Add caribou cracklings to harden. Never freezes.
8. Warmer at higher elevations and birds and animals retreat during winter, especially martin.
9. 300 martin in 100 miles in one season (Nov. 15 to June 15th) and 8-10 per run.
10. In one season will get 8 wolves, 20 lynx, 30 foxes, 100 tree squirrels, few rabbits, 30 weasels and marten. Departed Driftwood via C46 to A.R.L at Point Barrow. at 2:24 P.M made cache or supply drop to party 25 miles NW of Driftwood.

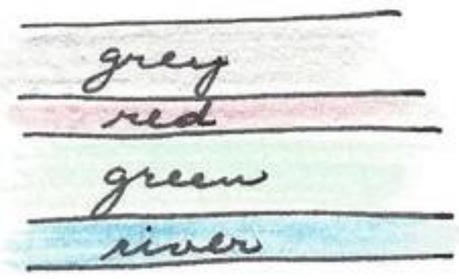
520829-154

General impression of Plateau Provence are as follows:

1. Rolling undulating country with distinct and gently curving erosional lines from exposed strata. Vegetation uniform yellowish brown. Lakes rare. Willows greenish yellow in drainage courses but not very prevalent. Drainage systems not well developed. Considerable bare areas due to erosion of certain layers of rock. Creek only fine lines. Few examples of mud flows down slopes. Some segmented streams.

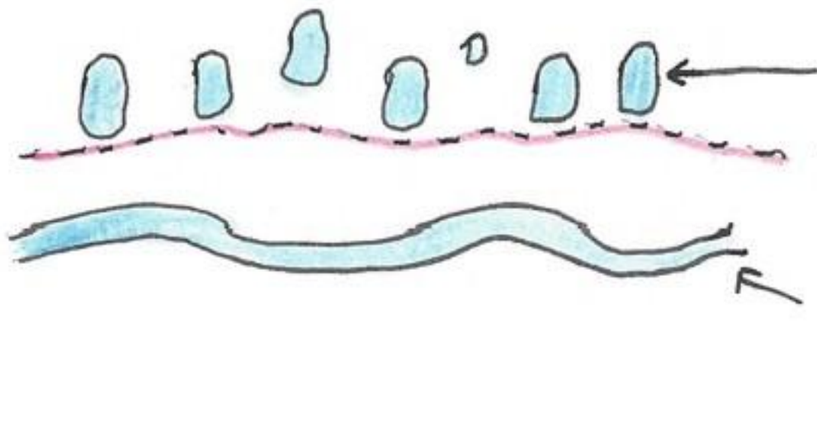
at about 3:00 P.M dwarf alder (Betula nana) giving landscape a pattern like alegator skin and increasing in extent. Flatter areas dominated by this plant.

or



3:08 P.M 12 caribou in one group.

Just before end of Plateau Provence noted the abrupt contact between this rolling country and the coastal plains at 3:14 P.M.



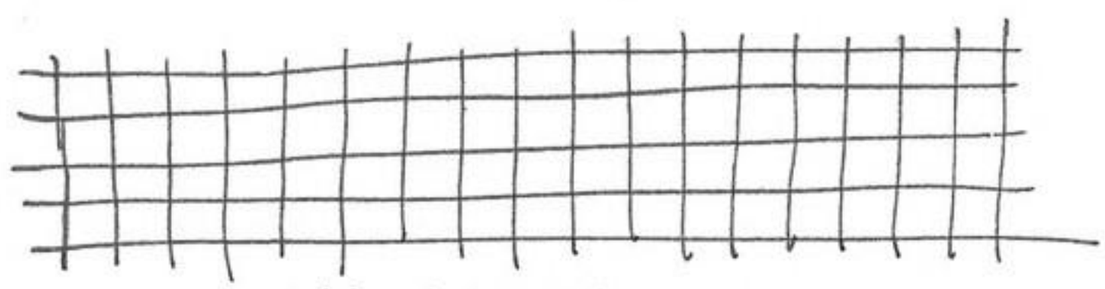
oriented lakes of Coastal Plains

contact between Coastal Plains and Plateau Provence.

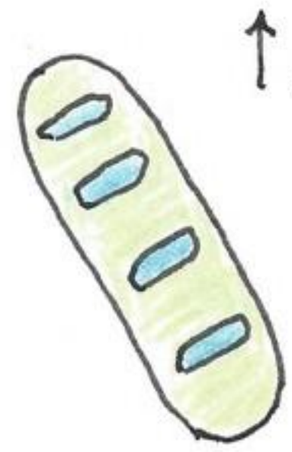
River on Plateau Provence which parallels contact.

8 caribou swimming north across this river. Caribou trails more numerous in this area 3:15 P.M and many trails trending NE-SW. Arrived at lakes 3:17 P.M where they become immediately oriented. One oriented lake almost filled in and with 90° oriented lakes to its main axis.

not many trails beyond on low lake tundra. One polygon lik this:

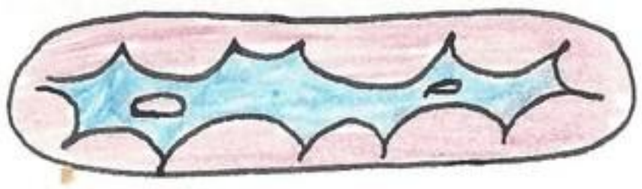


all square.



520829-155

one lake almost completely sealed in with arctophila fulva in a greenishbrown color.



Arrived A.R.L at Point Barrow at 3:54 P.M. Near the Point Barrow Village, approx 8 miles south and 1/2 mile out from shore noted several whales. They dove and stirred up the mud on the bottom of the ocean. These whales could be conveniently hunted by Eskimos from their land base at Barrow Village.

Arctic Research Lab, Pt. Barrow, Alaska.
Sept. 2, 1952

Recorded information in letter to Dr. Ira Wiggins from norman Wilimovsky on Porpoise data. "The porpoise was collected Aug. 6, 1952. "The example, a female (apparently a species of Phocaena), was taken in the northeastern extremity of Elson Lagoon on Aug. 6, 1952 by an Eskimo fisherman, David Otsuna. It had been entangled in a large meshed gill net. Although rare even to the Eskimos, there is a name for it ... the closest phonetic spelling is "ag-vi-suak. The last occurrence in the vicinity of Pt. Barrow appears to be about 1930.... The following measurements were taken, some 10-12 hours after the capture of the example.

weeght	109 lbs
snout to base of tail notch	162 cm
girth behind flippers	81.2
" at origin of tail flukes	19.8
" " " " dorsal fin	83.3
mopimum width aeross tail flukes	33.0
snout to origin of dorsal fin	72.0
heeghth of dorsal fin	? 10
dimenecon of eye opening	11 x 21
length of flipper	23.0

Washings from the stomach contained fish bones (mostly vertebral elements) and otoliths. On the bases of the latter, it is possible to say that some of the food consisted of species

of the genus Leucichthys (whitefish).

This afternoon, Ed. Hall and I visted Tommy Brower at Barrow Village. Mr. Brower had moved his store, or at least established a subdivision at Barrow Village in the SW community area. He reports:

1. Lost $52,000 dollars in a herd near Pit Point because of operation of Coast Guard or Geodetic Survey. His herders had kept herds in close groups for last 11 months and had them on a peninsula with a cabin blocking base of peninsula. Herd stampeded and escaped.

2. Reindeer can be easily told from caribou by smaller stature, rounded hooves ⌒⌒ in contrast to squarish terminals of caribou ⌒⌒ and type of gait. [This distinction does not hold true in my observations].

3. Domestic reindeer, which are used to dogs cannot defend themselves against wolves. Hybrids between caribou and reindeer are wilder than either caribou or reindeer.

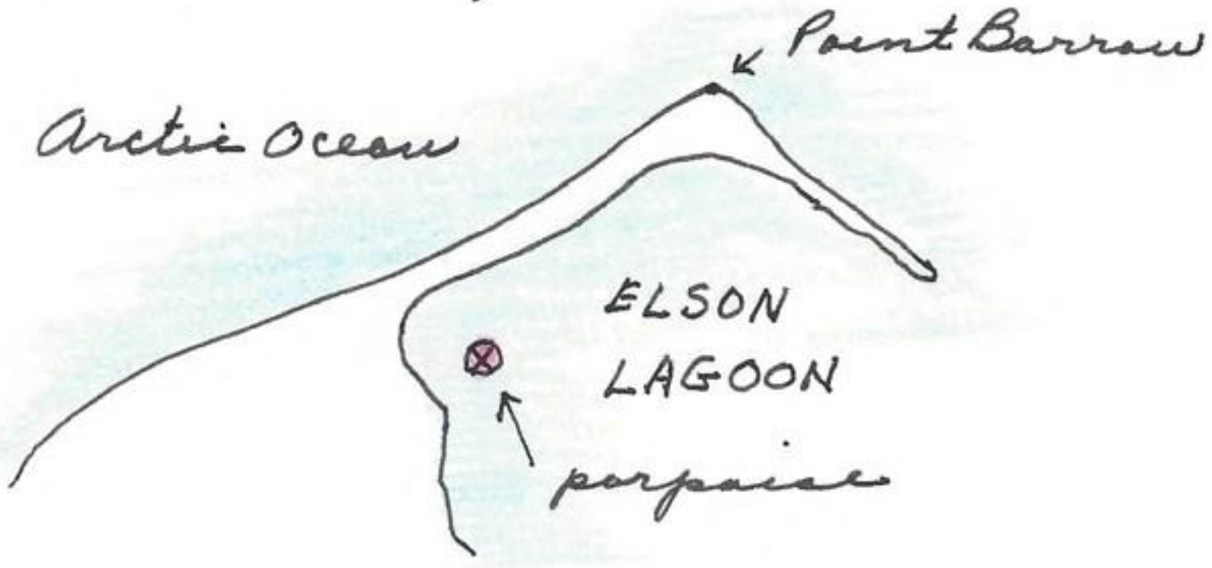
4. Brower kills wolves from plane with buckshot (12 gauge) aiming at tail which, with speed of plane leads proper distance.

5. Eskimos Warned Fish and Wildlife that if they disturb caribou herds at Anaktuvuk Pass they would shoot at plane. They now fly high over pass.

6. First year the red phalarope have been congregating on ocean front at Point Barrow.

7. No statement to make on effect of Navy in area on wildlife and on welfare of Eskimo.

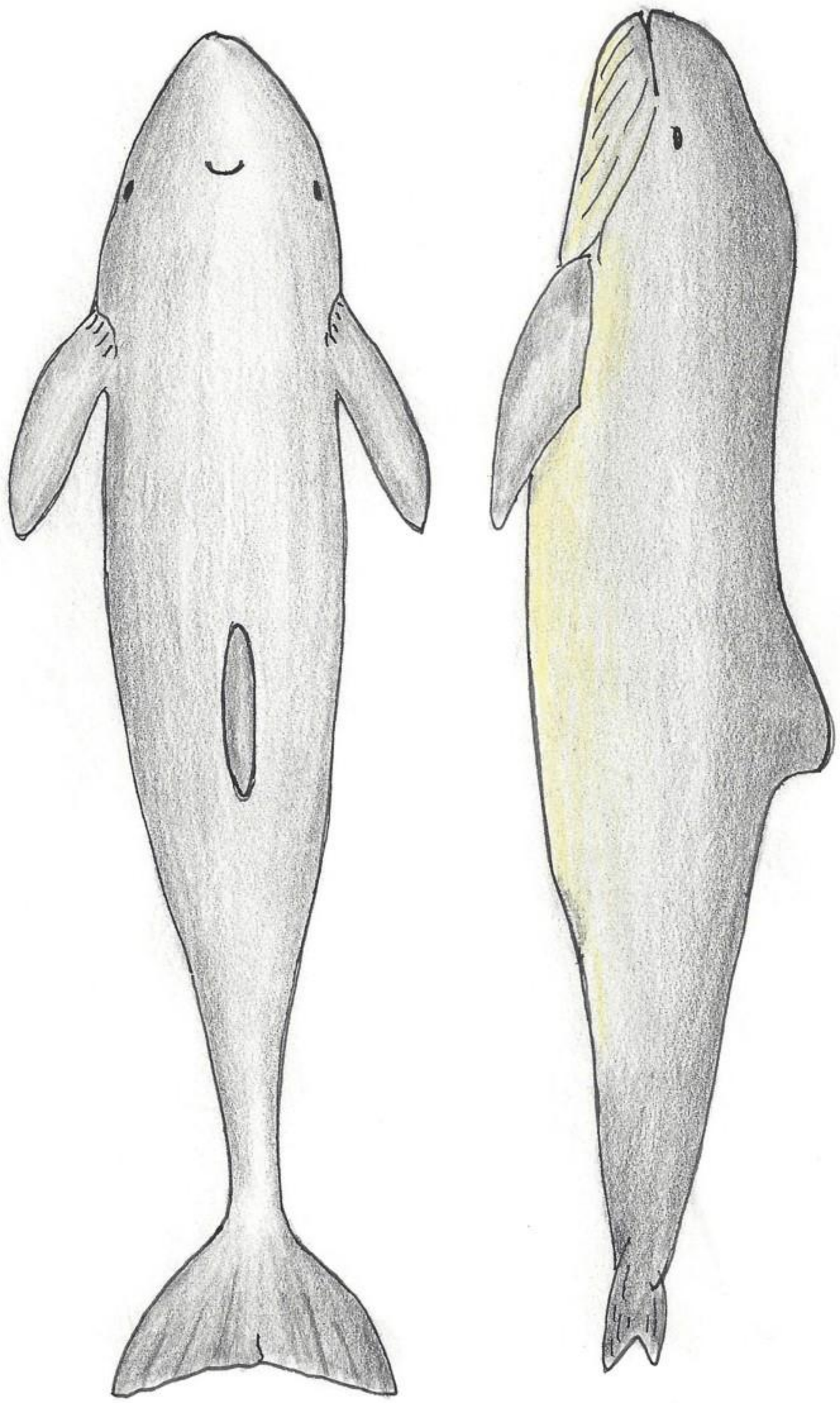
Met Isik Tuckle who in turn presented us to Clay Kaigelak. Clay showed us a young porpoise which his son had collected Aug. 23, 1952 or found alive near shores of new Elson Lagoon. while hunting eider near Birnirk Village. This young animal had been stranded in shallow water with part of back above water. It was killed by hitting on head with the butt of his gun. It was placed in permafrost cellar since August 23. and on this date Sept. 2 was in excellent condition - frozen solidly. Several slitlike mark ≡≡≡ on body about 20 mm apart. no odor from animal.



520902-159

PHOCAENA VOMERINA FROM ELSON LAGOON

520902-1



DORSAL

LATERAL

520902-158

measurements of Phocaena vomerina 520902-1 collected by crew of Clay Kaigelak at nw Elson Lagoon, 71°20'27", 156°35'45", 0 ft.

Total length (overall length)	910 mm
Length along curve of back to base of notch between tail flippers	924 mm
Length along curve of back to vertical line connecting tips of hind flippers	962 mm
Depth of notch between flippers	18 mm
Depth of notch between flippers	18 mm
Distance from tip of snout to anterior angle of eye.	110 mm
Length of eye opening x width	17 x 5 mm
Distance from angle of mouth to anterior angle of eye	29 mm
Distance from tip of snout to angle of mouth	82 mm
Tip of snout to blowhole	120 mm
" " " " anterior base of dorsal fin	415 mm
" " " " posterior base of fin	556 mm
" " " along dorsal curvature to posterior, nearly vertical margin of dorsal fin	550 mm
Posterior base dorsal fin to base of notch between hind flippers	369 mm.
Angle of mouth to external auditory meatus	75 mm
Tip of lower jaw to anterior base front flipper	200 mm
Tip of " " " posterior back " "	257 mm
Tip of lower jaw along curvature	—
Tip of lower jaw to center umbilicus	377 mm
Center of umbilicus to base of notch between hind flippers	525 mm
Tip of lower jaw to anterior end of genital opening	426 mm
Length of genital opening	35 mm
Tip of lower jaw to anus	630 mm
Anus to base of notch of hind flipper	272 mm
Maximum circumference of head	493 mm
circumference immediately behind flippers	470 mm
circumference of body at umbilicus	500 mm

Circumference of body immediately behind dorsal fin	450 mm
Circumference of body at anus	296 mm
Minimum circumference of caudal peduncle immediately in front of hind flippers.	122 mm
Width across hind flippers	203 mm
Circumference of body at anterior origin of dorsal fin	485 mm
Height of dorsal fin	59 mm
Length of flipper on front ridge	171 mm
Extension of lower jaw beyond upper jaw	5 mm

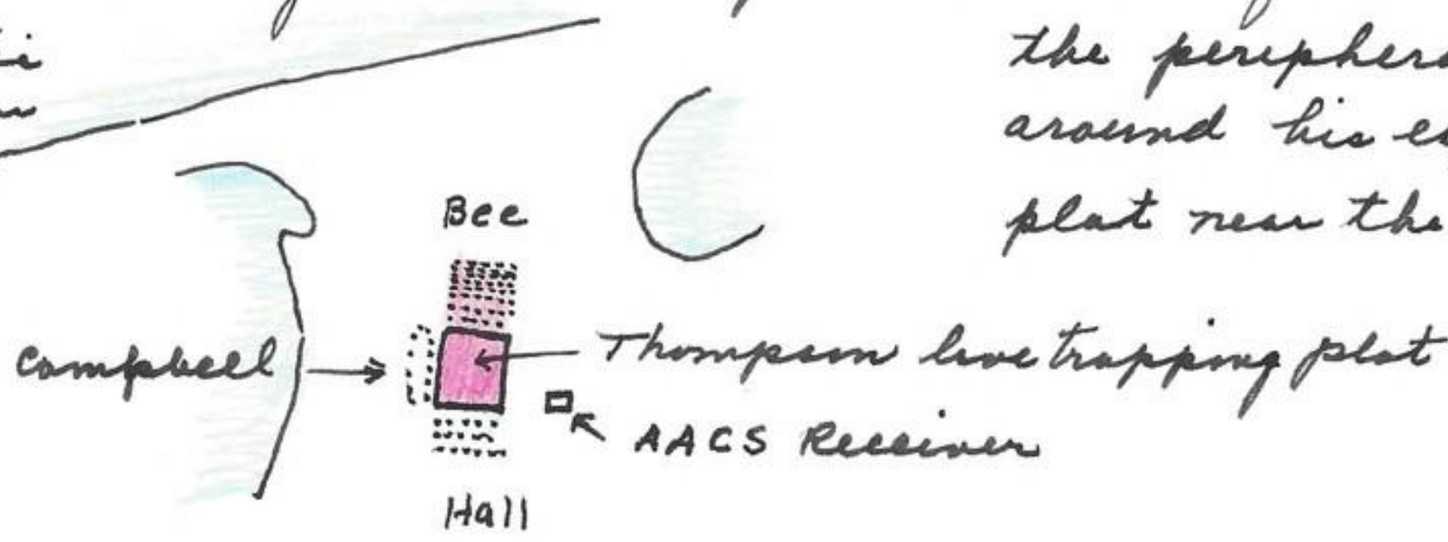
Preserved porpoise in formalin. Enroute to A.R.L. noted again an Arctic loon 6 feet on sandy shoreline preening its feathers. Ocean very calm today even with a small amount of snow flying in air. Mr. Clay Kaigelak had 40 king eider, undressed, hanging on drying rods at his home. At A.R.L. Dr. Preston says Arctophila fulva grey green in acid water and red in basic alkaline waters. Measured fecal pellets of 520804-33 ♂ Dicrostonyx as 4.2 mm x 1.7 mm which is a smaller pellet than either Lemmus or Microtus oeconomus. Pete Savalik says porpoise seen every year at Barrow and washed up on beach or mud. Beg ones good to eat. Our specimen 520902-1 must be a very small one. Mr. Ward reports following publications good on Alaska botany.

1. J.P. Anderson. Flora of Alaska and Adjacent parts of Canada. Iowa State College Jour of Science. Vols 26:3, 21:4, 23:2, 20:2, 18:4, 19:2, 18:1, 24:2.

2. Flora of Alaska and Yukon. Eric Hultén. Vols 1 to 10. Lund Universitets Arsskrift. N.F. Acad 2 Bd 27, no. 1.

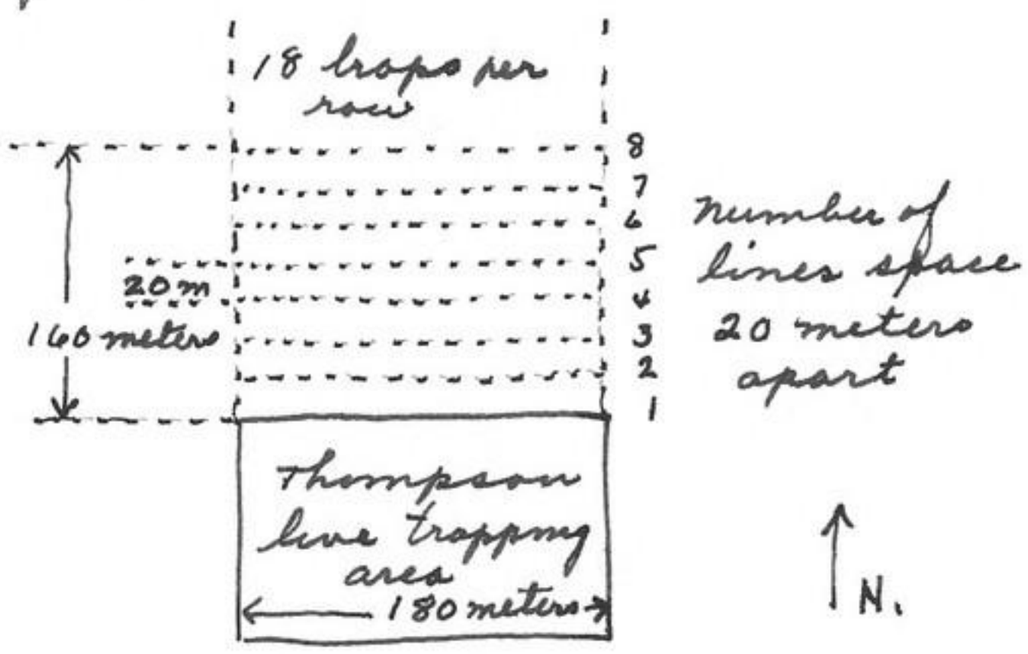
Arctic Research Lab., Point Barrow, Alaska
Sept. 3, 1952

This evening Daniel Thompson asked me if we would trap the peripheral areas around his experimental plat near the A.R.L.



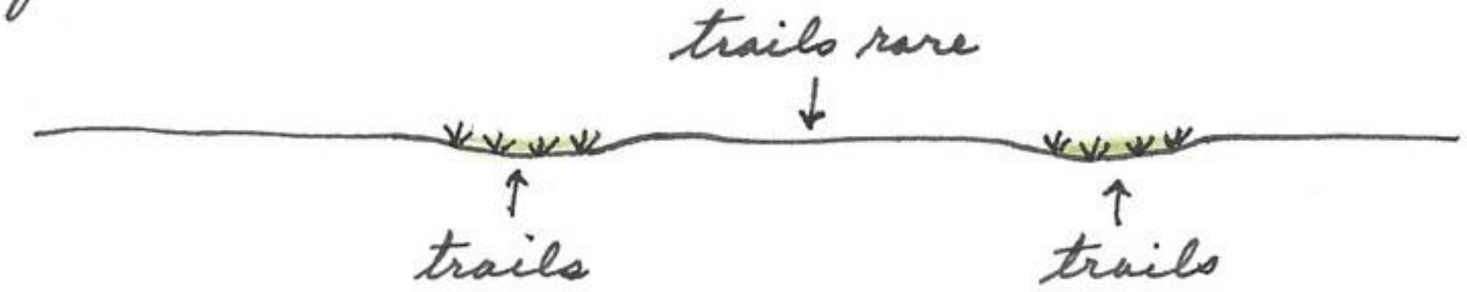
The center of the Thompson Plat is 156°39'40", 71°19'03", 6 feet.

It is my opinion that the peripheral areas should have been trapped with live traps instead of snap traps. Our lines were formed beyond the limits of his boundary in a systematic plan. My area I laid out thus:



144 traps placed 10 meters apart in 8 lines separated by 20 meters. All traps placed in runways and baited with oatmeal.

The area trapped of raised polygons but relatively flat. Vegetation covering sparse and trails entrenched and low in grass cover. Eriophorum empressively in blossom. Nearly all channels between raised areas supporting runways with extensive trail development at intersections and places where grasses and sedges more dense. Cover ranged from completely covered trails to bare trails over raised polygons or man made bare exposures. The animals were inhabiting an area where I would not have expected Lemmus to use so extensively. Jaegers in area.



Point Barrow, Arctic Research Laboratory, Alaska

Sept. 4, 1952

Inspected trapline set of last night. Cold, cloudy, high wind and traces of snow on surface. Ice pellets clinging to fur of Lemmus. Caught 77 Lemmus and 32 traps sprung.

line 1	traps 1-8	Two of Thompson's marked specimens in traps.
" 2	" 9-20	line no 1. The specimen no 65 of Thompson
" 3	" 21-29	measured ♀ 120-17-17-9-41 gms, vagina open.
" 4	" 30-39	On Aug. 8 this animal weighed 21 gms and
" 5	" 40-49	this date (Sept 4) weighed 41 gms or a gain of 20 gms
" 6	" 50-56	in about 25 days. Line no 2. This specimen
" 7	" 57-66	was a ♀ 123-18-19-9-47 gms, vagina closed.
" 8	" 67-77	(see catalogue for rest of Lemmus caught)

520905-161

Point Barrow, 156° 40', 71°20', 3 ft., Alaska

Sept. 5, 1952

Putugusruyuk (written by Adam Leavitt, ARL Eskimo) was taken on beach N of ARL on the Arctic Ocean. This crustacean 520905-1 was blown upon the upper beach by a high wind of yesterday. Mr. James Oliver, an ARL Eskimo said that these animals (Mesidotea entomon (L.) = (Idotaega entomon)) are frequently blown on shore in the fall at Wainwright either as a result of high winds which are associated with fall or as result of lowering of temperatures. Observed 3 other specimens on beach in 1 mile of ocean beach. Movie and still of this storm taken last night in the evening.

Pete Savolik, an Eskimo working for ARL reports to me:

1. Chandler River is known in Eskimo as Ninguk which refers to the Colville cottonwoods which are found there.

2. Petes father reports only an occasional moose when he (Petes father) was a young boy, and increased in numbers as he grew up. His father (Petes) believes that there were no moose on the north slope of the Brooks Range when his father was a young boy and the main group were around the Wiseman area on the south side of the mountains (Brooks Range). Today, on the north side, they tend to remain in one river drainage or canyon for a year or two and after exhausting the willows move over into another canyon.

3. Barren-ground grizzly bears go into hibernation the last of October and emerge about May 1st. Not all barren-ground grizzlies hibernate but some of the middle sized ones and larger ones remain active all year. Those not hibernating build a nest among willows which is lined with grasses and leaves and general trash. Snow surrounds the nest cavity which gives protection from wind. There is no overhead protection.

Upon leaving hibernation about May 1 the bears are black and after contact with air and sunlight turn brown.

4. Bears move into mountains or foothills in winter and

feed on caribau and fish. Bears get caribau by jumping down on their backs from points of elevation.

5. During summer there is a change of fur from old hair to new hair. The early hair just after hibernation is comparable to the pelage of marmots.

6. In winter when bear feed on fish they collect a mantle of ice and mud that is impenetrable to an arrow.

7. Animals change color when sun comes up in the spring from dark to light as: Wolf - dark greyish on top to white. Red fox - in spring changes to whitish with black undersides. white fox - in fall not too white but in spring to pure white. Parka ruffs - in spring change to a much lighter color than in winter or fall.

8. Wolverine kill caribau just as bear by jumping on backs from an elevation.

9. Wolves, like bear and wolverine kill caribau by dropping on back but mainly by tiring caribau by chasing. Two or more wolves will participate in such an attack, one pursuing at a time. When a wolf pulls down a caribau, it grabs it by its hind leg first and when the caribau turn to defend itself the wolf grabs its throat. It only takes a few seconds to kill a caribau under such an attack. Once a wolf starts to chase a caribau it always gets it. If a group of wolves are following a caribau one pursues while the other follows and when the caribau is actually killed, the wolf gives a call which in effect invites the other hiding wolves in to the feast.

9a. Walrus frequently taken every year at Barrow Village and Wainwright.

10. In regards to Phocena vomerina (porpoise) he says: Aug 1, 1937 he observed two small porpoise about 3½ feet long and as big as a seal in Kugruak Lagoon on the point NE of Wainwright. They were the smallest porpoise ever seen and were chasing fish 10 feet from shore and with their backs out of the water. The water was smooth and when they were approached with the motor boat they swam away and at a speed greater than the boat. On Sept. 1, 1933 he found a dead porpoise 21 miles north Wainwright at Atanik. It was 6 feet long and had been dead for a long time. In 1930 one large and one small porpoise were seen at exactly the same place as the ones observed in 1937. Porpoise have been observed in the Wainwright area as long as anyone can recall, however, only 5 or 6 are generally

observed in one season.

At dinner this evening overhead the following conversation: Barren-ground grizzly bears have raided a train of wanagons at K16 about 100 mi. W Umiat on Colville River. It destroyed cupboards, food etc between July 20 and Aug. 20 of this year. They also reported a wolverine killed at party 145 east of Umiat. Mr. Max Brewer, U.S.G.S at ARL (permafrost investigator) reports:

1. 2 wolves at Titaluk about 6 mi. E. Ikpikpuk at Valley of the Willows, July 16, 1951.

2. One barren-ground grizzly at some place on July 15, 1951.

3. At Knifeblade observed 3 wolves, one of which was black in the first week of November.

4. In the spring of 1951 several people reported a group of 3 grey and 1 black wolf moving between Topogaruk and East Oumalik.

5. The greatest concentration of white foxes at Point Simpson and to the SW in fall of 1950. He saw foxes on 28 different times. One trapper caught 20 with one trap in Nov. and Dec. 1950.

6. Observed and collected 2 Citellus parryi at west of Cabin on the Inarie River, approx. 156° 30', 70° 54"; on June 3, 1951. at which time the ground was covered with snow over the greatest part of the landscape.

7. Red fox observed 1¼ miles S Barrow Village in April 1951.

Arctic Research Lab, Point Barrow, Alaska

Sept. 5, 1952 (cont.)

Found 2 skulls of small dog on top of storage shelves in Carters work office. Carter had left for the States with all his equipment. Will tag now and inform him that they were taken and ask for disposition. They were excavated at Hauser Q'at Birnirk mounds. and carry field numbers 520904-82 and 52090483.

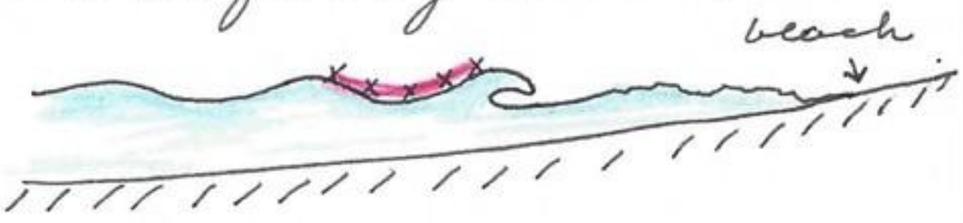
Arctic Research Laboratory, Point Barrow, Alaska

Sept. 6, 1952

High wind today brought ice pack to within 40 miles of coast at Point Barrow and several ice bergs the size of a room which lodged on beach. The ice is a beautiful blue color. Many smaller fragments (1 yard) and less were washed upon the shore. This was one of the most exciting things that has occurred since I have been at P. Barrow. In the afternoon

drove weasel down wave washed beach to top of cliffs and and thence upon tundra (3 mi. SW Barrow Village). Lemmus in practically every section of the tundra that supported favorable places. Many runways in grasses and sedges that were not thick enough to give protection to runways. Many or about 70% of runways were exposed from above but protected laterally. Extensive runways under coverings of masses with runways overlain by a raised arch of moss;

Runways occupying swales that will be inundated in spring thaws. Much of this area is covered with dwarf willow that seldom exceeds 3 inches above the ground. I would estimate that runways were never separated by more than 40 feet at any point. Along the ocean beach the immature red phalaropes were feeding on waves just before the waves overturned:



Sabine gulls 60%, arctic tern 20%, Kittiwake 5%, glaucous gulls 15% were found along the beach moving both north and south along the shoreline. Returned to A.R.L. at about 1 mile S of Barrow Village, along beach cliffs saw several holes in eroded banks which I believed to be those made by Citellus.

Sept. 7, 1952

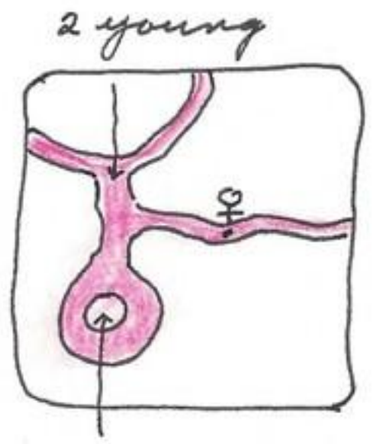
Snowed occasionally today. Inspected ridge about 1/2 mi. S ARL and found Lemmus inhabiting all favorable areas. Forage appears green but relatively sparse compared to what it might look like if it had not been grazed by Lemmus. On riding on top of weasel vehicle noted that Lemmus occurred about 1 out of 4 of likely inhabiting areas. It was a common sight to see 2 or 3 in groups, predominantly, however, singly. Collected 1 ♀ 520907-1 and its young ♀ 520907-3 from an area not definely associated with runways but within 2 feet of same. The two young were together as the adult ♀ left them. They rather awkwardly attempted to escape but were easily captured without the usual exertion required to capture adult Lemmus. The lower left mammary nipple was bleeding and suggests that young were nursing when ♀ abruptly left. This establishes that small Lemmus of the size indicated in catalogue, are still nursing from adult ♀ and are closely accompanying them in exposed and open situations. 4 snowy owls, 7 Pomarine

jaegers, 8 Steller eider, 1 loon, 1 Lapland longspur, 7 glaucous gulls, 5 snow buntings, no red phalarope except at edge of ocean + fresh water lakes, were observed. Lemmus are active during snow storms as well as clear weather. Tracks and feces in runways lined with the new snow. Water in trails now ice upon which the Lemmus still navigates. Small ponds and water on tundra now ice and has been for last 2 days. Medium sized lakes partially open. Largest lakes free of ice.

Arctic Research Lab., Point Barrow, Alaska

Sept. 8, 1952

The two Lemmus captured alive yesterday on trip south of ARL are now doing well and feeding on lettuce. This A.M. at 11:30 one died. The remaining Lemmus throwing on lettuce, apple and Arctophila. This A.M checked area 2 blocks S of ARL and found under an upturned Coca-Cola bot one ♀ and 5 dead young, Two of the young were 2 inches apart eight inches from the nest in runway, one of the two had a puncture through throat and had been bleeding. Nest material 2½ inches of insulation with top opened to bottom of bot. The young were apprxt. 7 days old. Nos 520908-5 to 520908-9 The female no. 520908-4. Four other groups of young (4-4-6-5) about 7-10 days old were also found dead and cold in nest. They could not have died over 4 or 5 days ago, most of them appears to be only a day or so. A male Lemmus 520908-1 swam in cold water of lake for 7½ minutes before drowning. Fur not soaked above. A ♀ Lemmus 520908-2 ran for 1 hour and 20 minutes with only short pauses until uncouraged on. At the end of 1 hour and 20 minutes it refused to move except when forced and then only to adjust itself. This animal was placed in ice water pond to saturate fur for about 15 seconds and then placed on snow. It moved about 12 feet and then died in 8 minutes. When this Lemmus was in running experments had a tendency to run in a straight line direction regardless of attempt to herd it in any other direction. Another Lemmus was released from one point 10 times and in each case ran in the same direction. A female Lemmus 520908-3 was placed in water



position of female in runway.

nest of 3 young

(fresh water lake) for 15 seconds and then on snow. It died in 21 minutes. The weather at time of endurance tests was - slight breeze, lake surface smooth. Snow on ground and deepest it has been since first snows. Lemmus 52090810 to 520908-12 under bot and probably same family. The snow of last night might have covered the entire groind surface. The Lemmus trails were reestablished near main entrances but not the entire trail systems used before the snow. It is difficult to see these animals now because of the snow covering. Nearly all the 50 gallon drums along pipeline were marked by trails

Pete Sovalik

shrew	ugruagruk
muskrat	Kivgaluk
bearded seal	Ugruk
spotted (harbor) seal	Karigiak
harbor seal ?.	natchek
baleen whale	Agvik
squirrel	Sikrik
Coyote	Arnaguruk
beaver	Kigiak (Pakuktak)

↑ noatak name

The above Eskmo names including Pete Sovalik name written in Old Eskmo in the language of Barrow Village People. Pete Sovaluk, a full blooded Eskmo, age 48 in October. Pete also supplied the following information.

1. Spoiled meat makes our people sick.

2. If Eskmos eat meat only and without oil they get sick in a few days with systems of grip in chest and constipation. On islands away from the coast, they get fat and oil from squirrels and bear by boiling. Their method of extraction is to hammer bones of seal, caribou on a large flat rock with a stone hammer into fragments and after a big pile has accumulated they boil out the oil and greases which float to the surface and then store in bags made from stomachs of caribou. They mix marrow with

this congealed fat and oil and eat. Oils are also extracted from fish. This fat mixture must be eaten daily with boiled or raw meat or they get sick. People of the coast are not troubled because of lack of oil because they have the resources of the whale, seal, walrus and other mammals rich in oil fats.

3. When Pete was a young boy on the Colville his father and mother would trade furs and meat for flour, sugar, molasses, brown bread, hard bread at the mouth of the Colville River and then return inland. When these supplies were exhausted they lived on meat alone.

4. Eskimo language includes:

e pronounced i
u pronounced o
ng to be written

nunamiuts at Anaturuk Pass moved there recently to escape punishment for taking supplies on a vessel left in ice over winter on the coast of N.E. Alaska. Eskimos did not live in the Brooks Range before that time.

5. Two white whales taken at Wainwright in spring 1952 and one at Point Barrow in 1950.

6. The narwhales are rare and have been seen at Kotzebue, Herschel Island and about 10 mi. S Cape Halkett (12 mi. W and 3 mi. N Atigaru Point, 152° 41', 70° 37'). The last mentioned specimen seen in September of 1929. It had been dead for some time.

7. Fur seals only rarely taken at Point Barrow.

8. Pete recorded the names of all the common mammals of the Arctic Slope as follows: (written in his own hand writing. copied)

Arctic cinereous shrew	Ugrugnak
Tundra saddle-backed shrew	Ugrugnek
Dusky shrew	Ugrugnak
Arctic barren-ground grizzly	Aklak
Polar bear	nanuk (Kaigulik)
Black bear	Igagnik
Alaska red fox	Kayuktuk
Arctic white fox	tigigaruak
Coyote	amaguruk
Alaska tundra wolf	amaguk
Alaska marten	Kaviatchiak
Ermine	Itigiak
Least weasel	naulayuk
Beaver	Kigiak
Mink	Itigiakpak
Wolverine	Kavik

Otter (river)	pamiuktuk
Canada lynx	nilluryik
Harbour seal	Kasigiak
Ring seal	natchik
Bearded seal	ugruk
Walrus	Avik
Ribbon seal	Kaigulik
Pacific killer whale	Aglu
White whale	Sisuak
Narwhal	Sisuak tugalik
Bowhead	Agvik
Gray whale	Agvikluak
Porpoise	Agvisuak
Snow shoe rabbit	ukaliatchiak
Arctic hare	ukaliuktuk
Hoary marmot	Sikrikpak
Parry ground squirrel	Sikrik
Red squirrel	Sakalatayik
Brown lemming	Avingaksiak
Varying lemming	Kilyagmiutak
Red-backed vole	Avingak pamuktuvuak
Tundra vole	Avingak
narrow-skulled vole	Avingak
Muskrat	Kivgaluk
Porcupine	Kingagluk
Alaska moose	tuttuvak
Stone caribou	tuttupiak
Muskox	umiknak
Dall Mt. Sheep	Imaik
Ribbon seal	?

Pete Sovalik

Pete said the coyote is occasionally seen on tundra and in the Brooks Range and has always been there as long as he can remember. Some of the peculiarities of Pete's pronounciation are:

"
indestines = intestines
plubber = blubber
eksperments = experience
skelets = skeletons
dat = that fiks = figs.

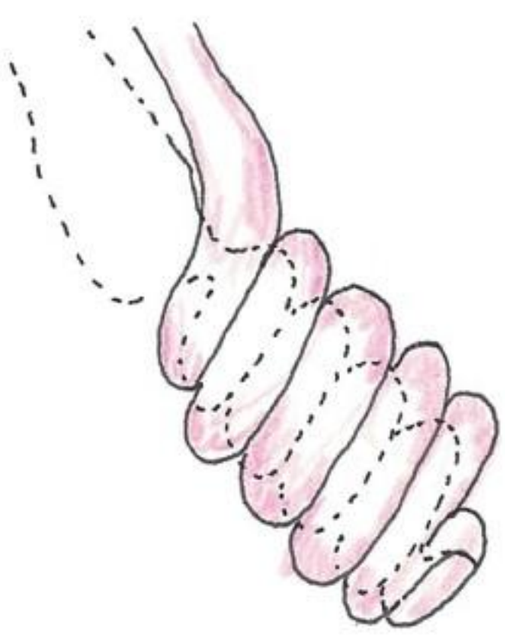
520908-168

Oliver James Angashuk.

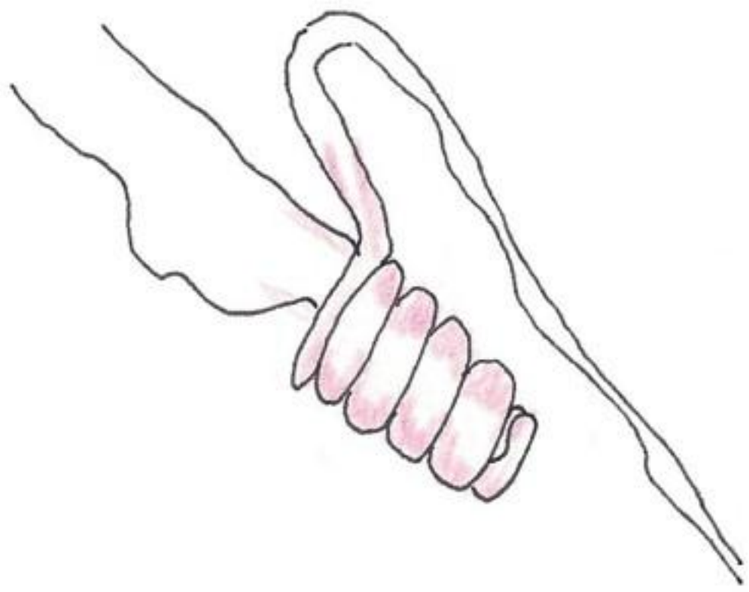
Age 46, Barrow Village and employee of A.R.L reports:

1. Muskrat holes approx. 90 mm in width on two lakes inland from Point Barrow. There were approx. 50 holes on the ice that were being kept open by some kind of animal that he was not aquainted with. As he remembered there were no vegetation clippings surrounding these holes. The ice was about 200 mm thick. Oliver is a cousin of Simon Paneak of Anaktuvuk Pass and Homer Meikiana also of that area. Oliver frequently speaks of a red rock area once found by Eskimos but never rediscovered and used in making household utensils.

In preparing Lemmus I have noticed a peculiar structure of the intestines which occur in all Lemmus so far examined:



2X



From # no. 520908-4

These adsorption coils are situated in several positions in the body cavity of different individual lemming.

Clay Kaigelak

Age 35 and from Barrow Village (born at Point Barrow but lived most of life at Beechey Point and Foggy Island) reports to me:

1. Never has seen rabbits on Arctic Slope.
2. Never has seen porpoise east of Elson Lagoon at Point Barrow.
3. Lynx numerous at Barrow Village before he was born. He has never seen them.
4. Barren-ground grizzly bear hibernates in winter, some stay out late. Come to within 18 miles of coast at Beechey Point.

5. white fox common at coast and only occasionally inland.
6. Least weasel mainly in foothills but few in lowlands.
7. Mink (see map)
8. Walverine (see map)
9. Killer whale at Point Barrow.
10. Never seen narwhal
11. Moose (see map)
12. Agreed to get 6 skulls of white fox, 3 red fox, 1 bearded seal, 1 ring seal, 1 spotted seal at $1.00 apiece.
13. No one living at Beechey Point.
14. Likes caribou best for "lasting longer".
15. Characterizes caribou versus reindeer on the following basis.

Caribou	Reindeer
1 horn big	1. horns not big
2 longer legs	2. short legs
3 longer nose	3. short nose
4. one color	4. spotted, white
5. feet longer	5. feet rounder.
6. ♡ longer in proportion to width (front feet)	6. ♡ rounder (front feet)

Both drawn by Clay.

Made census of mammals collected this summer:

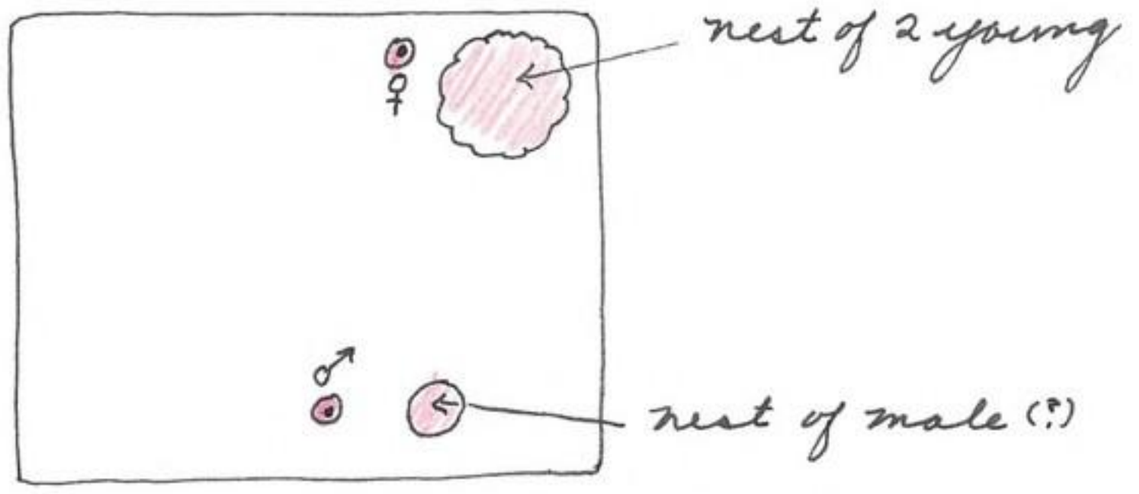
Lemmus trimucronatus	318
Citellus parryi	88
marmota caligata	2
Mustela ermnea	8
Sorex (3 species)	12
Microtus oeconomus	483
Dicrostonyx	9
Clethrionomys	64
Canis lupus.	1

Arctic Research Laboratory, Point Barrow, Alaska
Sept. 9, 1952

Snowed last night covering ground. Large icebergs (7 of them) on horizon to north. Snow of yesterday left area by evening.

520909-170

This morning collected 14 Lemmus and 1 Sorex cinereus from tundra about 200 feet south of Arctic Research Lake. Sorex no 520909-1 from tundra (Arctophila fulva dominant and only grass) about 30 feet from where the camp (A.R.L) is located on pure gravel. The Sorex is fast when attempting to escape. Collected approx. 200 mm from a Lemmus runway. Lemmus common in area. Lemmus 520909-2 and 520909-3, young, from dry grass nest of about 1 3/4 gal. capacity under composition board. The ♀ 520909-4 was at nest. The male 520909-12 was 5 feet away near a nest of green Arctophila stems and nest not large but frail looking as if used as a resting nest.

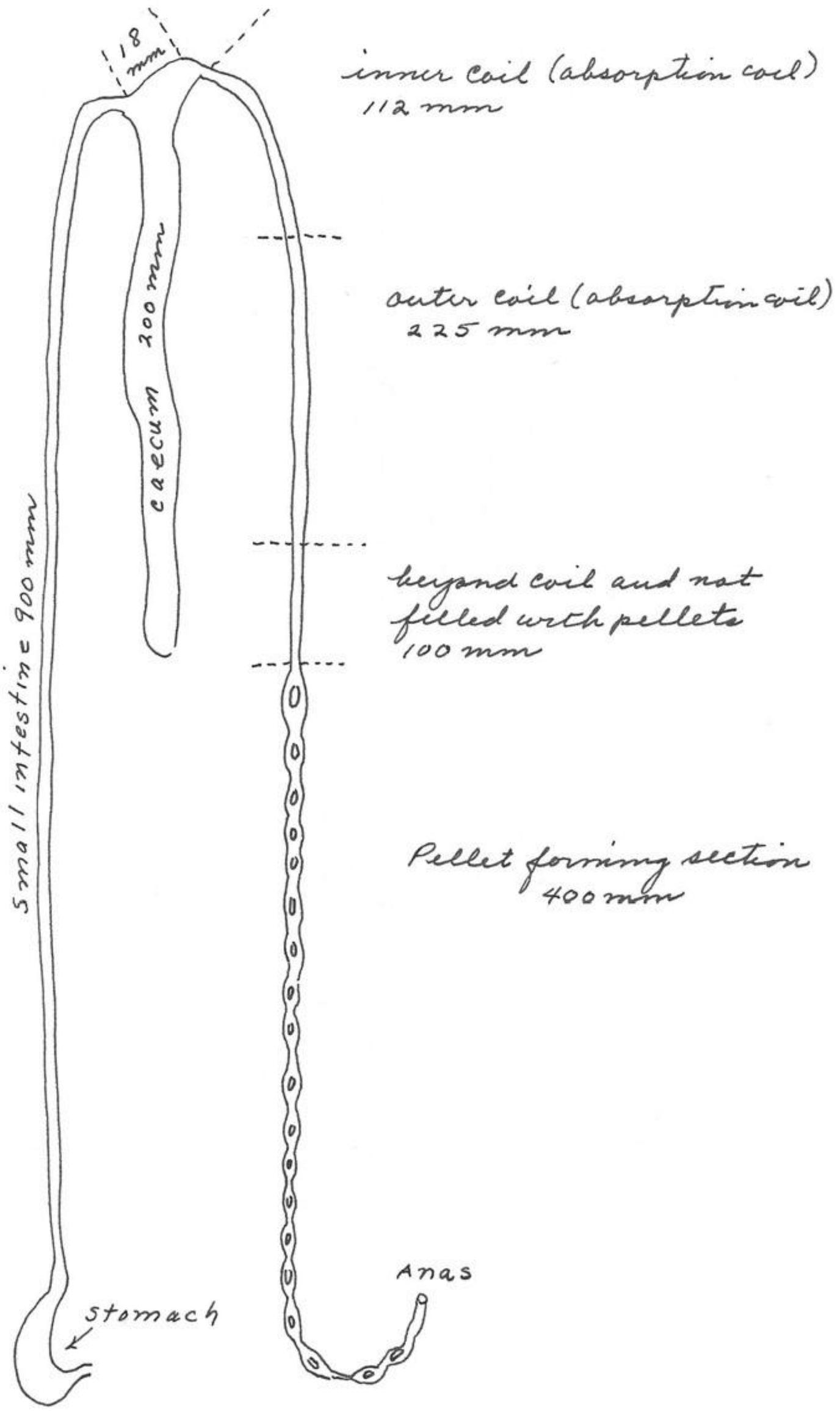


The wood board was a 5×5 composition board with 5 inch sides (double layer of board). All specimens in collection. A ♂ lemming 37 gms wt. was a solitary individual and independent of family group. Lemmus family of 4, 520909-6 to 520909-9 from well insulated group nest with diameter of 12×12 inches without lining of grass. The young instinctively defend themselves. Umbelical scars present but eyes not open; mammae noticeable in ♀♀ but not in ♂♂. Lemmus 520909-10 ♀ of a family of 4. These were together with nest just large enough to accommodate the 4. Observed 5 other such age groups and always together (in groups of 3-4-3-4-4-3). There were many exceptions, however, in which smaller ones were found alone. As the animals attain red backs they have left family groups and are alone. Lemmus 520909-11, 520909-12, 520909-13 520909-14, 520909-15 and 520909-5 of general collection. Lemmus 520909-16 donated by Daniel Thompson. This animal was placed in a 2×4 enclosure with floor covered with 40 species of plants in sod form. The lemming had eaten all food except 1 or 2 lichen and a noteable exception in Cassiope tetragona. Some masses and all grasses were eaten. At 11 days it starved. made into skin. Atopsy revealed 12 pellets in lower digestive system. Largest interval between pellets 100 mm, closest 3 mm. Most of alimentary system appeared to be filled. It is evident that the crash in Lemming numbers is not due to lack of food as this animal had eaten all vegetation down to roots which never occurs in nature. Posterior body 3 mm above tail and about 8 mm in diameter

520909-171

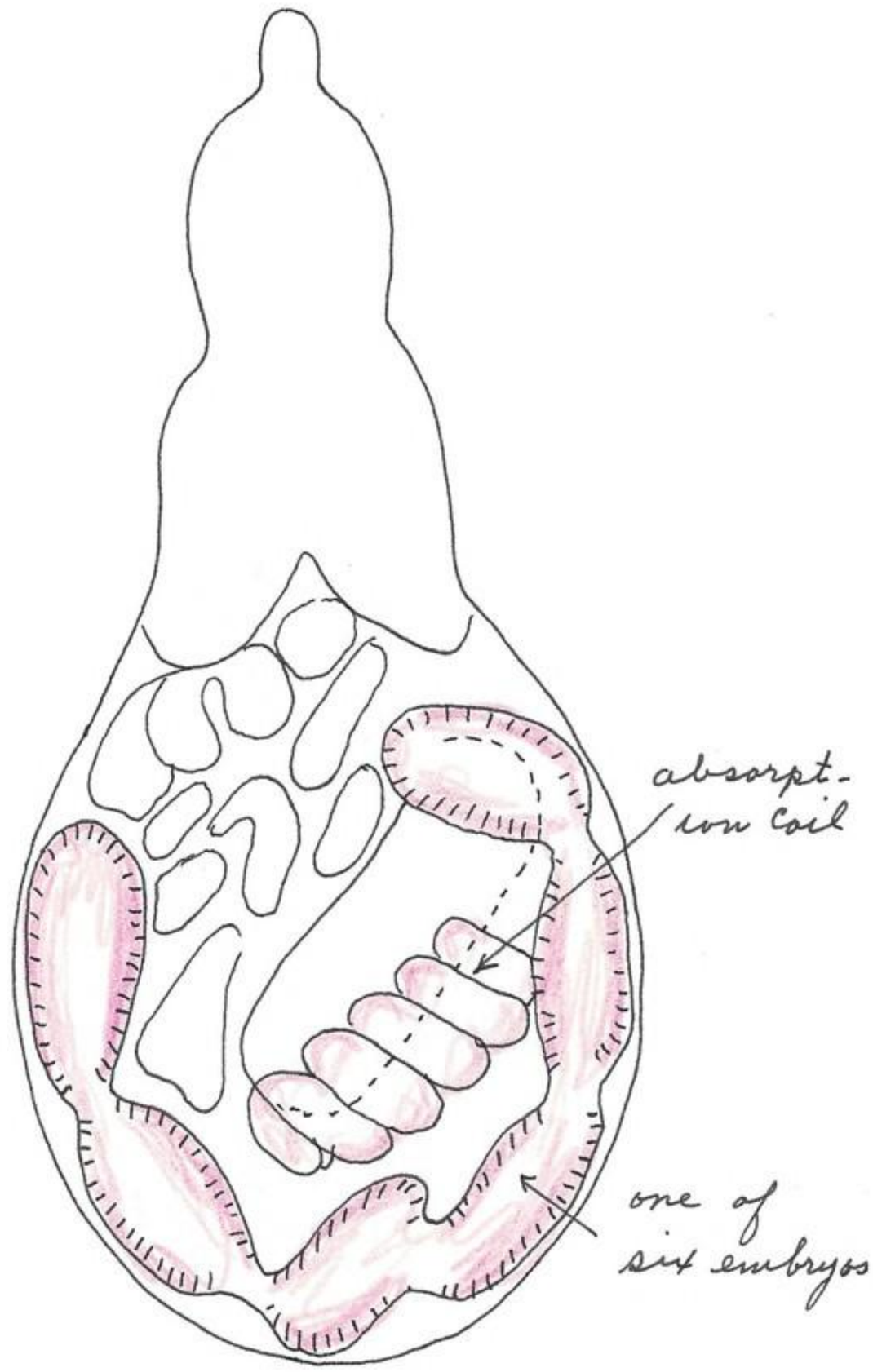
DIGESTIVE SYSTEM LEMMUS T. ALASCENSIS

NO. 520909-5 ♀



Largest pellet, 12 mm; smallest pellet, 4 mm; longest interval between pellets, 24 mm; smallest interval, 8 mm; weight guts, 21 gms; weight pelt, 12 gms; weight embryos, 17 gms; weight minus embryos, guts and pelt, 55 gms.

scared with no hair and covered with dirt. The body minus guts and skin weighed 37 gms. Skin only 8 gms, guts only 9 mms. This total weight is about 1/2 of a normal animal in both gut and total weight. The head was fluffed and eyes deeply seated. Again, this experiment suggests that these animals can live on vegetation beyond the period of the crash if vegetation alone is a factor as during such periods, there is always sufficient vegetation to carry on an emergency. If they eat all the food first the entire area would be bare. It is possible that they die of malnutrition or disease before the actual food supply is 100% depleted. The above animal was covered with about 200 or so small ectoparasites.



Arrangement of embryos and absorption coil in Lemmus no. 520909-5. Approx nat. size.

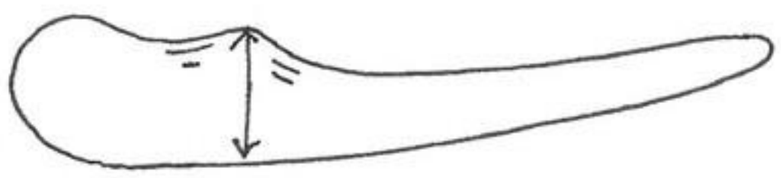
Mr. Clifford Fiscus of the U.S.G.S reports the following to me:

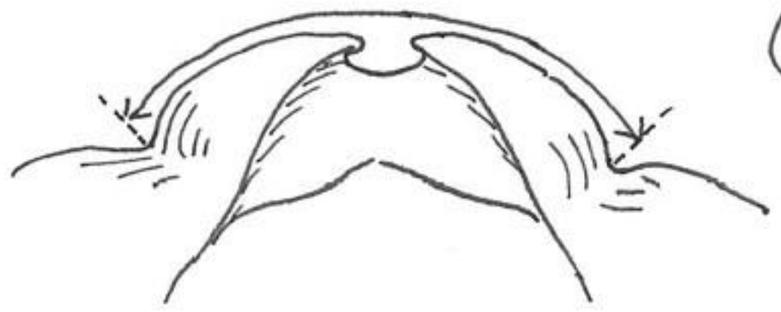
1. 6 wolves in one group.
2. Caribou killed in action by 2 wolves, one approached after tiring and diverting from herd and then killing by grabbing throat. The second wolf came to kill after the first one actually killed the caribou.
3. Arctic fox, red fox, black fox, silver and cross fox in area of Pitt Point.
4. Raven off Fish Creek but mainly along Colville River.
5. No bear at Pitt Point.
6. Eskimo Alfred Kreggs reports sea otter (see map) at Harrison and bay off Habbett in 1951-1952.
7. Eskimos reports night hawk at Wainwright & mouth Colville Riv.

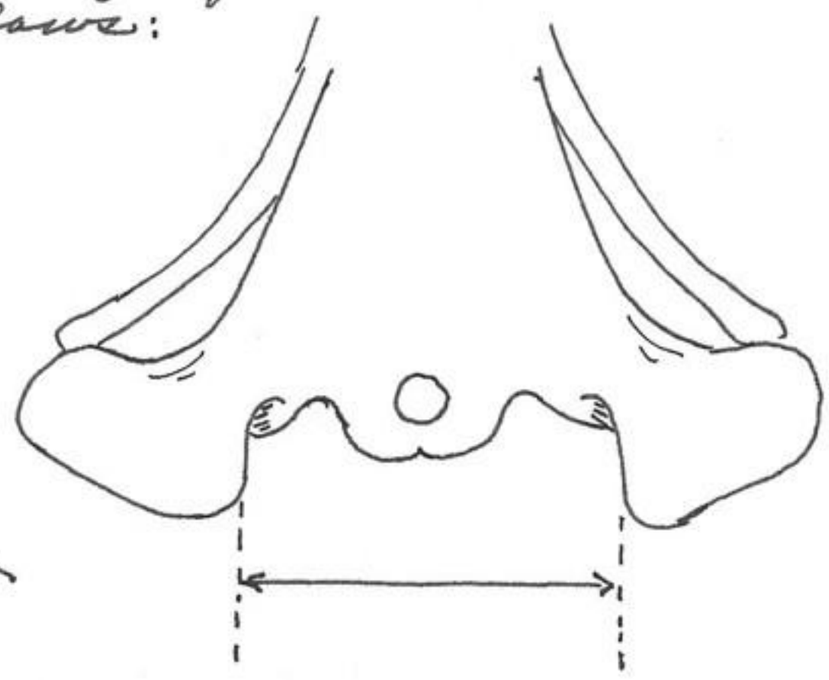
8. Collected sparrow hawk and varied thrush at mouth of Colville River.
9. When ice pack is in near shore the seal are more numerous.
10. Lemmus numerous at Pitt Point and Saktuina Point.
11. Walrus and skeleton observed along beach (See map Sept. 8, 1952) at Pitt Point.

Point Barrow, 71°23'12", 156°27'33", 12 ft., Alaska.
Sept 11, 1952

At most northern point of Alaska measured several Balaena mysticetus skulls and lower rami to determine age groups of population of whales kill by Eskimos for food. The skulls and rami were from houses and those lying on the ground near houses. measurement were as fallows:





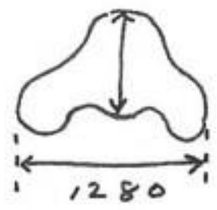


Diameter rami	curvature outer condyles	inner squamosal distance
241	310	682
220	320	684
320	310	670
148	330	
295	325	
330		550
530	350	580
250	332	
260	333	
366	333	
230	339	
221	333	
270	340	
260	310	
252	345	
330	310	
220	375	780
323	305	
450	370	670
320	300	
386	365	
292		
250		
245		
240		
273		
261		
218		
235		
295		
201		
207		
243		
239		

Where skull measurements are on same line they are of the same skull.

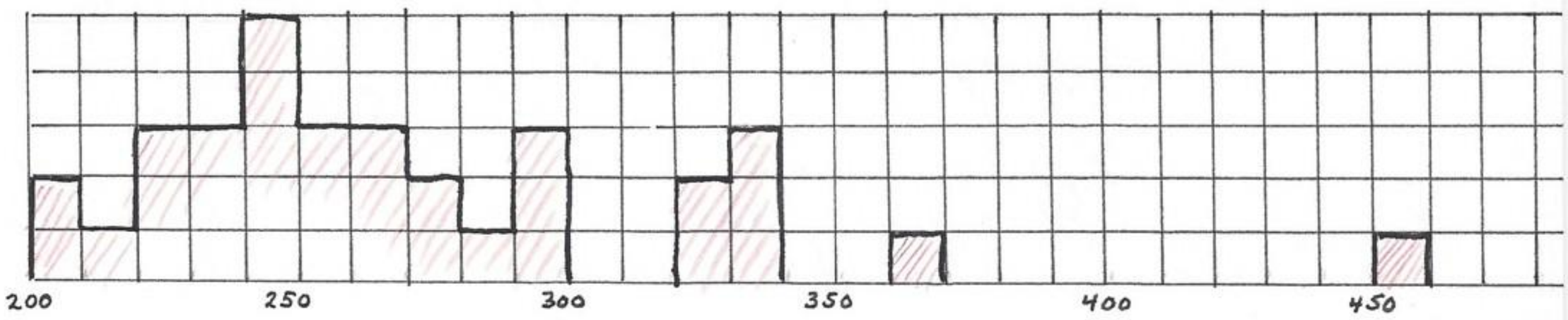
5209 11-174

Two rami measured 270 X 2550 and 260 X 2620 using diameter of above measurement and total length. these two rami differed in curvature.
One scapula measured 1300 mm. One skull measured 710 X 1280 mm



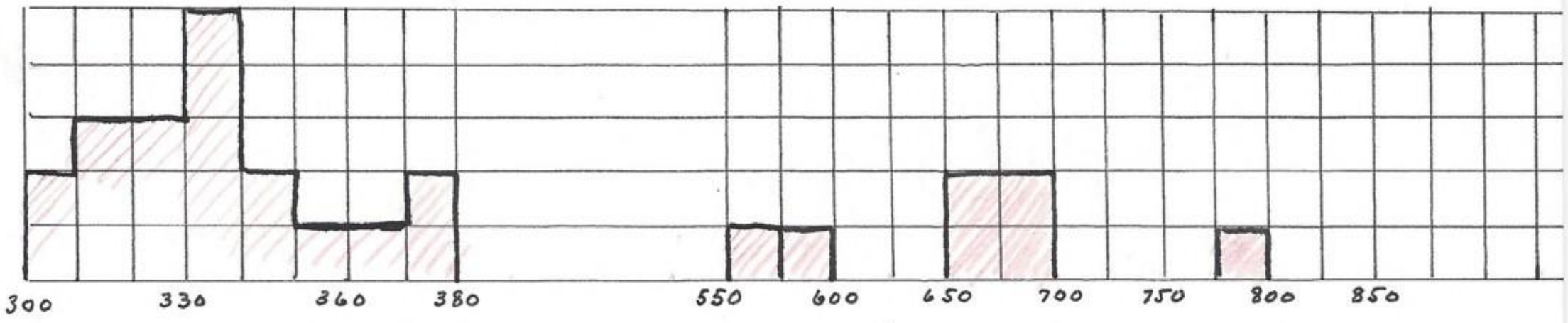
The skull (on previous page) which measured 580 (inner squamosal distance) had a greatest width of 1270 mm.

MEASUREMENTS BALAENA MYSTICETUS



DIAMETER RAMI

one specimen 530 →



WIDTH CONDYLES

INNER WIDTH SQUAMOSALS

The above graph of measurement on previous page showing normal curve.

Observed light colored seal at extreme northern point at about 100 feet from shore. It rode high in water. 3 snowy owl at point. About 1/2 way between Barrow and point counted 230 glaucous gulls in one group, 19 Sabine gulls a 8 eider. no red or northern pharapes. No snow bunting at point in area where they nested this summer. at 71° 22' 10", 156° 30' 00" collected young harbor seal 520911-1. It measured 980 mm length, tail 88 mm, hind foot 204, ♀. This A.M drove to Barrow Village to see Mr. Thomas Brower. Bower has never seen porpoise east of Elson Lagoon. His father saw a narwhal at mouth of Colville River years ago.

Some prices at his store are:

Butter, $1.25; pork chops, $1.15; maktoak (white whale) .18¢ lb. Bananas, 75¢ dozen; oranges, 2 for 25¢; bacon, 90¢ lb; Johnson motors (10 horse), $360; Johnson motors (5 horse), $230.

Brower says whales confuse snow and ice on shore as ice flows and move north to Barrow Point, thence n w into Arctic Ocean.

Photo 520911-5 of superstructure supporting kayak and dried meat on a double exposure of an Eskmo dog, Barrow Village — the ghost of Eskmo existence. Several Lemmus were collected alive for shipment from Point Barrow. One lemming 520911-2 ♀ measured 133-18-19-10-66 gms. Hair rubbed off stomach and extended with air. Uterus normal. Color movie of Hall and weasel at Point Barrow. 520911-10 of sunset at Point Barrow. 520911-11 and 12, of Hall in weasel. 520911-13 of Edward Campbell. Photo 520911-14 House Q at Birnick Mounds. At A.R.L. made final preparations for departure by packing 5 specimen boxes for air express and 2 equipment boxes for boat rail freight.

Arctic Research Laboratory, Point Barrow, Alaska.

Sept. 11, 1952

Checked in equipment. Large ice bergs on shoreline, many others moving east out into the ocean. Photo 520911-1 of Ed. and Malone sign. Collected 9 live Lemmus trimucronatus alascensis and 4 Dicrostonyx rubricatus and prepared a cage for their transportation to Lawrence, Kansas. These animals would be carried with us as feeding and watering was to be a daily duty. Fresh lettuce, carrots would supply most of their demands for moisture. Ideally each animal should be placed in a separate compartment. While in camp at Point Barrow, prepared the Progress Report, listed all localities where we had trapped, both 1951 and 1952, and listed the movie sequence to be used for educational film. The catalogue of specimens follows, listing all material collected in this summers field work. A map used to pinpoint localities of observations follows the catalogue.

520911-176

all
1 Bird skins and skeletons from Arctic Slope of northern Alaska collected this summer, 1952.

	Skeleton	Skin
Gavia adamsii	2	
Anser a albifrons	1	
Anser acuta	2	
Somateria spectabilis	1	
melanetta perspicillata	2	
Lagopus rupestris	2	
Charadrius semipalmatus	2	
Pluvialis dominicus	2	
Rissa tridactyla pallicaris		1
Xema sabini	1	
Sterna paradisaea	2	
Asio flammeus	1	
Corvus corax	1	
Hylocichla m. minima	1	
Oenanthe O. oenantha	1	
Cyanosylvia suecica	4	3
Motacilla flava alascensis	1	
Anthus spinoletta rubescens	3	
Acanthis hornemanni	1	
Passerculus sandwichensis	4	1
Spizella arborea ochracea	3	2
" passerina arizonae	3	
Zonotrichia leucophrys gambeli	1	1
Passerella iliaca iliaca		1
Calcarius lapponicus	3	
Calcarius pictus	2	
Plectrophenax n. nivalis	1	

Mammals collected are: (total)

Dusky shrew	2	Brown lemming	426
Saddle-backed shrew	6	Singing vole	242
Cinereous shrew	5	Meadow vole	273
Wolf	2	Arctic red-backed mouse	73
Arctic grizzly (skull	2	Hoary marmot	5
Ermine	10	Porpoise (sent to National Museum)	1
Collared lemming	9		

520911-177

Point Barrow, Alaska

Sept 11, 1952

The following was information included in the Progress and Final Report for July, August and September, dated Sept. 11, 1952.

The following localities in the eastern part of the Brooks Range were sampled for information on the classification and geographic distribution of the mammals of the Arctic Slope. Each locality was selected to include representative plant and animal communities of the three physiographic provinces, namely Brooks Range, Plateau and Arctic Coastal Plain provinces.

Umiat, July 1 to July 3
Wahoo Lake, July 4 to July 12
Porcupine Lake, July 13 to July 19
Umiat July 20 to July 23
Schrader Lake, July 24 to July 30
S. end Lake Peters, Aug 1 to Aug. 14
Umiat, August 15 to August 18
Itkillik Lake, Aug. 19 to Aug 23
Point Barrow, Aug. 23 to Aug. 27
Driftwood, Aug 28 to Aug 31
Point Barrow, Sept. 1 to Sept 12

The collections from important because these localities are intermediate between the Mackenzie River District to the east and the western part of the Brooks Range. The mammals of the timbered slopes on the south side of this range also find their most northern distribution in the general area where collections were made.

Adequate series of all the small mammals, with the exception of Mustela ridosa and Sorex were collected. Filed notes supplemented information on the smaller mammals. Because of limitations of our collecting permits, field notes provided our only data on the larger mammals.

noteworthy observations were made on the trampling effect of 15,000 caribou. On the valley floor in the Lake Peters Canyon, entire communities of plants and mammals were eliminated by the passage of this animal. The congestion and composition of mammals trapped

from the plant refugia indicated a lateral movement from the trampled areas. The 15 caribou left behind, either as a result of natural death or predation, were eaten by raven, bear, wolves and wolverine.

The entire area investigated was marked by the nature of its primitiveness as evidenced by the unconcern of mammals and birds for man's presence. The animals were curious instead of afraid. The untouched nature of this part of the Brooks Range was also indicated by the normal aggregation of large mammals. From one vantage point I counted eight barren ground grizzly bears in an area of approximately 15 square miles. They continued to live their own interesting lives in spite of our presence. To permit the continuance of this fauna, certain conservation measures should be immediately instituted. Already reports are being received of repeated raiding of caches and the destruction of unoccupied camps by bears. If the shooting of these animals is allowed to continue their numbers will become greatly reduced. Equipment should be bear-proofed and certain areas established as inviolate sanctuaries if this representative of the largest carnivorous mammal is to be perpetuated on the Arctic Slope.

The following mammals were collected in the period covered by this report.

Dusky shrew
Saddle-backed shrew
Cinereous shrew
Wolf
Barren ground grizzly
Ermine
Least weasel
Porpoise.

Collared lemming
Brown lemming
Sagebrush vole
Meadow vole
Arctic red-backed mouse
Arctic ground squirrel
Hoary marmot

The geographic sampling of the Arctic fauna was directly proportional to the transportation provided and we are grateful to the administrators of the Arctic Research Laboratory for effectively using the transportation facilities available to them. James W Bee.

Camps and collecting localities on the Arctic Slope of northern Alaska in 1951 and 1952.

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

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

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

4 1/2 mi. SW Point Barrow, 5 ft. (Sept. 7, 8, 1951), but in the second year (June 14, 16, 1952) specimens from this same place were labelled "Birnirk mounds, 156°36'02". 71°20' 40", 8 ft.

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

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

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

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

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

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

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

14/10 mi. S and 6/10 mi. E Barrow Village, 156°45'25", 71°16'20", 20 ft., (June 20, 1952).

7 1/2 mi. S and 7 mi. W Point Barrow, 156°49', 71°17' (Sept 6, 1952).

Teshekpuk Lake (1951: July 29-Aug. 4). Shown on a map titled "Trails and Caches 1951 Season, Naval Petroleum Reserve no. 4... traced and reproduced from U.S. Geological Survey maps, march 1945, compiled from USAF Trimetrogon photography for Aeronautical Chart Service".

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

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

Kaolak River (1951: July 12-18). Lower shown on map cited above under Teshekpuk Lake. The actual camp on the river is 159° 47'40", 70° 11'15", 30 ft.,

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

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

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

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

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

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

1 1/2 mi. W and 3/4 mi. N Umiat, 152° 08'10", 69° 22'18", 370 ft. (Aug. 30, Sept 4, 1951).

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

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

As shown in notes, a reconnaissance flight was made from Umiat to Saddlerochit River and return (July 22, 1952). Lake Schrader - Lake Peters (July 23 - Aug. 16, 1952). Longitudes and latitude taken from map entitled "Preliminary Copy", U.S. Petroleum Reserve no. 4, U.S. Geological Survey, March 1948, scale 1-6900,

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

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

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

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

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

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

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

mount Mary, S end Lake Peters, 145°10'02", 69°20'30", 2920 ft. (July 30 - Aug. 11, 1952).
S. end Lake Peters, 145°09'50", 69°20'15", 2906 ft. (Aug. 15, 1952).
Weasel Point, S end Lake Peters, 145° 09'30", 69°20'15", 2920 ft. (Aug. 9-11, 1952).
Carnivore Lakes (Carnivore is the name of the three lakes at elevations of 3260, 3385 and 3400 ft between 69°18' and 69°17' on Carnivore River, which flows from Jones Robert Lake to Lake Peters). (Aug. 8, 1952.)
James Robert Glacier, 145°09', 69°16', approx. 3700 ft. (Aug. 8, 1952).

Wahoo Lake (July 3-11, 1952). Longitude and latitude taken from map entitled "Preliminary Copy", Naval Petroleum Reserve no. 4, U.S. Geological Survey (of same series of map used at Porcupine Lake, see below).
Wahoo Lake, 146°58', 69°08', 2350 ft.

Driftwood (Aug. 27-31, 1952). Longitude and latitude computed from map cited above under Teshekpuk Lake.
2 mi. W Utukok River, 161°15'30", 68°54'50", 1275 ft. (Aug. 30, 1952).
Driftwood, Utukok River, 161°12'10", 68°53'47", 1200 ft (Aug 27-31 1952)

Porcupine Lake (July 11-18, 1952). Longitude and latitude computed from map titled "Preliminary Copy", Naval Petroleum Reserve no. 4, compiled by U.S. Geological Survey Map, 1949, Alaska, K6, scale 1:4800.
Porcupine Lake, 146°29'50", 68°51'57", 3140 ft. (July 12-16, 18, 1952.)
Mount Annette, 146°28'51", 68°50'38", approx 5700 ft.
(Mount Annette is in the Annette Range south of Porcupine Lake between the Canning River and the Ivashak River.) (July 17, 1952).

Chandler Lake (Aug. 9-25, 1951). Longitude and latitude taken from World Aeronautical Chart (63) Brooks Range, U.S. Coast and Geodetic Survey, 5th ed., Feb 2, 1949.
Chandler Lake, 152°45', 68°12', 2900 ft.

520911-182

Point Barrow, Alaska

Sept. 11, 1952

The following is the sequence of the colored movie film taken on 35 mm color (used Dads camera)

1. E.R. Hall, Point Barrow, Alaska, Sept 11, 1952
2. Edward G. Compbell, Point Barrow, Alaska, Sept. 11, 1952
3. Great Salt Lake, Utah. Sept. 15, 1951 (2 shots)
4. Dry farming wheat fields, Idaho. Sept. 15, 1951
5. Mt. ranges at north end of Vancouver Island, Canada Sept. 14, 1952 (5 shots).
6. Taku Glacier, fjords and mountains near Juneau, Alaska. June 11, 1952 (10 shots).
7. Alaska Range, east of Mt. McKinley, Alaska. Sept. 13, 1951 (3 shots).
8. Mt. McKinley National Park, Alaska. Sept 13, 1951 (2 shots)
9. approaching N side Brooks Range, Alaska Sept 11, 1951
10. Front range - Plateau Province contact, Brooks Range, Alaska. Sept. 11, 1951
11. Plateau Province and Brooks Range in distance. Ice field in foreground. Aug. 16, 1952.
12. Ice covered tundra lakes, Coastal Plains, Alaska. June 14, 1952.
13. Open tundra lakes, Coastal Plains, Alaska. Aug 27. 1952 (5 shots)
14. Above clouds, Coastal Plains, Alaska. Aug. 27, 1952

14a. Tundra lakes near Point Barrow, July 3, 1951

14b. Arctic Ocean coast line near Will Roger Memorial, Alaska. July 3, 1951 (2 shots)

15 Arctic Ocean and waves, Point Barrow, Alaska Aug. 6, 1951 (8 shots).

16. E.R. Hall in weasel, Point Barrow, Alaska. Sept 11, 1952 (3 shots)
17. Eskimo children, Barrow Village, Alaska. Sept 2, 1952 (3 shots) (3 shots)
18. Eskimo houses, Point Barrow, Alaska. Sept 11, 1952
19. Eskimo dog, Umiat, Alaska. June 29, 1952 (3 shots)
20. Caribou, Teshekpuk Lake, Alaska. July 31, 1951 (8 shots)
21. Umiat from plane, Alaska. Aug. 13, 1952
22. Landing on Colville River, Umiat, Alaska. Aug. 13 1952.
23. Helicopters, Umiat, Alaska. June 29, 1952.
24. Ice fields and surface features of tundra. Aug. 16, 1952

25. Brooks Range and Plateau Province, Alaska. Aug. 16, 1952.
26. Return by helicopters, Umiat, Alaska. June 29, 1952
27. Edward H. Campbell and weasel crossing Seabee Creek, Umiat, Alaska. June 29, 1952.
28. Loading Norseman plane, Point Barrow, Alaska. July 19, 1951.
29. Pilots. Umiat Alaska. July 18, 1952.
30 Shadow of Norseman plane, Canning River, Alaska July 18, 1952.
31 Chandler River, east of Umiat, Alaska. July 19, 1952.
32 Plateau Province tundra east of Umiat, Alaska July 18, 1952.
33 Chandler River, east of Umiat, Alaska. July 19, 1952
34 Chandler River, east of Umiat, Alaska July 19, 1952
35 " " " " " " " " "
36. Polygon tundra surface, Will Roger monument, south Barrow Village, Alaska. July 3, 1951.
37. Tundra surface, east of Umiat, Alaska. Aug. 16, 1952 (3 shots)
38. Canning River, Brooks Range, Alaska. July 18, 1952. (5 shots)
39. Norseman landing at Lake Peters, Brooks Range, Alaska. July 24, 1952.
40. South end of Lake Peters, Brooks Range, Alaska. July 28, 1952.
41 Upper end of Lake Peters Canyon, Brooks Range, Alaska. Aug. 3, 1952.
42. Mt. sheep, Lake Peters, Brooks Range, Alaska. Aug. 15, 1952.
43. Marmot country, Lake Peters, Brooks Range, Alaska Aug 1, 1952
44 Arctic grizzly, Wahoo Lake, Brooks Range, Alaska.
45 Edward H. Campbell and specimens, Wahoo Lake, Alaska. July 9, 1952
46. Caribou at edge of lake, Teshekpuk Lake, Alaska. Aug. 6, 1951
47. Caribou kill, Lake Peters, Brooks Range, Alaska July 29, 1952.
48. Arctic Char, Wahoo Lake, Alaska July 9, 1952
49. Porcupine Lake, Brooks Range, Alaska July 17, 1952

50. Head of Canning River, Brooks Range, Alaska. July 18, 1952
51. Lake trout, Lake Schrader, Alaska. July 24, 1952
52. Bill Irving and Eskimo guide, Lake Peters, Alaska, Aug. 13, 1952.
53. Arctic loon, Gavia Lake, east Umiat, Alaska. Aug 23, 1952 (2 shots)
54. Yellow-billed loon on nest, Wahoo Lake, Alaska. July 5, 1952.
55. Yellow billed loon leaving nest, Wahoo Lake, Alaska July 6, 1952.
56. Eggs of yellow-billed loon, Wahoo Lake, Alaska. July 6, 1952.
57. Old squaw duck, Umiat, Alaska. June 27, 1952.
58. " " " Gavia Lake, Aug 23, 1952.
59. Young of old squaw duck, Kaolak River, Alaska. July 13, 1951.
60. Nest and eggs of white-fronted goose, Umiat, Alaska June 27, 1952.
61. Willow ptarmigan, Gavia Lake, east of Umiat, Alaska Aug. 22, 1952.
62. Duck hawk, Umiat mountain, Alaska. June 28, 1952 (3 shots.)
63. Gyrfalcon, Umiat, Alaska. June 28, 1952.
64. Raven, Umiat, Alaska. Aug. 23, 1952.
65. Snow covered mountains at Lake Peters, Brooks Range, Alaska. Aug. 10, 1952
66. Norseman plane leaving Lake Peters, Alaska. Aug. 8, 1952.
67. Snow covered mountains at Lake Peters, Alaska. Aug. 6, 1952.
68. Coming out of Brooks Range with snow covered mountains. Aug. 16, 1952.
69. Brooks Range and Plateau Province, east of Umiat, Alaska. Aug. 16, 1952.
70 Tundra lake with Brooks Range in distance, Alaska. Aug. 16, 1952
71. Chandler River with braided river system, Alaska Aug. 16, 1952
72. Red phalarope, Point Barrow, Alaska. Aug. 25, 1952 (3 shots)
73. Arctic Ocean and kittiwake, Point Barrow, Alaska, Sept. 5, 1952 (2 shots)
74. "Alaska" on wing of C46 over Coastal Plains Province Alaska. Sept 12, 1952
75. mus. nat. Hist at Lawrence. 1951

CATALOGUE 1952

in journal
Entered Sept. 11, 1952

Annette Island, 55°8', 131°28'; 8 ft. S.E. Alaska
June 11, 1952

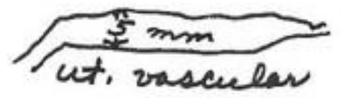
520611-1 Bufo
520611-2 "
520611-3 "
520611-4 "

University of Alaska, College, Alaska
June 12, 1952

520612-1 Snail

Birnirk mounds, 156°36'02", 71°20'40", 8 ft, Point Barrow, Alaska
June 15, 1952

520615-1 ♀	Lemmus trimucronatus alascensis			134-20-20-9-45 gms, ut. normal
520615-2 ♀	"	"	"	145-24-21-11-68 gms, " "
520615-3 ♀	"	"	"	142-19-21.5-9-65 gms, " "
520615-4 ♂	"	"	"	142-21-21-9-58 gms, testes 11 mm
520615-5 ♀	"	"	"	150-22-21-9-61 " , ut. enlarged
520615-6 ♀	"	"	"	125-22-20-9-41 " , ut. normal
520615-7 ♂	"	"	"	130-22-20-9-44 " , testes 10 mm
520615-8 ♂	"	"	"	146-21-21-9-55 " , " 10 "
520615-9 ♀	"	"	"	116-19-18-6-30 " , ut. normal
520615-10 ♀	"	"	"	118-19-18.5-7-26" , " "
520615-11 ♂	"	"	"	110-18-19-7-24" , testes 8 mm
520615-12 ♀	"	"	"	108-18-19-7-22 - , ut. normal
520615-13 ♀	"	"	"	110-17-19-7-18 " , " "
520615-14 ♀	"	"	"	100-16-18-7-18" , " "
520615-15 ♀	"	"	"	96-17-18-8-15" , " "
520615-16 ♀	"	"	"	154-24-22-10-60" , ut. 3 mm wide
520615-17 ♂	"	"	"	131-19-20-9-53" , testes 11 mm
520615-18 ♂	"	"	"	114-15-18.5-9-20" , " 8 "
520615-19 ♀	"	"	"	108-17-19.5-9-20", ut. normal
520615-20 ♂	"	"	"	106-18-19-9-21 gms, testes 6 mm
520615-21 ♂	"	"	"	108-17-19-9-20 " , " 6 "
520615-22 ♀	"	"	"	126-19-20.5-9-44 " , ut. normal
520615-23 ♂	"	"	"	116-17-19-9-27" , testes 8 mm
520615-24 ♂	"	"	"	117-17-19-9-26" , " 9 "
520615-25	"	"	"	125-18-20-9-23" ,
520615-25a ♂	"	"		146-21-21-10-74 gms., testes 13 mm
520615-26 ♂	"	"	"	148-20-20.5-9-68 gms, testes 12 mm

520615-27 ♀	Lemmus trimucronatus alascensis			123-20-19-9-33gms, ut. normal
520615-28 ♀	"	"	"	158-20-20.5-9-60gms, ut. normal
520615-29 ♂	"	"	"	122-18-20-9-27 " , test 8 mm
520615-30 ♂	"	"	"	139-18-20-10-60 " , " 13 "
520615-31 ♂	"	"	"	117-15-18-10-25 " , " 8 "
520615-32 ♂	"	"	"	158-23-21.5-9-81 " , " 12 "
520615-33 ♂	"	"	"	138-18-19.5-9-53 " , " 12 "
520615-34 ♂	"	"	"	145-19-20-9-43 " , " 11 "
520615-35 ♂	"	"	"	159-26-23-11-70 " , " 13 "
520615-36 ♂	"	"	"	149-22-20-10-73 " , " 12 "
520615-37 ♀	"	"	"	140-22-20-9-54 " , 5X4 emb 6 mm
520615-38 ♂	"	"	"	133-22-20-10-38 " , test. 10 mm
520615-39 ♂	"	"	"	133-19-20-9-38 " , " 10 mm
520615-40 ♂	"	"	"	133-20-20-9-50 " , " 12 "
520615-41 ♂	"	"	"	138-20-21-9-48 " , " 12 "
520615-42 ♀	"	"	"	143-21-20-8-55 " , 
520615-43 ♂	"	"	"	152-23-21-10-63gms, testis 11 mm
520615-44 ♂	"	"	"	134-20-20-9-46gms, " 12 "
520615-45 ♀	"	"	"	130-21-20-9-41 " , ut. normal
520615-46 ♂	"	"	"	145-20-20-10-47 " , test. 12 mm
520615-47 ♂	"	"	"	118-17-19-9-28 " , " 10 "
520615-48 ♂	"	"	"	126-17-19-9-31 " , " 9 "
520615-49 ♀	"	"	"	118-17-18-9-28 " , ut. normal
520615-50 ♀	"	"	"	117-17-18-9-25 " , " "
520615-51 ♂	"	"	"	120-19-19-9-27 " , test 9 mm
520615-52 ♂	"	"	"	121-18-19-9-30 " , " 7 "
520615-53 ♂	"	"	"	148-21-21-9-72 " , " 11 "
520615-54 ♂	"	"	"	152-23-21-10-86 " , " 14 "
520615-55 ♀	"	"	"	135-21-21-10-55 " , ut. normal
520615-56 ♂	"	"	"	154-22-22-11-88 " , test 12 mm
520615-57 ♂	"	"	"	156-19-21.5-10-95 " , " 12 "
520615-58 ♀	"	"	"	143-21-20-9-64 " , ut. slightly enlarged vascular
520615-59 ♀	"	"	"	149-22-21-10-80 " , 4X3 emb 5 mm
520615-60 ♂	"	"	"	148-21-21-9-66 " , testes 12 mm
520615-61 ♀	"	"	"	142-21-20-8-60 " , ut. enlarge-vasc.
520615-62 ♀	"	"	"	143-23-20-10-60 " , 6X6 emb. 3 mm
520615-63 ♀	"	"	"	136-22-20-9-52 " , ut. normal
520615-64 ♀	"	"	"	148-24-21.5-10-66 " , ut. slightly enlarge
520615-65 ♂	"	"	"	124-18-20-8-44 " , test. 11 mm
520615-66 ♂	"	"	"	133-20-19-8-54 " , " 11 "
520615-67 ♀	"	"	"	131-19-20-9-50 " , ut. normal

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520615-68 ♂ Lemmus Trimucronatus alascensis 120-19-20-9-43 gms, test 8 mm
520615-69 ♂ " " " 133-19-20-~~10~~ 9 - ~~56~~ 41 ", test. 10 mm
520615-70 ♀ " " " 137-19-21-10-56", ut. normal
520615-71 ♀ " " " 131-20-20-9-49", " "
520615-72 ♀ " " " 133-20-20-9-48", test 10 mm
520615-73 ♂ " " " 127-20-19-8-45", " 9 "
520615-74 ♀ " " " 150-23-21-9-54", ut. normal
520615-75 ♂ " " " 125-20-19.5-9-45", test 10 mm
520615-76 ♀ " " " 131-19-20-10-45", ut. normal
520615-77 ♂ " " " 123-20-20-9-39", test. 10 mm

Birnirk Mounds, 156° 36' 02", 71° 20' 40", 8 ft., Point Barrow, Alaska
June 16, 1952

520616-1 ♂ Lemmus t. alascensis 152-20-21-9-85 gms, test 12 mm
520616-2 ♂ " " " 145-19-20-10-66", " 12 "
520616-3 ♂ " " " 145-19-21.5-10-71", " 12 "

1/10 mi. W Salt Water Lake, 156° 42' 02", 71° 18' 26", 10 ft., Point Barrow, Alaska
June 17, 1952

520617-1 ♀ Lemmus t. alascensis 121-19-19.5-10-45 gms, 3x3 emb. 5mm
520617-2 ♀ " " " 127-20-19-10-47 gms, ut normal
520617-3 ♀ " " " 143-20-19-9-63", ut enlarged 3 mm
520617-4 ♂ " " " 136-19-19-9-57", test. 11 mm
520617-5 ♀ " " " 148-22-20-10-78", 2x2 emb 26 mm
520617-6 ♂ " " " 145-20-21-10-64", test ~~30~~ 13 mm
520617-7 ♀ " " " 150-22-20-10-95", 3x5 emb. 34 mm
520617-8 ♀ " " " 148-20-20.5-10-61", ut 5x4 emb 4 mm
520617-9 ♀ " " " 145-20-21-10-70", ut sl. enlarged
520617-10 ♀ " " " 143-21-20-9-60", " normal
520617-11 ♀ " " " 138-20-19-4-57", ut enlarged
520617-12 ♀ " " " 145-21-20-10-68", ut enlarged 3 mm
520617-13 ♀ " " " 148-22-22-10-83", 2x4 emb. 4 mm
520617-14 ♂ " " " 155-22-20-10-85", test 13 mm
520617-15 ♂ " " " 157-23-20-10-94", " 12 "
520617-16 ♂ " " " 154-23-21-10-96", testes 12 mm
520617-17 ♀ " " " 143-19-20.1-10-68", ut normal
520617-18 ♀ " " " 150-22-20-10-85", " "
~~mo~~ 520617-19 ♀ " " " 146-22-20.5-9-67", ut. 4 mm, vaginal plug felted with sea foam
520617-20 ♂ " " " 152-22-21-10-88", testes 13 mm
m.o. 520617-21 ♀ " " " 137-23-20-9-50", ut. normal
m.o. 520617-22 ♀ " " " 118-18-20-8-34 gms, " "

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520617-22 ♀ Lemmus trimucronatus alascensis 118-18-20-8-34 gms, ut. normal
520617-23 ♀ " " " 119-18-20-8-35 " , ut. normal
520617-24 ♀ " " " 148-21-20-10-73 " , " "
520617-25 ♀ " " " 139-21-20.5-10-73 " , 5x4 emb. 4 mm

1/10 mi. W Salt Water Lake, 156°42'02", 70°18'26", 10 ft., Point Barrow, Alaska
June 18, 1952

520618-3 ♀ Lemmus t. alascensis 146-21-21-10-63 gms, ut. normal
520618-4 ♂ " " " 161-23-20-10-86 " , test 12 mm
520618-5 ♀ " " " 142-20-20-9-69 " , ut. enlarged } 4x3 mm
520618-6 ♀ " " " 150-21-20.5-10-72 " , 5x3 emb. 5 mm
520618-7 ♀ " " " 137-20-20-10-58 " , vaginal plug, ut. vasc.
520618-8 ♀ " " " 136-18-20-9-58 " , ut. normal
520618-9 ♀ " " " 145-22-20-9-60 gms, vag. plug 3 mm, ut enlarg 2 mm
520618-10 ♂ " " " 147-20-20-10-71 " , test 13 mm
520618-11 ♀ " " " 130-20-19-9-49 " , ut. normal
520618-12 ♀ " " " 148-21-20-10-73 gms, ut. normal
520618-13 ♀ " " " 161-22-20.5-10-86 " , ut. slightly enlarge
520618-14 ♀ " " " 156-22-21.5-10-77 " , ut. normal

W side Salt Water Lake, 156°42'00, 71°18'41", 4 ft., Point Barrow, Alaska
June 19, 1952

520619-1 ♀ Lemmus t. alascensis 156-20-20-10-76 gms, ut. enlarged, vasc.
520619-2 ♀ " " " 145-21-20-9-70 " , ut enlarged 4 mm wide
520619-3 ♂ " " " 166-21-22-10-94 " , test 12 mm
520619-4 ♂ " " " 171-21-22-11-113 gms, test 14 mm.

1/10 mi. W Salt Water Lake Lagoon, 156°42'02", 71°18'26", 10 ft., Point Barrow, Alaska
June 19, 1952

520619-5 ♀ Lemmus t. alascensis 154-24-20-10-70 gms, ut. normal
520619-6 ♂ " " " 165-24-21-11-108 " , test 14 mm
520619-7 ♂ " " " 154-23-22-11-74 " , " 12 "
520619-8 ♂ " " " 143-24-20-10-65 " , " 12 "
520619-9 ♀ " " " 143-22-21-10-64 " , ut 6 mm wide
520619-10 ♂ " " " 142-21-20-10-60 " , test 11 mm
520619-11 ♂ " " " 126-21-20-9-39 " , test 11 mm
520619-12 ♂ " " " 126-21-20-9-45 " , " 11 "
520619-13 ♀ " " " 136-22-21-9-47 gms, ut. normal
520619-14 ♀ " " " 143-22-21-9-54 gms, " "
520619-15 ♀ " " " 124-18-20-8-43 gms, " "
520619-16 ♂ " " " 136-18-20.5-9-51 " , test 12 mm

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520619-17 ♂ Lemmus trimucronatus alascensis 136-19-21-9-51 gms, test 8 mm
520619-18 ♂ " " " 128-22-20.5-9-45 gms, testes 10 mm

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

520620-1 ♂ Lemmus trimucronatus a. 160-22-19-10-81 gms, testes 13 mm
520620-2 ♀ " " " 155-22-20-10-66 ", ut enlarged, 3 mm wide
520620-3 ♂ " " " 167-25-21-11-95 ", test 11 mm.
520620-4 ♂ " " " 155-22-20-10-82 ", test. 12 mm
520620-5 ♂ " " " 161-22-20-10-98 ", " 13 "
520620-6 ♀ " " " 151-22-19-10-80 ", ut. enlarged, 3 mm
520620-7 ♀ " " " 152-20-21-9-68 ", 7x7 emb. 4 mm
520620-8 ♂ " " " 156-21-21-9-84 ", testes 14 mm
520620-9 ♀ " " " 154-23-21-9-78 gms, ut. normal
m.o. 520620-10 ♂ " " " 145-21-20-8-62 ".
mo. 520620-11 ♀ " " " 138-19-20-8-48 ".
m.o. 520620-12 ♂ " " " 120-16-19-9-39 ".

Point Barrow, 156°27'25", 71°23'11", 3 ft. Alaska
June 21, 1952

520621-1 Plectophenax n. nivalis nest and 5 eggs
520621-2 ♀ Lemmus t. alascensis 134-21-21-10-53 gms, 5x3 emb. 6 mm
520621-3 ♀ " " " 138-22-21-10-53 ", 4x2 emb. just beginning
520621-4 ♀ " " " 129-21-20.5-9-42 ", 6x1 emb. 6 mm
520621-5 ♀ " " " 134-22-21-10-43 ", ut. normal
520621-6 ♀ " " " 111-20-19-8-21 ",

Convergence of Chandler and Sic-sic puk rivers, 152°00, 68°51, Approx. 1800 ft., Brooks Range, Alaska
April 10, 1952

SKULL o. 520621-7 ? Ursus horribilis richardsoni (presented by Dra. L. Wiggins)

9/10 mi. E 8/10 mi. N Barrow Village, 156°44'15", 71°18'20", 8 ft., Alaska
June 23, 1952

520623-1 ♀ Lemmus. t. alascensis 143-20-20-10-68 gms, ut. normal
520623-2 ♂ " " " 148-22-22-10-91 gms, testes 13 mm
520623-3 ♂ " " " 150-21-21-10-78 ", " 13 "
520623-4 ♂ " " " 153-22-20-10-82 ", " 13 "
520623-5 ♀ " " " 155-22-20-10-98 ", 4x4 emb. 12 mm
520623-6 ♀ " " " 149-22-20-10-75 ", 8x1 emb. 7 mm
SKULL 520623-7 ♀ " " " 143-22-22-10-73 ", 7x4 emb. 6 mm

SKULL	520623-8 ♀	Lemmus trimucronatus alascensis			147-22-20-10-58 gms, 6X2 emb. 3 mm
SK	520623-9 ♂	"	"	"	136-23-20-9-59 " , test 13 mm
SK	520623-10 ♀	"	"	"	137-22-20-9-56 " , ut. slightly enlarged
m.o.	520623-11 ♀	"	"	"	130-22-19.5-10.47 ", 4X3 emb. 5 mm.
m.o	520623-12 ♀	"	"	"	144-20-18-9-33 " , ut enlarged 4 mm filled with white cream material
m.o	520623-13 ♂	"	"	"	120-19-19-8-43 gms, test 11 mm
m.o	520623-14 ♀	"	"	"	114-19-18-8-30 " , ut. normal
m.o	520623-15 ♀	"	"	"	123-18-19-9-44 " , 6X2 emb 5 mm

Umiat, 152° 09'30", 69° 22'08", 352 ft., Alaska

June 25, 1952

520625-1	♂	microtus oeconomus gilmorei			160-40-20-11-55 gms, test 8 mm
520625-2	♀	"	"	"	164-44-19-11-50 " , 3X5 emb 12 mm
520625-3	♂	"	"	"	162-39-19-11-58 " , test 9 mm
520625-4	♂	"	"	"	160-38-19-11-56 " , " 9 "
520625-5	♀	"	"	"	144-35-19-12-60 " , 4X3 emb 20 mm
520625-6	♀	"	"	"	157-42-20-12-51 " , 4X5 emb 4 mm
520625-7	♀	"	"	"	155-40-20-12-42 " , 3X4 emb 2 mm
520625-8	♀	"	"	"	156-42-19-11-41 " , 2X7 emb 5 mm
520625-9	♂	"	"	"	168-40-19-11-58 " , testes 8 mm
520625-10	♀	"	"	"	161-43-19-11-47 " , 4X4 emb 14 mm
520625-11	♂	"	"	"	150-48-19-11-45 " , testes 8 mm
520625-12	♀	"	"	"	170-47-20-12-63 " , 3X4 emb 10 mm
520625-13	♂	"	"	"	175-43-20-12-64 " , testes 8 mm
520625-14	♀	"	"	"	160-42-19-11-45 " , 5X5 emb. 8 mm
520625-15	♂	"	"	"	166-46-19.5-12-58 " , testes 8 mm
520625-16	♀	"	"	"	154-42-19-11-46 gms, 7X2 emb. 3 mm
520625-17	♀	"	"	"	150-41-20-11-43 " , 3X4 emb 12 mm
520625-18	♂	"	"	"	163-43.20-12-64 " , test 8 mm
520625-19	♀	"	"	"	152-41-20-11-51 " , ut. normal
520625-20	♀	"	"	"	152-40-18-11-45 " , 5X3 emb 3 mm
520625-21	♀	"	"	"	151-41-19-12-46 " , 3X4 emb. 10 mm
520625-22	♂	"	"	"	[158]-[31]-20-11-62 gms, testes 8 mm
520625-23	♂	"	"	"	150-40-20-11-42 " , " 9 "
520625-24	♀	"	"	"	150-41-19-11-51 " , 2X3 emb. 24 mm
520625-25	♂	"	"	"	151-42-19-11-43 " , testes 7 mm
520625-26	♀	Clethrionomys rutilus dawsoni			133-33-18-13-28 " , 4X3 emb 3 mm
520625-27	♀	microtus miurus mearnsi	"		138- -19-23-43 " , 5X4 emb 9 mm
520625-28	♂	"	"	"	[131]-[12]-19.5-12-43 " , testes 11 mm
520625-29	♀	microtus oeconomus gilmorei			150-41-19-11-36 gms, 7X2 emb 8 mm
520625-30	♀	"	"	"	[121]-[17]-19-11-35 gms, 3X2 emb 3 mm

520911-19.1

	520625-5 ♂	Microtus	muricus	muricei	153-33-21-13-58 gms, testes 12 mm
	520625-36 ♂	"	oeconomus	gilmorei	172-42-19-12-60 ", " 8 mm
	520625-37 ♂	"	"	"	156-38-19-12-57 ", " 8 "
	520625-38 ♀	"	"	"	169-42-20-13-48 ", 4X3 emb 2 mm
	520625-39 ♂	"	"	"	158-38-19-12-56 ", test. 8 mm
m.o.	520625-40	"	"	"	see E.C. no 101

Umiat, 152°09'30", 69°22'08", 352 ft., Alaska

June 26, 1952

	520626-1 ♂	Lemmus	trimucronatus	alascensis	130-19-19-10-55 gms, testes 10 mm
	520626-2 ♀	Microtus	oeconomus	gilmorei	156-39-19-12-41 ", 3X7 emb 2 mm
	520626-3 ♂	"	"	"	160-39-19.5-12-60 ", testes 9 mm
	520626-4 ♀	"	"	"	168-45-19-12-62 ", 3X7 emb 12 mm
	520626-5 ♂	"	"	"	168-44-19.5-12-68 ", test 8 mm
	520626-6 ♂	"	"	"	166-42-19.5-12-64 ", " 8 mm
	520626-7 ♀	"	"	"	160-41-19-11-47 ", 5X5 emb 10 mm
m.o	520626-8	"	"	"	(see E.C. 102)
m.o	520626-9	"	"	"	" " 99
m.o.	520626-10	"	"	"	" " 103
m.o.	520626-11	"	"	"	
skel	520626-12 ♂	Motacilla	flava	alascensis	L. 165 mm, wt. 19 gms
m.o	520626-13 ♂	Microtus	o.	gilmorei	165-42-19-12-56 gms
m.o	520626-14	"	"	"	151-33-19-11-37 "
m.o	520626-15	"	"	"	172-48-19.5-12-50 "

1 3/10 mi. E and 1 3/10 mi N Umiat, 152°05'30", 69°23'12", 350 ft., Alaska

June 27, 1952

	520627-1 ♂	Sorex	arcticus	tundrensis	94-31-13-8 gms, testes 7 mm
	520627-2 ♂	Lemmus	t.	alascensis	148-20-20-10-70 gms, testes 12 mm
	520627-3 ♂	Microtus	o.	gilmorei	164-44-20-13-78 ", " 9 "
	520627-4 ♂	"	"	"	165-45-21-13-80 ", " 10 "
	520627-5 ♀	"	"	"	160-41-20-12-65 ", 3X4 emb 25 mm
	520627-6 ♂	"	"	"	154-40-20-12-57 ", test 8 mm
	520627-7 ♂	"	"	"	168-44-20-13-65 ", " 8 "
	520627-8 ♀	"	"	"	168-43-20-12-54 ", 4X3 emb 3 mm
	520627-9 ♀	"	"	"	162-42-20-12-57 ", wt. normal
	520627-10 ♂	"	"	"	164-43-20-12-60 ", testes 8 mm
	520627-11 ♂	"	"	"	170-44-19.5-12-58 ", " 9 "
	520627-12 ♂	"	"	"	158-35-19-11-58 ", " 8 "
	520627-13 ♂	"	"	"	170-44-19.5-12-74 ", " 7 "
	520627-14 ♂	"	"	"	151-41-19.5-12-53 ", " 8 "

	520627-15 ♂	microtus oeconomus	gelmorei		170-42-19-12-69 gms, testes 10 mm
	520627-16 ♀	"	"	"	161-42-19.5-11 " , 5X3 emb 20 mm
	520627-17 ♂	"	"	"	[162]-[33]-19-12-66 gms, testes 9 mm
m.o	520627-18 ♀	"	"	"	145-34-17.5-11-32 ", ut. normal
m.o	520627-19 ♀	"	"	"	157-40-19-12-45 ", ut. enlarged 4 mm
m.o.	520627-20 ♂	"	"	"	164-43-19-12-51 ", testes 7 mm
m.o.	520627-21 ♀	"	"	"	168-42-20-12-51 ", ut. normal
m.o.	520627-22 ♂	"	"	"	163-41-19-12-56 ", testes 9 mm
m.o.	520627-23 ♀	"	"	"	160-40-19.5-12-43 ", 2X3 emb 3 mm
m.o.	520627-24 ♂	"	"	"	168-42-19-12-57 ", testes 9 mm
m.o.	520627-25 ♀	"	"	"	163-41-19-12-42 ", ut. normal
m.o.	520627-26 ♂	"	"	"	160-40-19-12-44 ",
m.o.	520627-27 ♂	"	"	"	170-43-19.5-12-53 ", testes 8 mm
m.o.	520627-28 ♂	"	"	"	157-36-20-12-44 ", " 8 "
m.o.	520627-29 ♀	"	"	"	165-42-19.5-12-62 gms, 2X3 emb 30 mm
m.o.	520627-30 ♀	"	"	"	161-41-19-12-52 gms, 3X5 emb 5 mm

Bearpaw Creek, 17/10 mi. E and 17/10 mi. N Umiat, 152°04'50", 69°23'30", 550 ft., Alaska

June 28, 1962

	520628-1 ♀	sp. n. kennicottii ~~Citellus~~ parryi			403-123-62-13-833 gms, 4X3 plac. scars
	520628-2 ♀	Spermophilus undulatus	kennicottii		408-123-62-13-816 ", 6X3 " "
	520628-3 ♀	"	"	"	408-124-62-13-821 ", 4X3 " "
	520628-4 ♀	"	"	"	388-121-62-13-661 ", 4X3 " "
	520628-5 ♂	"	"	"	404-127-65-14-785 ", testes 9 mm
5K.o	520628-6 ♂	"	"	"	400-106-67-14-809 ", " 11 "
5K.o	520628-7 ♀	"	"	"	398-122-65-13-754 ", 5X4 emb plac. scars
5K.o	520628-8 ♀	"			398-123-62-13-750 ", 3X4 plac. scars

same locality as June 27, 1952 June 28, 1952

m.o	520628-9 ♀	microtus oeconomus	gelmorei		155-34-19-11-48 gms, 4X3 emb. 16 mm
m.o	520628-10 ♀	"	"	"	152-36-19-11-38 ", ut. normal
m.o	520628-11 ♀	"	"	"	160-38-19-11-51 ", 4X4 emb 6 mm
m.o	520628-12 ♂	"	"	"	167-40-19.5-12-56 ", testes 8 mm
m.o	520628-13 ♀	"	"	"	155-35-19-11-40 ", ut. normal
m.o	520628-14 ♀	"	"	"	155-37-19-11-45 ", 3X4 emb 2 mm
	520628-15 ♀	"	"	"	155-38-19-11-40 ", 4X3 emb. 2 "
	520628-16 ♂	"	"	"	170-40-19-11-60 ", testes 9 mm
	520628-17 ♂	"	"	"	170-41-19-12-63 ", " 9 "
	520628-18 ♀	"	"	"	165-40-19-11-40 ", ut. normal
	520628-19 ♂	"	"	"	171-42-19-11-62 ", testes 9 mm
	520628-20 ♂	Lemmus trimucronatus	alascensis		147-43-19.5-9-63 gms, testes 11 mm

520911-193

9/10 mi. W and 9/10 mi. N Umiat, 152°10'58", 69°22'53", 380 ft., Alaska

June 30, 1952

520630-1	♂	Sorex arcticus alascensis		101-29-14-6-8 gms. testis 7 mm
520630-2	♂	Lemmus trimucronatus alascensis		136-22-19.5-9-63 ", " " "
520630-3	♂	" " "		128-21-19-9-47 ", " " "
520630-4	♀	microtus muurus muricei		138-29-20-13.51 ", 4x4 emb 15 mm, 3 small 4 mm
520630-5	♀	" " "		142-30-20-13-48 ", 2x2 emb 20 mm
520630-6	♂	" " "		143-30-20.5-13-47 ", testis 10 mm
520630-7	♂	" " "		149-30-20-13-49 ", testis 10 mm
520630-8	♀	" " "		149-31-20.5-13-49 ", 6x5 emb 15 mm
520630-9	♀	" " "		140-29-20-12-53 ", 5x3 " 23 "
520630-10	♂	" " "		147-31-20-13-54 ", testis 12 mm
520630-11	♂	" " "		150-32-20.5-13-50 gms. " " "
520630-12	♀	" " "		150-32-19-13-54 ", 2x5 emb. 18 mm
520630-13	♂	" " "		144-30-20-13-52 ", testis 11 mm
520630-14	♂	Clethrionomys rutilus dawsoni		130-31-18-13-29 ", " " "
520630-15	♂	" " "		126-30-18-13-28 ", " " "
520630-16	♂	" " "		130-31-19-13-30 gms, " " "
520630-17	♂	" " "		128-33-19-13-30 ", " " "
520630-18	♀	" " "		137-36-19-13-34 ", 5x5 emb. 3 mm
520630-19	♀	" " "		134-35-19.5-13-28 ", 5x3 plac. scars
520630-20	♂	microtus oeconomus gilmorei		164-39-20-11-55 ", testis 8 mm
520630-21	♀	" " "		149-40-19-10-54 ", 5x2 emb. 20 mm
520630-22	♂	" " "		165-40-20-11-61 ", testis 8 mm
520630-23	♀	" " "		159-39-20-11-54 ", 6x1 emb 20 mm
520630-24	♂	" " "		151-39-20-11-52 ", testis 8 mm
m.o. 520630-25	♂	" " "		165-40-20-11-60 ", " " "
skel. 520630-26	♀	Cyanosylvia suecica		L. 151 mm, tail 48, W 70, 22 gms, largest egg 1 mm

July 1, 1952

520701-1	♂	microtus oeconomus gilmorei		175-47-22-13-60 gms, testis 10 mm
520701-2	♂	" " "		160-43-19-11-58 ", " " "
520701-3	♀	" " "		155-42-19-12-62 ", 6x2 emb 28 mm, wt 18 gms
520701-4	♂	" " "		152-41-19-11-56 ", testis 8 mm
520701-5	♀	"	microtus muricei	142-32-20-13-48 ", 4x6 emb 10 mm
520701-6	♀	" " "		148-33-20-13-54 ", 4x6 emb 22 mm
520701-7	♀	" " "		150-32-20.5-13-62 ", 7x4 plac. scars
520701-8	♀	" " "		142-32-20-13-40 ", 6x3 emb 16 mm
520701-9	♂	" " "		149-~~32~~ 34 -20.5 13-46 ", testis 11 mm
520701-10	♂	" " "		147-25-20-12-47 ", " " "
520701-11	♂	Clethrionomys r. dawsoni		129-29-18-13-28 ", " " "
520701-12	♀	" " "		137-34-19-13-34 ", 4x3 plac. scars
520701-13	♀	Sorex arcticus tundrensis		110-32-13.5-7-11 gms wt. normal

Wahoo Lake, 69°08', 146°58', 2350ft., Brooks Range, Alaska

July 4, 1952

	520704-1 ♂	microtus oeconomus gilmorei		168-12-19-13-59 gms, testes 9 mm
	520704-2 ♀	"	"	167-41-19-13-47", 9 x 2 emb 4 mm
	520704-3 ♀	"	"	168-40-19-13-59", 5 x 4 emb 5 "
	520704-4 ♂	"	"	162-39-19-13-54", testes 8 mm
m.o	520704-5 ♂	"	"	153-38-19-13-43", " 7 "
m.o	520704-6 ♀	"	"	153-39-9-13-44", 3x3 emb. 3 mm
	520704-7 ♂	microtus miurus muriei		151-31-19-13-43", test 10 mm
	520704-8 ♂	"	"	158-31-20-13-56", " 12 "
	520704-9 ♂	"	"	158-32-20-13-58", " 12 "
	520704-10 ♂	"	"	155-30-19.5-13-54", " 11 "
	520704-11 ♂	"	"	158-31-20-13-51", " 10 "
	520704-12 ♀	"	"	134-~~25~~ 19-12-39", 2x6 emb. 6 mm
	520704-13 ♂	"	"	147-33-19-12-44", testes 11 mm
	520704-14 ♂	"	"	157-32-19.5-13-48", " 6 "
m.o	520704-15 ♀	"	"	154-31-19-13-48", 2x6 emb. 16 mm
m.o	520704-16 ♀	"	"	150-30-19-13-45", 5x3 " 3 mm
	520704-17 ♂	"	"	154-30-19-12-43", testes 11 mm
	520704-18 ♀	"	"	151-31-19-13-52", 4x4 emb 10 mm
	520704-19 ♀	microtus o. gilmorei		160-36-19-12-55", 4x5 emb. 8 mm
	520704-20 ♀	Clethrionomys rutilus dawsoni		148-39-19.5-15-32", 3x2 plac. scars
	520704-21 ♂	Sorex o. obscurus		112-42-18-7-8 gms, test 4 mm
	520704-22 ♂	"	"	113-45-19-7-8", " 5 "
	520704-23 ♀	Spermophilus undulatus kennicottii		337-105-55-13-436", ut. normal
	520704-24 ♀	"	"	348-105-60-13-398", " "
	520704-25 ♀	"	"	342-104-57-13-498 gms, ut. normal
	520704-26 ♂	"	"	360-108-57-13-500", test. 9 mm
	520704-27 ♂	"	"	400-130-68-16-823 gms, testes 11 mm
	520704-28 ♀	microtus o. gilmorei		155-30-19.5-13-37 gms, 3x5 plac. scars
	520704-29 ♂	Spermophilus u. kennicottii		354-105-58-13-478 gms, test 4 mm
SKULL	520704-30 ♀	"	"	347-102-56-13-442", 3x4 plac. scars
	520704-31 ♂	"	"	346-106-56-13-426", test. 4 mm

July 5, 1952

	520705-1 ♂	Spermophilus u. kennicottii		[342]-[88]-61-14-680 gms, test 9 mm
	520705-2 ♂	"	"	364-103-58-13-540", " 10 "
m.o	520705-3 ♀	"	"	213-64-45-11-90 gms, ut. normal
m.o	520705-4 ♂	"	"	227-73-50-11-103", test 3 mm
	520705-5 ♂	"	"	221-72-50-11-100", " 3 "
	520705-6 ♂	microtus miurus muriei		160-31-20-13-48", " 6 "
SKEL.	520705-7 ♂	Passerculus sandwichensis		L. 141, wt. 18 gms; testes 10 mm

520911-195

520705-8 ♀ Microtus miurus muriei 137-25-18-12-40gms, 3x5 plac. scars
520705-9 ♀ " " " 138-26-18-11-39 " , 2x5 emb. 6 mm
520705-10 ♂ " " " 154-35-20-13-48 " , testes 12 mm
520705-11 ♀ " " " 142-27-19-12-44 " , 5x4 emb. 6 mm
m.o. 520705-12 ♀ Spermophilus undulatus kennicottii 220-72-47-11-94 " , wt. normal

Wahoo Lake, 69°08', 146°58', 2350 ft., Brooks Range, Alaska
July 6, 1952

520706-1 ♀ Microtus oeconomus yukonensis 156-37-19-11-46 gms, 5x5 emb. 3 mm
520706-2 ♀ " " " 165-44-18-12-48 " , 3x4 emb. 7 mm
520706-3 ♀ " " " 154-38-19-12-48 " , 5x6 emb 2 mm
520706-4 ♀ " " " 165-45-18-12-60 " , 5x4 emb. ~~15~~ 10 mm
520706-5 ♀ " " " 160-42-18.5-12-50 " , 3x5 emb. 12 mm
520706-6 ♂ " " " 175-48-20-12-60 " , test 8 mm
520706-7 ♀ " " " 160-41-19-12-48 gms, 3x4 emb. 2 mm
520706-8 ♀ " " " 164-43-19-12-49 " , 4x3 " 3 "
520706-9 ♂ " " " 160-42-19-12-53 " , test 8 mm
520706-10 ♀ " " " 163-41-19-12-58 " , 3x3 emb. 6 mm
520706-11 ♂ " " " 172-45-19-12-52 " , test 10 mm
520706-12 ♂ " " " 104-26-18-10-10 " , " 4 "
m.o. 520706-13 ♀ " " " 128-32-18-10-23 " , wt. normal
m.o 520706-14 ♀ " " " 106-28-17-9-14 " , " "
m.o. 520706-15 ♂ " " " 120-30-18-10-15 " , test. 5 mm
m.o. 520706-16 ♀ " " " 113-29-18-10-17 " , wt. normal
m.o 520706-17 ♀ " " " 108-29-17-9-11 " , " "
520706-18 ♂ Spermophilus u. kennicottii 395-117-66-15-660 " , test 11 mm
520706-19 ♂ Spizella arborea ochraceous L. 152, wt 16 gms, testes 9 mm

July 7, 1952

m.o. ↓ 520707-1 ♂ microtus o. yukonensis 190-51-20-13-70 gms, testes 9 mm
520707-2 ♀ " " " 160-43-18.5-12-45 " , wt. normal
520707-3 ♀ " " " 122-30-18-11-19 " , " "
520707-4 ♀ " " " 125-31-18.5-11-19 " , " "
520707-5 ♂ " " " 113-29-18-11-13 " , test 4.5 mm
520707-6 ♂ " " " 94-20-16-6-8 gms, " 4 "
520707-7 ♂ " " " 100-28-18-9-11 " , " 4.5 "
520707-8 ♂ microtus miurus muriei 158-31-20-12-50 gms, " 12 "
520707-9 ♂ " " " 150-31-20-12-37 " , " 11 "
520707-10 ♂ " " " 150-31-20-12-48 " , " 11 "
520707-11 ♀ " " " 140-26-18-11-45 " , 6x4 ~~emb~~ plac scars
520707-12 ♀ " " " 148-26-19-12-41 " , wt. normal
↑ m.o. 520707-13 ♂ " " " 148-25-19-12-43 " , test. 13 mm

	520706-14 ♀	microtus	oeconomus	gilmorei	90-22-17-7-9 gms, ut. normal
	520707-15 ♀	"	"	"	161-40-19-12-45 gms, 2×4 emb 3.5 mm
	520707-16 ♀	"	"	"	155-39-19-12-46 gms, 5×2 plac. scars
	520707-17 ♂	"	microus	muriei	156-32-19-12-48 ", testis 8 mm
	520707-18 ♀	"	"	"	150-30-20-12-46 ", 3×4 emb. 7 mm
	520707-19 ♀	"	"	"	150-29-19-11-38 ", 3×4 emb just born
	520707-20 ♂	"	"	"	150-29-19-12-46 ", testis 10 mm
	520707-21 ♀	"	"	"	152-30-18-12-39 ", 5×4 plac. scars
	520707-22 ♀	"	"	"	148-28-18.5-12-43 gms, 5×5 plac. scars
	520707-23 ♂	"	"	"	160-31-20-13-54 ", test 10 mm
	520707-24 ♂	"	"	"	150-27-21-12-51 ", test 11 mm
	520707-25 ♂	"	"	"	156-31-21.5-13-50 ", " 9 "
	520707-26 ♀	"	"	"	136-28-19-12-43 ", 5×3 emb. 5 mm
	520707-27 ♀	"	"	"	150-28-19-12-44 ", 2×6 emb 4 mm
m.o.	520707-28 ♂	Spermophilus	undulatus	kennicotti	255-78-54-78-13-166 gms, test. 5 mm
SK.	520705-29 ♂	"	"	"	363-113-58-14-470 ", " 9 "
	520707-30 ♀	"	"	"	350-114-58-14-511 ", ut. normal
	520707-31 ♂	"	"	"	383-120-62-15-651 ", test 9 mm

July 8, 1952

	520708-1 ♂	Dicrostonyx	groenlandicus	rubricatus	124-17-18-5-50 gms, testis 8 mm
SK.	520708-2 ♀	microtus	miurus	muriei	148-27-18.5-11-38 ", 3×4 emb 5 mm
	520708-3 ♀	Clethrionomys	rutilus	dawsoni	138-38-20-15-38 ", 4×3 plac scars, just born
	520708-4 ♀	microtus	muurus	muirei	144-28-19-12-43 ", 3×6 emb. 7 mm
	520708-5 ♀	"	oeconomus	gilmorei	165-45-18.5-13-37 ", 4×4 " 7 "
SKull	520708-6 ♀	"	muurus	muriei	152-26-19-13-49 ", 4×3 " 9 "
SKull	520708-7 ♀	"	"	"	147-28-19.5-12 gms, ut normal
SKull	520708-8 ♀	"	o.	gilmorei	162-38-18-12-47 gms, 4×2 emb 3 mm
~~SKull~~	520708-9 ♀	"	muurus	muriei	150-27-21-13-43 ", 3×5 plac. scars
m.o	520708-10 ♂	"	"	"	147-26-20-13-14 ", testes 11 mm
m.o	520708-11 ♂	"	"	"	110-30-18-10-11 ", " 4.5 mm
	520708-12 ♂	"	"	"	150-28-20-12-46 gms, testes 12 mm
	520708-13 ♀	"	"	"	137-26-19-12-30 gms, ut. normal
	520708-14 ♀	"	"	"	147-30-19-12-36 ", 5×3 plac. scars
SKel.	520708-15 ♂	Spizella	arborea	ochracea	L. 162, wt 18, testes 5 mm

July 9, 1952

	520709-1 ♂	Clethrionomys	r.	dawsoni	140-37-19.5-13-30 gms, testes 12 mm
m.o	520709-2 ♀	"	"	"	110-28-18-12-13 ", ut. normal
m.o	520709-3 ♀	"	"	"	116-27-19-12-15 ", " "
m.o	520709-4 ♂	microtus	muurus	muirei	152-28-19-12-44 ", test 12 mm
	520709-5 ♀	"	"	"	146-30-19-13-49 ", 3×4 emb 3 mm
	520709-6 ♀	"	"	"	44-31-19-13-47 ", 5×3 emb 5 mm

	520709-7	♀	microtus	miurus	muriei	146-30-19-13-40 gms, 5×3 plac. scars.
	520709-8	♀	"	"	"	148-26-20-13-51 " , 2×5 emb. 8 mm
	520709-9	♀	"	"	"	152-27-19-13-46 " , 4×3 plac. scars
	520709-10	♂	"	"	"	152-27-19-13.47 " , test 12 mm
	520709-11	♂	"	"	"	155-28-19.5-13-48 " , " 12 "
	520709-12	♀	microtus	oeconomus	gilmorei	178-45-18.5-13-50 " , 4×3 emb plac scars
Record only ↓	520709-13		"	"	"	
	520709-14		"	"	"	
	520709-15		"	"	"	
	520709-16		"	"	"	
	520709-17		"	"	"	
	520709-18		"	"	"	
	520709-19		"	"	"	
	520709-20		"	"	"	
	520709-21		"	"	"	
	520709-22		"	"	"	
	520709-23		"	miurus	muriei	
	520709-24		"	"	"	
↑ Record only	520709-25		"	"	"	
	520709-26		"	"	"	
Skel.	520709-27	♂	Calcarius pictus			L. 172, wing 93, tail 65, wt 28 gms
Skel.	520709-28	♀	Govia adamsi			
Skel.	520709-29	♂	"	"		(see Campbell 194)

Wahoo Lake, 69°08', 146°58', 2350 ft., Brooks Range, Alaska

July 10, 1952

	520710-1	♂	Spermophilus undulatus	kennicotti	383-108-62-16-654 gms, test. 10 mm
m.o	520710-2	♂	"	"	220-70-48-11-97 "
	520710-3	♂	mustela	erminea	arctica 344-100-49-25-215 gms, test 12 mm

July 11, 1952

	520711-1	♂	Spermophilus u.	kennicottii	401-125-60-14-659 gms, test. 9 mm
Skel.	520711-2	♂	Lagopus	mutus	L. 356, wing 158, tail 101, wt 460 gms, test 7.
Skel.	520711-3	♀	Hylocichla	minima	L. 191, wing 98, " 68, " 34 "
Skel.	520711-4	♂	Acanthis	flammea	L. 131, " 70, " 52 " 14 "
	520711-5		mollusca		

Porcupine Lake, 68°51'57", 146°29'50", 3140 ft., Brooks Range, Alaska

July 13, 1952

	520713-1	♀	Sorex cinereus	ugyunak	90-31-12-7-3.5 gms, wt normal
	520713-2	♂	microtus o.	gilmorei	140-36-19-12-35 gms, test. 8.5 mm
	520713-3	♂	"	miurus	muriei 138-26-20-13-38 gms, testes 10 mm.

520713-4 ♀	Microtus miurus muriei	154-31-19-12-48gms,	5x4 emb. 4 mm
520713-5 ♂	" " "	153-32-19-13-41 " ,	testes 12 mm
520713-6 ♂	" " "	151-30-19-12-42 " ,	" 13 "
520713-7 ♂	Clethrionomys rutilus dawsoni	120-30-20-13-19 " ,	" 10 "
520713-8 ♂	microtus oeconomus gilmorei	136-32-19-12-33 " ,	" 7 "
520713-9 ♂	" " "	134-31-19-12-30 " ,	" 7 "
520713-10 ♂	" " "	132-32-19.5-12-28 " ,	" 7 "
520713-11 ♂	" " "	137-35-20-13-32 " ,	" 7.5 "
520713-12 ♀	" " "	120-31-17-11-20 " ,	wt. normal
520713-13 ♂	" miurus muriei	101-20-18-11-14 " ,	test 5 mm
520713-14 ♀	" " "	102-20-18-11-13 " ,	wt. normal
520713-15 ♀	" " "	103-20-18-11-12 " ,	" "

July 14, 1952

520714-1 ♂	microtus oeconomus gilmorei	165-42-18-12-50gms,	testes 8 mm
520714-2 ♂	" " "	174-46-19-12-54 " ,	" 10 "
520714-3 ♀	" " "	160-40-18-12-38 " ,	wt. normal
520714-4 ♂	" " "	138-36-19-12-33 " ,	testes 7 mm
520714-5 ♂	" " "	124-36-18-12-19 " ,	" 5 "
520714-6 ♂	" miurus muriei	149-31-19.5-14-40 " ,	" 10 "
520714-7 ♀	Passerculus sandwichensis	L. 140, immature	
520714-8 ♂	Spizella arborea ochracea	L. 155, wt 13 gms	
520714-9 ♀	microtus miurus muriei	95-18-16-8-11gms,	wt. normal
520714-10 ♂	" o. gilmorei	137-36-19-12-34 " ,	test 7 mm
520714-11 ♂	" " "	133-35-19-12-29 " ,	" 7 "
520714-12 ♀	" " "	130-34-19-12-26 " ,	3x5 emb 5 mm

July 15, 1952

520715-1 ♀	microtus o. gilmorei	164-41-18-13-38 gms,	just parturient.
520715-2 ♂	" " "	168-42-19-13-48 " ,	test. 8 mm
520715-3 ♀	" " "	142-32-18-12-33 " ,	5x3 emb 13 mm
520715-4 ♀	" " "	160-42-18-13-49 " ,	6x4 emb. 18 mm
520715-5 ♂	" " "	150-38-19-12-32 " ,	test 8 mm
520715-6 ♂	" miurus muriei	153-30-19-13-42 " ,	" 12 "
520715-7 ♂	" " "	158-41-19-13-38 " ,	" 12 "
520715-8 ♂	" o. gilmorei	126-34-19-11-27 " ,	" 7 "
520715-9 ♀	" " "	128-34-18-11-25 " ,	3x3 emb. 5 mm
520715-10	Spizella a. ochracea	165 L., 76 wing, tail 68,	wt. 18 gms
520715-11	" " "	158 L. 77 " , "	67, wt 18 "
520715-12	" " "	132 L. 66 " , "	40, wt 20 "
520715-13	Capella delicata	L. 160, wing 67, ex culmen 36 mm	
520715-14 ♂	Dicrostonyx g. rubricatus	113-13-16-5-31 gms,	test 7 mm
520715-15 ♀	microtus o. gilmorei	158-42-19-13-43 gms,	3x3 placs just parturient
520715-16 ♂	" " "	137-34-19-11-26 gms,	test 7.5 mm.

520911 – 199

Porcupine Lake, 68°51'57", 146°29'50", 3140 ft., Brooks Range, Alaska

July 14, 1952

520716-1 ♀	Microtus oeconomus gilmorei	156-41-18-13-36 gms, 3x2 emb 2 mm
520716-2 ♂		143-38-19-11-33 " , testes 8 mm
520716-3 ♂		160-41-19-12-52 " , " 8 "
520716-4 ♂		169-43-19.5-13-57 " , " 9 "
520716-5 ♀		160-42-19-12-46 " , 3x3 emb. 7 mm
520716-6 ♀		162-44-19-13-37 " , 3x5 emb. 2 "
520716-7 ♀		133-32-18.5-12-37 " , 3x4 emb 4 mm
520716-8 ♂		132-31-18-11-28 " , testes 6 mm
520716-9 ♀		136-36-18.5-11-28 " , 3x3 emb 8 mm
520716-10 ♂		133-33-18-11-28 " , test 6 mm
520716-11 ♂		123-32-19-11-24 " , " 6.5 mm
520716-12 ♂	Microtus mirei	151-32-20-13-43 " , " 12 "
520716-13 ♀	o. gilmorei	137-35-18-11-28 " , 2x4 emb 11 mm
520716-14 ♂		133-32-18.5-11-26 " , testes 7 mm
520716-15 ♀		132-32-18-11-24 " 6x1 emb 7 mm
520716-16 ♀		130-33-18-11-24 " 3x6 emb 5 mm
520716-17	Passerculus sandwichensis	L. 145, wing 67, tail 51, wt 19 gms
520716-22 ♂	Spermophilus undulatus kennicottii	384-120-60-13-555 gms, testes 9 mm

Mount Annette, 68°50'38", 146°28'51", approx 5700 ft., Brooks Range, Alaska

July 17, 1952

520717-1	Rock specimen - Sadlerochit - Permian
520717-2	monotis - Brachiopod of Upper Triassic
520717-3	
520717-4	Trisetum spicatum var. molle (Michx.) Beal - grass
520717-5	Poa glauca Vahl - grass
520717-6	Bromus arcticus Shear. - grass
520717-7	Hierochloa alpina (Swartz.) Roem. + Schult - grass
520717-8	Poa glauca Vahl (?) - grass
520717-9 ♀	Oenanthe o. oenanthe
520717-10 ♀	Spermophilus u. kennicottii 348-108-62-12-430 gms, 3x3 plac scars
520717-11 ♀	" " " 328-105-54-12-370 " , wt. normal

Porcupine Lake, 68°51'57" 146°29'56", 3140 ft., Brooks Range, Alaska

July 18, 1952

520718-1 ♂	Spermophilus undulatus kennicottii		396-121-59-13-715 gms, testes 9 mm	
520718-2 ♂	"	"	"	340-96-56-12- " 7 "
520718-3 ♂	"	"	"	407-133-64-15-682 " " 10 "
520718-4 ♂	"	"	"	355-104-56-12-440 " " 7 "

520911-200

520718-5 ♀ Spermophilus undulatus kennicottii 371-105-58-12-550gms, 3x3 plac. scars
Skull 520718-6 ♂ " 350-108-60-12-415", test. 7 mm
520718-7 ♂ " 315-102-57-12-320", " 6 "
520718-8 ♂ " 316-98-57-12-321", " 5 "
520718-9 ♀ " 328-108-57-12-342", wt. normal
m.o 520718-10 imm. Lagopus lagopus L.200, wing 107, wt 100 gms

Umiat, 152°09'30", 69°22'08", 352 ft., Brooks Range, Alaska

July 21, 1952

Skel 520721-1 Pluvialis d. dominica L.260, wing 185, tail 78, wt ~~158~~ 155
" 520721-2 Charadrius hiaticula semipalmata L.175, wing 124, " 55, wt 55
" 520721-3 " L.180, wing 122, " 52, " 50

July 22, 1952

520722-1 ♀ microtus oeconomus gilmorei 160-42-19-12-57gms 3x3 emb 20 mm
520722-2 ♂ Clethrionomys rutilus dawsoni 133-32-19-13-30", test 10 mm
520722-3 ♂ Sorex arcticus tundrensis 99-32-13-4-9", " 6 "

Lake Schrader, 145°09'50", 69°24'28", 2900 ft., Brooks Range, Alaska

July 24, 1952

520724-1 ♀ Lemmus trimucronatus subarcticus alascensis 154-20-19-10-78gms, 4x5 emb 13 mm
520724-2 ♀ " 125-18-19-9-56gms, 4x5 emb. 25 mm
520724-3 ♀ " 140-20-20-11-65", 2x4 " 7 "
520724-4 ♂ " 140-20-19-10-60", test 13 mm
520724-5 ♂ " 144-19-19-10-57", " 12 "
520724-6 ♂ " 143-19-19-10-65", " 11 "
520724-7 ♀ " 144-20-19-11-59", 0x6 emb 4 mm
520724-8 ♀ " 148-22-19-11-67", 6x1 emb 15 mm, one absorbed
520724-9 ♂ " 147-22-19-11-70", testes 11 mm
520724-10 ♀ " 145-21-19-11-60", 4x3 emb plac. scars
520724-11 ♀ " 118-18-18-10-58", 5x4 emb. 25 mm
520724-12 ♂ " 126-18-19-10-48", test 11 mm
520724-13 ♀ " 143-19-19-11-63", 3x3 plac scars
520724-14 ♂ " 105-16-18-10-24", test 4 mm
520724-15 ♀ " 113-18-17-10-43", 2x2 emb 23 mm
520724-16 to 520724-21 Lemmus t. ~~alascensis~~ subarcticus record only
520724-22 ♀ microtus o. gilmorei 154-40-18-12-38gms, ut. normal
520724-23 ♀ " 160-40-18.5-12-52", 4x4 emb 10 mm
520724-24 ♂ " 143-37-18-11-40", test 8 mm
520724-25 ♂ " 154-38-19-12-44", " 8 "
Skull 520724-26 ♂ " [133]-[10]-19-11-47", " 8 "

520911-201

520724-27 to 520724-32 micratus oeconomus gilmorei, record only
520724-33 Calcarius pictus
520724-34 Erolia bairdii
520724-35 " "

Lake Schrader, 145°09'50", 69°24'28", 2900ft., Brooks Range, Alaska

July 25, 1961

520725-1 ♂	Lemmus trimucronatus ~~Glacialis~~ subarcticus		130-18-20-9-56 gms, testes 12 mm
520725-2 ♀	"		125-18-19-10-37 gms, ut enlarged 3 mm, clear
520725-3 ♀	"		136-19-20-10-70 ", 2x6 emb. 14 mm
520725-4 ♀	"		128-17-17-9-43 gms, 7x4 emb 5 mm
520725-5 ♂	"		128-18-18-9-48 ", testes 10 mm
520725-6 ♂	"		138-19-20-11-57 ", " " "
520725-7 ♂	"		114-17-17-8-32 ", " 10 "
520725-8 ♀	"		138-19-20-11-60 ", 1x7 emb 5 mm (1 high in ut.)
520725-9 ♂	"		108-14-18-7-25 ", test 4 mm
520725-10 ♀	"		103-16-18-8-21 ", ut. normal
520725-11 ♀	"		111-17-17-8-32 ", 1x3 emb. 8 mm
520725-12 ♀	"		108-15-18-7-29 ", 4x0 emb. 7 mm
520725-13 ♂	"		111-17-17-8-21 ", test 3 mm
520725-14 ♂	"		110-17-18-8-24 ", " 6 "
520725-15 ♂	"		84-13-16-6-11 ", " 4 "
520725-16 ♀	"		88-13-17-6-12 ", ut. normal
520725-17 ♂	"		86-13-17-6-11 ", test 4 mm
520725-18 ♂	"		89-13-17-7-13 ", test 4.5 mm
520725-19 ♂	micratus oeconomus gilmorei		140-35-19-11-35 ", testes 8 mm
520725-20 ♀	"		133-34-19-11-36 ", 5x2 emb, 16 mm
520725-21 ♂	"		140-35-19-12-36 ", testes 8 mm
520725-22 ♀	"		125-32-18-11-23 ", ut. normal
520725-23 ♂	"		130-33-18-11-27 ", test 7 mm
520725-24 ♀	"		168-46-18-12-50 ", ut. normal
m.o 520725-25	Erolia bairdii		L.125, wing 85, bill 17, wt 20 gms

July 26, 1952

520726-1 ♂	Lemmus. t. subarcticus		148-19-19-10-66 gms, testes 11 mm
520726-2 ♀	"		146-19-19-10-68 ", 3x3 emb 5 mm
520726-3 ♀	"		138-20-19-10-60 ", 3x3 " 8 mm
520726-4 ♀	"		146-19-19-10-59 ", 3x4 emb 9 mm
520726-5 ♂	"		135-19-18-10-64 ", testes 11 mm
520726-6 ♂	"		133-19-19-10-51 ", " 10 "
520726-7 ♀	"		118-19-17-9-33 ", 2x3 emb 3 mm

	520726-8 ♀	Lemmus trimucronatus subarcticus		143-19-18-10-50gms, 2x4 emb 4mm
	520726-9 ♂	"		149-19-19-10-68", testes 11 mm
	520726-10 ♂	"		114-17-18-9-30", " 9 "
	520726-11 ♀	"		122-17-18-9-45", 4x2 emb 17mm
	520726-12 ♀	"		133-19-19-10-49", 3x3 emb. 3mm
	520726-13 ♀	"		123-17-18-9-40", 3x4 " 3 "
	520726-14 ♂	"		103-17-18-9-22", testes 4mm
	520726-15 ♂	"		107-18-18-9-30gms, " 7 "
	520726-16 ♀	"		103-17-18-8-25", ut. normal
SKull	520726-17 ♂	"		138-20-18-10-58", test. 12mm
m.o	520726-18 ♀	"		146-18-18.5-11-54", 1x4 emb 8mm
"	520726-19 ♂	"		129-18-21-10-36", testes 9mm
"	520726-20 ♂	"		122-18-19-8-30", " 7 "
"	520726-21 ♂	"		112-17-18-8-29", " 4 "
"	520726-22 ♂	"		113-17-18-8-28", " 3.5 "
"	520726-23 ♂	"		114-17-18-8-27", " 3.5 "
"	520726-24 ♂	"		93-17-17-7-13".
"	520726-25	"		
"	520726-26	"		
	520726-27 ♀	Microtus oeconomus gilmorei		150-38-19-11-34gms, ut. normal
	520726-28 ♂	"		136-31-19-10-32", testes 8mm
	520726-29 ♂	"		146-33-20-11-38", " 5 mm
	520726-30 ♂	"		150-37-20-12-39", " 10 "
	520726-31 to 520726-34	Microtus oeconomus gilmorei record only		
	520726-35 ♀	Microtus murus muriei		120-25-19-12-20gms, ut. normal
m.o.	520726-36 ♂	Evotia ~~pectoralis~~ melanotas		L. 205, hfl 26, tail 35, wing 112, wt 59 gms, test 2 mm

July 27, 1952

520727-1 to 520727-15 Lemmus trimucronatus subarcticus record only.

520727-16	Evotia melanotis		
520727-17	"		
520727-18	Evotia bairdii		L. 142, hfl 18, tail 31, wing 82, wt 21 gms

S.W Lake Schrader, 145°11'30", 69°24'32", 2925 ft, Brooks Range, Alaska

July 27, 1952

520727-1 ♀	Spermophilus undulatus kennicottii		382-115-60-14-741 gms, ovary 8mm, 2x2 plac scars, fat.
520727-2 ♀	"		394-118-61-15-747", 3x2 plac scars, fat
520727-3 ♀	"		390-116-60-14-615", 3x3 plac scars, fat
520727-4 ♂	"		398-120-65-15-800", testes 10 mm
520727-5 ♂	"		400-128-63-15-712", " 10 "
520727-6 ♀	"		389-124-58-15-822", 2x3 plac scars 3x4 ocd " " very fat

520727-7 ♂ Spermophilus undulatus kennicotti 336-110-59-14-430gms, testes 7mm
520727-8 ♀ " " " 325-103-56-13-350", ut. normal

Schrader Lake, 145°09'50", 69°24'28", 2900ft., Brooks Range, Alaska
July 28, 1952

m.o. 520728-1 ♂ Lemmus. t. subarcticus 110-16-18-8-26 gms, testes 7mm
m.o 520728-2 ♂ " 114-17-18.5-9-25", " 4 "
m o 520728-3 ♂ " 113-12-18-9-26", " 3 "
m o 520728-4 ♂ " 116-16-18-9-25", " 6 "
m.o 520728-5 ♀ " 118-17-19.5-9-28", ut. normal
m.o 520728-6 ♂ " 116-17-19-9-24", test. 4mm
m.o 520728-7 ♂ microtus oeconomus gilmorei 145-35-20-12-34", " 8 "
m.o 520728-8 ♀ " 148-36-20-12-35", 2x3 emb 14mm
m.o 520728-9 ♀ " 136-28-19-11-30", 3x4 " 5 "
m.o 520728-10 ♀ " 136-32-19-11-23", ut. normal
m.o 520728-11 ♂ " 136-31-19.5-11-25", testes 7mm
m.o 520728-12 ♀ " 147-37-18-11-34", 5x2 emb. 7mm
m.o 520728-13 ♂ Erotia bairdii L.131, bell 17, wt. 18 gms
m.o 520728-14 ♂ Calcarius pictus L.166, wing 88, tail 60, wt 22gms
520728-15 ♀ Sorex cinereus ugyunak 95-32-11-4gms, ut. normal

SW Schrader Lake, 145°11'30", 69°24'32", 2925ft., Brooks Range, Alaska
July 28, 1952

(dup. nos.)
520728-1 ♀ Citellus undulatus kennicotti 356-114-58-14-479 gms place scars
520728-2 ♂ " 342-108-58-14-450", test 7mm
520728-3 ♂ " 347-104-57-14-418", " 6 "
520728-4 ♀ " 318-103-54-13-355", ut. normal
520728-5 ♂ " 343-107-57-14-480", testes 6mm
520728-6 ♀ " 350-105-57-14-458", ut. normal
520728-7 ♂ " 335-106-59-14-400", testes 6mm

Spawning Creek, W side Lake Schrader, 145°11'40", 69°25'08", 2908ft., Brooks Range, Alaska
July 28, 1952

(Dup. nos.)
520728-1 ♂ Microtus miurus muricei 156-30-21-11-48 gms, testes 12mm
520728-2 ♂ 156-31-21-11-48", " 10 "
520728-3 ♂ " oeconomus gilmorei 175-46-19-10-58", " 9 "
m.o. 520728-4 ♀ " miurus muricei 115-24-20-10-17 gms.
520728-5 ♀ " o. gilmorei 163-38-18-10-44", 3x4 emb 11mm
m.o. 520728-6 ♂ 143-35-13-12-32",

520911-204

Lake Schrader, 145°09'50", 69°24'28", 2900ft., Brooks Range, Alaska
July 29, 1952

520729-1 ♂ Lemmus trimucronatus subarcticus 143-21-19-11-65 gms, testis 11 mm
520729-2 ♂ " 142-22-19-11-63 gms, " 12 "
520729-3 ♀ " 164-22-19.5-12-78 ", just past parturition
" ut 7 mm wide, 3x4 emb. segments
520729-4 ♀ " 152-20-19-9-98 gms, 5x3 emb 33 mm
520729-5 ♂ " 103-16-18-9-21 ", testis 3.5 mm
520729-6 ♂ " 113-16-18-9-26 ", " 4 "
520729-7 ♀ " 122-15-19-9-31 ", 4x6 emb 5 mm
520729-8 ♀ " 95-16-17-8-13 ", ut. normal
520729-9 ♀ " 107-16-18-9-19 ", " "
520729-10 ♀ " 118-17-18-9-28 ", " "
520729-11 ♀ " 115-14-18-9-31 ", 3x3 emb 2 mm
520729 12 ♂ " 113-16-18-9-26 ", testis 4 mm
520729-13 to 520729-25 Lemmus trimucronatus subarcticus record only.
520729-26 to 520729-29 Microtus oeconomus gilmorei record only
520729-30 Erolia bairdii
520729-31 " melanotos L. 185, bill 23, wing 100, tail 36, wt 43 gms

E side Lake Schrader-Lake Peters Channel, 145°09'30", 69°24'15", 2905 ft., Brooks Range, Alaska
July 30, 1952

520730-21 ♂ Lemmus t. subarcticus 137-20-19-11-57 gms, testis 11 mm
520730-22 ♀ " 130-19-19-10-51 ", 2x2 emb. 12 mm
520730-23 ♀ " 118-18-19-9-34 ", 2x2 emb 8 mm
520730-24 ♀ Microtus meurus meurei 140-28-19-13-43 ", 5x0 past parturition
520730-25 Calcarius pictus L. 148, wt 20 gms.

Lake Schrader, 145°09'50", 69°24'28", 2900ft., Brooks Range, Alaska
July 30, 1952

520730-26 ♂ Lemmus t. subarcticus 142-20-19-9-61 gms, testis 11 mm
520730-27 ♀ " 123-20-18-8-33 gms, ut normal
520730-28 ♀ " 107-14-18-8-25 ", " "
520730-29 " 94-17-18-8-13 ",
520730-30 ♂ Microtus oeconomus gilmorei 168-42-19-12-63 gms, test. 8 mm
520730-31 ♀ " 161-43-18-12-42 ", ut. normal
520730-32 ♀ " 143-37-18-10-33 ", " "
520730-33 ♂ " 147-38-19-11-37 ", testis 8.5 mm
520730-34 ♂ " 143-37-18-10-38 ", " 8 "
520730-35 " 163-38-20-10-33 ".
520730-36 " 105-26-17-8-13 gms.

5209 11-205

mount mary, S end Lake Peters, 145°10'02", 69°20'30", 2920 ft., Brooks Range, Alaska.

Aug. 1, 1952

520801-1 ♀ Clethrionomys rutilus dawsoni 133-35-20-15-28 gms, 3x3 plac scars
520801-2 ♂ " 131-36-19-14-27 gms, testes 11 mm
520801-3 ♂ " 117-32-19-14-20 ", " 3 "
520801-4 ♀ " 127-33 19.5-14-22 ", ut. normal
520801-5 ♂ " 120-29-19.5-14-18 ", testes 3 mm
520801-6 ♀ microtus muirus muriei 156-33-21-13-47 ", 4x3 plac scars
520801-7 ♂ " 128-29-20-12-26", testes 7 mm
Skel. 520801-8 ♀ Plectophenax nivalis L. 183 + wng 11, tail 70, tar 24, wt 34 gms
Skel. 520801-9 ♀ Oenanthe o. oenanthe L. 158, " 94, " 51, "30, " 26 "

Aug. 2, 1952 (see date after Aug. 3, 1952)

520802-11 ♂ Lemmus trimucronatus subarcticus 134-17-18.5-10-56 gms, testes 12 mm
520802-12 ♂ microtus muirus muriei 160-34-21-13-54 gms, testes 18 mm
520802-13 ♂ " 145-33-20.5-12-43", " 11 "
520802-14 ♀ " 118-24-19-12-20 ", ut. normal
520802-15 ♂ " 116-23-19-11-18 ", test 3 mm
520802-16 ♂ " 112-20-20-11-19", " 3 "
520802-17 ♂ Clethrionomys r. dawsoni 142-38-20-14-32 gms, testes 13 mm
520802-18 ♂ " 141-39-20-14-33 ", " 12 "
520802-19 ♂ " 138-35-20-13-30 ", " 12 "
520802-20 ♀ " 134-33-19-13-38 ", 1x6 emb 20 mm
520802-21 ♀ " 127-31-20-14-23 ", ut. normal
520802-22 ♂ " 123-31-20-14-20", testes 3 mm
520802-23 ♂ " 123-31-20-14-20", " 3 "

Aug. 3, 1952

Skull 520803-1 ♂ Lemmus t. subarcticus 117-21-18-9-29 gms, testes 9 mm
Skull 520803-2 ♂ " 113-19-18-9-25 ", " 6.5 mm
520803-3 ♀ " 126-22-19-10-37", 2x3 plac. scars
520803-4 ♀ microtus muirus muriei 152-31-20-13-45", 1x5 emb 15 mm
520803-5 ♀ " 120-24-18-12-19", ut. normal
520803-6 ♂ Clethrionomys r. dawsoni 127-33-19-13-21", test 3 mm
520803-7 ♀ " 123-31-19-14-19", ut. normal
Skull 520803-8 ♀ " 128-32-20-13-20", " "
520803-9 ♂ " 131-33-20-13-23", testes 3 mm
Skeleton 520803-10 ♀ Anthus spinoletta jnw. L. 162, wng 81, T 60, wt. 17 gms
Skel. 520803-11 ♀ Zonotrichia leucophrys jnw. L. 180, " 78, T 73, wt. 26 "

Meade River, 56.5 mi S and 9 mi. W Point Barrow [not village] 156°30'53", 70°39'30" 40 ft., Alaska Aug 2, 1952

520802-27 ♀ microtus oeconomus gelonorei 161-41-19-60 gms
520802-28 ♂ " " " 180-40-19-63 gms

Aug 4, 1952

	520804-1 ♀	Lemmus trimucronatus subarcticus	87-15-16-4-11 gms, ut. normal	
	520804-2 ♀	Microtus miurus muriei	152-32-20-13-42 gms, 4x4 plac scars	
	520804-3 ♀	"	152-33-20-13-41 ", 5x5 " "	
	520804-4 ♀	"	142-32-19.5-13-40 ", 3x4 " " 4 mm	
	520804-5 ♂	"	157-34-20-14-44 ", testis 10 mm	
m.o	520804-6 ♀	"	115-22-18-11-18 gms, ut. normal	
m.o	520804-7 ♀	"	120-25-18-11-22 ", " "	
m.o	520804-8 ♂	"	130-29-20-12-26 ", testis 7 mm	
m.o	520804-9 ♂	"	113-22-19-11-17 ", " 3 "	
m.o	520804-10 ♂	"	105-21-18-10-14 ", " 4 "	
m.o	520804-11 ♂	"	158-35-20-14-45 ", " 10 "	
	520804-12 ♀	Clethrionomys rutilus dawsoni	128-32-19-15-21 ", ut. normal	
	520804-13 ♀	"	125-31-19-15-21 ", " "	
SKULL	520804-14 ♂	"	130-31-20-15-20 ", testis 3.5 mm	
	520804-15 ♂	"	126-31-19-15-18 ", " 4 "	
	520804-16 ♂	"	129-32-19-15-21 ", " 3 "	
	520804-17 ♂	"	126-31-19-15-21 ", " 3 "	
	520804-18 ♀	"	130-33-20-15-22 ", ut. normal	
	520804-19 ♀	"	128-32-19-15-23 ", " "	
	520804-20 ♀	"	126-31-19-15-23 ", " "	
SKULL	520804-21 ♂	"	126-29-19.5-15-21 ", test 3 mm	
"	520804-22 ♂	"	129-32-19-15-21 ", " 4 "	
"	520804-23 ♂	"	130-33-20-15-22 ", " 4 "	
"	520804-24 ♂	"	128-30-19-15-21 ", " 4 "	
m.o.	520804-25 ♂	"	135-35-20-13-29 ", " 11 "	

Mouth Chamberlin Canyon, S end Lake Peters, 145°08'34", 69° 20'58", 3690 ft., Brooks Range, Alaska

Aug. 4, 1952

520804 26 ♀ marmota caligata browneri 600-163-86-23-8 lbs (3629 gms) 2x3 plac scars

Meade River, 50.5 mi. S and 9 mi W Point Barrow [not village] 156° 30'53", 70° 39'30" 40 ft., Alaska

Aug. 4, 1952

520804-30 ♀	Microtus oeconomus gilmorei	172-43-20-11-49 gms	4x5 plac. scars.
520804-31 ♂	Lemmus t. alascensis	164-22-20-11-89 ",	testes 11 mm
520804-32 ♂	"	124-20-20-9-40 ",	" 8 "
520804-33 ♂	Dicrostonyx g. rubricatus	147-20-19.5-6-73 ",	" 8 "
520804-34 ♂	Lemmus t. alascensis	136-17-19-10-52 ",	" 9 "

52D911-207

mouth Chamberlin Canyon, S end Lake Peters, 145°08'34", 69°20'58", 3690 ft., Brooks Range, Alaska

Aug. 5, 1952

520805-11 ♂ marmota caligata kraueri 580-152-87-25-8 lbs (3629 gms) testes 25 mm

Mount Mary, S end Lake Peters, 145°10'02", 69°20'30", 2920 ft., Brooks Range, Alaska

Aug. 9, 1952

520809-1	♂	mustela erminea arctica	320-90-45-18-150 gms,	testes 8 mm
520809-2	♂	microtus miurus muriei	156-29-20-14-44 ",	" 11 "
520809-3	♀	"	112-22-17-10-16 ",	wt. normal
520809-4	♀	"	118-28-19-11-20 ",	" "
520809-5	♂	"	160-29-20-14-38 ",	testes 11 mm
520809-6	♂	clethrionomys r. dawsoni	125-30-20-15-22 gms,	" 3 "
520809-7	♂	"	142-34-20-14-30 ",	" 11 "
520809-8	♂	"	140-33-20-14-28 ",	" 12 "
520809-9	♀	"	140-34-20-14-24 ",	2x3 plac. scars
520809-10	♂	"	123-31-20-14-18 ",	testes 3 mm
520809-11	♂	lemmus t. subarcticus	105-17-18-9-22 gms	" 4 mm
m.o ↓ 520809-12	♂	"	108-18-18-9-23 ",	" 4 "
520809-13	♀	clethrionomys r. dawsoni	128-32-20-14-20 ",	wt. normal
520809-14	♂	"	126-31-19.5-14-19 ",	testes 3 mm
520809-15	♀	"	128-31-20-14-20 ",	wt. normal
520809-16	♀	"	120-31-19-13-18 ",	" "
520809-17	♀	"	126-30-19.5-14-21 ",	plac. scars
520809-18	♀	"	121-30-19-13-19 ",	wt. normal
520809-19	♂	"	150-41-20-14-40 ",	testes 14 mm
520809-20	♀	"	133-35-19-13-22 ",	wt. normal
520809-21	♂	"	124-27-19-13-19 ",	testes 2.5 mm
520809-22	♂	"	122-31-20-14-18 ",	" 3 "
520809-23	♂	"	125-30-20-15-22 ",	" 3 "
520809-24	♀	"	140-34-20-14-26 ",	plac. scars
520809-25	♂	"	142-34-20-14-30 ",	testes 11 mm
520809-26	♀	microtus miurus muriei	153-38-19-13-43 ",	plac. scars
520809-27	♂	"	118-26-19.5-12-20 ",	testes 2 mm
m.o ↑ 520809-28	♂	"	119-27-20-12-22 ",	" 2.5 mm

Aug. 10, 1952

520810-3 ♂ mustela erminea arctica 314-85-46-21-152 gms, testes 4.5 mm

Aug 11, 1952

SKULL 520811-1 ♀ mustela erminea arctica 260-73-37-19-112 gms, wt. normal

520911-208

mount mary, S end Lake Peters, 145°10'05", 69°20'35", 3012 ft., Brooks Range, Alaska
Aug 14, 1952

520814-1 ♀	microtus miurus muriei		137-26-20-13-40gms. 6x5 plac. scars
520814-2 ♀	"		142-27-19-12-34 ", plac. scars
520814-3 ♂	"		153-33-20-13-39 ", testes 9 mm
520814-4 ♂	"		161-31-20.5-14-53 ", " 7 "
520814-5 ♀	"		148-28-20-13-47 ", 4x2 plac scars
520814-6 ♀	"		152-30-19-14-39 ", plac scars
520814-7 ♂	"		148-31-20-13-44 ", testes 6 mm
520814-8 ♀	"		118-26-19-11-20 ", ut. normal
520814-9 ♂	"		124-26-19-11-22 ", testes 2 mm
520814-10 ♀	"		120-26-19-11-20 ", ut. normal
520814-11 ♂	"		123-26-19-11-23 ", testes 2 mm
520814-12 ♂	"		112-25-19-12-20 ", " 2 "
520814-13 ♂	"		110-25-19-11-16 ", " 2 "
520814-14 ♂	"		103-22-18-10-13 ", " 2 "
520814-15 ♂	"		113-25-19-11-20 ", " 2.5 "
520814-16 ♂	"		107-22-18-11-14 ", " 3 "
520814-17 ♀	"		103-22-18-10-16 ", ut. normal
520814-18 ♂	"		99-21-18-11-13 ", testes 4 mm
520814-19 ♂	"		113-24-19-11-20 ", " 3 "
520814-20 ♂	"		104-25-19-11-14 ", " 3 "
SR. 520814-21 ♂	"		102-24-19-11-25 ", " 3 "
520814-22 ♀	"		103-23-19-11-15 ", ut. normal
m.o 520814-23 ♀	"		103-23-19-11-14 ", " "
m.o 520814-24 ♀	"		108-22-19-11-14 ", " "
m.o 520814-25 ♂	"		109-23-19-11-16 ", testes 4.5 mm
m.o 520814-26 ♀	"		108-22-19-11-14 ", ut. normal
520814-27 ♀	Clethrionomys rutilus dawsoni		130-32-20-14-24 ", " "
520814-28 ♀	"		140-33-20-15-29 ", 2x3 plac. scars
520814-29 ♀	"		132-33-20-14-22 ", ut. normal
520814-30 ♂	"		122-33-20-14-22 ", test. 2.5 mm
520814-31 ♂	"		124-31-19.5-14-22 ", " 2.5 "
520814-32 ♂	"		124-33-20-14-22 ", " 2.5 "
520814-33 ♂	"		122-33-20-14-23 ", " 2 "
520814-34 ♀	"		124-32-20-14-21 ", ut. normal
520814-35 ♂	"		122-33-19-14-23 ", testes 2.5 mm

Aug. 16, 1952

520816-1 ♂	microtus miurus muriei	155-28-19-10-43gms, testes 8 mm
520816-2 ♂	"	155-29-20-12-42 ", 6x3 plac scars
520816-3 ♀	"	160-34-21-13-43 ", plac scars

520816-4 ♀ microtus miurus muriei 153-32-20-12-32gms, plac scars
520816-5 ♂ " 145-28-19-12-34", testis 6 mm
520816-6 ♂ " 119-24-19-12-19", " 2.5 "
520816-7 ♀ " 123-26-18-11-18", ut. normal
520816-8 ♀ " 120-25-19-11-17", " "
520816-9 ♀ " 127-25-19-11-19", " "
520816-10 ♀ " 118-23-19-12-18", " "
520816-11 ♀ " 120-24-19-12-17", " "
520816-12 to 520816-19 microtus miurus muriei
520816-20 ♀ Clethrionomys rutilus dawsoni 124-31-19.5-15-20gms, ut. normal
520816-21 ♀ " 128-32-20-15-19", " "
520816-22 ♂ mustela erminea arctica 350-100-51-23-207", testis 11 mm
520816-23 ♀ microtus miurus muriei 142-26-19.5-13-42", 3x5 plac. scars
520816-24 ♂ " 125-25-18-12-20", test. 2 mm
520816-25 ♀ " 115-23-18-12-18", ut. normal
520816-26 ♂ " 124-23-20-12-20", testis 3 mm
520816-27 ♀ " 123-23-19-12-20", ut. normal
520816-28 ♀ " 122-22-18-12-17", " "

Umiat, 69°22', 152°08', 337 ft., Brooks Range, Alaska
Aug. 19, 1952

Skel. 520819-1 ♀ Corvus corax L. 682, wing 440, tail 255, long sp 1215, wt 1360

Gavia Lake, 69°35', 150°00', 460 ft., N White Hills, Brooks Range, Alaska
Aug. 21, 1952

520821-1 ♀ microtus oeconomus gilmorei 163-44-18-13-56gms, plac. scars
520821-2 ♀ " 165-48-19-13-45", " "
520821-3 ♀ " 163-45-18.5-13-49", " "
520821-4 ♂ " 172-46-20-13-56", testis 8 mm
520821-5 ♂ " 158-45-19-12-50", " 6 "
520821-6 ♂ " 122-32-19-11-21", " 2 "
520821-7 ♂ " 104-21-18-10-15", " 3 "
520821-8 ♂ " microtus miurus muriei 120-24-19-12-21", " 3 "
520821-9 ♀ " 143-32-20-13-39", plac scars
520821-10 ♂ " 148-32-20-12-50", testis 2 mm
520821-11 ♀ " 140-31-20-12-47", plac scars
520821-12 ♀ " 119-23-19-12-19", ut. normal
520821-13 ♀ Spermophilus u. kennicottii 360-115-63-507gms, ut normal
Aug. 22, 1952
520822-1 ♂ microtus o. gilmorei 181-47-20-13-55gms, testis 6 mm
520822-2 ♀ " 165-42-19-12-54", plac. scars

520911-210

	520822-3 ♀	Microtus oeconomus gilmorei	158-41-19-12-38 gms, ut. normal	
	520822-4 ♀	"	161-42-19-12-39 ", " "	
	520822-5 ♀	"	160-42-19-12-45 ", " "	
	520822-6 ♂	"	180-47-20-12-57 ", testis 8 mm	
	520822-7 ♂	"	175-47-19-12-53 ", " 6 "	
	520822-8 ♀	"	105-26-18-10-13 ", ut. normal	
	520822-9 ♀	"	131-33-19.5-12-23 ", " "	
	520822-10 ♀	"	148-43-19-12-37 ", " "	
	520822-11 ♀	" Microtus muricei	104-24-18-11-13 ", " "	
	520822-12 ♀	"	135-27-20-12-33 ", 4X4 postpart enlarge	
	520822-13 ♂	"	153-33-21-12-47 ", testis 11 mm	
	520822-14 ♀	" O. gilmorei	128-33-19.5-12-23 ", ut. normal	
SKel	520822-15 ♂	Passerculus sandwichensis	L. 151, wing 68, tail 55, wt 19 gms	
Skel	520822-16 ♂	Spizella arborea ochracea	L. 165, " 75 " 70 " 19 "	
SKel	520822-17 ♂	Luscinia svecica svecica	L. 148. " 70 " 53 " 21 "	
SKel	520822-18 ♀	Calcarius lapponicus alascensis	L. 163 " 18 " 58 " 28 "	
	520822-19 ♀	Spermophilus u. kennicottii	330-105-60-14-415 gms, ut. normal	
	520822-20 ♀	"	350-108-61-14-442 ", " "	
~~SKel~~ m.o	520822-21 ♂	Clangula hyemalis	L. 318, wing 62, tail 45, exp cul 22, wt 226 gms	
~~SKel~~ m.o	520822-22 ♂	"	L. 214, " 30 " 27 " " 16 wt 119 gms	
~~SKel~~ m.o	520822-23 ♂	Passerculus sandwichensis	L. 148, wt 17 gms	
+ m.o	520822-24 ♂	"	L. 150, wt 19 "	
m.o	520822-25 ♀	Microtus muricei	120-26-18-10-18# gms, ut. normal	
↓	520822-26 ♀	"	118-24-19-10-18 gms, " "	
	520822-27 ♂	"	122-27-19-11-19 gms, testis 3 mm	
	520822-28 ♂	"	120-23-19-11-20 ", " 3 "	
	520822-29 ♀	"	118-24-19-11-17 ", ut. normal	
	520822-30 ♀	" O. gilmorei	110-29-18-9-12 ", " "	
	520822-31 ♂	"	124-31-18-11-19 ", test 3 mm	
	520822-32 ♂	"	128-33-19-12-18 ", " 2 "	
	520822-33 ♀	"	128-33-19-12-18 ", ut. normal	
	520822-34 ♂	"	125-31-19-11-19 ", testis 3 mm	
	520822-35 ♀	"	123-31-18-9-18 ", ut. normal	
	520822-36 ♂	"	111-29-18-10-14 ", testis 3 mm	
	520822-37 ♂	"	120-30-18-10-20 ", " 3 "	
	520822-38 ♂	"	115-29-18-10-14 ", " 2 "	
	520822-39 ♀	"	113-27-18-10-16 ", ut. normal	
	520822-40 ♀	"	123-30-18-10-18 ", " "	
	520822-41 ♂	"	132-34-19-11-21 ", testis 3 mm	
	520822-42 ♀	"	123-32-18-9-17 ", ut. normal	
↑ m.o.	520822-43 ♀	"	123-32-18-9-17 ", " "	

m.o ↓	520822-44 ♀	microtus oeconomus gilmorei	120-30-18-10-17 gms.	ut normal
	520822-45 ♀	"	120-31-18-11-19 " ,	" "
	520822-46 ♂	"	122-30-18-10-19 " ,	test 3 mm
	520822-47 ♀	"	120-26-18-10-18 " ,	ut. normal
	520822-48 ♂	"	112-29-18-10-13 " ,	testes 3 mm
	520822-49 ♀	" microtus muricei	116-23-18-10-16 " ,	ut. normal
	520822-50 ♀	"	102-22-17-9-13 " ,	" "
	520822-51 ♂	"	107-23-18-10-13 " ,	test 2 mm
	520822-52 ♂	"	105-24-18-10-14 " ,	" 2.5 "
	520822-53 ♂	"	117-21-18-10-15 " ,	" 3 "
	520822-54 ♂	"	108-24-18-10-14 " ,	" 2 "
	520822-55 ♂	"	111-19-18-10-11 " ,	" 5 "
	520822-56 ♀	"	117-21-18-10-16 " ,	ut. normal
	520822-57 ♀	"	108-22-18-10-15 " ,	" "
	520822-58 ♀	"	117-24-18-10-17 " ,	" "
	520822-59 ♂	"	105-24-18-10-13 " ,	testes 2.5 mm
	520822-60 ♂	"	106-23-18-10-14 " ,	" 3 "
↑ m.o	520822-61 ♀	"	101-22-17-9-12 " ,	ut. normal

Gavia Lake, n white Hills, 69°35', 150°00', 460 ft., Brooks Range, Alaska
Aug. 23, 1952

520823-1 ♀	Spermophilus undulatus kennicotti	472-100-63-13-730 gms.	4×3 plac. scars
520823-2 ♂	microtus o. gilmorei	130-35-20-11-22 " ,	testes 5 mm
520823-3 ♀	"	127-34-19.5-11-20 " ,	ut. normal
520823-4 ♂	"	136-37-20-11-21 " ,	testes 3 mm
520823-5 ♂	"	137-35-20-11-20 " ,	" 2 "
520823-6 ♀	"	120-29-18-11-16 " ,	ut. normal
520823-7 ♂	Lemmus trimucronatus subarcticus	144-19-19-11-51 " ,	test 10 mm
520823-8 ♂	"	100-18-18-9-22 " ,	" 3 "
520823-9 ♂	Sorex arcticus tundrensis	108-30-12-8 gms	" 7 "
520823-10 ♂	Luscinia svecica svecica	L. 165, wing 74, tail 60, wt. 18 gms	
520823-11 ♀	microtus o. gilmorei	131-31-19-11-18 gms,	ut. normal
m.o ↓ 520823-12 ♂	" microtus muricei	98-21-18-8 gms,	test 2 mm
520823-13 ♀	"	95-20-18-8 " ,	ut. normal
520823-14 ♀	"	102-19-18-9-13 " ,	" "
520823-15 ♀	"	103-19-18-10-13 " ,	" "
520823-16 ♂	"	120-26-19-11-18 " ,	testes 3 mm
520823-17 ♂	" o gilmorei	130-33-19-10-21 gms	" 4 "
520823-18 ♀	"	110-28-18-10-14 gms.	ut. normal
↑ 520823-19 ♂	"	138-36-19-11-23 " ,	test 4 mm
m.o 520823-20 ♂	"	125-30-19-10-21 " ,	" 4 "

m.o 520823-21 ♀ Microtus oeconomus gilmorei 108-28-18-10-12 gms, ut. normal
m.o 520823-22 ♂ " " " 110-26-18-10-14 gms, testes 2.5 mm

Point Barrow, 156°27'25", 71°23'11", 3 ft., Alaska
Aug. 25, 1952

520825-1 ♂ Lemmeria spectabilis L. 560 mm, condition very poor, thin

Driftwood, Utukok River, 161°12'10", 68°53'47", 1200 ft., Brooks Range, Alaska
Aug 28, 1952

520828-1 ♀ Microtus murus muricei 120-24-21-11-21 gms, ut normal
520828-2 ♀ " 151-27-20-12-42 " , " "
520828-3 ♀ " 147-29-20-11-38 " , " "
520828-4 ♀ " 118-24-20-10-20 " , " "
520828-5 ♀ " 156-30-20-13-39 " , " "
520828-6 ♀ " 147-25-20-12-41 " , " "
520828-7 ♀ " 143-26-18-13-40 " , " "
520828-8 ♀ " 145-28-20-13-35 " , " "
520828-9 ♀ " 158-31-21-13-47 " , " "
520828-10 ♀ " 122-22-19-12-19 " , " "
520828-11 ♂ " oeconomus gilmorei 140-36-18-12-30 " , testes 4 mm
520828-12 ♀ " 152-40-20-12-34 " , ut. normal
520828-13 ♀ " 150-39-19-12-35 " , " "
520828-14 ♂ " 157-40-20-13-39 " , test 4 mm
520828-15 ♂ " 160-44-19-12-40 " , " 5 "
520828-16 ♀ " 168-47-20-12-50 " , ploc scars
520828-17 ♀ " 155-42-20-12-36 " , ut. normal
520828-18 ♀ " 174-48-19-13-48 " , " "
520828-19 ♀ " 130-31-20-12-20 " , " "
520828-20 ♀ Lemmus trimucronatus alascensis subarcticus 112-18-18-8-20 gms " "
m.o. 520828-21 ♀ microtus o. gilmorei 128-32-19-11-21 gms testes 3 mm
m.o. 520828-22 ♀ " " " 123-31-19-12-21 " , ut. normal
↓ 520828-23 ♀ " 121-31-18-10-18 " , " "
520828-24 ♀ " 112-28-19-10-18 " , " "
520828-25 ♀ " 118-28-18-10-20 " , " "
520828-26 ♀ " 120-28-18-10-20 " , " "
520828-27 ♂ " 128-32-19-11-21 " , test 2.5 mm
520828-28 ♂ " 123-30-19-10-22 " , " 2 "
520828-29 ♂ " 116-27-18-10-19 " , " 3 "
520828-30 ♂ " 123-30-19-11-22 " , " 2.5 "
↑ 520828-31 ♀ " 120-28-18-10-20 " , ut. normal
m.o 520828-32 ♀ Microtus murus muricei 118-22-19-12-18 " , " "

520911-213

m.o.	520828-33 ♂	microtus miurus muriei	118-22-19-12-20 gms., testes 3 mm
↓	520828-34 ♂	"	112-21-19-11-19 " , " 2.5 mm
	520828-35 ♀	"	110-21-19-11-18 " , ut. normal
	520828-36 ♀	"	120-22-19-12-19 " , " "
	520828-37 ♀	"	116-22-19-12-19 " , " "
	520828-38 ♂	"	116-21-19-11-17 " , test. 2,5 mm
	520828-39 ♀	"	118-22-19-12-18 " , ut. normal
	520828-40 ♂	"	121-23-19-12-22 " , test 2,5 mm
	520828-41 ♂	"	116-22-19-12-20 " , " 3 "
	520828-42 ♀	"	116-21-19-11-20 " , ut. normal
	520828-43 ♀	"	114-21-19-12-19 " , " "
	520828-44 ♀	"	116-22-19-12-17 " , " "
	520828-45 ♀	"	112-21-19-11-18 " , " "
	520828-46 ♂	"	120-23-19-12-19 " , test. 2 mm
	520828-47 ♀	"	120-22-19-12-19 " , ut. normal
↑	520828-48 ♂	"	126-25-20-12-21 " , testes 3 mm
m.o	520828-49 ♂	"	~~118~~ -
	520828-50 ♀	"	118-22-19-12-19 gms, ut. normal
	520828-51 ♂	"	116-21-19-11-21 " , test. 2 mm
	520828-52 ♂	"	120-23-19-12-19 " , " 2.5 "
	520828-53 ♀	"	116-23-19-12-21 " , ut. normal
	520828-54 ♀	"	119-23-19-12-22 " , " "
	520828-55 ♀	"	113-23-19-11-19 " , " "
	520828-56 ♀	"	112-22-19-11-18 " , " "
	520828-57 ♂	"	122-23-19-12-21 " , test. 3 mm
	520828-58 ♀	"	118-22-19-12-20 " , ut. normal
	520828-59 ♀	"	119-23-19-12-18 " , " "
	520828-60 ♂	"	120-23-19-12-20 " , testes 3 mm
	520828-61 ♂	"	118-22-19-12-20 " , testes 2.5 mm
	520828-62 ♂	"	126-26-19-10-21 " , " 3 "
	520828-63 ♀	"	120-23-19-11-19 " , ut. normal
	520828-64 ♀	"	116-22-19-11-18 " , " "
	520828-65 ♀	"	127-26-19-12-23 " , " "
	520828-66 ♀	"	118-22-19-11-18 " , " "
	520828-67 ♂	"	123-24-19-12-23 " , testes 3 mm
	520828-68 ♀	"	119-24-19-11-19 " , ut. normal
	520828-69 ♀	"	108-21-19-12-18 " , " "
	520828-70 ♀	"	118-23-19-12-17 " , " "
	520828-71 ♀	"	116-22-19-11-21 " , " "
	520828-72 ♀	"	120-23-19-12-19 " , " "
	520828-73 ♀	"	120-23-19-12-18 " , " "
	520828-74 ♀	"	112-20-19-11-20 " , " "

520911-214

Driftwood, Utukok River, 161°12'10", 68°53'47", 1200ft., Brooks Range, Alaska
Aug. 29, 1952

520829-1	♀	Microtus miurus muriei	162-27-20-11-40gms, 3x5 plac. scars	
520829-2	♀	"	148-26-19-12-36", ut. normal	
520829-3	♀	"	152-27-19-12-34", " "	
520829-4	♀	"	158-29-19-13-44", plac. scars	
520829-5	♀	"	160-30-19.5-12-43", ut. normal	
520829-6	♀	"	116-21-20-11-16", " "	
520829-7	♂	"	112-20-19-11-16", testis 3mm	
520829-8	♂	"	111-21-19-10-16", " 2.5 "	
520829-9	♂	"	120-23-19-11-19", " 2.5 "	
520829-10	♀	"	120-24-19-11-19", ut. normal	
520829-11	♀	"	121-23-19-11-20", " "	
520829-12	♂	"	125-27-21-23", testis 2.5mm	
520829-13	♀	Lemmus. t. subarcticus	109-15-18-8-22gms, ut. normal	
520829-14	♀	microtus oeconomus gilmorei	143-36-20-12-29", " "	
520829-15	♀	"	150-38-19-12-32", " "	
520829-16	♀	"	90-18-16-7-9", " "	
520829-17	♂	"	122-29-19-11-20", testis 2mm	
520829-18	♂	"	130-31-19-11-21", " 3 "	
520829-19	♀	"	123-25-19-11-18", W. normal	
520829-20	♂	"	126-31-19-21gms, testis 2mm	
520829-21	♀	microtus miurus muriei	122-24-19-12-19gms, ut. normal	
520829-22	♀	"	122-23-19-12-19", " "	
520829-23	♂	"	121-24-19-12-18", test 2mm	
520829-24	♂	"	121-23-19-12-21", testis 2.5mm	
520829-25	♂	"	121-22-19-12-21", " 2.5 "	
520829-26	♀	"	119-21-19-12-18", ut. normal	
520829-27	♀	"	116-21-18-12-17", " "	
520829-28	♀	"	124-25-19-12-21", " "	
520829-29	♀	"	118-22-19-12-19", ut. normal	
520829-30	♀	"	120-24-19-12-17", " "	
520829-31	♀	"	118-22-19-12-20", " "	
520829-32	♀	"	120-23-19-12-20", " "	
520829-33	♂	"	126-26-30-12-23", " "	
520829-34	♂	"	120-23-19-12-21", test 3mm	
520829-35	♀	"	123-24-19-11-20", ut. normal	
520829-36	♀	"	115-21-19-11-17", " "	
520829-37	♂	"	114-22-19-~~11~~ 16-16", testis 3mm	
520829-38	♀	"	115-21-19-11-17", ut. normal	
520829-39	♂	"	121-23-19-12-21", testis 3mm	

m.o ↓

m.o ↑

mo.	520829-40 ♀	Microtus miurus muriei	117-21-19-11-18 gms, ut. normal
↓	520829-41 ♂	"	112-21-18-11-16 ", testis 3 mm
	520829-42 ♂	"	118-21-19-12-19 ", " 3 "
	520829-43 ♂	"	118-21-19-12-21 ", " 2.5 "
	520829-44 ♂	"	120-22-19-12-20 ", " 2.5 "
	520829-45 ♂	"	122-23-19-12-19 ", " 3 "
	520829-46 ♀	"	125-26-19-12-23 ", ut. normal
	520829-47 ♂	"	120-22-19-12-20 ", testis 3 mm
	520829-48 ♂	"	126-25-20-12-22 ", " 3 "
	520829-49 ♀	"	114-21-18-11-18 ", ut. normal
	520829-50 ♀	"	120-23-19-12-20 ", " "
	520829-51 ♀	"	128-25-20-12-21 ", " "
	520829-52 ♀	"	116-20-19-11-18 ", " "
	520829-53 ♀	"	118-21-19-12-20 ", " "
	520829-54 ♀	"	123-24-19-12-22 ", " "
	520829-55 ♀	"	120-23-19-12-20 ", " "
	520829-56 ♂	"	120-22-20-12-21 ", testes 3 mm
	520829-57 ♀	"	120-23-19-12-17 ", ut. normal
	520829-58 ♂	Lemmus trimucronatus subarcticus	103-19-17-8-18 ", testes 3 mm
	520829-59 ♂	microtus oeconomus gilmorei	122-26-19-11-20 ", testis 3.5 mm
	520829-60 ♀	"	97-23-17-9-10 ", ut. normal
↑	520829-61 ♀	"	120-27-17-11-18 ", " "
mo	520829-62 ♀	"	123-27-17-11-20 ", " "

Aug. 30, 1952

520830-1 ♀	Microtus miurus muriei	147-26-19-12-39 gms, slee scars
520830-2 ♀	"	120-23-19-12-21 ", testes 2.5 mm
520830-3 ♀	"	120-23-19-11-22 ", ut. normal
520830-4 ♂	"	123-25-19-12-22 ", testis 2.5 mm
520830-5 ♂	"	123-26-19-12-22 ", " 2 "
520830-6 ♂	"	118-22-20-12-19 ", " 3 "
520830-7 ♂	"	120-23-19-12-21 ", " 3 "
520830-8 ♀	"	110-21-18-10-20 ", ut. normal
520830-9 ♂	"	121-23-20-11-22 ", testis 3 mm
520830-10 ♂	" oeconomus gilmorei	115-25-18-10-19 ", " 2 "
520830-11 ♀	"	94-20-16-7-10 ", ut. normal
520830-12 ♂	Lemmus t. subarcticus	112-16-18-8-27 ", testis 3 mm
520830-13 ♀	microtus o. gilmorei	171-47-20-13-49 ", ut. normal
520830-14 ♀	"	176-42-19-13-47 ", " "
520830-15 ♂	"	138-32-20-11-28 ", testis 2 mm
520830-16 ♀	"	130-31-19-11-22 ", ut. normal
520830-17 ♂	"	116-28-18-10-17 ", testis 2 mm

520830-18 ♂	microtus oeconomus gilmorei		127-31-18-11-20gms, testes 2 mm
520830-19 ♂	"	"	125-31-18-11-17gms, " 2 "
520830-20 ♀	microtus miurus muriei		111-21-20-11-20gms, ut. normal
520830-21 ♂	"		122-22-20-10-20 ", testes 3 mm
520830-22 ♀	"		116-21-19-10-18 ", ut. normal
520830-23 ♂	"		120-21-19-11-20 ", testes 3 mm
520830-24 ♂	"		118-22-19-11-20 ", " 2.5 mm
520830-25 ♀	"		117-21-19-11-18 ", ut. normal
520830-26 ♂	"		117-22-19-11-19 ", testes 2.5 mm
520830-27 ♀	"		122-23-20-12-21 ", ut. normal
520830-28 ♂	"		120-21-19-11-20 ", testes 3 mm
520830-29 ♂	"		123-23-20-11-22 ", " 3 "
520830-30 ♀	"		120-22-19-12-21 ", ut. normal
520830-31 ♂	"		118-22-19-11-17 ", testes 2 mm
520830-32 ♀	"		112-20-19-10-17 ", ut. normal
520830-33 ♀	"	oeconomus gilmorei	125-31-19-11-20 ", ut. normal
520830-34 ♂	"		118-27-20-10-18 ", testes 3 mm
520830-35 ♀	"		127-32-19-12-22 ", ut. normal
520830-36 ♂	"		132-31-19-12-22 ", testes 2.5 mm
520830-37 ♀	"		125-30-19-11-19 ", ut. normal
520830-38 ♂	"		135-31-19-12-23 ", testes 3 mm
520830-39 ♂	"		127-31-19-12-19 ", " 2.5 "
520830-40 ♂	"		126-32-19-11-20 ", " 2.5 "
520830-41 ♀	"		123-26-19-10-18 ", ut. normal
520830-42 ♂	"		120-25-19-11-19 ", testes 2.5 mm
520830-43 ♀	"		124-25-19-11-21 ", ut. normal
520830-44 ♂	Spizella arborea ochracea		L. 165, wing 75, tail 70, wt. 20 gms
520830-45 ♂	"		L. 160, " 70 " 65 " 19 "
520830-46 ♂	microtus oeconomus gilmorei		127-31-19-12-19 gms, testes 2.5 mm.

Aug. 31 1952

520831-1 ♀	microtus miurus muriei		143-30-20-12-36 gms, ut. normal
520831-2 ♂	"		153-31-20-12-43 ", testes 5 mm
520831-3 ♀	"	oeconomus gilmorei	150-31-19-12-35 ", ut. normal
520831-4 ♂	"		182-46-20-12-60 gms, testes 6 mm
520831-5 ♀	"		157-37-20-12-35 ", ut. normal
520831-6 ♀	"		159-38-20-13-40 ", " "
520831-7 ♂	"		155-41-19-11-34 ", testes 4 mm
520831-8 ♀	"		144-34-19-11-30 ", ut. normal
520831-9 ♂	"		138-35-19-11-28 ", testes 2 mm
520831-10 ♀	"		140-33-19-12-32 ", " 3 "
520831-11 ♂	"		130-31-19-12-25 ", " 2.5 "

520831-12 ♀	Microtus oeconomus gilmorei	130-32-19-12-21 gms, testes 2 mm	
520831-13 ♂	"	132-32-19-11-24 ", " 2 "	
520831-14 ♀	"	124-27-18-11-20 ", ut. normal	
520831-15 ♀	Lemmus trimucronatus subarcticus	93-14-18-7-14 " , " "	
520831-16 ♀	"	110-18-18-8-26 ", " "	
520831-17 ♀	"	110-18-18-9-28 ", " "	
520831-18 ♀	"	113-17-18-8-30 ", " "	
520831-19 ♀	"	108-18-18-8-25 ", " "	
520831-20 ♂	"	111-17-18-8-27 " ,	

NW Elson Lagoon, 71° 20'27", 156° 35'45", 0 ft., Point Barrow, Alaska
Sept. 2, 1952

520902-1 ♂ Phocena vomerina (see notes for measurements)

Point Barrow, 156° 39'40", 71° 19'03", 6 ft., Alaska
Sept. 4, 1952

520904-1 ♀	Lemmus trimucronatus alascensis	130-22-19-9-61 gms, 2X3 plac scars, just partus.	
520904-2 ♂	"	123-17-19-9-47 " , testes 7 mm	
520904-3 ♂	"	126-19-19-9-42 ", " 5 "	
520904-4 ♂	"	123-18-19-9-41 ", " 7 "	
m.o. 520904-5 ♀	"	128-21-19-10-42 ", ut. normal	
m.o. 520904-6 ♀	"	122-17-19-9-35 ", " "	
m.o. 520904-7 ♀	"	118-18-18-8-28 ", " "	
m.o. 520904-8 ♂	"	123-18-19-9-40 ", testes 6 mm	
520904-9 ♀	"	154-25-20-10-83 ", 3X0 emb 28 mm	
520904-10 ♀	"	126-18-19-9-48 ", 2X2 emb 8 mm	
520904-11 ♂	"	122-16-19-9-48 ", testes 9 mm	
520904-12 ♀	"	123-19-19-9-37 ", ut. normal	
520904-13 ♀	"	120-18-18-9-40 ", ut. normal	
520904-14 ♀	"	134-19-19-9-50 ", 3X2 emb 7 mm	
520904-15 ♀	"	124-19-19-9-40 ", ut. normal	
520904-16 ♂	"	130-22-19-9-45 ", testes 9 mm	
520904-17 to 520904-20	Lemmus trimucronatus alascensis record only		
520904-21 ♂	Lemmus t. alascensis	154-26-20-10-88 gms, testes 11 mm	
520904-22 ♂	"	128-19-19-10 39 " , " 6 "	
520904-23 ♀	"	135-21-20-10-56 ", ut. normal	
520904-24 ♂	"	122-19-19-9-38 ", testes 5 mm	
520904-25 ♂	"	130-20-19-10-39 ", " 2.5 mm	
520904-26 ♀	"	117-18-19-9-29 " , ut. normal	
520904-27 ♀	"	128-19-19-9-37 " , " "	
520904-28 ♂	"	132-20-19-10-47 ", testes 10 mm	

m.o.	520904-29 ♀	Lemmus trimucronatus alascensis	106-18-20-7-21 gms,	ut. normal
	520904-30 ♀	"	120-19-19-9-35 " ,	" "
	520904-31 ♀	"	124-21-19-9-44 " ,	" "
	520904-32 ♀	"	125-18-19-9-43 " ,	" "
	520904-33 ♀♂	"	126-18-19-9-44 " ,	testis 7 mm
	520904-34 ♂♀	"	119-19-19-9-36 " ,	ut. normal
	520904-35 ♂	"	112-19-19-9-27 " ,	testis 4 mm
	520904-36 ♂	"	126-18-19-9-38 " ,	" 5 "
m.o	520904-37 ♀	"	124-20-19-9-37 " ,	ut. normal
m.o	520904-38 ♀	"	108-18-18-8-21 " ,	" "
m.o	520904-39 ♂	"	131-20-19-10-36 " ,	testis 6 mm
	520904-40 ♂	"	137-17-19-9-41 " ,	" 7 "
	520904-41 ♀	"	132-20-19-10-58 " ,	3x1 emb 10 mm
m.o	520904-42 ♀	"	120-18.5-18-9-34 " ,	ut. normal
↓	520904-43 ♀	"	134-20-19-9-41 gms.	3 x 2 plac scars
	520904-44 ♀	"	124-18-19-9-35 " ,	ut. normal
	520904-45 ♂	"	122-19-19-9-35 " ,	testis 5 mm
	520904-46 ♂	"	119-19-19-10-33 " ,	" 5 "
	520904-47 ♂	"	108-19-19-9-24 " ,	" 3.5 "
	520904-48 ♀	"	106-18-19-9-26 " ,	ut. normal
↑ m.o.	520904-49 ♀	"	128-19-18-9-49 " ,	" "
	520904-50 ♀	"	136-21-19-9-50 " ,	" "
	520904-51 ♀	"	128-19-18-9-50 " ,	" "
	520904-52 ♂	"	148-21-18-10-79 " ,	testis 11 mm
m.o	520904-53 ♀	"	128-18-19-10-45 " ,	3x2 emb 3 mm
m.o	520904-54 ♀	"	134-21-19-10-47 " ,	ut. normal
m.o	520904-55 ♂	"	113-18-19-9-26 " ,	testis 4 mm
m.o	520904-56 ♀	"	128-18-19-9-42 " ,	ut. normal
	520904-57 ♀	"	115-18-19-8-34 " ,	ut. normal
	520904-58 ♂	"	121-21-20-7-40 " ,	testis 5 mm
	520904-59 ♂	"	163-23-23-11-83 " ,	" 12 "
m.o	520904-60 ♂	"	120-18-18-9-35 " ,	" 4 "
↓	52904-61 ♀	"	122-19-19-10-35 " ,	ut. normal
	520904-62 ♀	"	113-18-19-9-30 " ,	" "
	520904-63 ♂	"	112-17-19-9-36 " ,	testis 4 mm
	520904-64 ♂	"	118-17-19-9-34 " ,	" 4 "
	520904-65 ♀	"	106-18-18-8-27 " ,	ut normal
↑ m.o	520904-66 ♀	"	118-18-18-9-32 " ,	" "
	520904-67 ♂	"	132-21-20-9-44 " ,	testis 4.5 mm
	520904-68 ♀	"	123-18-17-7-32 " ,	ut. normal
	520904-69 ♀	"	148-23-20-11-84 " ,	ut. normal

520911-219

520904-70 ♀ Lemmus trimucronatus alascensis 150-22-20-11-85 gms, 3x1 emb. 15 mm

m.o 520904-71 ♀ " 134-22-19-10-63 ", 3x2 emb 28 mm

m.o 520904-72 ♂ " 120-17-18-9-37 ", 4.5 testes

m.o 520904-73 ♂ " 120-18-18-9-42 ", testes 8 mm

m.o. 520904-74 ♀ " 111-21-20-9-22 ", ut. normal

m.o. 520904-75 ♂ " 113-20-19-25 gms, testes 4 mm

520904-76 ♂ " 112-20-18-8-23 ", " 3.5 "

m.o 520904-77 ♀ " 120-20-19-9-24 ", ut. normal

Point Barrow, 156° 39' 40"; 71° 19' 03", 6 ft., Alaska

Sept. 7, 1952

520907-1 ♀ Lemmus t. alascensis 128-19-19-10-50 gms, plac. scars

520907-2 ♀ " 126-20-18.5-10-50 gms, ut normal

520907-3 ♀ " 90-15-17-6-14 gms, ut. normal

Sept. 8, 1952

520908-1 ♂ Lemmus t. alascensis 118-18-19-10-47 gms, testes 6 mm

520908-2 ♀ " 128-20-19-11-43 ", ut. normal

520908-3 ♂ " 117-18-19-10-33 ", testes 6 mm

520908-4 ♀ " 135-20-20-10-68 ", 4x1 plac. scars ut at base 1½ mm

520908-5 ♂ " 69-10-13-3-7.8 gms, testes 2.5 mm

520908-6 ♂ " 68-11-13-3-7.0 gms, " 2.5 mm

520908-7 ♀ " 71-11-12-3-7.4 gms, ut. normal

520908-8 ♂ " 71-11-13-3-7.7 gms, testes 2.5 mm

520908-9 ♀ " 68-11-12-3-7.1 ", ut. normal

520908-10 ♂ " 100-19-19-9-21 ", testes 6 mm

520908-11 ♂ " 106-18-19-9-24 ", testes 5.5 mm

520908-12 ♀ " 97-18-18-8-21 ", ut. normal

(eyes not just open)

Point Barrow, 156° 40' 40", 71° 19' 30", 8 ft., Alaska

Sept. 9, 1952

520909-1 ♀ Sorex cinereus ugyuak 87-28-12-7-3 gms, ut. normal

520909-2 ♂ Lemmus t. alascensis 78-12-16-4-10 ", test 2.5 mm

520909-3 ♂ " 77-12-16-4-44 ", " 3.5 mm

(eyes not open)

520909-4 ♀ " 130-17-20-10-66 gms, 3x2 plac. scars

520909-5 ♀ " 151-19-20-10-105 ", 3x3 emb. 25 mm

520909-6 ♀ " 75-12-15-4-8 gms, ut. normal

520909-7 ♀ " 73-12-16-4-8.5 ", " "

520909-8 ♀ " 73-11-15-4-8 ", " "

520909-9 ♂ " 73-12-15-4-8.5 ", testes 3. mm

520909-10 ♀ " 113-17-19-9-34 ", plac. scars

520909-11 ♂ " 155-21-22-10-96 ", testes 12 mm

(eyes not open)

520911-220

520909-12 ♂ Lemmus trimucronatus alascensis 153-22-21-10-80gms, testes 11 mm
520909-13 ♀ " 148-21-20-9-77 ", 2x3 plac scars ut 2.5 mm wide
520909-14 ♂ " 126-19-20-9-50 ", testes 7 mm
520909-15 ♀ " 138-19-21-9-70 ", 3x2 plac. scars
520909-16 ♀ " 152-21-21-10-43 ", ut. normal, starvation specimen

Point Barrow, 156°30'00", 71°22'10", sea level, Alaska
Sept 11, 1952

SKULL 520911-1 ♀ Phoca 980-88-204
" 520911-2 ♀ Lemmus t. alascensis 133-18-19-10-66gms

Point Barrow, 156°27'25", 71°23'11", 3ft., Alaska
Oct. 16, 1952

521016-1 ♂ Lemmus trimucronatus alascensis 121-18-20-9-26gms, testes 5 mm

Oct 18, 1952

521018-1 ♀ Lemmus t. alascensis 112-18-19-8-48 gms, 3x2 plac. scars

Oct 24, 1952

521024-1 ♂ Lemmus t. alascensis 143-22-21-10-68 gms, testes 7 mm

The three above lemming were captured alive and transported to Univ. of Kansas for observation and killed on above dates. All Alaskan specimens of birds and mammals in mus. Nat. Hist collection at Univ of Kansas. (K.U. Museum Natural History) Catalogue numbers of mammals 50404 to 51564 and 51567 to 51569.

520911-221

Entered Sept. 11, 1952

Catalogue of grasses and sedges from the Arctic Slope of Northern Alaska + summer of 1952 (field number of each specimen is incorporated the date of collection).

Wahoo Lake, 69°08', 146°58', 2350 ft., Brooks Range, Alaska

520712-1 Carex membranacea
520712-2 Carex lugens Holm.
520712-3 Carex aquatilis wahl. var. stan (Drejer) Boott.
520712-4 Carex lugens Holm.
520712-5 Carex aquatilis wahl.
520712-5a Carex lugens Holm.
520712-6 Poa glauca Vahl.
520712-7 Bromus pumpellianus Scribn.
520712-7a Arctagrostis latifolia (R. Br.) Griseb.
520712-8 Calamogrostis purpurascens R. Br.
520712-9 Festuca scabrella Torr.
520712-10 Trisetum spicatum (L.) Richt.
520712-11 Carex consimilis Holm
520712-12 Carex aquatilis wahl.
520712-13 Eriophorum angustifolium Honckn.
520712-14 Trisetum spicatum var. molle (Michx.) Beal
520712-15 Carex aquatilis wahl.

Mount Annette, 68°50'38", 146°28'51", 5700 ft., Brooks Range, Alaska

520717-3 Carex podocarpa R. Br.
520717-4 Trisetum spicatum var. molle (Michx.) Beal
520717-5 Poa glauca Vahl.
520717-6 Bromus ~~pumpellianus~~ arcticus Shear. ~~var. tweedyi Scribn.~~
520717-7 Hierochloa alpina (Swartz.) Roem. + Schult
520717-8 Poa glauca Vahl (?)

Umiat, 152°09'30", 69°22'08", 352 ft., Brooks Range, Alaska

520721-4 Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Schreb.
520721-5 Carex aquatilis wahl.
520721-5a Carex lugens Holm.
520721-6 Arctagrostis latifolia (R. Br.) Griseb.
520721-7 Luzula
520721-8 Poa arctica R. Br.
520721-9 Arctagrostis latifolia (R. Br.) Griseb.
520721-9a Poa (1951 - or 1952?) [Probably 1952, JB]
520721-10 Carex lugens Holm.

520721-11 Carex physocarpa Presl.
520721-12 Carex lugens Holm.
520721-13 Luzula rufescens Fisch.
520721-14 Arctagrostis latifolia (R. Br.) Griseb.
520721-15 Calamagrostis neglecta (Ehrh.) Gaertn. Meyer + Schreb.
520721-16 Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Schreb.

East side Lake Shrader - Lake Peters channel, 145°09'30", 69°24'15", 2905 ft., Brooks Range, Alaska.

520730-1 Calamagrostis neglecta (Ehrh.) Gaertn. Meyer + Scherb.
520730-2 Arctagrostis latifolia (R. Br.) Griseb - approaches
520730-3 Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Scherb.
520730-4 Poa arctica R. Br.
520730-5 Luzula confusa Lindeb.
520730-6 Carex lugens Holm.
520730-7 Hierochloa alpina (Swartz) Roem. and Schult.
520730-8 Carex aquatilis Wahl.
520730-9 Carex physocarpa Presl.
520730-10 Eriophorum angustifolium Honckn.
520730-11 Carex lugens Holm.
520730-12 Hierochloa alpina (Swartz) Roem and Schult.
520730-13 Poa glauca Vahl.
520730-14 Calamagrostis purpurascens R. Br.

Lake James Robert, 145°10'00", 69°16'30", 3600ft. Brooks Range, Alaska

520808-8 Carex montanensis Bailey
520808-9 Trisetum spicatum var. molle (Michx.) Beal
520808-10 Poa arctica R. Br.

Mount mary, S end Lake Peters, 145°10'02", 69°20'30", 2920 ft., Brooks Range, Alaska

520809-13 Eriophorum Scheuchzeri Hoppe
520809-14 Carex podocarpa R. Br.
520809-15 Poa arctica R. Br. toward Poa glauca Vahl.
520809-16 Carex aquatilis Wahl. var. stans (Drejer) Boott
520809-17 Hierochloa alpina (Swartz.) Roem. and Schult.
520809-18 Arctagrostis latifolia (R. Br.) Griseb.
520809-19 Carex misandra R. Br.
520809-20 Alopecurus alpinus J. E. Smith
520809-21 Carex podocarpa R. Br.
520809-22 Luzula nivalis var. latifolia (Kjelm.) Sam.
520809-23 Carex podocarpa R. Br.

520809-24 Carex membranacea Hook.
520809-25 Carex lugens Holm.
520809-26 Juncus castaneus Sm.
520809-27 Festuca ovina L.
520809-28 Trisetum spicatum var. molle (Michx.) Beal
520809-29 no specimen for this number
520809-30 Poa arctica R. Br.
520862-1 Arctagrostis latifolia (R.Br.) Gresib.
520812-2 Poa arctica R. Br.
520812-3 Carex podocarpa Holm.
520812-4 Taraxacum lacerum Greene

Mount Mary, S end Lake Peters, 145°10'05", 69°20'35", 3012 ft., Brooks Range, Alaska.

520814-1 Fern
520814-2 Empetrum (?) sterile
520814-3 Dryas octopitata L.

Mount Mary, S end Lake Peters, 145°10'02", 69°20'30", 2915 ft., Brooks Range, Alaska.

520816-1 Fern
520816-25

Driftwood, Utukok River, 161°12'10", 68°53'47", 1200ft., Brooks Range Alaska.

520831-50
520831-51
520831-52
520831-53
520831-54
520831-55
520831-56
520831-57
520831-58
520831-59

W: Charles Whittington - U.S.G.S. Wash. 520911-224
M: Marvin Mangus - U.S.G.S, Fairbanks, Alaska
J-I. William Irving, College, Fairbanks — Josh Tukle - Barrow Village

(63) BROOKS RANGE

ELEVATIONS IN FEET

161° (Joins 33-Water) 160° 159° 158° 157°

72°

(Joins 64)

1. Canis Lupus - (2 together) W- June 1, 1949 and wolverine
2. " " W- Aug. 15, 1951 and 1 wolverine
3. " " W- Aug 15, 1947 and 1 wolverine
4. " " W- Sept. 20, 1951
5. " " W- June 18, 1948
6. " " W- June 15, 1948
7. " " W- " " "
8. " " (♂ and ♀ and 6 pups and 1 wolverine W.- Aug 5, 1949
9. Golden Eagle nest - M. 1952, July 4.
10. " " " and young - (10 mi. S Driftwood) M- 1950.
11. " " nest. M- June 10, 1951
12. Barrenground grizzly. Raided cache W-1947
13. " " grizzly. Raided cache W. 1947
14. " " grizzly. Observed raiding cache, W- May 25, 1947, Bears visited later in summer.
15. Barren ground grizzly W- July 7, 1951
16. " " " W- " " "
17. " " " (3 adults) W. July 5, 1952 together
18. " " " W- June 10, 1949
19. " " " W- July 5, 1949 (2)
20. " " " W- " 1, 1949 (2)
21. " " " W- " 2, " (2)
22. " " " W- July 1, 1950 (♀ + 2 cubs)
23. " " " W- July 15, 1948
24. " " " W. Aug 3, 1948 (many detailed in Jurassic shale valley)
25. " " " W- June 28, 1948
26. Canis lupus. W- June 28, 1948
27. Ovis dalli. W- June 28, 1948 (12)
28. " W- " " (1)
29. Barren ground grizzly W- Aug 30, ±
30. Porcupine W- 5 mi NE Driftwood Sept 5, 1950 (3/4 grown)
31. Barren ground grizzly, W- June 1, 194
32. moose, W- July 10, 1952
33. " " 1945 Colalung Kill
34. " W- July, 1949
35. Wolf - W- Aug 15, 1950
36. Caribou moving south Aug 5, 1949, none before, none after
37. 5 dead Caribou from herd due east W- Aug 15 1950 to Sept 1, 1950
38. 15 Caribou - W- July 2, 1952
39. moose - 1946 W.
40. Golden Eagle nest. M. July 1, 1946.
41. Caribou, 3000, July 1, 1952 - J-I
42. " " " " " - J-I
43. " 40 " 13 " - J-I
44. " 40 " 13 " - J-I
45. moose - J-I Winter of 1935 - going north

26°E

110° A N

020° A N

POINT BARROW RADIO 236 PBA

RBn POINT BARROW 437 PBA

RBn SKULL CLIFF 290 SKX (On request)

Building Point Barrow

Barrow

POINT BARROW (NEW) 23 LH 48

Utkiavi

POINT BARROW (OLD) 13 — 30

Wiley Post Monument

133

134

(625)

Sinaru

Point Franklin

132

Fish camp

Atanik

119

Peard Bay

Cabin

49

WAINWRIGHT (NORTH) 05 —

WAINWRIGHT 20 — 15

Kugura R.

Kungok R.

Kuk River

Many snow or ice covered lakes

Nigtakiuvik

MEADE R.

Atkasuk

Topagoruk River

Anaktuk

Kangik

Kaolak R.

Awalik River

71°

70°

C H U K C H I S E A

ELEVATIONS

9239

9000

7000

5000

3000

2000

1000

Sea Level

CONTOUR INTERVAL 1000'

CAUTION - Gradient tints delimited by dashed contour lines indicate approximate relief only

ALTITUDE CONVERSION SCALE

30 — 100

H= Harmon Hellmerick. (wife Constance Helmerick) S= Pete Sovalik 520911-225
C= Frank Cernick, Wash D.C.
Code= Tom Cade, Ann Arbor.

WORLD AERONAUTICAL CHART

F= Clifford Floeres U.S.G.S.

156° 155° (Joins 33-Water) 154° 30°E 153° 152° 32°E 151° 150°

72° 71°

58
...ud, Sept 5, 1950 (3/4 grown)

...#49, none before, none after end Aug, W
...ases. W- Aug 15, 1950 to Sept 1, 1950.

46. Caribou = I-T July 5, 1952 - going west
47. Canis lupus = I-T, July 5, 1952
48. Caribou = I-T, group 40-50 fem. July 5 to 9th, 1952, also Aug 2, 1952 according to Tuttle, caribou arrive coast about July 1 and leave Aug 10. Come because of cool weather of coast.
49. T = Caribou migration last fall for first time
50. I-T = wolf 2 miles old, Aug 2, 195...
51. T = Caribou move back to here ...winter, but some on coast.
52. I-T = 20 caribou June 25, 1952
53. T = Wolverine, 1946.
54. T = whale killed near this island
55. M = 2 adult Canis lupus July 1, 1947
56. M = wolverine, July 1, 1947
57. M = 8 Canis lupus in one group. April 26, 1952
58. M = 2 " " " " " " 25, 1952
59. T = Barren ground grizzly - 1935 - probably most northern record along Colville according to Esker who have lived here.
60. T = 2 wolverine, 1944.
61. m = 1 Barren ground grizzly, April 20, 1952
62. m = 1 " " " Aug. 12, 1947
63. m = 1 " " " Aug 12, 1947
64. m = 1 " " " July 15, 1947
65. m = 2 Canis lupus. April 10, 1949.
66. m = 1 Barren ground grizzly. April 10, 1952 (our specimen)
67. m = 2 " " " April 25, 1948
68. m = 1 wolverine, April 15, 1949
69. m = 1 " 4 Wolves, April 15, 1949
70. m = 6 wolves April 10, 1949 and 6 wolves in same area April 10, 1952
71. m = 1 Barren ground grizzly, April 14, 1949.
72. m = 1 " " " July 4, 1949
73. I = Wolverine tracks, July 14, 1951
74. m = Rabbit and wolf. Aug 20, 1949
75. I = 2 adult Canis lupus & 3 pups. July 9, 1951
76. m. 4 wolves together June 10, 1951
77. m. Den of pups (wolves) after having abandoned. July 8, 1952
78. m. Barren ground grizzly. Aug 1950 (killed by Eskimo)
79. m. 2 " " " (one 96 inches long) and 2 wolves, May 30, 1949
○ m. unnumbered. 30 individual barren ground grizzly & 1 wolverine between upper Utukok and west fork of Kobluk, May 30 to Sept 1 Utukok Kobluk

RACON BAND 1-1-1-2

LUK IS

PLOVER ISLANDS

Christie Point

Cabin

House

Dease Inlet

Abandoned cabins

Cape Simpson

Oil seep

Abandoned buildings

Abandoned cabin

Admiralty Bay

SMITH BAY

BROWER

Half Moon Three Ranch

Cabin

Trading post

Cape Halkett

TESHEKPUK LAKE

Atigaru Point

HARRISON BAY

Thetis I

Oliktok Po

Fish Cr

Snow or ice covered lakes

COLVILLE

N 200° A

N 290° A

102 3/4 miles left

AMBER 2

BEAUFORT

~~U.S.Geo.S~~ unnumbered Armour, ~~S. Dakota~~

O.M: Tree squirrel head of Saviuyuk River.

~~O.M = Tree squirrel head of Saviuyuk River~~

O.T: unnumbered. Caribou reach plains Aug 5 and leave last of August (note?)

149° 34°E 148° (Joins 33-Water) 147° (Joins 34-Water) 36°E 146° 145° 38°E 144° (Joins 34-Water) 143° 72° (Joins 62)

O.M - unnumbered. 1 adult + 2 young otter 30 mi. S Hunt Fork, Aug. 15, 1951

O M: unnumbered. Most northern record of beaver on Johns River at Crevasse Creek. Aug 15, 1951

O M: unnumbered. 15 mi. up John River Canyon 30 wolves on 2 occasions July 21, 1951

~~In 1930 adult + 1 yo in some area~~

~~106 S: Porpoise (see notes) 2.4 feet long. 1 Aug. 1937~~

~~107 S: Adult porpoise dead on shore. Sept 1, 1933~~

~~108 S: Hibernating Barren ground grizzly. Nov 15, 1938.~~

~~109: S: Moose killed by Sovalik Sept 1, 1931. (long ago)~~

~~110: S:~~

72°

80. J.T: moose, June 30, 1951 (Tuttle says they remain all winter here)
81. B-C: 9 Barren ground grizzly - (see notes) Porcupine Lake
82- " " 1 " " " (" ")
83- " " 1 " " " (" ") and 1 wolf. } Wolves Lake
84. H: Snowy owl after Lemmings and swan in open water. April, 1946
85. H: Lemmings going straight north on ice & snow. 10 mi. beyond island. April May 1946 but nearly every month. Also ptarmigan out on ice at this point
86. H: Caribou tracks 5 mi. beyond shore on ice and snow. Mar. 1946
87. H: 2 Barren ground grizzly, 1944 (Reportedly Wood)
88. H: 1 " " " July. 1948
89 H: Mink and otter tracks 1949
90 H: Rabbit foot, Aug 25, 1946
91 H: Moose, Aug 14, 1952
92 H: ♀ and 2 cub ~~barren ground grizzly~~ polar bears, 1949
93 H: Calfless moose, Aug 1951 (on saltwater flats)
94 H: Barren ground grizzly. Sept. 1951
95 = H: Cottonwood 45' high for 10 miles in Creek bed.
96 = H: Caribou spent summer every year. in July. about 15,000
97 = H: Beaver tracks & mink numerous (in general area) 1949
98 = H: Caribou in one group, 20,000, Mar. 1946.
99 = H: Rabbit ~~common~~ in 1945 (by Paneak) general area
100 = H: Barren ground grizzly just out hibernation May 10, 1952
101 = H: 29 moose between Anaktuvuk Pass + Mouth Colville this year and probably entire population. 1952
102 = H: Barren ground grizzly. July. 1948
103 = H: ♂ polar bear, fat, September. (by wood George)
104: C: ♀ and cubs. 1951. July Barren ground grizzly

71°

105 - BC. 1 barren ground grizzly Aug. 1951
106 - Cade = 1 barren ground grizzly. Aug 13, 1952 (Cache destroyed between June 25 & Aug 13)
1,1950 107 - Cade = groups 12 to 50 + singles. caribou July 18 1952 (singles in view all times between July 17 and July 20 1952)
108 = M: 2 sandhill cranes. Aug 16, 1952
109 = M: mink, otter, beaver, bear, wolves, wolverine in valley Aug 16, 1952 (Barren ground grizzly)
110 = M. edge tree line Aug 16, 1952
111 - F Citellus from 111 to 112 from Aug 30 - 1952 40 observed 4 + many holes
112. F. Eskimo (Albert Driggs, Wainwright) observed sea otter. 1952 (mid Aug?) reported to Fiscus
113. F. " " 1951
114. F. Helmericks reports killing polar bear 8 miles N Pitt Point killed winter 1952
115. F. Red fox (1) April 30. 1952 Eskimo report others.
116. F 8 wolves April 27 1952

117 F. (common) (10) Common & spotted seal from Pitt Point to Harrison Bay 1952 195
118. F Walrus skull picked up summer 1952 with one tusk.
119. S: Porpoise (see notes) two young 4 feet long. 1 Aug. 1937
In 1930 one adult and 1 young also observed here.
120. S: Adult porpoise - dead on shore. Sept 1, 1933
121. S: Hibernating Barren ground grizzly. Nov 15, 1938
122 S: Moose killed by Sovalik. Sept 1, 1931 (long ago)
123 S: Killed moose here in 1929-1930.
124 S " " " 1936. Many moose in this general area.
125. S. Five moose along river. 1942
126. S. 10-15 moose along river. 1942 and greatest congregation
127. S. Wolverine. Febr. 1938
128. S. Congregation moose. 1942
129. S Congregation of moose 1942
130. S Tracks of moose, 1924. observed
131. S Narwhale, ~~dead~~. Sept. 1, 1929 ice also on Herschel Island
132. S Citellus parryi. along ocean crossing wall 1937
133. S " " July 8. 1951
134. S Citellus parryi. July 8, 1951 Saviuyuk
135. M Tree squirrel at head of and most northern record

S E A

Pingok Island

JONES

38° E 71°

520911-227

Meade River

Carbon Creek

LOOKOUT RIDGE

Nuka River

LAKE NOLUK

DE LONG MOUNTAINS

Colville River

Awuna River

Kwalik Creek

Killik River

Fawn Creek

HOWARD PASS

NOATAK RIVER

Sholton Lake

P-4, C-4 X

X P-4, C-5

P-4 C-1X

X P-6, C-6

X P-6, C-7

X P-6, C-5

X P-6 C-4

X P-6 C-2

X P-6, C-3

P-7 C-5X

P-7 C-6X

P-7 C-7X

P-3 C-4X

Meters Feet

For conversions above 100 feet, add like number of ciphers to the figures on both sides of scale.

SCALE 1:1,000,000

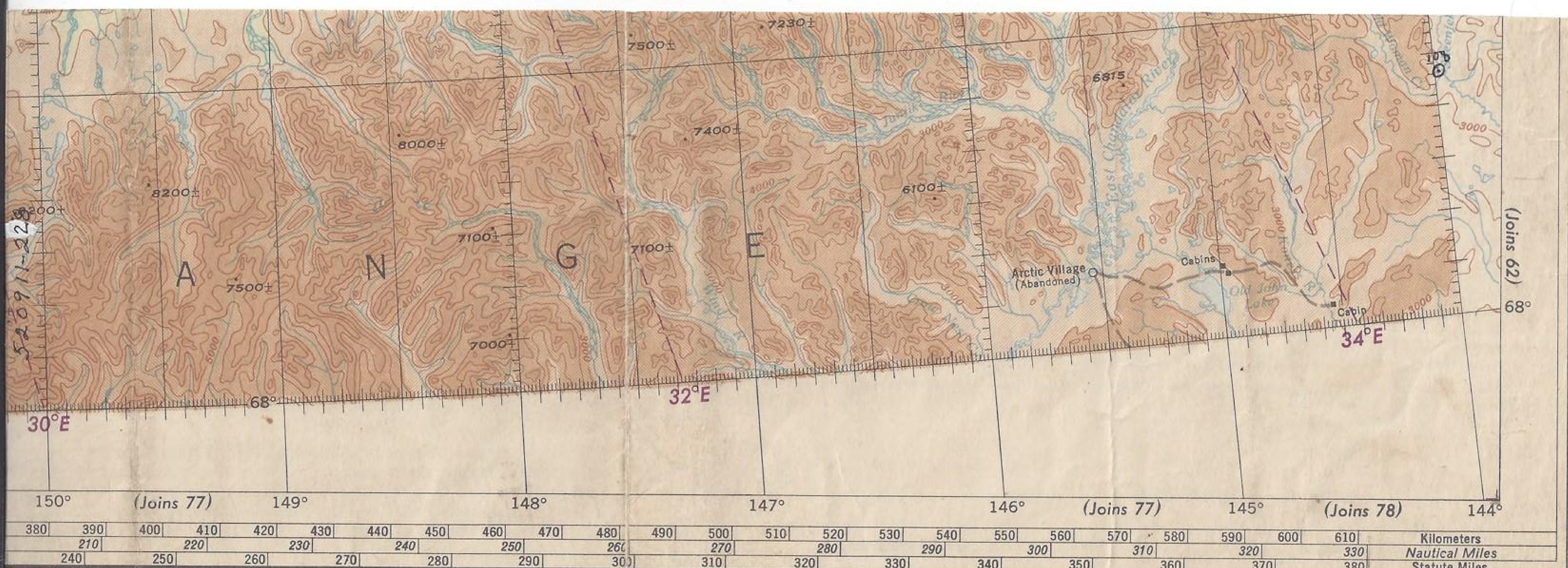
Fifth edition - February 2, 1949

(63) PRICE 25 CENTS

Date of magnetic information 1947

Consult Civil Aeronautics Administration Notices for changes in aeronautical data on this chart after February 2, 1949

Principal Sources: U. S. Geological Survey, U. S. Air Force, Civil Aeronautics Administration and the U. S. Coast and Geodetic Survey.



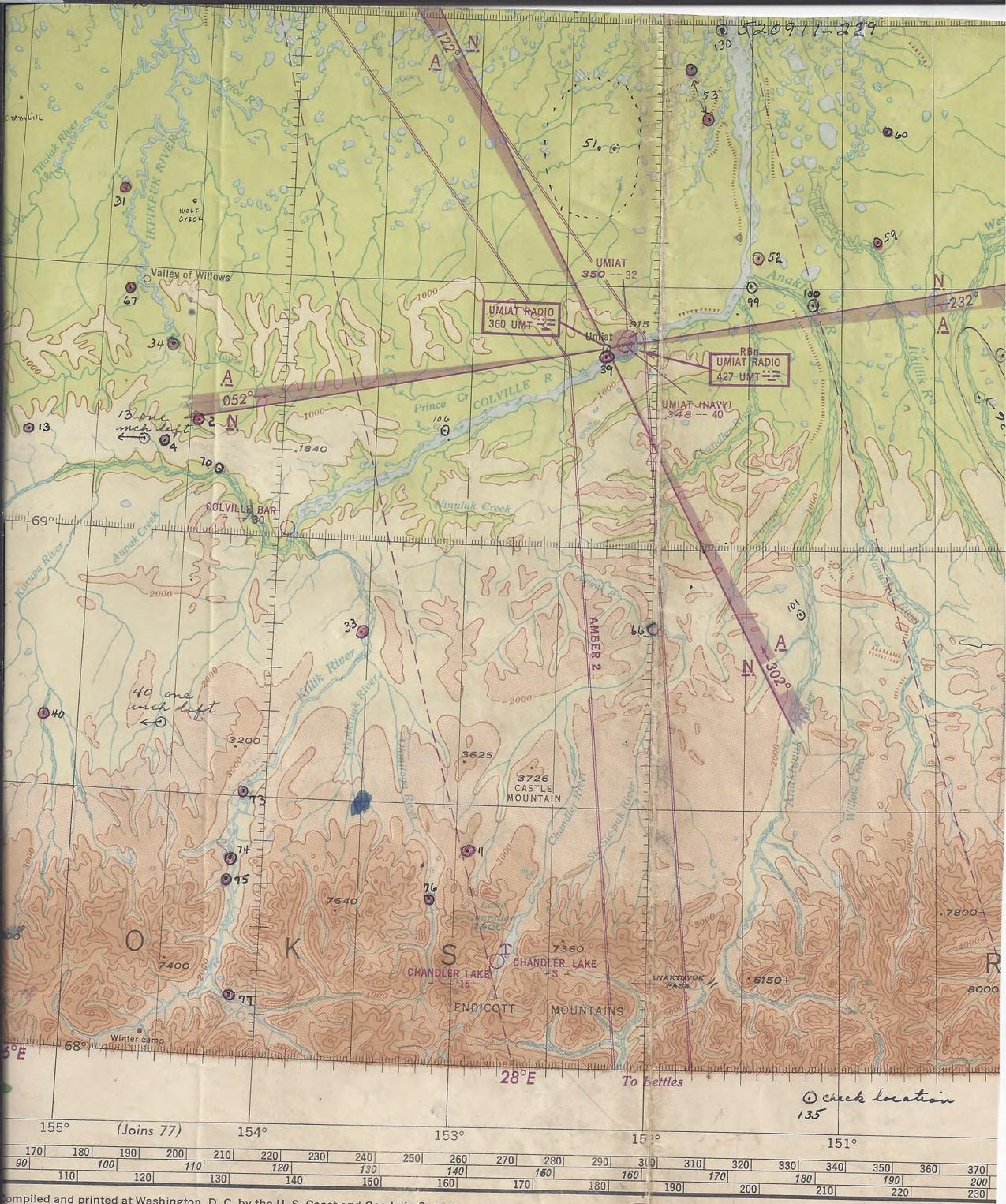
is chart indicate corrections and additions
r attention and notify
DETIC SURVEY, WASHINGTON 25, D. C."

SCALE 1:1,000,000

FIFTH EDITION — FEBRUARY 2, 1949

BROOKS RANGE (63)

ALASKA



Compiled and printed at Washington, D. C. by the U. S. Coast and Geodetic Survey
under authority of the Secretary of Commerce

MARCH, 1946 Revised NOVEMBER, 1948 BASE NO 4

NOTE: It is requested that users of th[e] ... which come to thei[r] ... "THE DIRECTOR, U. S. COAST AND GE[ODETIC SURVEY]

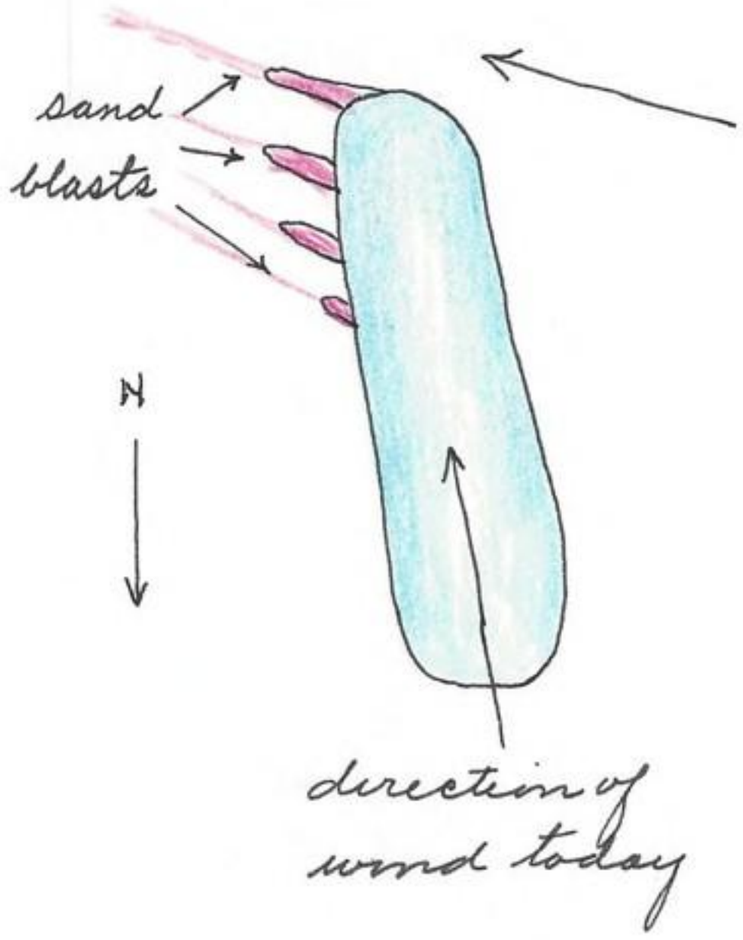
BEECHEY POINT
Beechey Point
ISLANDS
Cross I
McCLURE IS
STOCKTON IS
MAGUIRE IS
Heald Point
Foggy Island
Tigvariak Island
Flaxman Island
Brownlow Point
056°
CAMDEN BAY
Konganevik Point
Anderson Point
Barter I
Arey I
Cabin
BARTER ISLAND RANGE
278 BTI
BARTER ISLAND AF (AUX)
08 L-55
236°
326°
BARTER ISLAND RADIO
296 BTI
RBn
(On request)
Numerous small lakes
Kuparuk River
Sagavanirktok River
Prudhoe Bay
Kadleroshilik River
Shaviovik River
Canning River
Tamayariak R
Okpilak River
Hulahula River
East Kuparuk River
MOUNT WELLER
9922
MOUNT MICHELSON
9239
9131 MOUNT CHAMBERLIN
MOUNT SALISBURY
6900
SHUBLIK MOUNTAINS
6200±
4800±
4700±
5100±
7180±
8400±
7900±
7200
7400±
8700
1600±
Ismel valley
70°
69°
36° E

520912-231

Arctic Research Laboratory, Point Barrow, Alaska

Sept. 12, 1952

Checked in all clothing and cleared with ARCON. Departed Point Barrow for Fairbanks at 2:18 P.M via C47. At 2:30 P.M some snow around edges of lakes. All lakes appear to be open and with only slight evidence of ice in small ponds or blind sections of streams.



direction of wind producing aeolian blasts and ridge, in the same direction beyond. The areas are between 3:50 P.M and 4:05 P.M. Beyond this point ice on small ponds. No snow on tundra. Water high in all places. At 3:05 P.M ice more than 10 minutes ago and white snow on ice of ponds. No snow on tundra as yet. At 3:06 P.M at contact between low coastal plains and Plateau Province. There is a conspicuous diference between the two provinces in that beyond the Coastal Plains the snow covers the ground regardless of elevation of the plateau which at this point is only slightly higher than Coastal Plain. The type of vegetation probably makes the difference between snow cover of the two provinces. From the contact the ground is covered with snow but all features of the tundra can be detected and vegetation elposed above in some places. A river valley will appear without snow although only slightly lower than surrounding hills. Caribou trails about 1 per 3 mills and generally single trails. Arrived Umiat 3:15 P.M The Alnus at Umiat still in green leaves and the willows with a few yellow leaves. The yellow of the willow of last year appears much less intense because they have not changed yellow or are now all off the tree as the hillsides are brownish red with the green of alnus. Departed Umiat 3:55 P.M. Beyond Umiat toward the Brooks Range the cliffs facing SW are bare because of the heat absorbing capacity of the cliffs. As was the case on approach to Umiat, the ground in the broad curved slopes are completely covered with snow without irregularity of tundra showing elcept the dead willows lining the river courses. 4:02 P.M large lakes open, small ones closed and snow completely covering higher rounded knolls. Photo 520912-1a of snow

coverage at our position at 4:02 P.M. No caribou trails, wind mainly from west. At 4:04 Chandler River valley free of snow and vegetation reddish brown with a rare indication of green along certain portions of the river channel. Wind now about ENE as expressed on snow surface. 4:12 P.M definite caribou corridor bending east but probably established before snow. From this point on clouds over the Brooks Range. At 5:13 P.M broad valley of brilliant yellowish red deciduous trees, probably combination of aspen, birch and poplar. Some brilliant red. Photo 520912-1 at 5:18 P.M of this fall color along the meandering Yukon to east. Conifers in the minority and green. 5:29 P.M color shot of aspen hillside. Arrived Fairbanks Municipal Airport at 5:50 P.M.

Fairbanks, Alaska

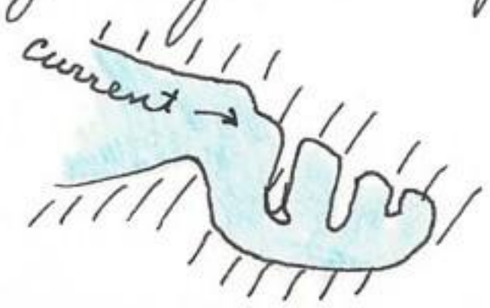
Sept. 13, 1952

Lemmus and Dicrostonyx required more food and water bottles. One of the 9 Lemmus died. The Lemmus are restless and attempt to get out of container. Dicrostonyx still have original food supply and are not moving about in contrast to the excessive activity of Lemmus. All food of Lemmus Consumed. Added grass and lettuce and allowed to run in washing bowl for exercise and water. Met Hall at Fairbanks. This evening at 8:30 P.M reported to MATS terminal to check in baggage and wait air transportation to Great Falls, Montana via Anchorage, Seattle and thence Great Falls. Will depart about 9:30 P.M. Departed Fairbanks, DC6 (C54) 9:30 P.M, arrived Anchorage 11:00 P.M.

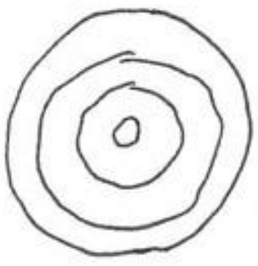
Anchorage, Alaska

Sept. 14, 1952

Departed Anchorage about 1:30 A.M via C54 for McChord Field, Washington over Pacific Ocean route. At 7:25 A.M photos of NE end of Vancouver Island taken between 7:15 A.M and 7:40 A.M. nos 520914-1 to 520714-9 and also movies. This area is worthy of exploration. At the southern end of Vancouver Island observed tremendous increase of timber cutting with complete annihilation of resource. Many fires of native timber burning from result of normal operation. It looks like they are getting all they can before objections are raised. At a bay near Bremerton noted the following segmentation of a bay given as possible explanation



of couse of oriented lakes of Arctic slope. The color changes of vegetation are noticeable in this area with understory shrubs and trees brilliant red, yellow any many, however, green. Arrived Mc. Chord Field at 8:35 A.M. Departed 12:10 A.M (2 hours clock change) for Great Falls, Montana. Photo 520714-10 of Mt. Rainier from north. At one time could see Mt Adams, St. Helens, Mt. Hood, Rainier at one time. Photo 520914-11 of Columbia River and associated country. The change of vegetation from rain forests of the west slope of Cascades and the dry country at this point is abrupt, particularly when travelling by air. One cannot see how these Cascades can control climate so effectively. At 1:15 observed several places in the scablands where the lava domes were eroded, leaving



circular depressions. at 1:40 P.M Photo 520914-12 of lake at Coeur de Alene. Mountains beginning to form in gentle slopes in this area as contrasted to the Columbia River Plains we have just passed. The mountains continue to increase in elevation and compactness most of the way across Idaho, much like the upper Spanish Fork country of Utah. As we approached the eastern part of either eastern Idaho or western Montana the mountains gave way to broad valleys and finally to praire between isolated mountains. The yellow Cheatgrass lake valley or savannas on slopes gave a bright yellow color and suggested influence of praireland of the east. Photo 520914-13 of wheat pattern of stripped yellows and brown plowed fields which seems to be peculiar only to this area. Arrived Great Falls Army Air Base 4:00 A.M. One Lemmus died enroute from Fairbanks. Others doing well. Have fed them lettuce and potatoes to Dicrostonyx. From Great Falls, Montana, continued to Provo, Utah.

Provo, Utah Co., Utah.

Sept. 16, 1952

Photo 520916-1, 520914-2, 520916-3 of soil slide area on Wasatch mountains. (see discription of slides on June 8, 1952 account. These slides have been produced by excessive moisture in soils from heavy winter snows.

52 1013-234

museum Natural History, Univ. Kansas, Lawrence. Kansas

Oct. 13, 1952

Examined Quay material (meretus murus) from Seward Peninsula.

catalogue number	basal length	width zygomatic arch	width glenoid fossae	width lambdoidal crests	width squamosal of zygoma
43382	26.4	14.9	9.6	12	14.5
43381	25.8	14.1	9.4	11.7	13.8
43379	24.9	13.8	9.1	11.3	
43386	25.9	15.2	9.5	11.9	14.3
43385	22.0	11.1	9.4	9.6	11.0
43478	25.6	14.6	9.3	11.9	14.3
43384	23.9	11.1	9.0	10.2	11.2
43473	24.0	13.8	9.4	11.2	13.2
43377	27.9	15.1	9.7	11.8	14.2
43384	23.8	12.3	9.4	10.4	11.9
43378	26.3		9.7	11.8	
43477		11.8	9.0	9.9	10.8
43467	24.0	14.0			
43464	25.1	14.3	9.7		13.7

In comparison of Seward material with Brooke Range the Seward specimens are:

1. Zygoma heavier
2. Entire skull wider
3. Lambdoidal crests, medial crests better developed.
4. Brain case wider
5. Optic operature round in contrast to angular
6. Lateral angle zygomatic arch greater
7. Skin browner than Driftwood specimens.

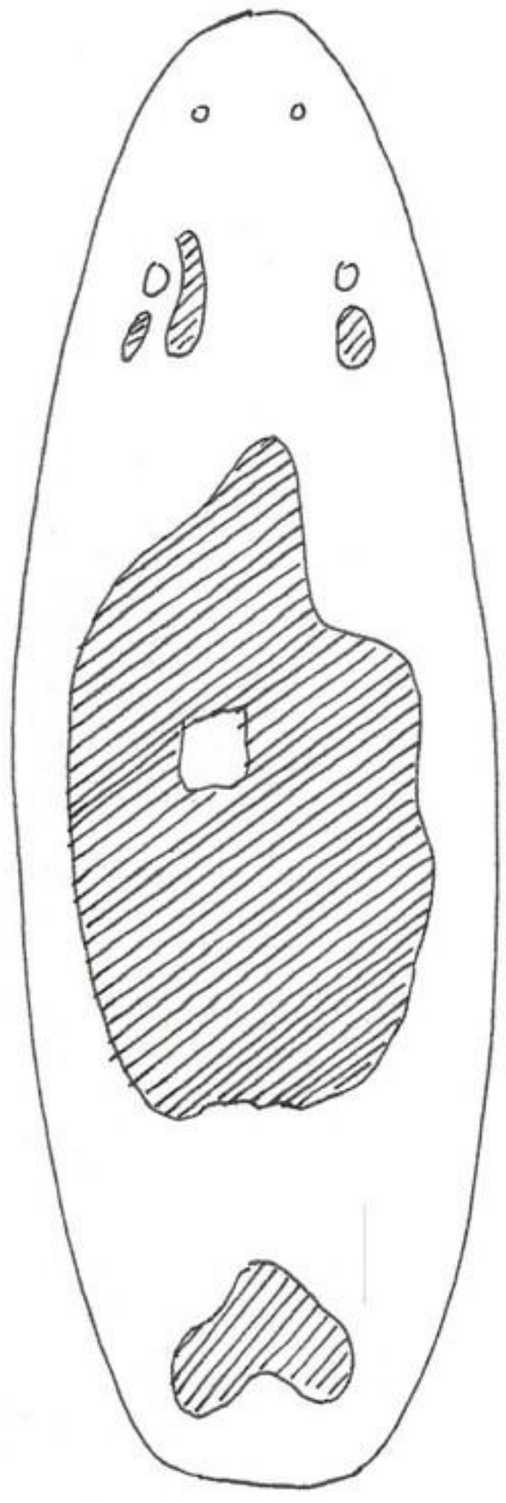
Our specimen 51250 (darkest brown) is not as brown as the Seward Peninsula material but is intermediate.

(see below for Oct 13, 1952) 521124-235

Museum Natural History, Univ of Kansas, Lawrence, Kansas
Oct. 24, 1952

Prepared 2 Lemmus t. alascensis taken at Point Barrow, 150°27'25", 71°23'11"; 3 ft., Alaska on September 11, 1952 and held captive at museum natural History at Lawrence, Kansas until disposed.

521016-1 ♂ Lemmus killed Oct 16, 1952
521018-1 ♀ " " " 18, "
521024-1 ♂ " " " 24, "



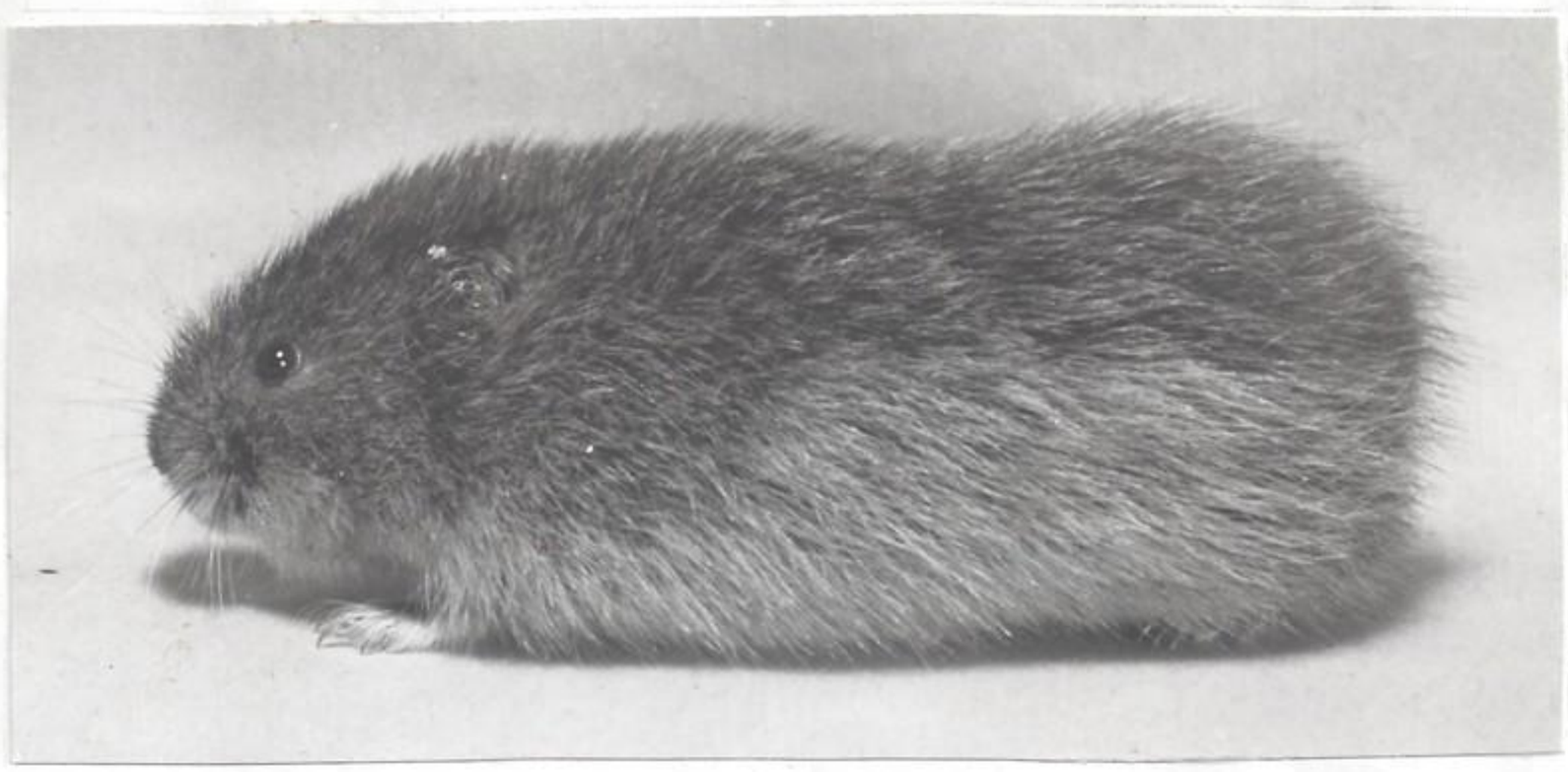
Specimen 521024-1 had the following dorsal molt pattern on inverted skin which matches with hair pattern on normal skin side. This is the only specimen that shows the molt line. No 521016-1, however, shows two molt dots which constitutes the dorsal line. The history of the 9 lemming and 4 Microstonyx is as follows:
Started from Point Barrow with 9 Lemmus & 4 Microstonyx
One Lemmus died Sept. 13 at Fairbanks. One Lemmus died between Fairbanks and Great Falls, Montana Sept. 14, 1952. (see notes of Ed. Campbell for conditions beyond Great Falls as he accompanied them to Lawrence, via Tinker Field, Oklahoma.

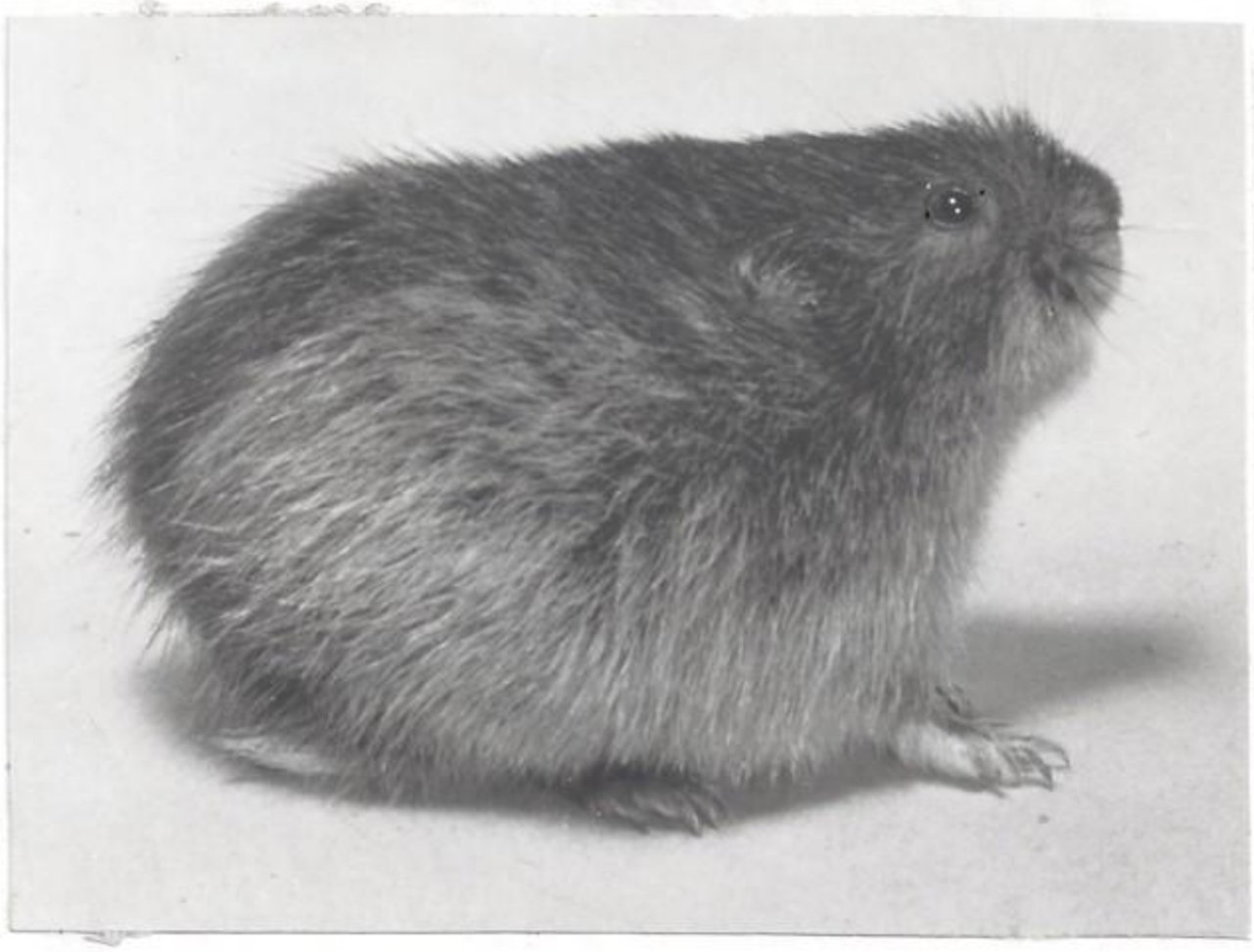
Museum Natural History, Univ of Kansas, Lawrence, Kansas
Oct. 13, 1952

The first noticeable evidence of change of color in leaves was October 11 with a few individual trees red & yellow. The 12th showed considerable change and the 13th rich yellow and red colors. This change has been very abrupt this year perhaps because of an abnormal below freezing temperatures of about a week ago and a dry autumn.

521124-236

October 24, 1952

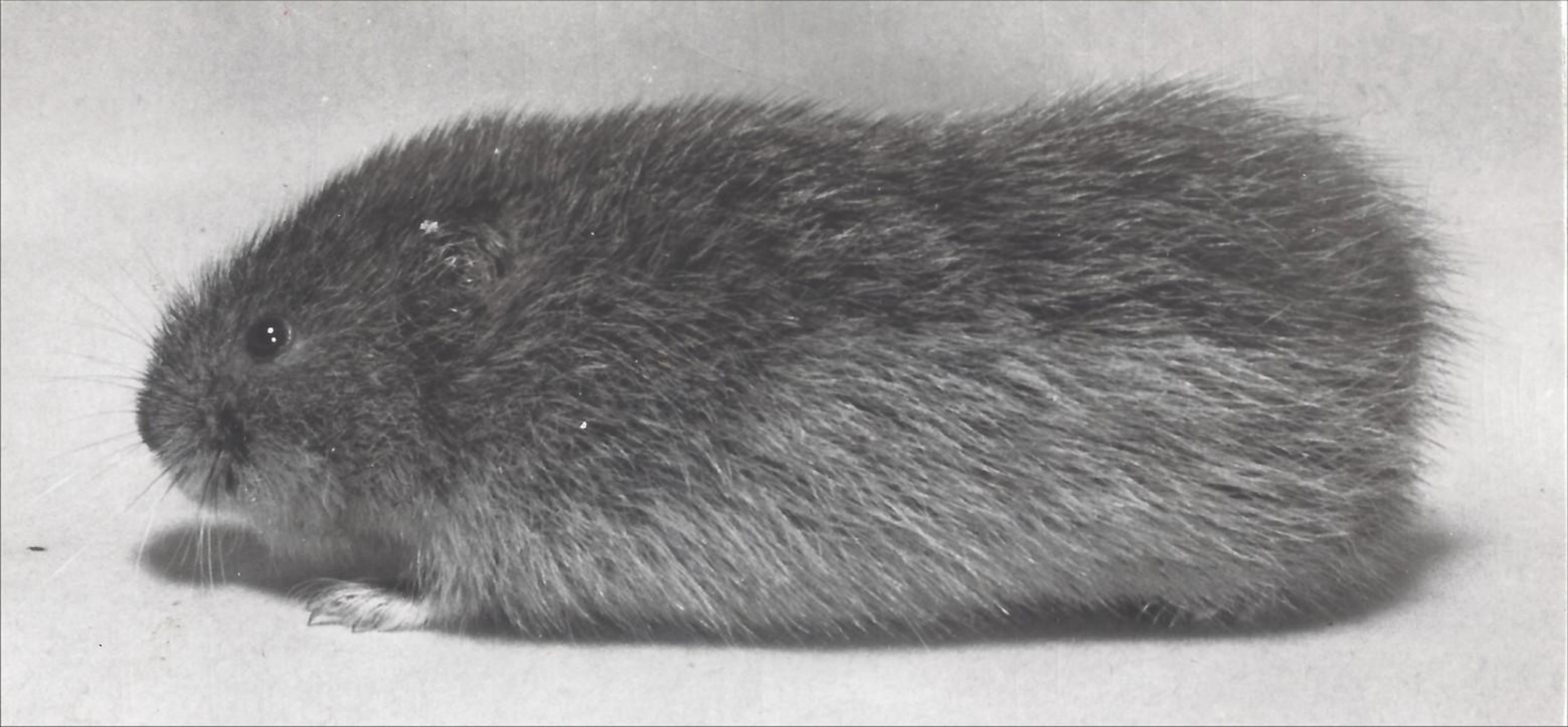


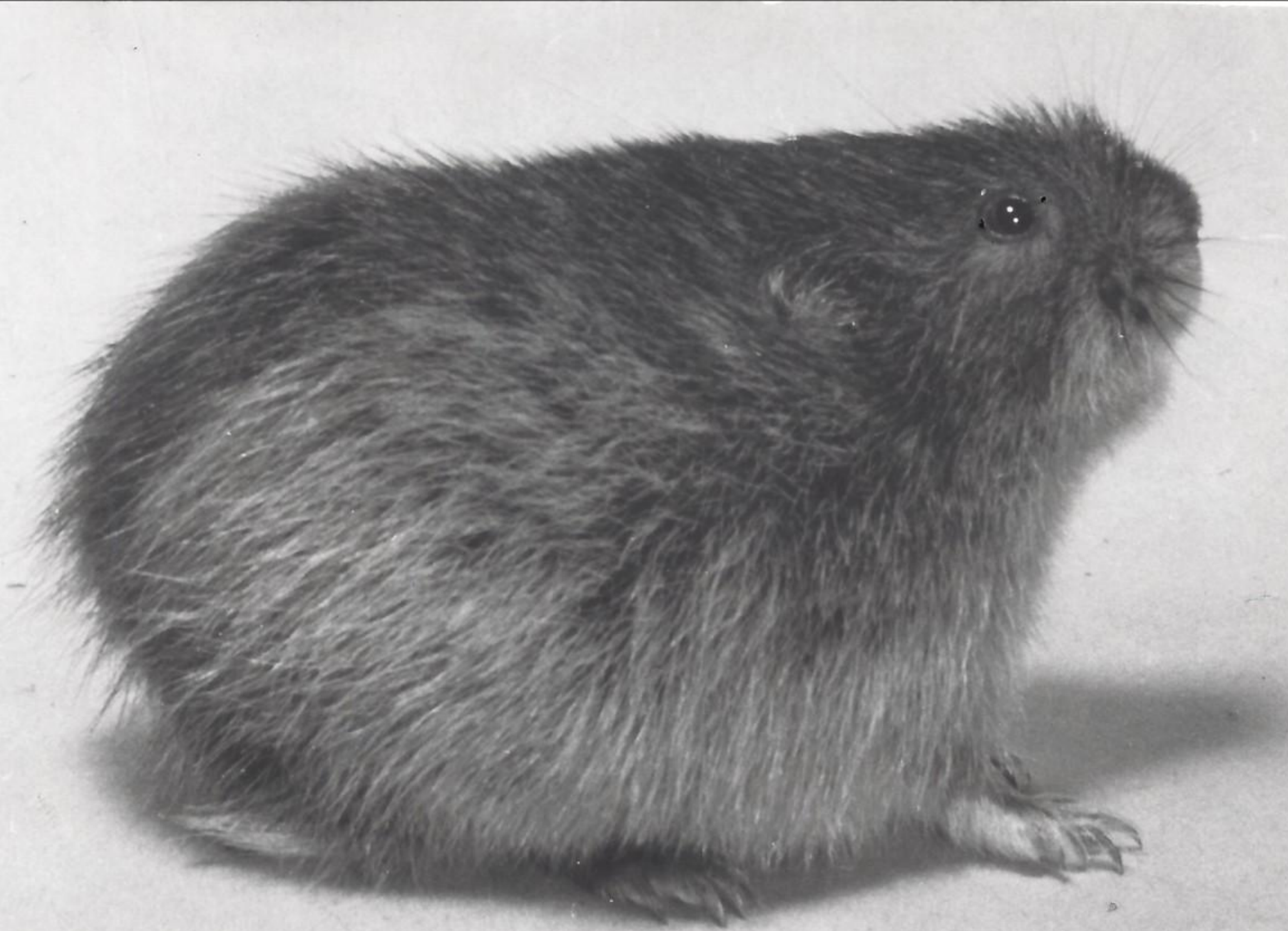


The Lemmus trimucronatus above were collected at Point Barrow on Sept. 11, 1952 (original number 9 Lemmus and 4 Dicrostonyx) and transported to Lawrence (see notes of Oct. 24, 1952. These animals were shipped to:

Dr. Ernest P. Walker
3016 Tilden St.
~~north~~ north West Washington 8
D.C.

Walker photographed these animals and presented me with a copy of the prints. The upper animal is Walkers no 3684 C. The one below is no 3684 A. photograph. Both shots are very characteristic





521124-237

October 24, 1952

adult ♂ young ♂

Lesions in Frontal sinuses →

MUSTELA ERMINEA ARCTICA-

The volume of the braincase of mustela erminea arctica was determined by placing lead shot into braincase and then measuring the volume of the shot in a graduated cylinder and in the weight of the shot. It was apparent that the younger weasels had relatively larger braincase, 20% larger, than the adults. It is not known whether this condition is usual for these species of weasel. If there is not a normal decrease in the skull of the young with growth by internal apposition & growth and absorption on the exterior, some other explanations then must be proposed. One explanation is that there is a differential growth according to the time of year when the young were born or whether they were born during a population high of their principal prey species. Summer growth and good food supply could produce a large animal than winter conditions & scarcity of food. Another explanation might be in the invasion of the smaller form south of the Brooks Range into the territory of the larger form north of the Brooks Range. Such invasion could occur under exceptional circumstances of lack of food or purely on the basis of the extensive wandering.


51552
♂


43855
♂

52 1124-238

Entered in journal Oct 24, 1952

Mammals of the Arctic Slope of Alaska.

by

James W. Bee, Edward H. Campbell, E. Raymond Hall and J. Knox Jones, Jr.

In the summers of 1951 and 1952 when we sampled the mammalian fauna of northern Alaska, we verified the existence there of 41 species (one with two subspecies in the area), belonging to 32 genera of 19 families of seven orders. Twenty-nine of the species are land mammals and 12 are marine mammals (six seals and six cetaceans, that is to say, whales and their allies).

On the Arctic Slope of Alaska--meaning from the crest of the Brooks Range of mountains northward to the Arctic Ocean--there are only a few kinds of mammals, and the numbers of each kind fluctuate widely over periods of three to nine years. The same can be said of the fauna of any part of the Arctic region in comparison with the fauna of the Tropical region.

The actual number of land mammals, say, in an area 25 miles square, is fewer than 17 immediately south of Point Barrow, Alaska, as contrasted with about 55 at Lawrence, Kansas, in the Temperate region, and more than 140 in the Tropical region, immediately adjacent to Panama City, Panama.

Why are there so few kinds in the Arctic region? Continuous cold for a long part of each year so shortens the growing season that there are few kinds of foods readily available and but few places to live and so only a few species can exist. Bats, for example, subsist mostly on insects; but at Point Barrow insects are readily obtainable in only two of the twelve

months and so no bats live there. There are no trees there and consequently no arboreal mammals such as make up a sizable part of the mammalian fauna farther south. There are not even any bushes five to ten feet tall that provide habitat for such mammals as chipmunks and woodrats farther south. The permafrost, several hundred to more than a thousand feet deep, excludes the variety of species that burrow and live in holes in the ground farther south. Lakes and streams, although covering half the surface of the area around Point Barrow, are open only briefly in the short summer and for most of the year are frozen solid; fresh-water mammals, therefore, have no place to live and so the river otter, mink, muskrat and water shrew are missing.

It is only the surface of the ground that is available to mammals, and of course, for a brief period in summer, the upper six to eight inches of soil that thaws out. It seems that the small number of species of mammals is proportional to the small number of habitats; it is correct to say that there are few species because there are few habitats.

The fluctuations in number of individuals in each of several species is great. For example, in a summer when brown lemmings are scarce, a naturalist walking for days on the tundra might see only one or two individuals, or none at all. On the same area a year later a dozen individuals might be seen, and two years later a hundred. Three years later thousands might be seen--four to a dozen at any given instant scurrying to hiding places ahead of the observer, reminding him of dry autumn leaves moving ahead of a strong breeze. The increase is gradual, but gains momentum, over a three year period until the peak is reached. Then, perhaps early in spring, in only one or a few months, the crash reduces the numbers to a fraction of one per cent of the winter population.

The causes? 1) Starvation because all the food has been eaten up. 2) Natural enemies concentrate on the easy-to-catch prey. 3) Disease spreads rapidly because of overcrowding, and flames like a torch to destroy nearly all within reach before the fire burns itself out. One or another of these causes can be detected in any crash and sometimes all three causes operate together. Of course there are other causes, such as floods and cold, depending on the time and place. This gradual build-up in numbers and ensuing sudden crash recur so regularly that the time of the crash and the beginning of the build-up can be predicted accurately two years or more in advance.

A marked tendency to gradual increase and sudden crash is seen in the Temperate region too, but the duration of the period of increase is more variable and many of the upward trends in numbers stop short of the expected peaks. Therefore, the time when a peak will occur cannot be predicted accurately. Consequently the term "cyclic," implying regularity, is less applicable to fluctuations in numbers of individuals of a species, especially in the Temperate region, than was originally supposed and some students, therefore, have used instead the adjective "multiannual." Irrespective of the adjective applied to these fluctuations, they are of lesser magnitude and less frequent in progressively more southern regions until in the Tropical region there is no detectable fluctuation in most species.

Precisely why this fluctuation does not occur in the Tropics is unknown but it is tempting to speculate from the basis of fact that is available. One basis is the number of species of carnivorous mammals and small herbivorous mammals arranged according to life-zones (see Table 1).

Table 1.

Region	Life-zones	Number of smaller herbivorous mammals	Number of carnivorous Mammals	Nature of fluctuations in populations
Arctic region	Arctic Point Barrow	5	7	cyclic
	Hudsonian			
	Canadian			
Temperate region	Transition			
	Upper Austral Lawrence, Kans.	22	15	multiannual
	Lower Austral			
Tropical region	Upper Tropical			
	Lower Tropical Panama City	35	18	none

When the population of any one of the 35 smaller herbivorous species in the Tropical Life-zone begins to increase it may be that the carnivorous species concentrate on that particular prey species because of the ease with which it may be obtained. Because the carnivores are concentrating on only 1/35 of the smaller herbivorous species, the carnivores exert a checking effect that may be sufficient to control the particular species of herbivore.

In the Arctic Life-zone, predation by carnivores is certainly insufficient to stem the increase in numbers of any given species of small herbivore. Were it otherwise these herbivores probably would not reach their peaks at relatively regular intervals. Also, population density of an Arctic carnivorous mammal itself fluctuates more or less cyclically lagging approximately one year behind that of its principal prey species in its increase, peak, and crash. This is evidence that the size of the population of the carnivorous species is actually determined by the size of the population of the prey species instead of vice versa. When the several carnivorous species concentrate in their feeding on the particular herbivorous species of small mammal that is increasing in numbers, the carnivores of the Arctic Life-zone are concentrating on roughly 1/5 of the total population of small herbivores --not on only 1/35 as has been postulated concerning the Lower Tropical Life-zone. Be that as it may, in the Arctic the carnivores do not prevent peaks in abundance of species of small herbivores even if they do so in the Tropical Life-zone. In the life-zones of the geographically intermediate Temperate region the carnivores could be supposed to exert a checking effect on any increases that get underway in the species of smaller herbivorous mammals and the checking effect would then sometimes greatly delay or even prevent

a species of small herbivore there from reaching its peak in population size.

A word of caution is in order here: Because the effect of predation seems to differ so much, according to life-zone, conclusions from studies made of predator-prey relationships in one life-zone cannot be applied safely in another life-zone, but only in the same life-zone where made. We recall the names of some generally careful naturalists who have been careless in this regard.

In any life-zone, but especially in the Tropical Life-zone, there are biological relationships other than predation which may have much to do with stabilizing the population size of species of small herbivores. For example, the larger number of kinds of herbivores than in life-zones polewards, may result in various types of competition between the herbivores themselves. Also, as a general rule, a given species has fewer young per litter in the Tropical Life-zone than it has in a life-zone nearer either pole.

But to return to conditions peculiar to the polar regions--conditions that have influenced the mammals of the Arctic: at Point Barrow there is no sun for a period of more than two months in winter and for a like period in summer the sun shines for 24 hours a day. This would be expected to influence the growth of the mammals and possibly the length of their period of growth. Certainly the continuous sunlight in summer rapidly increases the amount of vegetation that is the staff of life of the native species of small herbivorous mammals.

A climatic factor that may greatly influence mammals of the Arctic Slope is the slight amount of precipitation. At Point Barrow the yearly average is less than five inches, and as a result the layer of snow that

blankets the ground for most of the year is thin. Therefore the snow melts quickly with the advent of warm weather and consequently there is more time for plant growth than would be the case if the snow were deep. More plant growth means more food for the primary consumers, herbivores, which are situated low-down toward the broad base of the food-pyramid. Furthermore, the large herbivore, the caribou, more easily finds its natural winter food --lichens, mosses and other plants--beneath a thin, rather than a thick, blanket of snow. Also the muskox, before it was exterminated in northern Alaska, may have benefited from the thinness of the cover of snow in the same way that is postulated for the caribou but to an even greater degree.

It is noteworthy that there are no species of mammals occurring only on the Arctic Slope itself or in the immediately adjoining oceans.

Of the land mammals only the white fox, Arctic hare, collared lemming and muskox (extirpated in 1858 in Alaska) are confined to the Arctic Life-zone. Of the marine mammals only six live exclusively in Arctic seas.

The land mammals of the Arctic Slope, as would be expected, are adapted, probably by means of natural selection, to live in a cold climate. All have a thick coat of fur in winter to conserve body-heat. The marmot and ground squirrel hibernate in winter and the grizzly bear becomes inactive. Many others in winter seek protection under the snow or in spaces between boulders. The species that remain on top of the snow in winter have remarkably thick coats of hair. The hairs are long, silky, larger at the distal than at the proximal ends, and are strong enough to withstand buffeting by the wind. Also there is a dense growth of underfur. Furred foot-soles protect against the cold and give traction on ice as seemingly do the seasonally enlarged claws of the collared lemming. Reduction in size of ears and tail and increase

in size of body is the rule on the Arctic Slope. The mammal begins winter with a thick layer of fat that insulates the animal and is a source of energy and heat in the long dark winter.

In the brief summer the winter coat is replaced by new hair short and sparse enough to permit the animals to benefit from the sunlight. In summer these mammals seem to be active for more of each 24-hour period than are mammals in temperate regions.

One piece of new information resulting from our study is that some of the smaller mammals, for example, the brown lemming (Lemmus trimucronatus), have six different pelages in one year (July 1 to June 30). There are two molts. The greater number of pelages than of molts is caused by a new crop of hair growing into an existing crop of hair.

In conclusion, it is profitable to compare briefly the fauna of the northern Arctic Slope of Alaska with the fauna of southern Arctic alpine areas. In general features the tundra on the Arctic Slope resembles that on the high Arctic alpine areas in temperate regions, but wide range and extremes of temperature within the daily cycle in Arctic alpine areas versus uniformity in temperature on the Arctic Slope is a fundamental difference. Furthermore, permafrost in the soil on the Arctic Slope keeps water on the surface of the ground and permits extension of sedges and grasses onto many slopes that, in alpine areas, are dry and generally well drained. Permafrost does not, however, exclude mammals from living on the tundra of the Arctic Slope. The light fall of snow there is drifted by winds of high velocity which expose part of the tundra. Mammals are able to move about in winter on the Arctic Slope while in the Arctic alpine areas, say, in the United States, the deep snow excludes the larger and many of the smaller mammals.

The foliose lichens attain their optimum development on the Arctic Slope and seldom reach an equivalent stage of development in the Arctic alpine areas, because of the differences in the quality of the climate in the two regions. The presence or absence of mosses and lichens has less effect on mammals than does the presence or absence of sedges and grasses. Mosses and lichens form a protective layer in which small mammals build runways and nest, but this layer decomposes less on the Arctic Slope than in the Arctic alpine areas to the south.

The Arctic Slope is a broad and continuous ecotone between the coniferous forests and the more northern lands that support principally lichens and mosses. This ecotone is characterized by great expanses of terrain whereas in the Arctic alpine areas this ecotone, because of the physiography of the mountains, is generally of limited extent and in many places occupies a zone less than a hundred feet in vertical extent on the side of the mountain. The major part of the ecotone, made up by the Arctic Slope, is far removed from coniferous forests and there is less seasonal movement of mammals from the slope to the forests than there is from the Arctic alpine areas to coniferous forests. The differences enumerated above permit the survival of more kinds and numbers of mammals on the Arctic Slope than on the Arctic alpine areas farther south.

521124-247
[see Jan. 1953 for date of publication]

K.U. Zoologists Explore The Arctic

THE LAND above the Arctic Circle is not eternally covered with ice and snow, nor is it the bleak, barren area most of us imagine.

For three months out of the year the ice and snow melt and the ground thaws out a bit. But even with the sun shining 24-hours a day the ground thaws only six to eight inches deep. This is enough to allow grasses and mosses to grow and the tundra blooms under the warm midnight sun. Under this thin carpet of vegetation the ground is frozen solid to a depth of hundreds of feet.

Unexplored Country

Into the unexplored country of northern Alaska for the past two summers, parties from the K.U. Museum of Natural History have penetrated the flat, lake-dotted region to collect specimens of the native wildlife and to observe the habits of animals from mice to moose.

The two expeditions were headed by James M. Bee, assistant instructor in Zoology. In the summer of 1951, J. Knox Jones, Jr., another graduate student, was an assistant and last summer Edward G. Campbell, a senior in Zoology, assisted.

During the two summers, Bee and his two companions covered an area 1,000 miles long and 200 miles wide. In this region, more than twice the size of the State of Kansas, the K.U. men observed and trapped some 2,000 mammals.

The object of the expedition was to gather facts on animal life to be written up in a manual for the government. Because K.U.'s mammalogy department has an outstanding record in research on animal life, it was entrusted with the work in northern Alaska.

Flown Into Interior

The main base was the Arctic Research Laboratory of the United States Navy at Point Barrow. From there Bee and his companions were flown into the interior by planes equipped with pontoons. The zoology instructor explained that nearly sixty per cent of the coastal plain is water. Rivers and lakes abound, and since there are no roads, flying is about the only way you can get around in summer.

A bush plane would drop the K.U. men down on a convenient lake and pick them up again in a week. From these lakeside camps they could work the surrounding country, trapping animals and observing their habits. When the tundra is covered with mosses and grasses it is as soft as a Persian rug, Bee said. The vegetation is dense during the summer months, and the weather can be warm and pleasant. The temperature sometimes rises as high as 90 degrees F.

The Arctic Slope of Alaska lies north of the timber line. The trees which do grow are rarely more than a foot high. The average height is six to eight inches. Bee remarked that he did see even one tree that was knee high near Point Barrow.

Animals in remote parts of the region are unafraid of man. Bee said he once saw seven grizzley bears at one time, and they all just stood there looking at him wondering what kind of "two-legged caribou" he could be.

An Arctic wolf trotted up to the campsite one day and stood looking at Campbell. The wolf was so unafraid that when Campbell fired a rifle at him and missed, the wolf just backed off a little. The wolf's curiosity was the death of him. Campbell had time to shoot twice more. The skin and skeleton will eventually make a valuable study specimen in the research collection.

Bring Back Lemmings

Perhaps the best known animal the explorers brought back is the lemming. This small Arctic rodent is related to the common meadow mouse of the United States and weighs approximately a quarter of a pound. In addition to many dead specimens, the zoologists brought back seven live lemmings.

Because the lemmings are unaccustomed to the heat of temperate latitudes, their cages were packed with ice to keep the animals alive en route to Lawrence. Dr. E. Raymond Hall, Director of the Museum who joined the expedition for the last three weeks of the summer, said this was the first time live lemmings have been brought this far south.

The lemmings were brought back alive so that Richard Phillip Grossenheider, the noted animal artist, could draw them from life. Mr. Grossenheider's pictures will be used to illustrate the manual being written by Dr. Hall and Mr. Bee. Two of the lemmings have since died, two have been given to the National Zoological Park in Washington, D.C., and the remaining three are still at K.U.

Explode Legend

Contrary to popular legend the lemmings do not habitually jump into the Arctic Ocean and swim out of sight of land and drown. There are migrations of lemmings to be sure, but these are made when their food and protective cover is exhausted. Then the lemmings migrate, as often as not away from the sea as toward it. The lemming population increases and declines in regular cycles. Right now the lemming population is at a high point, and Jim Bee predicts that it will take a sharp drop next year. This prediction is based on known factors. When the lemming population

A LAND OF RIVERS AND LAKES, the area in Northern Alaska above the Arctic Circle, shakes off its coat of ice and snow when the sun shines 24 hours a day. Seen above is a portion of the Brooks Range which forms the great divide of Alaska. The almost treeless tundra is covered with a thick carpet of mosses and grasses which supports a suprisingly large animal population. In the background are snow capped mountains with rivers of ice sliding down their sides. Jim Bee, K.U. zoologist and leader of the two-man expedition, named several mountains after his wife and children.

becomes so large that it eats off the vegetation, it will become weakened by hunger and subject to disease. Natural enemies, such as the wolf and weasel, will catch many of them, and most of those remaining die of disease. When he left northern Alaska, Bee estimated that the lemmings had eaten sixty per cent of the grass. Next spring the remaining grass under the snow will have been eaten and the cycle of starvation and disease he expects will depopulate the region of lemmings.

Capture Rare Mammals

Among the specimens brought back were two rare arctic mammals. Resembling the woodchuck, this animal is called the sic-sic-puk and in books is named hoary marmot. Highly prized among the Eskimos because its thin, pliable hide and thick fur makes the best parkas, the sic-sic-puk is difficult to trap. If he becomes frightened he goes into his hole and hides for the rest of the day, Dr. Hall says. It takes a lot of patience to catch a sic-sic-puk, and Dr. Hall explained that Bee has just the kind of patience it takes to capture a couple.

Eskimos are about as scarce in most of this region as trees. The native population has decreased in the area as a whole. Some have moved to the cities of Alaska where living is easier. Some 1,200 live near Point Barrow, and a few hundred more live at scattered points along the Arctic Ocean. Seventy live about 200 miles inland at Anaktuvak Pass in the Brooks Range.

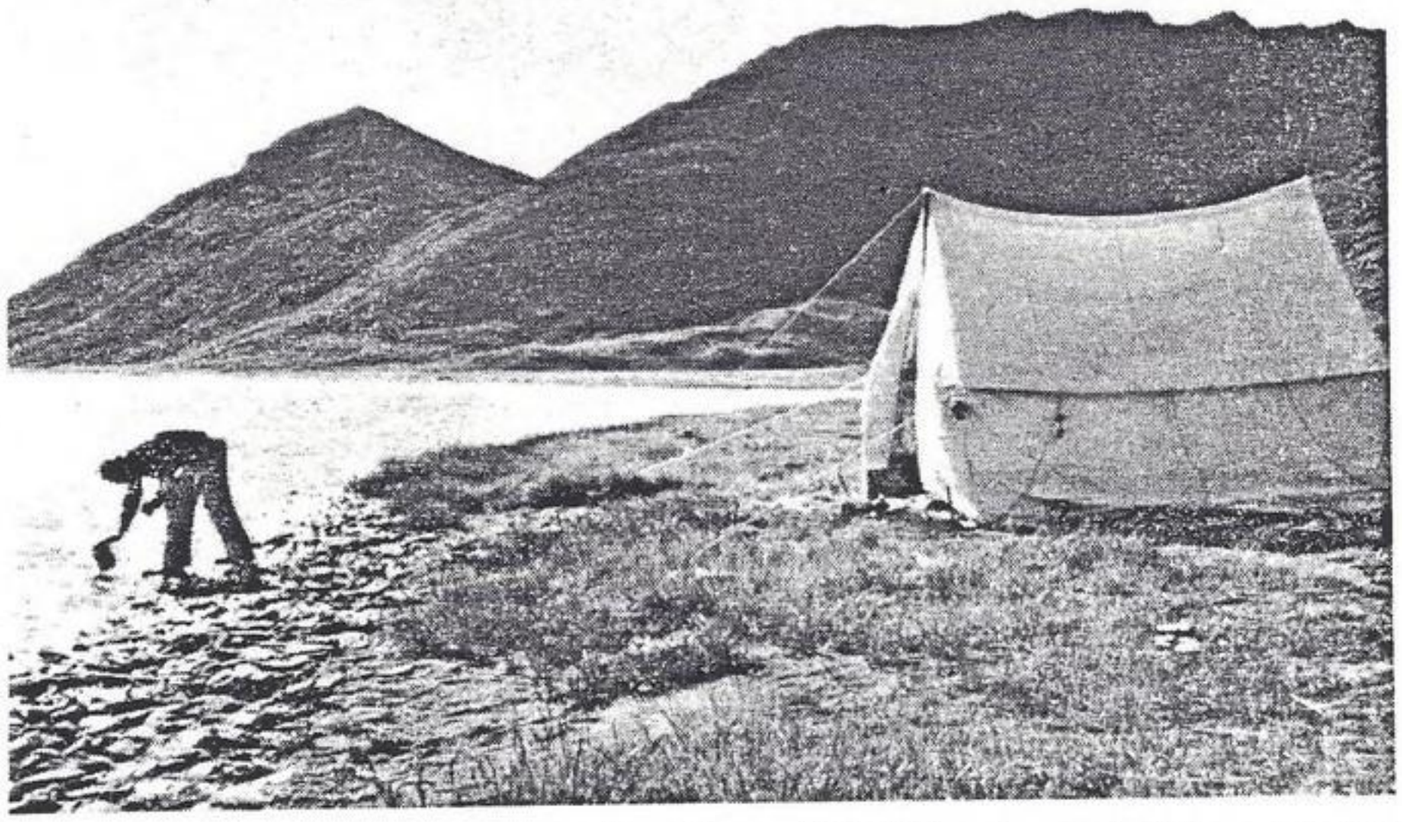
Names Mountain Peaks

The Brooks Range runs east and west and forms the great divide of Alaska. Rivers north of the Range flow into the Arctic Ocean, and those south drain into the Pacific. Much of the Brooks Range is unexplored, and Bee named mountain peaks after his wife and three children.

Unlike other expeditions, the K.U. party did not have any "adventures" in this far off land. Dr. Hall said that "Expeditions from the K.U. museum should not have adventures because adventures usually result from careless preparation or from persons taking unnecessary chances."

The nearest thing the field party had to an adventure took place when the weather closed in and airplanes were unable to fly the men out for five days. They ran short on food, but Bee said they were able to catch plenty of fish. He remarked that it was just like fishing in a hatchery. All they had to do was throw in a hook and pull out "a big one."

However, the area is not a potential fisherman's paradise because the growth of the fish is slow and intensive fishing would soon deplete the supply.



LAKESIDE CAMPS LIKE THIS were the bases from which K.U. staffers worked the surrounding country trapping specimens for the Museum of Natural History. J. Knox Jones, graduate student from Lincoln, Neb., dips a pail of ice cold water from the glacier fed lake. Bush planes landed the K.U. explorers on the lakes and picked them up periodically. Airplanes are the only practical method of travel in this unsettled country where bears, caribou, and wolves are the largest in habitants in this land of the midnight sun.

Learning what kinds of mammals are in Northern Alaska and then learning the geographic distribution of each kind provides basic information necessary for efficient follow-up studies on animal borne diseases transmissible to man. Such field trips also furnish economic information on fur-bearers. It was because of the scientific value of the K.U. zoological work that the government agreed to lend its support for the two arctic expeditions.

University of Kansas

521124-249

ADDENDA- 1952

Nov. 24, 1952

The following 250-264 are identifications of Alaskan plants collected by James W Bee. Dr. Bertrand Harrison identified or arranged for the identification of this collection. Entered this date Nov. 24, 1952

521124-250

Jan. 20, 1953 (addenda)

SERVICE LOT. NO. 140

Plants submitted by James W. Bee

Identified by: Bertrand F. Harrison

	520721-9	Arctagrostis latifolia (R.Br.) Griseb.
·	520712-5	? Poa glauca Vahl.
·	520712-6	Poa glauca Vahl.
·	520712-7(a)	Arctagrostis latifolia (R.Br.) Griseb.
·	520712-7	Bromus pumpellianus Scribn.
·	520712-8	Calamagrostis purpurascens R.Br.
·	520712-9	Festuca scabrella Torr.
·	520712-10	Trisetum spicatum (L.) Richt.
·	520712-14	Trisetum spicatum var. molle (Michx.) Beal
·	520717-4	Trisetum spicatum var. molle (Michx.) Beal
·	520717-5	Poa glauca Vahl
Entered gp. ·	520717-6	Bromus ~~pumpellianus var. twoodyi Scribn.~~ arcticus Shear.
·	520717-7	Hierochloa alpina (Swartz.) Roem. & Schult
·	520717-8	Poa glauca Vahl (?)
·	520721-4	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer & Schreb.
·	520721-6	Arctagrostis latifolia (R.Br.) Griseb.
·	520721-15	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer & Schreb.
·	520721-16	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer & Schreb.
·	520730-1	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer & Schreb.
·	520730-2	Arctagrostis latifolia (R.Br.) Griseb - approaches
·	520730-3	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer & Schreb approaches C. purpurascens.
·	520730-4	Poa arctica R.Br.
·	520730-7	Hierochloa alpina (Swartz) Roem & Schult.
·	520730-12	Hierochloa alpina (Swartz) Roem & Schult.
·	520730-13	Poa arctica R.Br. (?)
·	520730-14	Calamagrostis purpurascens R.Br.
·	520808-9	Trisetum spicatum var. molle (Michx.) Beal
·	520808-10	Poa arctica R.Br.
·	520809-15	Poa arctica R.Br. (?)
·	520809-17	Hierochloa alpina (Swartz) Roem. & Schult.
·	520809-18	Arctagrostis latifolia (R.Br.) Griseb.
·	520809-20	Alopecurus alpinus J. E. Smith
·	520809-27	Festuca ovina L.
·	520809-28	Trisetum spicatum var. molle (Michx.) Beal
·	520809-30	Poa arctica R.Br.
·	520812-1	Arctagrostis latifolia (R.Br.) Griseb.
·	520812-2	Poa arctica R.Br.
	520828-13	Poa

1952 Collection - other than grasses

· 520812-4 Taraxacum lacerum Greene
· 520814-3 Dryas octopitata L.

Identified to genus only

· 520721-9a (?) Poa (1951-or 1952 ?)
· 520712-13 Eriophorum
· 520721-7 Luzula
· 520721-13 Luzula
· 520730-5 Luzula
· 520730-10 Eriophorum
· 520809-13 Eriophorum
· 520809-22 Luzula
· 520809-26 Juncus
· 520814-1 Fern
· 520814-2 Empetrum (?.) sterile
· 520816-1 Fern

Specimens of the genus Carex

510820-3
510820-25
520712-1
520712-2
520712-3
520712-4
520712-11
520712-12
520712-15
520717-3
520721-5
520721-5a
520721-10
520721-11
520721-12
520730-6
520730-8
520730-9
520730-11
520808-8
520809-14
520809-16
520809-19
520809-21
520809-23
520809-24
520809-25
520812-3

The following numbers have been identified to genus:

510726-8	Eriophorum
510726-16	Carex (?) sterile
510728-8	Poa
510731-6	Luzula (confusa Lindberg (?))
510802-10	Juncus
510820-9	Calamagrostis sp. florets all shed
510828-10	Juncus
510820-11	Carex (?) sterile
510828-18	Poa

The following numbers are all species of the genus Carex.

510726-2	510820-1	510820-37
510726-4	510820-4	510828-11
510726-5	510820-5	510828-12
510726-17	510820-10	510828-14
510726-18	510820-14	510828-17
510726-19	510820-17	510904-107
510731-3	510820-19	510904-108
510731-5	510820-20	510904-110
510802-4	510820-21	
510802-5	510820-26	
510802-6	510820-28	
510802-7	510820-34	
510802-8	510820-35	
510802-9	510820-36	

UNIVERSITY OF KANSAS
MUSEUM OF NATURAL HISTORY
LAWRENCE, KANSAS

January 25, 1953 (addenda)

Dr. Bertrand F. Harrison
Department of Botany
Brigham Young University
Provo, Utah

Dear Bertrand:

Thank you for the identification of the Alaskan material and may I pay tribute to your extraordinary knowledge of grasses and your ability to get the job done. I know only too well the long hours and effort you must have spent in working up this list and I only hope that I can someday repay you for this kindness and service.

As you know, my first impressions of the ecology of Arctic Alaska were as chaotic as a rag bag with all the bewildering tangles and overlapping of plant communities. The problems just seemed too astronomical for me to phathom, however, with your help on the identification of these plants I am finding more and more order in the plant-animal relationships. It is really surprising how each species of mammals and plant actually occupy rather restricted ecological niches in what would superficially be considered a heterogeneous assemblage.

This Alaska information will tie in with the data which I have been gathering on the microtine-grass-sedge relationships from 18 midland states and already some light is beginning to shine upon the partial solution of the evolution and disperal of both the microtines and the grasses and sedges. Incidently, the grasses from Wyoming and vicinity which you question about are all taken from an abrupt ecologial contact in an critical geographical area between a mountain and a great plains form of Microtus, and to that extent I thought that the grasses and sedges would be of particular significance as possible range extensions.

As to the disposition of the plants, it is my desired that you:

1. Keep all Alaskan material.
2. If convenient, return to me from the Wyoming and vicinity areas only those duplicate specimens which do not add to the geographic additions to your herbarium.

This leaves the problem of the mosses and lichens. I already have some identifications of the dominant ones of the Arctic communities and as they appear to be only secondary to community preference by most mammals are not considered as important as the grasses and Carexes. Could we leave it this way? Keep all mosses and lichens and send me the names of only those which can be confeniently identified, say, at ten feet thru a pair of smoked glasses. In other words I do not want you to go to any further trouble and time to identify them at this time, but if by chance some student comes along in the future in your department and is interested in,and can gain some experience in working with these plants, I would be interested in a listing. I hate to say 'throw them away' as some of them are firsts and come from areas that have been visited by whiteman for the first time. I have another large box of these mosses and lichens from the eastern segment of the Brooks Range and which I am taking the liberty in sending to you without your formal acceptance. As you well know, they can also be used for insulation or chinking cracks

UNIVERSITY OF KANSAS
MUSEUM OF NATURAL HISTORY
LAWRENCE, KANSAS

of old buildings to keep the winter blasts from entering!

Our report on the mammals of the Arctic Slope is progressing according to schedule and should be ready for publication by June or this year. I Have just finished curating 2500 mammal specimens and as the life history work is about finished will be able to put full time on the taxonomic section. This chance to work in the Arctic has been most profitable as I have not only gained a first hand idea of some of its problems but at the same time have made 40 or 50 Arctic contacts with individuals of similar interests. I only hope that after I finish at KU I will heve the opportunity to continue on in this type of work.

As I opened your last letter between the mail box and my office I must have unknowinly dropped the printed label which you enclosed. Could you send me another one.

Thank you again and best regards to you and your family.

Sincerely
James Lee

PS. Have you had a chance to appraise Sid's new book on cytology?

255

521124-255

Nov. 24, 1952

BRIGHAM YOUNG UNIVERSITY

PROVO, UTAH

inserted from March 10, 1953

March 10, 1953 (addenda)

BOTANY DEPARTMENT

PLANTS OF THE ARCTIC SLOPE OF ALASKA

Office of Naval Research and the University of Kansas Expedition.

Coll. by: James W. Bee

Ident. by:

James Bee
Museum of Natural History
University of Kansas
Lawerence, Kansas

Dear James,

I thoroughly enjoyed reading you letter. If I could write such interesting letters I'm sure I would be a better correspondant than I am.

I am enclosing the labels I promised you before. I am sure that it was I who dropped the labels on the way to the mailbox.

We "identified" some of your carexes but this genus is so little provided with distinctive taxonomic characters that one does well to recognize near neighbors, let alone those from the country that specializes in the carex. ~~So~~ I finally sent them to Fredrick J. Hermann who is a Carex specialist in the division of Plant Exploration and Introduction. But to my surprise, he passed too, and in turn sent them to Marcel Raymond in Canada who agreed to identify them, but so far I have not had any return from them. Dr. Hermann identified some of the Juncuses. These identifications are given below.

I have just made a deal with Dr. W. A. Weber of the University of Colorado who is a lichens specialist, to identify the lichens. He tells me that he has recently worked on a group of lichens from the Brooks Range. I wonder if it was someone from the same party who sent them to him.

As in the case of the Carexes I think these collections are too important to be intrusted to an amateur. I will send you the identifications as fast as I have anything to send.

Yours truly,

Bertrand F. W.

520721-7	Luzula confusa Lindeb.
520721-13	L. rufescens Fisch.
520730-5	L. confusa Lindeb.
520809-22	L. nivalis var. latifolia (Kjellm.) Sam.
520809-26	Juncus castaneus Sm.

521124-256

nov-24, 1952

BRIGHAM YOUNG UNIVERSITY

PROVO, UTAH

Botany Department

Inserted from April 1, 1954 (addenda)

James W. Bee
University of Kansas
Office of Naval Research
University of Kansas Expedition
Lawrence, Kansas

Dear James:

Finally after this long period of time I have some further identifications to send to you. The sedges of the genus Carex are very difficult to identify so I hesitated to undertake these on my own. We have a man here, Mont Lewis, who is in charge of training forest rangers of Region 4 who has been working for a number of years on the Carex of the Intermountain region. We first of all had him look them over and he came to some tentative identifications but had some reservations. I then sent the Carex to Dr. F. J. Hermann of the U. S. National Herbarium who is an outstanding authority on Carex of the United States but he too passed and said that for these Arctic specimens he felt too many reservations to undertake their identification and he sent them on to Marcel Raymond of the Montreal Botanical Garden who has worked some time on Arctic Carices. I have just received his identifications and I am sending them along.

I have recently sent our Poas to Dr. David D. Keck, Curator of the New York Botanical Garden who is monographing the genus Poa. I sent along a number of your specimens about which I had some questions and one which I had not identified beyond the genus. He confirmed all of the identifications except one which I am noting below. The other names I am including along with the previously undetermined one.

I have also sent a number of grasses recently to Jason R. Swallen, Senior Agrostologist at the U. S. National Herbarium, and included some grasses of yours for checking. I will report them as soon as I hear. I keep getting reassuring letters from W. A. Weber who has been working on your lichens. He says they are all identified but he has sent some of your specimens of Cladonia to a specialist for checking.

By the time you get all of these identifications in, the ecological situation in Alaska will probably have evolved into something different, but then we will at least know what it was. We are most grateful for these specimens. They have made a great addition to our Herbarium and represent a region in which we are very much interested.

Sincerely yours,

Bertrand F. H.

Bertrand F. Harrison

BFH·vg

521124-257

PLANTS COLLECTED BY JAMES BEE

Identified by Marcel Raymond

510726- 2	Carex lugens Holm.
510726- 4	Carex aquatilis Wahl.
510726- 5	Carex lugens Holm.
510726-17	Carex aquatilis X C lugens
510726-18	Carex physocarpa Presl.
510726-19	Carex aquatilis Wahl.
510731- 3	Carex misandra R. Br.
510731- 5	Carex misandra R. Br.
510802- 4	Carex aquatilis Wahl.
510802- 5	Carex aquatilis Wahl.
510802- 6	Carex aquatilis X C lugens
510802- 7	Carex misandra R. Br.
510802- 8	Carex lugens Holm.
510802- 9	Carex misandra R. Br.
510820- 1	Carex aquatilis Wahl.
510820- 3	Carex lugens Holm.
510820- 4	Carex lugens Holm.
510820- 5	Carex lugens Holm.
510820-10	Carex aquatilis Wahl.
510820-14	Carex physocarpa Presl.
510820-17	Carex lugens Holm.
510820-19	Carex lugens Holm.
510820-20	Carex aquatilis Wahl.
510820-21	Carex aquatilis Wahl.
510820-25	Carex lugens Holm.
510820-26	Carex Kelloggii W. Boott
510820-28	Carex lugens Holm.
510820-34	Carex aquatilis Wahl.
510820-35	Carex aquatilis Wahl.
510820-36	Carex lugens Holm.
510820-37	Carex podocarpa R. Br.
510828-11	Carex canescens L.
510828-12	Carex Kelloggii W. Boott
510828-14	Carex aquatilis Wahl.
510828-17	Carex aquatilis Wahl.
510904-107	Carex aquatilis Wahl.
510904-108	Carex Kelloggii W. Boott
510904-110	Carex lugens Holm.
520712- 1	Carex membranacea
520712- 2	Carex lugens Holm.
520712- 3	Carex aquatilis Wahl. var. stans (Drejer) Boott
520712- 4	Carex lugens Holm.
520712-11	Carex consimilis Holm.
520712-12	Carex aquatilis Wahl.
520712-13	Eriophorum angustifolium Honckn.
520712-15	Carex aquatilis
520717- 3	Carex podocarpa R. Br.

520721- 5	Carex aquatilis Wahl.
520721- 5(a)	Carex lugens Holm.
520721-10	Carex lugens Holm.
520721-11	Carex physocarpa Presl.
520721-12	Carex lugens Holm.
520730- 6	Carex lugens Holm.
520730- 8	Carex aquatilis Wahl.
520730- 9	Carex physocarpa Presl.
520730-10	Eriophorum angustifolium Honckn.
520730-11	Carex lugens Holm
520808- 8	Carex montanensis Bailey
520809-13	Eriophorum Scheuchzeri Hoppe.
520809-14	Carex podocarpa R. Br.
520809-16	Carex aquatilis Wahl. var. stans (Drejer) Boott
520809-19	Carex misandra R. Br.
520809-21	Carex podocarpa R. Br.
520809-23	Carex podocarpa R. Br.
520809-24	Carex membranacea Hook.
520809-25	Carex lugens Holm.
520812- 3	Carex podocarpa R. Br.

PLANTS IDENTIFIED BY DAVID D. KECK

510728- 8	Poa arctica R. Br.
510820-15	Poa arctica R. Br. viviparous form
510828-18	Poa alpigena (Fr.) Linden
520717- 5	Poa glauca Vahl.
520717- 8	Poa glauca Vahl.
520721- 8	Poa arctica R. Br.
520730-13	Poa glauca Vahl.
520809-15	Poa arctica R. Br. toward Poa glauca Vahl.
520809-30	Poa arctica R. Br.

521124-260

BRIGHAM YOUNG UNIVERSITY

PROVO, UTAH

[nov. 24, 1952]

inserted from
August 14, 1954
(addenda)

BOTANY DEPARTMENT

Mr. James W. Bee
Student Housing
University of Kansas
Lawrence, Kansas

Dear James:

I am inclosing a list of identifications of your most excellent collection of lichens. We have them all put up in packets and nicely labeled. Already we have had one man look them over and express his interest in them. He is making a study of plant distribution and migration based on Alpine lichens.

I sent a number of your grasses to the U. S. National Herbarium for checking so that I might have some questionable specimens checked and have someone besides myself see the plants. The following numbers were identified by the name I sent you.

510731-8	Arctagrostis latifolia (R. Br.) Griseb.
510828-9	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Scherb.
520712-7(a)	Arctagrostis latifolia (R. Br.) Griseb.
520721-4	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Scherb.
520721-14	Arctagrostis latifolia (R. Br.) Griseb.
520730-1	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Scherb.
520730-3	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Scherb.
520712-8	Calamagrostis purpurascens R. Br.
520730-7	Hierochloa alpina (Swartz) Roem. & Schult.
520809-28	Trisetum spicatum var. molle (Michx.) Beal

The following two numbers were changed:

520717-6	Determined as Bromus arcticus Shear. instead of Bromus pumpellianus var. tweedyi Scribn.
510820-6	Determined as Festuca altaica Trin. instead of Festuca scabrella Torr.

inserted 8/14

The following numbers are identifications of plants which I did not previously identify:

510728-5	Arctophila fulva (Trin.) Anderss.
510728-6	Arctophila fulva (Trin.) Anderss.
510802-11	Arctophila fulva (Trin.) Anderss.
510820-12	Arctophila fulva (Trin.) Anderss.
510820-22	Arctophila fulva (Trin.) Anderss.
510820-30	Calamagrostis neglecta (Ehrh.) Gaertn. Meyer and Scherb.

The identification of these grasses was made by Ernest R. Sohn.

I believe that this, after these many years, completes the identifications of all of the Arctic collections. If there are any I have missed, I shall be glad to hunt them down for you.

If you get home this summer, be sure to look us up. Best regards.

Yours truly,

Bertrand

Bertrand F. Harrison

BFH:ldg

521124-262

James Bee Collection of Lichens from Alaska
Identified by W. A. Weber and S. Shushan
(Except those otherwise indicated)

510727-15	Sphaerophorus globosus (Huds.) Vainio by E. Dahl
510727-15	Sphaerophorus globosus (Huds.) Vainio by E. Dahl
510727-17	Cladonia rangiferina (L.) Web.
510821-3	Cladonia gracilis v. chordalis (Flk.) Schaer. by E. Dahl
510821-3B	Cladonia sylvatica (L.) Hoffm.
510821-6	Stereocaulon paschale (L.) Hoffm.
510821-6	Stereocaulon paschale (L.) Hoffm.
510821-8	Cladonia amaurocraea (Flk.) Schaer. by E. Dahl S2044
510821-8	Cladonia amaurocraea (Flk.) Schaer. by E. Dahl S2044
510821-8	Cladonia amaurocraea (Flk.) Schaer. E. Dahl S 2044
510821-8	Cladonia amaurocraea (Flk.) Schaer. by E. Dahl S 2044
510821-8	Cladonia amaurocraea (Flk.) Schaer. by E. Dahl S 2044
510821-8	Cladonia amaurocraea (Flk.) Schaer. by E. Dahl S 2044
510821-11	Cladonia amaurocraea (Flk.) Schaer. by E. Dahl
510821-11	Cladonia sylvatica (L.) Hoffm.
510821-11	Cladonia sylvatica (L.) Hoffm.
510821-11A	Cladonia gracilis v. chordalis (Flk.) Schaer. by E. Dahl
510821-11A	Cladonia gracilis v. chordalis (Flk.) Schaer. by E. Dahl
510821-11A	Cladonia gracilis v. chordalis (Flk.) Schaer. by E. Dahl
510821-11B	Cladonia sylvatica (L.) Hoffm.
510821-11B	Cladonia rangiferina (L.) Web.
510821-11B	Cladonia rangiferina (L.) Web.
510821-16A	Cladonia pyxidata (L.) Hoffm.
510831-54	Cladonia gracilis v. chordalis (Flk.) Schaer.
510831-58	Cladonia rangiferina (L.) Web.
520809-52	Cladonia coccifera (L.) Willd. by E. Dahl
520809-52	Sphaerophorus globosus (Huds.) Vain.
520809-52	Sphaerophorus globosus (Huds.) Vain.
520809-52	Sphaerophorus globosus (Huds.) Vain.
520809-52	Sphaerophorus globosus (Huds.) Vain.
520809-52	Sphaerophorus globosus (Huds.) Vain.
520809-52	Sphaerophorus globosus (Huds.) Vain.
520809-52	Sphaerophorus globosus (Huds.) Vain.
520809-52, 53, 89a	Sphaerophorus fragilis (L.) Pers. S 2069
520809-53	Cladonia gracilis v. chordalis (Flk.) Schaer. by E. Dahl.
520809-53	Cladonia gracilis v. chordalis (Flk.) Schaer. by E. Dahl.
520809-57	Cladonia amaurocraea f. oxyceras (Ach.) Wain.
520809-57a	Cladonia gracilis v. chordalis (Flk.) Schaer. by E. Dahl.
520809-57B	Cladonia pyxidata (L.) Hoffm.
520809-58	Cladonia sylvatica (L.) Hoffm.
520809-58A	Rhytidium rugosum (Hedw.) Kindb.
520809-60	Stereocaulon paschale Hoffm.
520809-65	Cladonia sylvatica (L.) Hoffm.
520809-66	Parmelia separata Th. Fr.
520809-66	Parmelia separata Th. Fr.
520809-65	Cladonia sylvatica (L.) Hoffm.
520809-68	Cladonia gracilis v. chordalis (Flk.) Schaer.
520809-71	Peltigera membranacea (Ach.) Nyl.

520809_75	Peltigera membranacea (Ach.) Nyl.
520809-75	Peltigera membranacea (Ach.) Nyl.
520809-76	Cladonia gracilis v. chordalis (Flk.) Schaer.
520809-80	Peltigera polydactyla (Neck.) Hoffm.
520809-83	Cladonia gracilis v. chordalis (Flk.) Schaer.
520809-87	Cladonia gracilis v. chordalis (Flk.) Schaer.
520809-94	Cladonia sylvatica (L.) Hoffm.
520809-94	Cladonia sylvatica (L.) Hoffm.
520809-95	Cladonia alaskana Evans in Bryologist 50:35.1947 by E. Dahl S 2269
520809-98A	Cladonia sylvatica (L.) Hoffm.
520809-100	Stereocaulon paschale Hoffm.
520809-100	Stereocaulon paschale Hoffm.
520809-103	Cladonia gracilis v. chordalis (Flk.) Schaer. by E. Dahl

James Bee Collection of Lichens from Alaska
Identified by W. A. Weber and S. Shushan
(Except those otherwise indicated)

510727-12	Ochrolechia frigida (Sw.,) Lynge S 2032 by E. Dahl
510727-13	Peltigera aphthosa (L.) Willd.
510727-16	Dactylina arctica (Hook.) Nyl. S 2027
510727-18	Nephroma arcticum (L.) Torss. S 2029
510821-3a	Cetraria islandica (L.) Ach. S 2054
510821-5	Thamnolia vermicularis (Sw.) Schaer.
510821-7a	Alectoria nitidula (T. Fr.) Vain
510821-9	Cetraria nivalis (L.) Ach. S 2056
510821-12	Cetraria cucullata (Bell.) Ach. S 2052
510821-12a	Thamnolia vermicularis (Sw.) Schaer.
510821-13	Cetraria chrysantha Tuck S 2050
510821-15	Cetraria richardsonii (Hook.) Tuck. S 2058
510821-16	Thamnolia vermicularis (Sw.) Schaer.
510821-17	Dactylina arctica (Hook.) Nyl.
	Parmelia separata Th. Fr. by M. Hale
510828-21	Cladonia cornuta (L.) Schaer. S 2011 by E. Dahl
510828-23	Cladonia sylvatica (L.) Hoffm. S 2015 " " "
510828-25	Nephroma articum (L.) Torss. S 2015
510828-26	Cladonia alpestris (L.) Rabh. S 2016
510828-28	Cladonia crispata (Ach.) Flot. S 2018 by E. Dahl
510828-29	Cetraria islandica (L.) Ach. S 2019
510828-29a	Dactylina arctica (Hook.) Nyl.
510831-53	Peltigera aphthosa (L.) Willd.
510831-59	Dactylina arctica (Hook.) Nyl. S 2035
510831-60	Alectoria nigricans (Ach.) Nyl.
510831-63	Cetraria nivalis (L.) Ach.
510831-63a	Cetraria cucullata (Bell.) Ach.
520809-50	Dactylina arctica (Hook.) Nyl. S 2059
520809-51	Peltigera aphthosa (L.) Willd.
520809-52	Sphaerophorus fragilis (L.) Pers. S 2069
520809-53	Sphaerophorus fragilis (L.) Pers. S 2069
520809-54	Cetraria nivalis (L.) Ach.
520809-55	Lobaria Linita (Ach.) Rabh. S 2061
520809-61	Cetraria chrysantha Tuck. S 2051
520809-65	Cetraria cucullata (Bell.) Ach.
520809-66	Alectoria nitidula (T. Fr.) Vainio
520809-67	Cetraria islandica (L.) Ach.
520809-73	Parmelia omphalodes Ach. by E. Dahl.
520809-76	Thamnolia vermicularis S 2062
520809-78	Cetraria islandica (L.) Ach.
520809-83	Cladonia verticillata (L.) Hoffm. S 2066
520809-83	Cladonia verticillata var. Cervicornis (Ach.) Flk. S 2065
520809-85	Alectoria nitidula (T. Fr.) Vainio S 2262
520809-85	Alectoria lanea (Ehrh.) vain S 2262
520809-85	Cetraria
520809-86	Parmelia separata Th. Fr. by Mason Hale, 1954
520809-86a	Parmelia centrifuga (L.) Ach.
520809-89	Cetraria nivalis (L.) Ach. S 2057
520809-89a	Sphaerophorus fragilis (L.) Pers. S 2069
520809-89b	Alectoria nitidula (T. Fr.) Vainio
520809-92	Cetraria cucullata (Bell.) Ach.
520809-94	Cetraria islandica (L.) Ach. S 2055
520809-98	Cladonia alpestris (L.) Rabh. S 2068
520809-101	Parmelia sulcata Tayl.
520809-102	Nephroma arcticum (L.) Torss.

Beetles

Nov. 24, 1952

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Subjects of Arctic Alaska movie film.

TAKEN BY JAMES W. BEE

1. Prof. E. Raymond Hall, Point Barrow, Alaska. Sept. 11, 1952
2. Mr. Edward G. Campbell, Point Barrow, Alaska. " " "
3. Great Salt Lake, Utah. Sept. 15, 1951 (2 shots)
4. Dry farming wheat fields, Idaho. Sept. 15, 1951
5. Mt. ranges at north end of Vancouver Island, Canada. Sept. 14, 1952 (5 shots)
6. Taku Glacier, fjords and mountains near Juneau, Alaska. June 11, 1952 (10 shots)
7. Alaska Range, east of Mt McKinley, Alaska. Sept 13, 1951 (3 shots)
8. Mt. McKinley National Park, Alaska. Sept 13, 1951 (2 shots)
9. Approaching north side of Brooks Range, Alaska. Sept 11, 1951
10. Front range-Plateau Province contact, Brooks Range, Alaska. Sept 11, 1951
11. Plateau Province and Brooks Range in distance. Ice field in foreground. Aug. 16, 1952
12. Ice covered tundra lakes, Coastal Plains, Alaska. June 14, 1952.
13. Open tundra lakes, Coastal Plains, Alaska. Aug. 27, 1952.(5shots)
14. Above clouds, Coastal Plains, Alaska. Aug. 27, 1952.

14a. Tundra lakes near Point Barrow, July 3, 1951.
14b. Arctic Ocean coast line near Will Roger Memorial, Alaska. July 3, 1951. (2 shots)

15. Arctic Ocean and waves, Point Barrow, Alaska. Aug. 6, 1951 (8 shots
16. Prof. E. Raymond Hall, and weasel, Point Barrow, Alaska. Sept. 11, 1952 (3 shots)
17. Eskimo children, Barrow Village, Alaska. Sept. 2, 1952 (3 shots)
18. Eskimo houses, Point Barrow, Alaska. Sept. 11, 1952. (3 shots)
19. Eskimo dog, Umiat, Alaska. June 29, 1952. (3 shots)
20. Caribou. Teshekpuk Lake, Alaska. July 31, 1951. (8 shots)
21. Umiat from plane, Alaska. Aug. 13, 1952.
22. Landing on Colville River, Umiat, Alaska. Aug. 13, 1952
23. Helicoptera, Umiat, Alaska. June 29, 1952
24. Ice fields and surface features of tundra. Aug. 16, 1952.
25. Brooks Range and Plateau Province, Alaska. Aug. 16, 1952.
26. Return by helicoptera, Umiat, Alaska. Aug. 29, 1952.
27. Edward G. Campbell and weasel crossing Seabee Creek, Umiat, Alaska. June 29, 1952.
28. Loading up Norseman plane, Point Barrow, Alaska. July 19, 1951.
29. Pilots. Umiat Alaska. July 18, 1952.
30. Shadow of Norseman plane, Canning River, Alaska. July 18, 1952
31. Chandler River, east of Umiat, Alaska. July 19, 1952.
32. Plateau Province tundra, east of Umitat, Alaska. July 18, 1952.
33. Chandler River, east of Umiat, Alaska. July 19, 1952.
34. Chandler River, East of Umiat, Alaska. July 19, 1952.
35. Chandler River, east of Umiat, Alaska. July 19, 1952.
36. Polygon tundra surface, Will Rogers Monument, south Barrow Village, Alaska. July 3, 1951.
37. Tundra surface, east of Umiat, Alaska. Aug. 16, 1952. (3)shots
38. Canning River, Brooks Range, Alaska. July 18, 1952. (5 shots)
39. Norseman landing at Lake Peters, Brooks Range, Alaska. July 24, 1952
40. South end of Lake Peters, Brooks, Range, Alaska. July 28, 1952
41. Upper end of Lake Peters Canyon, Brooks Range, Alaska. Aug. 3, 195
42. Mt. sheep, Lake Peters, Brooks Range, Alaska Aug. 15, 1952.
43. Marmot country, Lake Peters, Brooks Range, Alaska. Aug. 1, 1952
44. Arctic Grizzly, Waho Lake Lake, Brooks Range, Alaska.

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45. Edward G. Campbell and specimens, Wahoo Lake, Alaska. Jul7 9, 19
46. Caribou at edge of lake, Teshekpuk Lake, Alaska. Aug. 6, 1951.
47. Caribou kill, Lake Peters, Brooks Range, Alaska July 29, 1952.
48. Arctic Char, Wahoo Lake, Alaska. July 9, 1952.
49. Porcupine Lake, Brooks Range, Alaska. Uuly 17, 1952.
50. Head of Canning River, Brooks Range, Alaska. July 18, 1952.
51. Lake Trout, Lake Schrader, Alaska. July 24, 1952.
52. Bill Irving and Eskimo guide, Lake Peters, Alaska. Aug. 13. 1952
53. Arctic loon, Gavia Lake, east Umiat, Alaska. Aug. 23,1952(2 shots
54. Yellow-billed loon on nest, Wahoo Lake, Alaska.July 5, 1952
55. Yellow-billed loon leaving nest, Wahoo Lake, Alaska, July 6, 1952
56. Eggs of yellow-billed loon, Wahoo Lake, Alaska, July 6, 1952.
57. Old squaw duck, Umiat, Alaska. June 27, 1952.
88. Old squaw duck, Gavia Lake, Aug, 23, 1952
59. Young of old squaw duck, Kaolak River, Alaska. Jul6 13, 1951.
60. Nest and eggs of White-fronted goose, Umiat, Alaska. June 27, 195
61. Willow ptarmigan, Gavia Lake, east of Umiat, Alaska, Aug. 22, 195
62. Duck hawk, Umiat Mountain, Alaska. June 28, 1952 (3 shots)
63. Cyrfalcon, Umiat, Alaska June 28 1952.
64. Raven, Umiat, Alaska Aug. 23, 1952
65. Snow covered mountains at Lake Peters, Brooks Range, Alaska. Aug. 10, 1952
66. Norseman plane leaving Lake Peters, Alaska. Aug. 8, 1952
67. Snow covered mountains at Lake Peters, Alaska. Aug. 6, 1952.
68. Coming out of Brooks Range with snow covered mountains. Aug. 16, 1952.
69. Brooks Range and Plateau Province, east of Umiat, Alaska. Aug. 16m 1952.
70. Tundra lake with Brooks Range in distance, Alaska. Aug. 16, 1952.
71. Chandler River with braided river system, Alaska. Aug. 16, 1952
72. Red phalarope, Point Barrow, Alaska. Aug. 25, 1952 (3 shots)
73. Arctic Ocean and kittiwakes, Point Barrow, Alaska, Sept. 5, 1952 Coastal (2 shots)
74. 'Alaska' on wing of C46 over Plains Province, Alaska. Sept. 12, 1 5
75. Museum of Natural History, University of Kansas, Kansas.