

1941

1911



July 29 1911.

Bitterroot Valley, Montana.

Left Cozallie at 10 AM and took train from Woodside 17 miles up the valley to Beau's Spur, the nearest point to Cono Lake. Took blanket, traps, gun and grub for a 4 days trip in the mts. Walked up 4 miles to Cono Lake, then along the north side of the lake to its head, about 3 miles, then up the brush canyon bottom probably 4 miles farther and camped in a beaver meadow by the creek. The trail goes on the south side of the lake, and we had a rough trip over rocks along the north shore, then a slow scramble through brush up the creek bottom on bear & elk trails. The horse trail, which has not been used this season & is full of down trees runs along the side of the canyon for its lower part and we did not strike it -



Idaho Falls

Aug. 10 - left Idaho Falls with
team and light camp outfit +

few with for Irwin and Star Valley.
Started at 9 AM and travelled about
25 miles and camped in the canyon
of Snake River above Heiss Hot Springs.
Valley country largely under irrigation
good crops of wheat and oats and
sugar beets. Not much fruit.

A few young orchards of good apples
Some young peach trees not yet bearing

Dry level farming on the benches
is very successful, wheat looks well
and will yield 20 + 30 bushels, oats
in some cases 40.

Roads good but dusty, very
dry. Valley mainly Upper Sonoran
also lower benches, Canyon of river
and higher benches Transition.
Douglas spruce + aspens on
cold slopes of wall of canyon.

Snake River

Aug. 11 Caught a few things in
Canyon but nothing important.

Got off early, pulled up out of
Canyon, about 500 feet up steep road,
5.150 at river to 5650 on top.

Continued up west side of river
over high bench, reaching 6000 feet
at highest point on road, then
down to Kuna? valley on level with
the river at 5500. Then across the
river 2 miles beyond and stopped for
dinner at ranch on east side.

Then up narrow canyon to
Irwin for the night. Irwin is
in Swan Valley, 55 miles from
Idaho Falls by road. Alt. about 5000 ft.

For about 20 miles over the mesa
valley dry farming is being rapidly
developed with wonderful success.
Wheat is big and heavy, will go
25 to 40 bushels to the acre & oats
30 to 40. This is a rolling, sage
brush country with rich soil and
good natural growth of vegetation.
Thickets of aspens come down on
cold slopes to edges of fields
showing that it is high transition.

The valleys along the river have abundance of water for irrigation and good crops of grain & hay & potatoes are raised but no fruit. The valleys, Kuma & Swan, are old stock ranch valleys with stock ranch methods of farming. They need developing or else being made into great reservoirs for water storage. Kuma Valley is perfectly adapted to a reservoir site.

They are pure Transition as are the warm slopes back of them the Aspens & Douglas spruce come down in masses to the river on cold slopes.

At Devin we had a fine meal of Salmon trout for supper at the ranch hotel & again for breakfast. There is much fishing along the river and camping parties are numerous.

Shops are the principal stock of the ranchers and a sheep herders dance & big drunk at Devin last night is the event of the season.

Snake River

Aug. 12

Followed up east side of river, along narrow valley & in canyon about 10 miles and camped at mouth of Elk Creek, called "Pinchbowk" on land office map but not known by that name here. Set traps along creek and river bottoms & out in sagebrush. The narrow valley here is all on the east side of river and is only wide enough for elongated ranches.

Populus angustifolia & willows border the river and creeks and sagebrush and *Bigelovia*.

The valley is pure transition. Dense growths of aspen and Douglas spruce come down to the river on cold slopes and cover some of the steep hot slopes as well.

The mountains rise high on both sides with snow patches on the higher peaks.

Aug. 13

Stomachs examined of 5 *Citellus elegans*? were full of largely *Androschis* berries, seeds and all, some green herbages, yellow flowers of a composite, wiry seeds of grass or composite, usually a trace of insects - and one had a piece of stem - some meat eaten out of another that I caught in a trap. All but one were caught near the river and one in mts. at 7000 feet.

Callospermophilus castaneus - One shot at 9000 ft stomach full of meats of some oily seed, probably *Balsamorhiza* or *Wyethia*.

Eutamias amabilis - One shot at 9000 feet in mts. at edge of timber. Stomach full of some oily seed meats, probably *Balsamorhiza* or *Wyethia*.

Eutamias pictus, Shot in sagebrush by river. Stomach full of seeds and of a little pulp of *Service berry*. Seeds may have been of the same, but were all shelled & chewed fine.

Sciurus richardsoni, Pine squirrel shot at 7000 feet in Douglas spruces. Stomach full of spruce seeds, shelled & finely chewed to a white pulp.

Up Big Hole Mts.

Aug. 13 - Took gun and camera & aneroid and started up the mountains east of camp - The Big Hole Range. Followed up Elk Creek about a mile to ranch & then turned up gulch of the ridge & the north, until I reached the crest of ridge, then up the ridge east to a peak next to the highest on this ridge, then over into head of creek to the north, called locally Little Elk and land office map, Palisades Cr., then back down it to ridge. I went up & back to camp the way I started out.

Aneroid read 5600 at camp, 7000 on top of first ridge, 8000 on next ridge, 9500 feet on the highest peak I reached. The next peak would be 10500 and some of the peaks of the range may reach 11000 feet. There is none with much show of timberline on the warm slope but a well defined timberline comes down 1000 feet or more on many of the north slopes.

Big Hole
Salt River Mts.

The mts. are steep and dry and barren toward the tops.

I found no water after leaving our creek at 10 A.M. until I struck snow banks at 5 P.M. on cold slopes at 9000 feet. Here I found only short trickles below the banks & no ^{more} water until I returned to the creek at dark.

Peaks being naturally steep and dry the peaks have been shaped and burned off until a forest of sliding pebbles on the open slopes. Spruces still cling to the cooler & moister slopes where there was no grass to burn them with. And aspen thickets ^{cover} moister areas that on flats and lower slopes where the timber has been burned off.

The rock of the mts. is mainly limestone except along the river where lava forms most of the canyons below. There are many cliffs & bare rock slopes but most of the surfaces was naturally a soil covered slope.

Transition zone covers the river valley at 5400 feet and runs up on S.W. slopes as high as 8000 feet. This is owing to the bare, dry exposure which absorbs heat and carries scattered plants very high. On the less barren N.E. slopes Transition species reach little above the bottom of the river valley - or not above 6000 feet on steep slopes. The barren nature of the slopes however makes zone lines uncertain and difficult to locate. There is no yellow pine, but Douglas spruce takes its place down to the river banks in spots. Then *Ceanothus velutinus*, *Amelanchier alnifolia*, *Artemisia tridentata*, *Bigelovia canescens* & *tortifolia*, *Balsamorhiza sagittifolia* and *Wyethia* are the principal shrubs. Along the streams are *Populus angustifolia*, 3 willows, *Alnus*, *Betula fontinalis*, *Crataegus* and *Cornus*.

Canadian zone is even
now poorly marked, but seems
to run from 6000 NE to 9000,
and from 8000 SW to 10000.
In many places it seems to come
down on steep slopes to 5000 feet
or nearby to the rivers.

In places it is characterized
by *Picea pungens* low down and
P. engelmannii high up, by *Abies*
concolor, part way by *Pseudotsuga*
and by a few scattered *Pinus flexilis*
and *murrayana*. *Acer glabrum* grows
in gulches and a small form of
Acer grandidentatum is abundant at
6500 to 7000 feet, but may be transition.
The shrubs are *Pachyptera*, *Sorbus*,
Lipargyrea canadensis, *Rubus coccineus*,
Lonicera involucrata, *Ribes sanguineum*
& others.

The *Pinus* *equisetifolia*, *Manisuris rubra*,
Junceas and *Siskeys* make the
zone about as irregularly as do the
plants, that is occurring in a
few places where evidence is
possible.

Hudsonian zone reaches the warm slopes and peaks from 9000 to 10000 as nearly as I could tell, and lies at least 1000 feet lower on cold slopes.

It has an occasional *Pinus albicaulis*, stunted dwarf *Abies subalpina* & *Picea engelmannii*. Some *Ribes viscariaefolium*, *geum rassi* + 9.

Delphinium, a great white *Aquilegia*, *Phlox douglasii*, and a poor assortment of small vegetation.

Woodchucks and a few *Ochotona* and *Neotomas* inhabit the rocks.

Aug. 14 - Worked in the valley and at camp, putting up specimens & catching gophers & ground squirrels & writing up notes.

Aug. 15 Broke camp and followed up the valley to mouth of Snake River Canyon, where we ferried the cows and then kept up Salt River valley to the south 18 miles to Thayne. Averaged road 5600 at camp, 5800 at ferry, 6250 at Thayne. I am surprised at the extent of good land in these valleys, level sagebrush meadows and flats, mainly on the east sides of the rivers but some on both sides. The bottom part of the valley is usually 2 to 6 or 8 miles wide of good irrigable land. Only a small part of this is under cultivation or irrigation. There is more "dry farming" than irrigation and good crops of oats & wheat are raised without water being applied. Two or three feet of snow fall in the valley and there is abundant moisture for crops if held in the soil. Good potatoes are raised in Snake River valley generally but frost kills them in places. Few potatoes can be raised in Salt River on account of frost & only hardy vegetables

Salt River Valley

Cervus canadensis, 11 in pastures at Haynes.
Sciurus

Eutamias concoloratus, common in valleys

Citellus elegans, many seen all along

Thomomys, common all along

One caught at Haynes, large hills.

Lepus bairdi, tracks seen in valley

Canis latrans, tracks seen. heard.

Taxidea, tracks seen. heard.

one dead, skull saved, near Haynes.

Stock raising seems to be the chief industry of the valleys & much hay is cut. Alfalfa does well and the second crop is nearly grown. There is good grazing in the valleys, but many sheep are kept in Grand Valley & the wets are shupel bare. The stock in Salt R. valley is mainly cattle and the country is grassy & the Salt River wts. look fresh & green.

The wts. are poorly timbered but the lower slopes to the valley edges are covered with *Copernia* in dense growth, even on S.W. slopes that are not too steep and dry. In places they grow on flats in the valley bottoms, showing its near approach to Canadian zone. The valley seems to be mainly transition, with *Populus angustifolia* along the streams & *sagittata* over the side slopes. *Artemisia tridentata* and *arbuscula* are most common, but there is lot of *cana*?, *Ludoviciana* and *dracunculoides*. *Balsamorhiza sagittata* and *Wyethia* and *Bigelovia tortifolia* are common.

Frost in waning at Haynes.

Aug. 17 - Examined 10 stomachs of
Atellus ilgams, shot & trapped in valley.
All contained green herbage, yellow
flowers, (probably *Riglobria tortifolia*) and
green seeds of grass or other plants.
Two contained wild yellow currants,
seeds and all.

Aug. 16 - Star Valley

Left Haynes & traveled 18 miles
south up the Salt R. Valley, to Afton.
Anemoid at Haynes 6200, Afton 6400,
Camp in bottom of valley 2 miles west of
Afton 6300 -

For about 6 miles south of Haynes the
valley narrows to a canyon or meadows
full of aspens, willows, pines & spruces,
a Canadian zone section. Then it
opens out into the big ranch valley
of Star Valley proper, about 8 miles wide
and 20 miles long. The valley lies
in great flats or gentle slopes
and has abundant water for irrigation.
It is largely fenced and used for
hay, grain, and pastures. Alfalfa
does well and yields 2 good crops.
Wheat & oats do well but are late, not
ripe yet. But much of the valley is
used for pastures and much stock is
raised. Lots of cream is hauled to
Montpelier and there are cheese factories
here in the valley.

Star Valley

Aug. 17, Cary arrived last night
on stage from Montpelier &
I brought him down to camp
this morning. Got a fine lot
of Citellus and gophers and
a few other specimens.
Frost on our beds in morning.
The valley bottom seems to be
very cold and frosty,
although this is said to be
the coldest spell of weather
this season. The days are
very warm, but the nights
are cold.

Aug 18 - Another light frost
in valley. I was doubtful
about it at first until I
found the dish cloth frozen
hard where it lay on the
grass.

Broke camp and
went to Apton for mail
and supplies and then
about 4 miles south to
Oswood and turned up
an old mill road up

Dry Creek.

Dry Creek and followed up
it about 8 miles to an old
saw mill. Arrived at Camp
6:30, at Afton 6:40, at the
entrance of Dry Creek Canyon
6:50, at camp near mill
7:50.

A fairly good wood road
of way, a fine creek, most of
the ^{timber} cut or burnt off, but some
good stands of spruce & fir
on cold slopes.

Canadian zone covers
most of cold slope & near
mouth of canyon.

Transition zone covers warm
slope to a little above our
camp. The narrow bottom
of canyon is Canadian a
mile or two below camp and
mixed clear to mouth of canyon.

Dry Creek

Aug. 19. Caught a lot of mammals
and shot some birds.

Cary & Jewett have been making
skins most of day.

Hunted a little in morning.
Wrote notes & reports part of day.

Our camp is on an open bench about
40 feet above the creek & escapes the cold
currents at night. No frost in morning
and a warmer night than we have seen
in the valley bottom, 1300 feet lower.

Aug 20. Cary and I went up the Mts. to
head of Dry Creek 3 miles east of
camp to set traps for Ptarmigan &
get the zone levels and lists of plants
high up and such birds & mammals
as we could find. Reached a peak
at 10400 feet but there are others
beyond that seem to be 200 or 300
feet higher. The crest of the next long
ridge is shown by the Forest Service
contour map as 10500 in many
places. On the east side of the
peak we reached is a sheer cliff 1000
feet high - a great cirque - & at its
base great snowbanks, pools & streams.

We set traps in this case down to a beautiful little Hudsonian zone lake & came down into valley to camp by an easy grade around the N. side of Dry Cr.

The mts are steep and rather barren of tilted, stratified rock, lime & shale & sand largely. There is generally a thin soil cover & this has suffered much from effects of sheep & fire. Many extensive slopes are stony & bare but the more gradual slopes have some areas of good timber still. It is largely in strips and patches in gulches and on cold slopes. So much of the surface is barren that zone lines are not easily located but can be pretty closely guessed.

Transition zone covers the valley, unless the peaty bottoms of Star Valley should be classed as Canadian, and runs up the S.W. slopes on north side of Dry Creek to about 8000 feet, or to a point a mile east of our camp. On the cold

slope it does not get above the mouth
of the Canyon at 6500 feet.

It is marked by *Pseudotsuga* in part,
Pinus flexilis in part, or *Acer grandidentatum*,
Cercocarpus ledifolius, *Amelanchier*, *Prunus*
melanocarpa, *Betula fontinalis*, *Populus*
angustifolia, *Salix* (narrow leaf), *Juniperus*
scopulorum, *Berberis repens*, *Artemisia*
tridentata, *Wyethia*, *Palmaria*
serotina, *Ceanothus velutinus*,
Symphoricarpos oppositifolius, *Ribes cereum*
and possibly *d. irriguum*,

Canadian zone reaches on
S.W. slopes from approximately 8000
to 10000 feet and on N.E. slopes from
6400 to 9000 feet.

It is marked by *Picea pungens* & *englemanni*,
Abies concolor, *Pseudotsuga* in part,
Pinus flexilis in part, *Pinus murrayana*,
Populus tremuloides, *Acer glabrum*,
Lepargyrea canadensis, *Pachystima*,
Juniperus communis, *Ribes wolffi*? &
another & *sanguineum*, *Sambucus pubens*,
Sorbus, *Myrtus*, *Lonchocarpus*
& *utahensis*, *Vaccinium erythrococcum* &

Hudsonian zone reaches from about 10000 feet on SW slopes to the top of all but a few of the very highest peaks and it might reach there if not bare rocks; and on N.E. slopes from about 9000 to 9500 feet, but no good slopes were found. most were too steep for anything.

The zone is marked by *Pinus albicaulis*, *Abies balsamea*, and dwarf *Picea engelmannii*, *Ribes leptanthum*, *Salix* - 2 dwarf species, *Artemisia*, *Lupinus*, *Aquilegia*, white, *Oritocarpus* yellow or pink, *Pedicularis*

Arctic Alpine zone covers the highest peaks and down about 1000 feet on cold slopes - it is marked by *Draba digyna*, *Sibaldia procumbens*, *Genium*, *Potentilla*, *Achillea alpina*, *Erigeron*, *Myrtus alpinus*, *Sedum* 5.

Salt River Mts.

Aug. 21, Cary + Jewett went up to the traps while I took care of camp & made up yesterday's skins, 16, & wrote notes. Did not get *Phevaecampus*.

A cold night - Ice in basin in morning.

Aug. 22 - Broke camp + came down to Afton + west to narrows on Salt River west of Star Valley. Set traps for *Gophus*, *Neotoma* + *Microtus*.

Potatoes + all crops in Star Valley at all susceptible to frost are killed + the oats + alfalfa injured by the freeze of yesterday morning. Most of the wheat is out of the way of frost but not much is raised in this region. Hays + cattle + sheep are the principal products. There are several dairies + cheese factories in the valleys and much cream is hauled out to the railroad at Nampa.

Caribou Mts.

Aug. 23 We caught lots of
Thomomys + Neotoma + Musorex,
Sorex + Microtus + shot a Coney.
Wanted to skin specimens and for
Cary to catch the stage fall to
Afton at 10 A.M. Then Junett
+ I drove to Freedom, where we
got dinner and started up
Fire Cup Creek over the Caribou
Mts. via John Grays Lake to
Edabs Falls.

Followed easy grade up Fire Cup
to near its head, then over a
low divide, or big open ridge, to
the Dairy Ranch, 20 miles from
Freedom, and camped a mile
beyond by little creek in big
sagebrush valley.

Freedom 6000, divide 7250,
Camp 7200 feet.

The Caribou Mts. are largely
big open ridges and valleys of
sagebrush and fine range grass.
The timber is mainly in spots
and streaks on cold slopes or
on snowy slopes. It is a
broad, flat topped range with

Sage grouse, Saw great flocks of sage grouse in the high parks + valleys, and the road is tracked up by them. It is ideal country for them.

Caribou Mts.

many high ridges and a few high peaks, mainly farther N. & E. Caribou Peak, or Mt. Pioga, is the highest, a great old crater just N. E. of Grays Lake and apparently about 11000 feet high, with lots of snow & a timberline on cold slopes, but timbered in spots nearly to top on warm slopes. Farther N. E. is a great ridge almost as high. South of Caribou Peak the peaks and ridges reach 8000 or 9000 feet and are mainly timbered with aspens + spruce + fir + pine.

The greater part of the range lies in Canadian zone, but transition zone species run up on warm slopes to 7000 feet at least. The flats + meadows down to about 6000 are mainly Canadian.

Canadian zone species are *Picea pungens*, *Abies concolor*, *Pinus murrayana* + *flexilis*, *Populus tremuloides*, *Pseudotsuga* + others.

Caribou Mts

Aug. 24 - A cold morning in our
edgebrush camp, Dief was
an inch thick in the basin when
we got up at sunrise.

Continued west some 10
miles over high ridges and valleys
to John Gray's Lake, a great tall
marsh 20 miles long & 10 or 12
miles wide in the bottom of
a big valley that was once a
lake. There are a few small
spots where water can be seen
but the black tules are almost
solid. A wide border to the
lake is hay land and ranches
surround it. The five summer
grazing over the mts. makes
stock raising pay even when
hay has to be fed for half the
year.

Very little farming is tried
in this valley at 6700 feet, as
it is mainly Canadian.
A little wheat & oats & hardy
vegetables are raised on the
border slopes, but the grain
is not yet ripe & is injured by

Gray's Lake

frosts which the potatoes are all killed before they are big enough for use. Sheep & Cattle are the main products & always will be. The hay is good, largely timothy & clover & some alfalfa.

Summer ranges unlimited in abundance and not overstocked, even with sheep.

Ducks and waterfowl breed in great abundance in the marsh and were tame at the outlet where we could get near enough to see them. Later there are said to be great numbers of migrants & fine shooting.

We followed north along east side of lake and across north end to outlet, then about 10 miles down the outlet & camped on the Creek at 6400 feet

To Idaho Falls

Aug. 25. Another cold night and
an inch of ice in basin in
morning.

Continued down the creek
valley and over side ridges
and mesas as it got deeper
into its canyon. The road
runs up hill and down but
keeps its general level until
close to the valley where we
look down on Idaho Falls &
the great farming valley from
a bench at 6650 feet.
From Grays Lake, we have come
50 miles over a plateau
or elevated valley between
the Blackfoot and Caribou
Mts. It is a broad ~~region~~
region, mainly transition zone
and well adapted to dry farming.
Fine yields of wheat & oats are
obtained over the top slopes
from the moisture left in the
soil by the snow. The soil is
rich & fine volcanic dust
overlying lava beds.

Aug. 24-28 Rivand at Idaho Falls

writing up reports and collecting a few specimens in the immediate areas. Found *Thrips* & *Prolepus* & *Entanias pictus* common across river. Jack rabbits abundant.

Several light frosts have killed the tomato vines and cut some of the patches of sweet corn and in places with the alfalfa and injured the potatoes.

In other places the corn and potatoes are untouched by frost.

No serious damage is done, but such frosts preclude the raising of melons, tomatoes and many tender vegetables.

Apples seem not to be injured by the frosts.

To Ashtona

Aug. 29 Left Idaho Falls on 10 AM
train for Ashtona on the Yellowstone
Branch.

Country all under ditches and
largely under cultivation. Crops
good. Grains mostly out.

Alfalfa pastured a little in places but
shed and thin crops mostly
ready for cutting. Sugar beets
in great fields look very good.
Also potatoes. Some corn fields
fringed, + others untouched.

Roads very dry & dusty.

Rigby a nice little town on street.

Populus fremontii do well where
planted along ditches, but more
angustifolia + balsamifera + deltoides
+ lambrdya are raised. There
seem to be no native cottonwoods
except a few scrubby angustifolia
along the river.

A few small orchards are heavily
loaded with fine looking apples.

From Rigby to Thornton
is a succession of small R. clouds,
a regular delta, spread out over

To Ashton

gravelly flats with much poor soil
all waste land.

Populus angustifolia is abundant
over this bottom land as also willows,
birch, thornapple + Eleagnus.
Crops are generally poor + farms
likewise.

Therinton to Ribbary - good land
again under good cultivation and good
homes. Dry farming grain on low
mesa to the east.

Corn + potatoes some planted.

Good land + crops from Ribbary
to Sugar City. Fine sugar beets,
good alfalfa + grain.

Big Sugar mill + little town.

St. Anthony - 5000 feet, no signs of
mount. Fine grain and alfalfa country.
Apple trees loaded with good fruit.

A good town.

Ashton - as far as the train goes, 11:50 AM.

Set gopher traps, caught 2 *Thomomys fuscus* in
edge of town. Very abundant. No chipmunks.

A good grain and farming country, most of
land under cultivation. Mainly *Lippia scopulorum*
but a trace of *Balsamorhiza* on north slopes.

Timber hills across the river to north.

To Yellowstone

Aug. 30 - Took 3:50 A.M. train for Yellowstone. Getting light at Warm River. Real light at Island Park. Reached Yellowstone 6 A.M. and after breakfast tramped about 6 miles west to the river. Spot *Eutamias luteiventris* + caught *Thomomys pusillus*.

From Warm River to Yellowstone it is all lodgepole pine woods, very dense and clean generally.

Very gradual slopes on both sides of a flat summit and a great stretch of timbered plateau.

Here we saw several saw mills along the way where the largest timber is being worked up. The tops are nicely piled and the woods have a clean, well kept look. Few of the trees are more than a foot in diameter and the large ones are cut without injuring the small.

I saw also a few trees of *Pinus flexilis*, *Abies concolor*, *Pseudotsuga* + *Picea pungens*. There are aspen groves on some open side hills across + near the river.

Willows + *Betula glandulosa* cover the marshes in big thickets. Still there are big open marshes along the river.

Yellowstone, Mont.

Sciurus richardsoni, pine squirrels are abundant, carrying cones & toadstools.

Eutamias lutescens, Come through the timber & on old logs. one shot, others seen.

Thomomys fuscus - Abundant on both upland & meadows, must be on grassy sidehills. One taken but so full of cutworms not used.

Euthyris porcupine gnawings are common on the young pines in the woods.

Lepus variabilis - Snowshoe rabbits are common in the dense bottomland growth.

Castor canadensis - Beaver dams & ponds & houses and canals, fresh cuttings & trails & slides & fresh signs are common along the big creek 3 to 5 miles west of Yellowstone. In one place a few small lodgepole pines had been cut near the creek where only small willows were available for building material. The largest tree cut was about 4 inches.

Canis latrans - Coyote tracks were seen in the woods.

Two big mountain ranges rise high above timberline, one in the Yellowstone Park north of Madison River and rising north to Electric Peak, the other in Montana, west of Yellowstone and Madison River. The peaks are very bare and of reddish rocks but have considerably snow still.

They are largely Hudsonian & Arctic Alpines.

Canadian zone covers most of country over this corner of Idaho, Montana & Wyoming.

Transition zone species are common on hot slopes in the Madison valley park, down down where the creek from the south joins the river.

There are a lot of ranches where much hay is cut and a big road goes down among them & then down the Madison Canyon.

Artemisia tridentata & trifida, Balsamorhiza, Kunzia, Bigelovia trichophylla, and even on very hot slopes a little Tetradymia grows here.

Returned at 7:15 down the line, but it got dark at the Summit. Stopped at St. Anthony at 11 P.M.

St. Anthony

Aug. 31. Tramped over one side of river in forenoon & drove over toward sand dunes in afternoon & tramped over flats after supper to try & find gophers but found no signs of T. idahoensis. Found 2 sets of hills of puscus, evidently, in moist ground. No signs of Perodiposa, so did not set long traps.

Upper saoran zone is very different here & many of the plants are absent. No Tetradymia or Eurotia even on the sandy soil.

- Upper saoran species are
- Chrysothamnus graveolens, com. on sandy soil.
 - " tortifolia, com. on all soils.
 - Artemisia tridentata, " " "
 - " trifida, abn. on " "
 - Opuntia missouriensis, " " dry soil
 - " fragilis, com. " " "
 - Psoralea glandulosa, " " " "
 - Plantago patagonica, " " " "
 - Oryzopsis microantha, a little on sand.
 - Grewia squarrosa? com. along roads
 - Wardia, " " "
 - Salsola, " " "

St. Anthony

Transition zone species seem to dominate,

On river flats -

Populus angustifolia,	abr.
Salix 3 species	"
Alnus rhombifolia	com
Betula fontinalis	"
Amelanchier	"
Prunus melanocarpa	"
Ribes longiflorum	"

on dry soils

Krugia tridentata,	abr on sand
Balsamorhiza hirsuta,	abr. on dry soil.
Astragalus tridentata	com.
" trifida	abr.
Chrysothamnus tortiflorus	"

A few Canadian zone species grow along river close to the cold water -
Populus tremuloides, patches along river.
" balsamifera " " "

The zones are mixed & Sorghum is found only on dry soil. When cold ditch water enters the soil it is a question if it doesn't mean pure transition

Opuntia missouriensis?

" fragilis,

specimens of both mailed
to Dr. Rose from St. Anthony
Sept. 1.

There is abundance of water & crops
are good. Wheat, oats & alfalfa
are the standard crops.

All hardy garden vegetables do well
but corn, melons, and tomatoes do
not amount to much. They all
are frosted this year & usually.

Potatoes are not raised as much as
below - toward Idaho Falls.

Apples do well and the yellow-
transparent Red asticians are now ripe
and good. Wealthy & Dubess come
next & are good.

Melons & other fruits are shipped
here from Nampa & Payette country.

A more detailed and careful survey
of these agricultural plains is needed.

Great quantities of the small
cactus could be gathered here for
stock feed. It covers the poorest,
sandier land. Two men could
gather 5 to 10 tons a day with iron
rakes I should judge.

To Idaho Falls

Sept. 1, Took morning train to Idaho Falls, got my mail + made out Aug. expense account + wrote letters + notes.

A fierce dust storm.

Sept. 2 - Took 9:30 train for Pocatillo and staid there from 11 AM to 4:25 P.M. Tramped over hills + got lists of plants + some specimens.

Idaho Falls to Blackfoot is all settled up + largely under cultivation. Some good big apple trees at Blackfoot are loaded with fruit. About such a town as Idaho Falls. Pocatillo is larger.

All hopes gone but much finer frost at Pocatillo than on the lower valley. Corn + pumpkins + peaplant rot touched. Up on the benches 100 feet above town things are perfectly fresh + green. Young cherry + apple trees are fine and thrifty. Apples are good in town and one tree of Apicotts is so loaded with fruit it has to be propped up all round. They are small yellow Apicotts. Raspberry bushes are

Poecatlillo Plants

- Juniperus occidentalis*, abn. over hills on both sides of valley, specimens sent.
- Rhus trilobata*, com. in gulches.
- Atriplex canescens*, com.
- Zitadynia canescens*, "
- Chrysothamnus graveolens* "
- " *tortifolius* "
- Gutierrezia euthamiae* "
- Artemisia tridentata* "
- " *trifida* "
- " *arbuscula* a little on NE slopes
- Eriogonum lavale* com.
- Helianthus annuus* "
- Kunzia tridentata*, on NE slopes
- Balsamorhiza sagittifolia*, a little on NE slopes
- Plantago patagonica* abn.
- Chromola laetevirens* "

very thirsty & all vegetables and other garden crops are good. Grain & alfalfa are good out in the valley. The soil is very fine and white & makes bad dust. Broad leaved cottonwoods dwell in towns. A few pear trees and blue plums were seen with good looking fruit. Peach trees are common in yards, but no fruit on them at this season.

Took 4:25 train to McCombs and stopped off for over night. Followed up Marsh Creek valley, a narrow gulch between mountains and a stream of recent, black lava runs the whole length down the gulch from beyond McCombs to Poecatlillo. The creek cuts a shallow canyon in it in places, but the lava flow followed the gulch bottom. It is not very wide or deep.

Upper Sonoran zone does not run far up the canyon, not being much in evidence at Lubron. Only a trace reaches McCombs, where the valley is almost pure transition.

Plants of Mc Cannon

Betula fontinalis, com. along creek
Salix 3 species, " " "
Chenopodium " " "
Prunus melanocarpa, " " "
Kunzia tridentata " " "
Amelanchier " " "
Ribes longiflorum " " "
Artemisia tridentata Abundant
" *ludoviciana*, common.
Chrysothamnus tortifolia "
" *grayi*, a little
Gutierrezia euthamiae com.
Balsamorhiza sagittifolia a little
Tetradymia canescens, 1 plant seen.
Berberis repens, com.
Glycyrrhiza lepidota "
Opuntia missouriensis, a little
Helianthus annuus, along railroad
Chamaecrista integrifolia " "
Russian thistle " "

Mc Cannon

It is a wide, sagebrush valley here, mostly used for "dry farming" grain. The bottom lands are irrigated from the creek & there are some little side creeks & springs apparently come out of the side gulches of the mts. Ranges of rather low & barren mts. run along both sides of the valley. There are patches of aspens & strips of spruce on their cold slopes, but they have the appearance of being chapped & burnt to the last degree. Transition zone probably runs up nearly to the top on SW slopes but their cold slopes are mainly Canadian down to the base of the steep slopes.

Apples do well here & some trees are loaded. Red astrican & yellow transparent are common. Some early corn has not been frosted yet.

The successful dry farming indicates a good snow fall & probably a late spring. Still the grains are mostly harvested.

Sept. 3

From M^e Cannon south the valley slopes up very gradually to the summit of Swan Lake. It widens out & then narrows up to a few inches in width at the pass, but there is no perceptible divide or ridge. Marshes or sloughs are common along the creek which is well named. Swan Lake is a slough 0 mile long & 20 rods wide.

Sarcobatus occurs in spots all across the summit and here & there a little *Chrysothamnus graveolens*, but no other trace of Upper Sonoran was seen. *Artemisia tridentata* is the dominant vegetation.

After passing Offord now *C. graveolens* comes in, lots of *Helianthus annuus* and the big Bear River Valley (Cachel?) seems to be Upper Sonoran. But it is so fully cultivated as to be hard to recognize any zone species; mostly grain & alfalfa & sugar beets.

In Bear River Canyon see lots of *Juniperus utahensis* on both slopes. Reached Ogden at 4:30 & started west at 5:30 P.M.

Sept. 4

Daylight at Lovelocks.
Reached Hezen too late for train so
drove over to Fallon.

Worked at Fallon + vicinity Sept. 5 & 6.
Tried to find the desert fox but failed to
locate a den. Two are kept alive in a
cage at the Soda Lakes where they were
caught in hollow tubes of old tinning.
They are in fine condition but the man wants
10 dollars for them.

Sept. 7. Took morning train to Reno + the
Overland from there to San Francisco.

Sept. 8 Reached San Francisco at 7:45
and caught 8:15 boat for Sausalito -
arrived 10 AM.

Sept. 9, Decided to do some collecting
at Sausalito so returned to San Francisco
for baggage, mail and supplies

Sept. 10-14, Trapped in the Zamalpais
woods and over the bald hills near Sausalito
and caught many important mammals.

Sept. 16 - Went to Kentfield, and spent parts of 3 days gathering information and notes on mammals, birds & plants.

Sept. 17, Went to Point Reyes ^{station}, and set traps in big salt marshes near there hoping to get *Microtus edax* & a new *Rhithodonta* & black sails but failed in all. Found *Microtus californicus* all over the marshes, no *Rhithodonta* & caught only a Virginia rail.

Sept. 20 went to Olewa & Inverness and returned at night to Sausalito.

Sept. 22, Caught an early train in to San Francisco and an evening train out for San Luis Obispo.

Sept. 23, Reached San Luis Obispo at 1:20 A.M. Climbed one of the high hills near town to get a view of the country & a list of plants & birds. Went up to 1300 feet. Wrote reports in afternoon.

San Luis Obispo

Sept. 24: Got a saddle horse & went up San Luis Obispo Creek through the first gap, then turned south up another creek and rode to the last ranch, then left my horse & climbed east up the Pine Ridge to San Luis Obispo Peak, 2800 feet, about 6 miles due east of town. From this ridge I could map most of the transition zone area on the San Luis Obispo quadrangle. The rest of the country is all Upper Sonoran except the open valley bottoms which are a modified form of Sonoran.

Sept. 25 Left San Luis Obispo at 2:45 PM for Santa Maria, on the narrow gauge.

Sept. 26 - Got a team and drove east to Gary & beyond to Lepusquet Canyon, up it to west base of the peak & left my team and climbed as high as I could get up Lepusquet Peak. Couldn't get all the way up through dense chaparral but got into transition zone on cold slopes a little above 2000 feet.

Had a long cold drive back after dark against a chilly sea breeze, made about 40 miles besides the climb. Got good notes + a few specimens of plants.

Sept. 27 - Took train for Los Olivos + arrived there at a little after dark.

Sept. 28 - Got a saddle horse + went up the canyon north east of town as far as the trail went up the creek + got notes on trees + brush. The valley oak, *Q. lobata*, is all over the low country, then a border of *Pinus sabiniana*, and chaparral runs up the warm slopes to top of the nearest peaks. The valleys are all in big land-grant Ranchos, grain + stock are the main products, no farms or farming. Leased or managed areas are the rule. Cattle + pigs + some horses are raised. The question is what are these untraced valleys good for, they are dry + hot in summer + said to be cold in winter.

Odocoileus scaphiotes, abundant in mts. beyond where the trails go.

Many are killed each season.

Sciurus nigripes, Common up among oaks + Spruce + pine + Umbellulania in higher canyons, 2000-4000 feet.

Eat cones of digger pine + big cone spruce.

Eutamias merriami, Common in chapparral from 2000 to 4000 feet.

Neotoma, Common in chapparral

Perodipus?, Common in bottom of valleys

Perodipus?, One common on steep slopes in chapparral at 3000 feet. Closed burrows seen.

Maybe *Dipodomys*

Thomomys, Com. everywhere.

Fiber, Com in mts.

Lynx, " "

Canis, Common in valley

Procyon, " " + mts.

eat *Cercara berms* + *Prunus ibicifolia*.

Taxidea, A few in valley

Procyon, Common along streams.

Happy Camp + Caehuma Creek

Sept. 29+30, Took saddle horse + rode up Happy Camp, then over into Caehuma Creek canyon and up to Gonzalez's ranch, where I left my horse + tried to climb San Rafael Peak. Got up about half way - to 3000 feet, and had to give it up. There are no trails up + the chapparral is so dense I could not even crawl under it.

Came down into Caehuma canyon + followed up it till dark, slept by a little fire until daylight + then went on up a trail to a peak west of the Caehuma + about 4500 feet. Got a good view of the range + good notes.

Found lots of *Pseudotsuga macrocarpa* on cold slopes and *Pinus sabiniana* on warm slopes. No very good transition zone species, but plenty of maple, *Amarus chrysolepis* + *Umbellulania*.

Came back to ranch + rode back to Las Olivos.

Las Olivos

Oct. 1. Sunday. Am resting

and getting over effects of 2 bad days riding on a hard gaited horse & ready for a hard trip tomorrow up the Siagwoe.

Oct. 2, Found a Forest Ranger going up the Siagwoe tomorrow, so will wait for him. Hunted yellow billed magpies up Alamo Pintado Canyon and took dinner with Mr. & Mrs. Fox. Got 4 magpies from a flock of about 100. They soon got very wild and were difficult to get a shot at. Made up skins & got ready for start in morning.

Oct. 3, Started with Jess Smith on trip to Zaca Lake, then over to his cabin on the Siagwoe at mouth of Mangrove Cr. Got in late, somewhat after dark & got a good camp supper. Turned our saddle horses & burros into the old Mormon vineyard to eat dry grass and luscious grapes.

Sisquoc R.

Oct. 4. Packed our burro and started up the river. Got a feast of pears, peaches, apples, grapes & figs at the Montgomery ranch, then stopped at the Upper Montgomery place for lunch, and continued up through the Narrows to the mouth of South Fork & camped after dark.

The trail is rocky and rough much of the way & we could not make good time. The river is low, little more than a good creek, but is full of fine trout that jump into an oar or stick thrown into the water. I never saw better trout fishing but we had no time to fish & had to eat salt bacon.

Found our cask of baking powder was only flour so I had to make tortillas.

Beautiful camp spots all along the river and many signs of old camps. At present there are no campers, as the deer season is passed & the quail season not open. There are abundance of valley quail, a few mountain quail & lot of gray squirrels.

Big Pine Mtns.

Oct. 5. Packed up & continued 7 miles
up the river to Cottonwood Cr.

and camped & left horses. Started on
foot from here for top of Mtn. at 10 AM.
& followed to head of river, then up the
steep slope of canyon to Bear Camp, or
Dove flat as Mr. Tiben calls it, then up to
peak. Above 4000 feet there is fine
big timber of Jeffrey, Sugar, & Coulter pines,
big cone spruce, Abies & Libocedrus.

Also *Quercus chrysalipes* & *Acerra macrophylla*.
The forest is open & clear of chaparral
and a good trail runs over the top of
peak & down to open forests on the
west. The peak is 6580 feet, the
highest in the range. There are water
holes in rocks on top & the Fox bog pond
a broken partly, showing that it had been
used as an Indian camp ground.

Returned to camp but got in late

Oct 6. Left Cottonwood camp early & alone & rode back to Zaca Lake about 45 miles over rough trail. Got in at 6:30 & met Dr. Merriam then at Mr. Libens.

Oct. 7. Spent the forenoon preparing plants & specimens & getting notes on trees & bushes around the lake. In P.M. went down to Los Olivos.

Oct. 8. Got Charles Whiteber to take us over on the Santa Ynez Mts. on the Refugio road & from there went up Santa Ynez Peak to the timber. Found lots of *Pinus coulteri* & *Quercus densiflora* & *Chrysothrix*, big leaved maple & *Umbellularia*; a good strip of transition zone species along the north slope down about 1000 feet below the summit.

Returned and went to top of Garista Pass and back to Los Olivos. Stopped at Santa Ynez Mission.

Mr. Castro's son tells me that they rarely have frosts at this place in Tepusquet Canyon, sometimes 2 or 3 years without any. Says it is much warmer than the Santa Maria Valley.

They raise good figs & peaches and the next ranch raises walnuts & grapes but only Mission grapes.

Oct. 9 Wrote reports & notes & packed specimens & arranged baggage for trip to Santa Maria River, Cuyama Valley Ozeva & Bakersfield.

Oct. 10, Started with team & drove for Tepusquet Canyon, lunched at Mr. Musler's in Foxen Canyon and stopped for the night at ~~Sierra~~ Castro's in Tepusquet Canyon. Were most cordially entertained and could not induce Castro to accept any payment.

Oct. 11, Followed up Tepusquet Canyon to summit and over into Buckhorn Canyon and down it to Santa Maria R., (about 12 miles) then 10 miles up the river to Gray's ranch where we camped. Rather rough roads but a short days trip.

At Gray's ranch the valley is entirely cut off from moist west winds and many desert species appear. *Phacelia sericea*, *Opuntia acanthocarpa* & *inglauri*, *Artemisia tridentata*, *Bigelovia acedintalis*, *Gutierrezia*

Cuyama Valley

Oct. 12, Started early from Gray's ranch and followed up the Santa Maria Canyon about 10 miles, then out into a broader valley, the Cuyama. Continued about 30 miles up this to Cuyama Ranch No. 1. & stopped for the night & set traps.

This big open valley is hot dry, does not have a desert, mainly treeless except a few cottonwoods along the streams. It has 2 or 3 occupied ranches, but mostly belongs to Senator Perkins and is run by Miller & Lux as a cattle range.

South of the valley the great black range of San Rafael or Sierra Madre del Sur extends continuously and of a general level of 5000 feet. It is covered with dense chaparral except near the top and in gulches on cold slopes where tall pines and yellow leaved maples show.

On the north of the valley a low, bare desert range, the Tumbler, or Templeton range is bare of timber or brush except near the top where scattered bushes

Birds of Cuyama V.

Aix sponsa
Oryzopsis vociferus
Actitis macularia
Ardea herodias
Zonotrichia c. vallis
Zenaidura m. macroura
Elanus leucurus
Circus hudsonius
Accipiter velox
Buteo b. calurus
Aquila chrysaetos
Falco mexicanus
Falco sparverius
Geococcyx californianus
Ceryle alcyon
Dryobates
Melanerpes formicivorus
Ammodramus leucurus
Colaptes auratus
Tyrannus verticalis
Sayornis sayi
.. nigricans

Pica nuttalli stomachs
 Los Olivos, Calif. v. 03.
 Oct. 21, 1911

Grasshoppers	ants	Oats
25		19+
8	few	—
20	"	Several
1		5+
31		few
86%		14%
M. Atee		

A dark green are probably junipers as when the road runs up from Cuyama Ranch reaches almost 3000 feet a lower Sonoran gap Cuyama + San Joaquin

as well as San Emidio peaks east end of Cuyama V. timbered mountains, while is a little beyond Mts. Pinos S.E. The Pine Range is to show any characters. rare zone in the Cuyama V. at least 3000 feet as SW probably 2500 on the east valley. *Atriplex polycarpa* + abundant shrub and common only over the pass Joaquin Valley where it is found.

Otocoris
Pica nuttalli
Aphelocoma
Corvus c. sinuatus, com. in open valley
 .. *brachyphynchos*, com. at west end

Birds of Cuyama V.

<i>Aix sponsa</i>	1 ad. in river
<i>Oryzopsis vociferus</i>	com
<i>Actitis macularia</i>	1 in river
<i>Ardea herodias</i>	a few
<i>Zootheryx c. v. californica</i>	abundant
<i>Zenaidura m. carolinensis</i>	one seen
<i>Elanus leucurus</i> , 2	seemed to be.
<i>Circus hudsonius</i>	1 ♀
<i>Accipiter velox</i>	1 in canyon
<i>Buteo b. calurus</i>	a few seen
<i>Aquila chrysaetos</i>	2 seen
<i>Falco mexicanus</i>	a few seen
<i>Falco sparverius</i>	common
<i>Geococcyx californianus</i>	tracks all along
<i>Ceryle alcyon</i>	a few along R.
<i>Dryobates</i>	species not determined,
<i>Melanerpes formicivorus harrisi</i>	common
<i>Auriparus lewisi</i>	a few at ranch
<i>Colaptes</i>	common
<i>Tyrannus verticalis</i>	1 at ranch
<i>Sayornis sayus</i>	seen all along
.. <i>nigricans</i>	a few seen.
<i>Otocoris</i>	abn. in open valley
<i>Pica nuttalli</i>	a few all along valley
<i>Aphelocoma</i>	common in canyon
<i>Corvus c. sinuatus</i> , com.	in open valley
.. <i>brachyphynchos</i> , com.	at west end

of dark green are probably junipers. The low pass where the road runs over this range from Cuyama Ranch to Maricopa reaches almost 3000 feet and forms a Lower Sonoran gap between the Cuyama + San Joaquin valleys.

Mt. Piños and San Emidio peaks stand at the east end of Cuyama V. at big black, timbered mountains, while Fraser shows a little beyond Mt. Piños. Away to the S.E. the Pine Range is too distant to show any characters.

Lower Sonoran zone in the Cuyama V. extends up to at least 3000 feet on SW slopes and to probably 2500 on the east side of the valley. *Atriplex polycarpa* is its most abundant shrub and this extends commonly over the pass into San Joaquin Valley where it is also abundant.

Cuyana Valley

<i>Sturnella neglecta</i>	com. in open
<i>Agelaius</i>	a few at springs
<i>Euptagus cyanocephalus</i>	numerous
<i>Carpodacus</i>	com. at ranch
<i>Aythya americana</i>	com. at ranch
<i>Pipilo maculatus</i>	a few seen
<i>Chondestes g. strigatus</i>	com. in open
<i>Zonotrichia</i>	com.
<i>Junco</i>	a few at west end
<i>Amphispiza nevadensis</i> —	com. in open
<i>Melospiza</i>	2 at ranch
<i>Pipilo maculatus</i> —	com. in canyon
" <i>c. sinuata</i>	" " "
<i>Petrochelidon lunifrons</i>	nests on cliff
<i>Janus l. gambeli</i>	a few all along
<i>Dendroica auduboni</i>	com.
" <i> aestiva</i>	1 seen
<i>Anthus ruber</i>	a large flock at spr.
<i>Mimus p. hesperis</i>	2 seen
<i>Geothlypis trichas</i>	com.
" <i> leucotis</i> , 1 shot & several seen at E. end.	
<i>Salpinctes obsoletus</i>	com. in canyon
<i>Catherpes m. punctulatus</i> ? 2 heard in canyon.	
<i>Psathiparus</i>	com. in canyon
<i>Chamaea f. humstrewi</i>	" "
<i>Poliophtila</i>	1 seen in open valley
<i>Sialia m. occidentalis</i>	a few all along.

Ruby Valley, Nevada

Oct. 20,

Left Wells at 10 AM on the Western Pacific going east.

Over low pass to Ruby Valley there is mainly sagebrush, some *Atriplex confertifolia*, *Gutierrezia sutlowae*, *Sarcobatus*. On the sides of the pass junipers, & possibly nut pines, run up considerably higher.

This pass is evidently higher ~~lower~~ as we have always mapped it.

The Ruby Mts. are covered with snow for 2000 feet down on cold slopes and there is some snow on the ranges to the S.E. and much on the ~~Barren~~ ~~mountains~~.

The R.R. runs down the east side of Ruby V. over great level plains of dry but good soil.

The vegetation is mainly sagebrush, *Atriplex confertifolia*, *Sarcobatus*, *Eurotia*, *Gutierrezia*, *Bigelovia*.

At the far eastern edge of Ruby Valley we strike a little range and tunnel through a low place in its middle. It is mainly a juniper range, but over

its highest part, south of the road there is considerable tall timber, probably *Pinus flexilis* and considerable snow. North of the road the range is lower with little timber and only a doubtful trace of transition.

The big level, desert valley east of the range is also Upper Sonoran desert. *Sarcobatus* & *Atriplex confertifolia* cover the middle part, sagebrush, *Eurotia* & *Yucca* on the side slopes.

At Shafter in the middle of the valley we cross the road to Ely and continue N.E. east through a low pass in the Toano Range.

The Toano Range is not very high but is well timbered with juniper and nut pine and apparently along the crest with taller timber, probably *Pinus flexilis* + *Croocarpus ledifolius*. I can see no fellows of aspens even in cold N.E. gulches so give it only a transition zone crest. The basal slopes, as the valleys both sides are Sonoran.

A long curve down the west slope of the Toano Range and we

Come to the edge of the Great Desert,
or Salt Lake Playa, at Nevada.

To the north and south are sharp, low
little desert ranges and far to the S.E.
is a high, snow capped range.

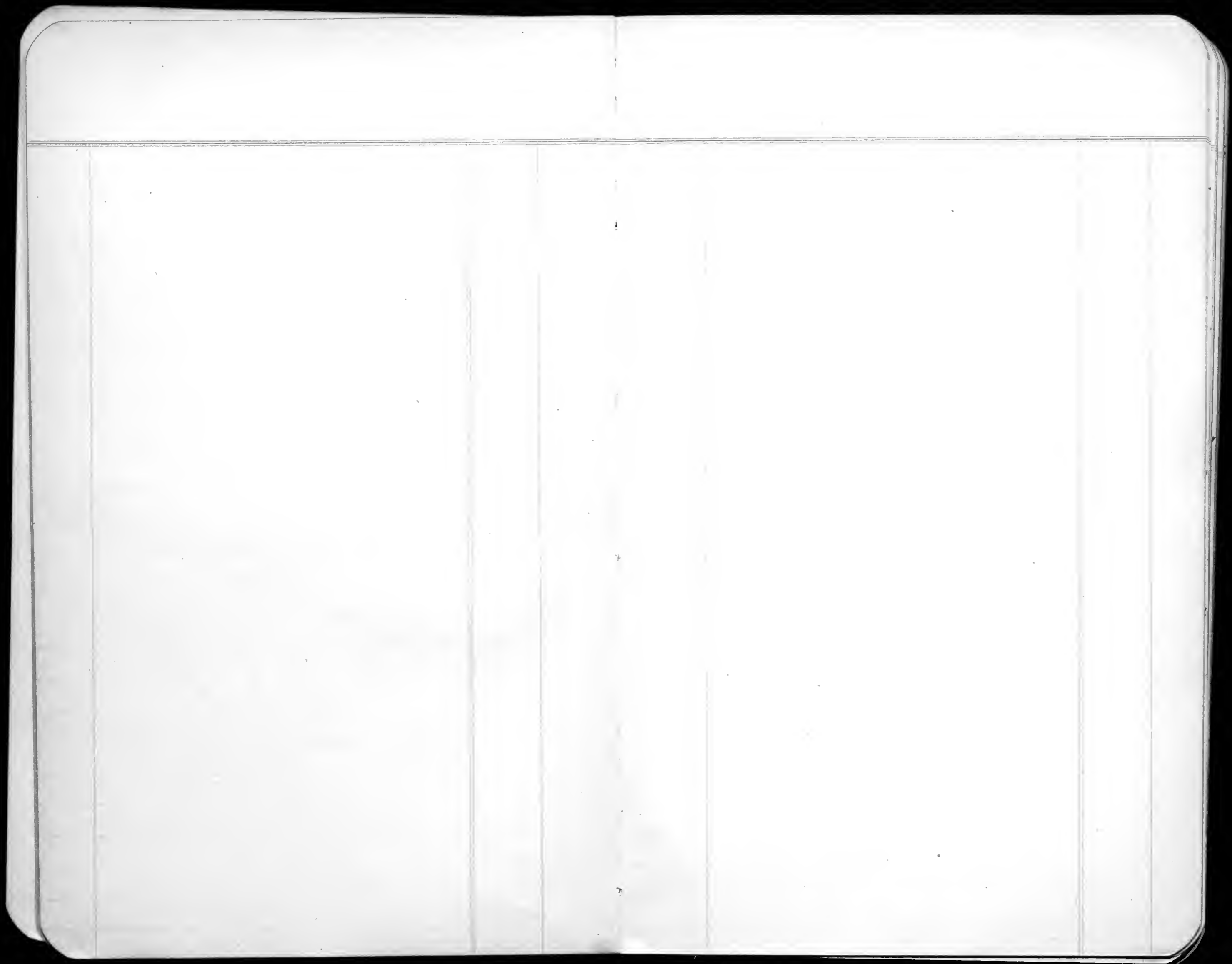
To the east snow white salt flats stretch
out of sight except for dim island
ranges here & there. We start across
the flat and straight east over a
sparkling surface, then through shallow
lagoons, and over more white for an
hour or more, nearly 2 hours,
before we come to a slightly higher
level where things grow again.

Then we go up over a low ridge
or gap in a low desert range
and over to another long narrow
playa, along the east side of
which is a steep, high range
with snow capped peaks and
probably a Canadian zone
summit. It comes close up to the
corner of Salt Lake where we
first strike it.

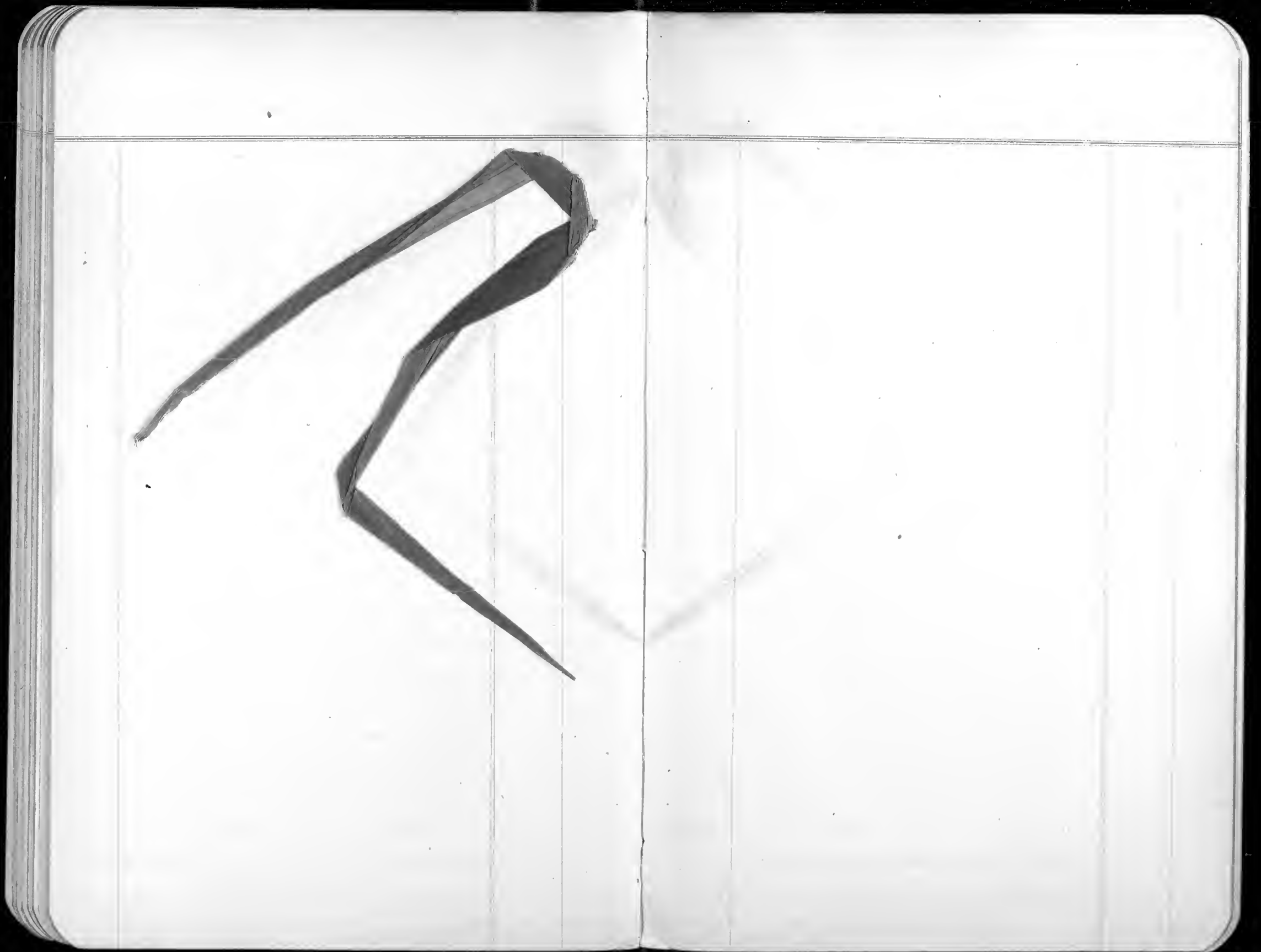
The next range, directly south of
the lake is also high with snow cover.
& it is the last range before reaching

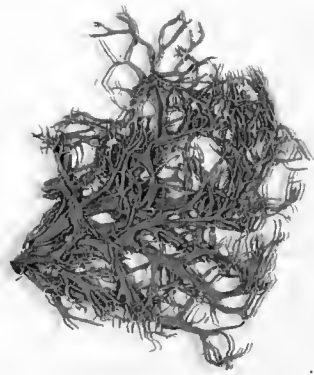
Salt Lake City.

For several miles we cross a shallow arm of the lake, then across salt grass flats to the river Jordan. They are plowing up salt grass land & seeding it to Alfalfa & also cutting a good crop of alfalfa on ground surrounded with only salt grass & halimololcha & white with alkali.

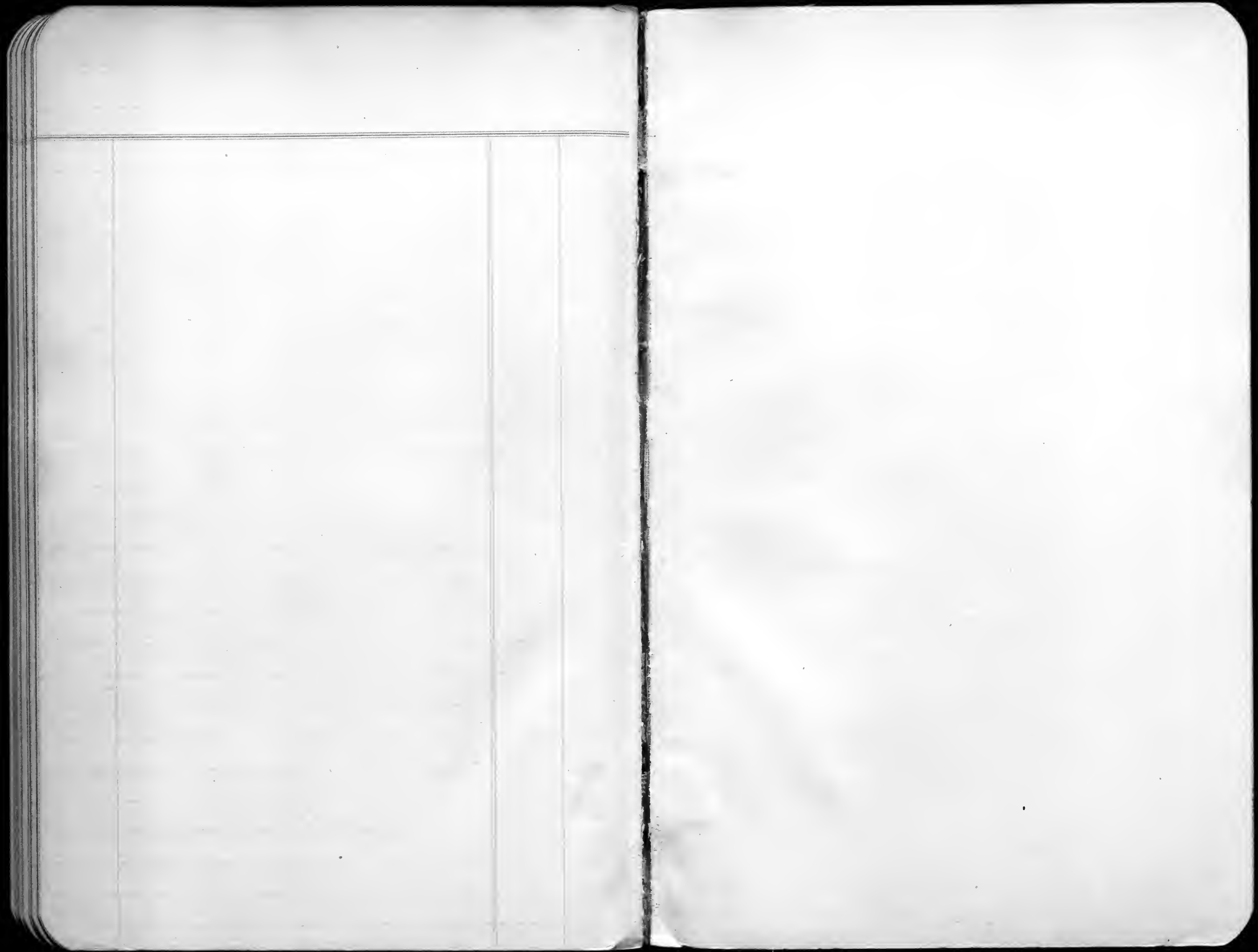












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22
40

