

RECORD OF DR. J.E. CHURCH  
re-Snow Survey

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Monday, Nov. 1, 1943

Left Reno 8:30 A.M. Bus not crowded. Arrived 10:30 A.M. Vapor rising from Donner Lake like fumarales. Snow (weathered) on south slopes and on level in shade.

Quarters

Old postoffice vacated and cold. Met Lieutenant King. Gave him 11, 111, 1V Human Side of Snow and letter from Col. Easton to show Col. Hennessy tomorrow. He will recommend postoffice rooms (now vacant) for our quarters. Meals will depend on Col. Hennessy.

Lunch at Donner Summit Lodge.

Calcium Chloride

Made a supply of antifreeze of 13 cans (tomato) plus 13 cans water or equivalent calcium and water by volume. At 1:45 P.M. reinked H-T at Hotel. Min. Therm. O.K.

Recharged Precip. Gages

Hotels:

- No. 1 - Standard - Total mass for Oct. 2.64 in. Test for leaking. Moisture seen by A.C. was probably sweating.
- No. 2 Stevens W Dpth 5.02, 4.30, 4.82 in. Thin comb over artifices. No jitters, but moved by steps, the tiny.
- Pen now 1.33 in. to right of base line. Determine initial distance

# TRU-LINE

1943 -

- Oct. 31 - Grandel comes West  
→ Nov. 18 Project of West Temp. in East  
Nov. 24 - Sentry Both Wires  
Dec. 2 - Pierce builder  
Post House,  
Dec. 7 - Case Boomer.

No. 9

From November 1 1943.

To December 10 1943

No. 18-G

Monday Nov. 1, 1943

Left Reno 8:30 am. Bus not crowded. Arrived 10:30 am

Vapor rising from Donner Lake like funnels. Snow (weathered) on south slopes and on level in shade.

#### Quarters

All postoffice vacated and cold. Not heating. Saw him II, III, IV Human Side of Snow and letter from Col. Easton to Col. Hanaway tomorrow. He will recommend postoffice rooms (now vacant) for our quarters. Heals will depend on Col. Hanaway.

Lunch at Donner Summit Lodge

#### Calcium Chloride

Made a supply of antifreeze of 13 cans (tonnets) calcium + 13 cans water or equivalent calcium and water by volume.

at 1:45 pm rinsed H-T at Hotel.  
Misc. things O.K.

Rechanged Precip. Log

No. 1 - Standard - Total wires for Oct. 2.64  
Test for bearing. Distance seen by A.C. was  
probably varying.

No. 2 - Standard II  
No jitter, but <sup>opt. 5.02, 4.80, 4.82</sup> <sub>Time about 1/2 sec</sub> wires by steps,  
the long.

Can now 1.38" to right of base line  
→ Determine initial distance when set  
July 26? 2.17" Gain for October 2.76  
(less initial setting)  
= 2.43"

→ The trace the continuous is by  
steps, for the neigh beam will  
not close contacts until the precip.  
is .01 or more? Test this. Write  
Range.

Motor started. Did I touch bar?

→ To check possibility of jitter, when  
we are here steadily trace off black  
trace effect if any.

→ The cover of the recording case sticks.  
Due to rubber weather strip.



No. 3. Army Engineers

Depth 4.9<sup>in</sup>  
increase October \_\_\_\_\_<sup>in</sup>

Abundant oil on stick. Possibly  
more accurate.

No. 4. HR 1.03 (12.03)<sup>in</sup>

Recharged 5.80 (16.80)<sup>in</sup>.

2 conc calcium solution + cover gal.

Sunshine Recorder.

Just well in contact. No better earlier  
in day. Are 8 vlt. too near for  
all pens? No; sunshine pen re-  
corded for a few minutes well.

→ "Case of triple register, having been  
inactive so long, not need cleaning."  
- a.c.

No. 5. Frey.

Removed 3:40 pm. Reset 3:45 pm  
Recharged 1 conc calcium + oil  
and set at 1<sup>in</sup> line.

HR 1.48<sup>in</sup> to 4.28<sup>in</sup> = 2.80<sup>in</sup>.

Pasture -

No. 6 wt 10.91\* (21.91) in.

Recharged 5.95 in

2 cans calcium + 2 water + oil.

No. 7 Stevens Q.

Wood shut removed.

Outlet recharged.

5:30 pm. Pen reset 5.16 in.

Pen still  $\frac{1}{2}$  high in pen. Range has sent instructions for cleaning and refilling.

Remaind!

at + ...	6.95 in
Net 1 ...	9.83
Outlet	<u>2.88</u> in

→ Need cement for strips on deer.

No. 8 wt 10.20 (21.20) in.

See case as large as a corky but only as thick as a wafer.

Recharged 4.61 (15.61) in.

1  $\frac{1}{2}$  cans calcium + 1  $\frac{1}{2}$  water.

Does tube shine? Thought I had 2+2 for all. Overlaid the voids in the calcium crystals.

Thermometer

glass O.K. Current min. 41.6° F  
H-T 42.0°

Lead humidity pan.

→ Feeling? Felt none at 5 pm. Eastern half  
of sky overcast and ice in shade  
of hotel melting.

But temperature steadily falling  
from 46° F at 4 pm to 42° F at 6 pm

No. 9 wt 1.08 (12.08) in., 1.075 in.

Recharged 4.77 in.

None, no snow. (6:30 pm.) Obtained flash light.

No. 10 wt. 1.22 (12.22) in.

Recharged 4.58 (15.58) in

→ Erect a standard anemometer  
by Nos. 9 and 10 precip. gauges to test  
friction of gages and willars  
on winds

Lumber

Brought up from Traverse and  
stored in barn opposite pasture.

## Comparison of Eyes for October

### Watch

No. 1	Depth (unshielded)	2.64 <sup>in.</sup>
No. 2	Stinson H - Graph	2.76 <small>(these may be 2.34)</small>
No. 3	any Eyes - Depth	2.00
No. 4	WT.	2.91
No. 5	Frey - Graph	[2.83]* Revised 2.74 <sup>in.</sup>

### Pasture

No. 6	WT.	2.79
No. 7	Stinson Q - Graph	2.90
No. 8	WT (unshielded)	2.54
No. 9	WT (3 ft deep)	2.93
No. 10	WT (can 3 ft deep)	2.95

### Notes -

Prescip. rain and snow

No. 1 and 8 unshielded.

No. 9 and 10 only 10 feet above ground.

\* Graph of Frey recorder

Oct. 1	...	1.45 <sup>in.</sup>	rain
" 15	...	2.10	0.65 <sup>in.</sup>
" 22	...	3.86	1.76
" 29	...	4.10	0.24
Nov. 1	...	4.28	0.18

2.83<sup>in.</sup> (subject  
to rain)  
Revised 2.74<sup>in.</sup>

[Over]

No. 1. Standard Lumberfield  
October

.08 in.  
.54  
.01  
.40  
.16  
.30  
.85  
.19  
.05  
.06  

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2.64 in.

Saturday, Nov. 6, 1943

Prof. Boardman and Dan Layson  
left for Tahoe and Soda Springs  
last night with tools and paint.

→ Took 100<sup>th</sup> anniversary Florida. I caught  
3 for his today

Auto Injury

Found that Arthur Cavilland had  
been auto-wrecked near Prosser  
Creek on bad curve. Thrown out  
and landed by side of instead  
of beneath Campbell near bottom  
side up downhill. Miracle that  
he escaped.

Army thought that I was the  
one wrecked. He had key to  
filling station in his pocket. So  
Army had to cut their loss.

Regular instruments being reset  
by Fred Small, set H-Ts and  
barograph running over. Reset  
them.

Construction

Boardman and Layson had extensive  
on east side of bridge in pasture well  
along.

### Temperature

Cold. Current temp.  $37^{\circ}\text{F}$ . (Min. for period  $22^{\circ}\text{F}$ )

Cold night also. Stayed upstairs at Deane's lodge.

Sunday Nov. 7 Cold but milder.

### Construction

Completed platform for telethermograph and an east-west corner of trestle a frame to hold thermometer shelters for the study of comparative temperature and humidity from surface of snow to the top of the trestle.

### Hypo-thermographs

Should have readjusted H-Ts November 1 to  $-10$  to  $80^{\circ}\text{F}$ . Used the winter shut yesterday but failed to raise the pen.

But did so today and reset also No. 5 Friez recorder.

### Friez Recorder

From Nov. 1 to 7 pen of Friez was still at 1 in. line. No evaporation.

## Calcium Chloride

Query: Calcium chloride does not absorb water after it is in solution. Is this because the solution is saturated? It can absorb no more water?

And the oil film prevents loss of water by evaporation.

Likewise the calcium absorbs none when it has become diluted by further precipitation.

→ Will a can of dry calcium chloride grow heavier if left out in moist air? Try it.

→ Determine relative weights of a can of calcium crystals and the same can full of water.

"Salt only 10% of water and calcium 50% or more?"

→ See Codd's formula for changing gases, and note that Army Engineers use weight rather than volume.

Monday, Nov. 8

Quarters

Lieut. King left for Auburn Saturday afternoon and returned only today.

He reports that we can have a room in the Hotel or the rooms at Filling Station, and meals at 30¢ each per person.

Close the Filling Station. But early changes of troops may be made.

"The old sergeant 'Pop' was transferred last Saturday." The new sergeant of Company B is already putting in new oil pipe for our heating stove.

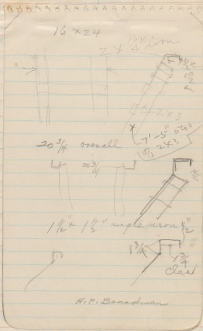
If Army moves away, Dennis Jones may come back, but we will probably be permitted to remain throughout the year. Then Mrs. Sandel could join us, especially while I was East to study snow in the Appalachians.

Construction

Completed construction in Pasture. Slowed Harry details of painting.

Started for Reno at 4:30 pm





### H-T Pave

Checked H-T pave. Correct. Should not be correct. But check them further by standard thermometer.

Reed, Tues. Nov. 9

### Stevens W

Washer weights from Stevens to test responsiveness of Stevens W.  
Responds presumably at 0.06" water.  
See his letter.

Thursday, Nov. 11. "Armistice Day"  
To Soda Springs at 10 am

Took ladders for Stevens Q and Comparative Temperature shelters. Erected the first securely with iron straps and completed the support for the shelters.

Carried lumber on auto from base to Hotel. Not difficult if slope and fender are used.

"Linsley has ordered 'Stevens Q' for four for night of 17th."

Christmas-tree cutting campaign  
by soldiers too. Are permitted to work  
if whereabouts known. Employed by  
Fred Small and Paul Harbin.  
"Pop" here and employed also.  
Perhaps he could meet man  
for us.

Spire not yet driven above gulch  
on stump, the paid for. Overlooked?

Friday, Nov. 12

Building extension on northwest  
corner of platform at Hotel.  
Much snowing and hickering.  
Harry has been painting the Grotto  
in Pasture.

Saturday, Nov. 13

Auto has stalled at starting each  
morning. Now it is out on the  
incline.

#### Instructions

East wind. Still fair. Ice in  
road.

Racet H-Ts and barograph.  
Stevens Q still has ice. Hold glue  
for weather strips.

### Construction

Floor on extension at Hotel.  
The uprights have been firmly braced  
on sloping rocks.

First coat of paint on trestle  
in Pastures.

Tried to see Lieut. King but left  
at 2 pm for Anchorage.

Soldiers busy at to cut Christmas  
trees.

### Home

Arthur Quilland in S.F. for change  
and new glasses. Expected home  
today with guests.

So has moved from our room  
upstairs to "Stevens Cabin".

"Dinner Summit Lodge is your home"  
said Nan.

Sunday, Nov. 14

Milder and fair. Wind still east.

### Instruments

No. 2 - Stevens W. still O.K.

Barometer. Need better blanket.

Tao ragged.

Rifle Register

Battery O.K. Sunshine recorder too weak. Mercury column rises barely to contacts.

Hotel beds or dunn are breaking. Springs have lost tension and become brittle when soldered. Heat of soldering or age?

Moving

Moving equipment to Filling Station. Left only the coils of mine at the Hotel. Should keep this room for storage of lumber and accumulation

a more understandable display of equipment for Bernard and efficient arrangement.

Besides abundant room - entry, bedroom, living-office room, kitchen-wash room, store room for instruments, store room for winter clothing and equipment, toilet, and two cozy upstairs bedrooms with oil stoves.

Need rugs, window shades, lights, chairs, lamp parts, office desks,

wood and coal for Nitcham.  
also a window glass 15x36 in.  
and material for closing hole  
in wall resulting from removal  
of postboxes.

Monday, Nov. 15 Triple Register  
Arthur Comilland returned  
yesterday and reset instruments  
last night.

Sunshine recorder "stopped"  
perfectly for a few minutes yesterday  
but mercury column is just at or  
below contacts. Insufficient alcohol?  
Need new sunshine recorder.

Drum had moved only an hour  
by this morning. Called Arthur.

He found that the metal "annulets"  
on the drum had caught on the  
wind-direction pens.

→ Ask Stevens to make a new  
pair such as those on Q or replace  
the wire springs. The coils on  
these have lost tension by age  
or heating. Rubber bands not  
better.

Completed platform but left  
planning for extension of top of  
Trig Tower until approval of  
Merrill Command was received.

Lieut. King believes that all of  
the cots of Dennis Jones are  
located up but will provide  
us with two Army cots, mattresses,  
and pillows. A few canvas chairs  
are already at Filling Station.

Left for Reno 5:15 pm. Home  
at 6:30 pm. Took a Technical  
corporal as passenger. Has two  
days off.

Tuesday, Nov. 16

To Soda Springs on 3 pm bus.  
A dozen turned away. No additional  
bus available. But I was granted  
the privilege of standing.

Finally three of us who lingered  
were given camp chairs in the aisle.  
Arrived 5 pm.

Loaded with window shades,  
glass, suitcase, and catched to the

Notice has appeared regarding sale  
of the property owned by the  
Railway. It is not yet known  
how much money will be raised  
from the sale.

amusement of the passengers.  
"Moving?" Yes, I'll show you where."  
But at Big Station found the  
window pane broken. No sound.  
Was much crowding and assistance  
at Big Station?

Cut beds at Lilly Station. Stone  
ready. One of the boys showed how  
to light it. Very simple and steady.  
Heavy jointing platform at Hotel.  
Set triple register for Caillard  
and helped carry baggage to  
Danner Summit Lodge. Had Beer  
No. 1 upstairs. No further news.

Forecast

Barometer had been falling slightly  
but sky was overcast and Christmas  
tree harvesters were anxious.  
I assured Paul Marboe that it  
could not snow sufficiently to prevent  
travelling with chains to 7,000 feet.  
He had only one load to bring out.  
The others were using packhorses  
and hoped to complete a cutting of  
at least 1,000 trees. Many more  
were available.

Tues. Nov. 16

"Hansen Silo" to PX.  
and "Weather".

When Triple Reg. stopped  
by metal band? Sunday night?

Harry painting Hotel  
Platform across.

Reset Triple reg.

No. 1 bedroom

Glass broken.

Wed. Nov 17.

Curtains too long.

Entrance curtain O.K.

Platten + Bucken came

for me for lunch 12:00

Car. riding

### Triple Register

When was triple register stopped by  
metal band? Sunday night? Rubber  
not substituted temporarily.

→ Paul offered to ship a tree for  
me to Marie Wysocki at Buckingame.  
by express for Tuesday.

Wednesday, Nov. 17

a clear morning. Sky overcast.  
Parasent net, thin covering of  
snow on the ground.

treated the soldier mail boys  
to coffee and doughnuts.

Met Dennis Jones. No news yet  
of his lost suitcase and copies  
of the lease in it. Has taken his  
hanger out.

Roda + Sada Springs in stern  
of mail truck.

### Setting

Kindow shades too long but  
shade cut down for outer door  
was put in place. The window  
drapes were used for the bedroom  
door.

House heated and swept for  
visitors.

Triple Register!

Put the tree on the drum of



Total of 8.  
+ Helmut  
Parker, recharged  
NO 5.

Fletcher recharged  
triple reg.

Too many landing  
it. Instr. should  
be covered and  
top fastened on.  
Sled leaving.

Remond proposes  
copying all records  
and placing originals  
in Regional Vault.  
agreed. Photographic  
process to not

### Triple Register

When was triple register stopped by  
metal bar? Sunday night? Rather  
not substituted temporarily.

→ Paul offered to ship a tree for  
me to Marie Wysocki at Encluzana.  
by express for trucker.

Wednesday, Nov. 17

A clear morning. Sky overcast.  
Parasent net, thin covering of  
snow on the ground.

visited the boulder mail boys  
to coffee and doughnuts.

Met Dennis Jones. No news yet  
of his lost suitcase and copies  
of the lease in it. Has taken his  
horses out.

Roda & Sada Springs in stern  
of mail truck.

### Settling

Kindergarten <sup>gile</sup>  
window shades too long but  
shade cut down for outer door  
was put in place. The window  
drapes were used for the bedroom  
door.

Klausen heated and swept for  
visitors.

### Triple Register!

Get the trace on the drum of

Wheeler and Webster  
return home.

Evening -

Exec. Committee

Hydrology -

Parker, Bernard, and  
self did not go below.

Bernard "is home".

Telegraph action.

Triple Register

When was triple register stopped by  
metal band? Sunday night? Rubber  
not substituted temporarily.

→ Paul offered to ship a tree for  
me to Marie Wysocky at Bucharyna.  
by express from Tuxes.

Wednesday, Nov. 17

A clear morning. Sky overcast.  
Parsonnet net, thin covering of  
snow on the ground.

treated the halibut mail boys  
to coffee and doughnuts.

Met Dennis Jones. No news yet  
of his lost suitcase and copies  
of the lease in it. Has taken his  
horses out.

Roda & Sada Springs in stern  
of mail truck.

Settling

Window shades too long but  
shade cut down for outer door  
was put in place. The window  
drapes were used for the bedroom  
door.

House heated and swept for  
visitors.

Triple Register!

Put the trace on the drum of

the triple register again was short. Harry had failed to tighten the set screw.

at noon Paulson and Codd drove by looking for me to take me to lunch.

Barometer rising.

#### Party by Light

Two cars with eight had arrived from Sacramento:

Hletcher of U.S.V. B. and Halcomb of Engineers who would return today to Sacramento; Barnes, Gerdel, and Paulson, who would turn back by auto tomorrow; and Bernard, Lindsay and Codd, who were taking tomorrow's evening train East.

#### 1. Triple Register Checking of Instruments

Mr Hletcher, expert, readjusted triple register to rearrange and synchronize the parts. Gerdel aided in order to become custodian of instruments.

Some nesting was found. Need a light over the case. He suggests reversing the case in order to fasten the top on and

considers the present "seal" as the usual front. Can the feed wires be stretched to reach farther into the room? Register has been handled by the major: Kistler.

The machine recorder seemed to satisfy. Linsley felt that the alcohol belonged above the mercury but I and also Arthur perhaps thru me thought that the alcohol supported it. Otherwise how is the length of the column regulated?

## 2. Gage No. 3 (Army Engineer).

Paulson and Walcott increased the charge of the Army Gage to see if sufficient caloric could be added to prevent freezing entirely. Likewise additional oil was included to prevent all evaporation.

The details were provided for our record by Paulson.

He is planning ultimately to place a gage in the center of American Basin, an unknown land meteorologically or at least in precipitation.

#3 U.S. Engineer Gage at Soda Springs.

	<u>CaCl</u>	<u>Water</u>	<u>Oil</u>	<u>Total</u>
Original Charge	13.35"	16.14"	0.17"	29.66"
Added 11-17-43	26.73	33.78	0.33	60.84"
	<u>40.08"</u>	<u>49.92"</u>	<u>0.50"</u>	<u>90.50"</u>

This is a 33.4% concentration on a 90.0" charge as recommended by U.S.W.B.

Depth measured Nov. 18 by Paulson 15.2".

precluded its removal. Besides the Pasture was needed for its grass.

#### Anemometers

The anemometers should be cleaned each month. Gendel has been even more delicate in such cleaning than the Weather Bureau. The much oil is an

The proposal to keep the contents stored has been abandoned. Parkson fears that icicles may form on the → prob. Try it.

#### Stations

Proposal was made that both stations now be concentrated in the Pasture but I suggested that the site of the 70 year station at the Hotel and the desirability of continuing the record there precluded its removal. Besides the Pasture was needed for its grass.

#### Anemometers

The anemometers should be cleaned each month. Gendel has been even more delicate in such cleaning than the Weather Bureau. Too much oil is an

had as too little. I had kept  
the oil cup filled. The anerometer  
had stuck. Then Arthur had  
used vaseline! Three bottles  
of clock oil on hand.

### Insulation

How can snow be melted under  
identical conditions of air temperature  
yet one sample be exposed to the  
sun? I suggested a room and  
a window. Camus added two  
air fans to circulate and mix the  
air. And to test rates of melting  
→ he proposed taking the calories  
of heat in each sample just before  
the sample started to drip.

This might give the relative rate  
on the sun-exposed and shaded  
surfaces of snow. Worth trying.

### Snow Board

Camus calls it a "toto-pole".  
Does the 2, 3, 4 mean feet or  
20, 30, 40 inches? Camus believes  
the Weather Bureau accepts the latter.  
Here the former is intended.

Fortunately, the detailed inches have been added, <sup>by Lindley</sup> to make a dual system.

I tell them that my age has come in 70 and not 70<sup>2</sup>.

### Stevens Q

The pen was still flowing fully. Plan to leave it an entire year. "an instrument made by engineers". Codd suggested some lead beneath the barrel to prevent adhesion of accumulating to the lead above. The coming instrument.

### Records

\* Codd suggests that all records, instrumental and manual, be reproduced photographically at Sacramento and copies be given to all cooperators and others desiring them but that the originals be placed in the Regional Weather Bureau depository at San Francisco.

Photostats may be too expensive but Lindley and Codd have planned a home-made printing apparatus



for approximately \$30.00 and the  
work will be done by the Bureau  
personnel.

If the copies are satisfactory,  
the advantages of the plan are great,  
for others can now work on the problem  
also.

— General has now received  
the detail chart of Precipitation for  
1942-43 at Sade Springs. Was  
holding it for the completion of the  
Cora history. He was satisfied  
upon learning that Lindsey has a copy,  
but one will be sent immediately.

Thursday, Nov. 18

Overcast. Precipitation recording  
at 8:30 breakfast, but I was late.  
Watch had stopped. When I arrived all  
were sitting out in unison "Good  
morning, Doctor". Codd's joke?

#### Downer Summit Project

The plan of placing a shielded  
precip. gage with the unshielded  
gage at C.A.A. station above Panzer  
Base was approved by General

provided it could be accomplished  
through unofficial cooperation with  
the official in charge. Only if the  
plans fail should CAA authority  
be formally invoked. These  
intricate correspondences can be  
avoided. Offer of cooperation  
by Experiment Station may expedite  
the plan.

The project is to determine the  
value of wind shields under  
high wind velocity. Negative results  
are anticipated, but the range  
of performance of shields under  
all winds should be determined.  
At present only the unshielded  
gage is under test.

Hope to spend whole days and  
nights at the Base observing wind  
currents.

#### Test of Bussip. Gages

Extension of platform at Ketchikan  
for additional pres. gages approved.  
and also the placing of a standard

can by the side of No. 1 to compare measurements by stick and by weighing.

a can of double the surface-area of No. 1 was approached to determine the effect of larger surface.

Approval was given the proposed extension of the platform of the Trig tower to carry a Ferguson gage to compare with the Trig. But Bernard preferred to obtain a Ferguson gage from the gages already in the possession of the Weather Bureau. I had previously written to Ferguson and to Trig.

#### Anti-Freeze Solutions

It was felt that price was not prohibitive in obtaining or developing any stable or dependable type of anti-freeze compound. Lundell's knowledge of physics and chemistry would permit a careful analysis of materials.

→ Bernard suggested painting a can black in front and white behind

To accentuate the circulation already noticed thru the chimney in its corner when the sun warms the car.

Another sack of calcium must be obtained to give abundant material. Alcohol, glycerine and other chemicals can be obtained as the project advances.

### Tests of Shields

Cobby states that Stevens was directed to a Weather Bureau installation at — To get a model for his wind shield and → really adopted Alter's original design. And the others agreed that the flimsy shields were the product of Lutz's economy.

Actually the original in hours of labor spared should be cheaper to construct and maintain.

General was authorized to restore continuous chains to all.

→ It is planned also to study effect of angle of shields on various types of cars by the catch-bite

Temperature over the Snow  
General believe he can obtain  
hydro-thermographs and Cotton-belt shelter  
for measuring temp and relative  
humidity above the snow. One  
H-T should be at Salt Lake City.

also by the stream lines of the  
wind as shown by smoke or  
streamers. Supplementary to this will  
be the use of a screen of pine  
branches to atomize the wind.

\* Temperature in Soil and Snow  
Various equipment has been  
provided to test best method of  
obtaining temperatures in soil and  
snow. Efforts by Kendall in Ohio  
not wholly satisfactory.

Because of physical discomfort  
last winter he suggests a cavity box  
for himself and instruments to which  
wires can be led. The delicacy  
of the instruments prevents the use  
of a box elevated after each storm  
to the surface of the snow. Therefore  
a box on stilts with floor 10 feet  
above the ground has been planned.  
The Pioneer Mill can aid in  
designing.

The attached plan is offered.  
a lantern and oil heater must  
provide light at night and heat.

\*Said wires have been made sufficiently small to enter the distribution system.

Bardal hopes to have terminal wires so small that they will contact snow crystals rather than voids. This, Bernard and I both agree will be difficult. Furthermore there should be little difference between the two for the air affects the crystals.

He desires a cable to carry the wires and believes that they are so fine that they will not be blown down by the snow-catching.

As a check, I plan to use thermistors in tubes and burial thermographs.

→ Dennis and Miss Jones agree to the additional installation. Brass can be left between the legs. An additional rental fee of \$5<sup>00</sup> annually was proposed and accepted and will be paid by the Station.

Dye

→ Bernard deeply interested in Lohia dye and its possibilities but still feels that melt water may travel considerable distance on frozen

→ snow strata. Here is a broad field. Shall use Bowen Hill to obtain steep gradients on which to observe melt-water percolation.

Temperature measurements on this slope turned down from the sun's rays could reveal effects of slope angle.

#### Calorimeter

Bowen but little interested in the thermojug and scale. Prefers to continue trial of the Wilson apparatus <sup>(Bowen)</sup>, which is light and he believes accurate. This equipment he has himself used on snow surveys with Collins and kept pace with the surveyors.

To see the thermojug is error proof the cumbersome. Finally had planned to have O'Neill make more daily measurements with Wilson apparatus. Now Gendel can more than parallel with the jug measurements by me.

### Evolution of the Snow Cover

Hottel said, "but" <sup>frequency of snow cover</sup> daily observation of snow crystals should be made by the Lundquist chart at (a) surface and (b) one foot or so beneath the snow. Snow sampling can likewise be made but daily may be too frequent.

### Record and Report Forms

More systematic forms were requested. Already a daily journal is kept. Snow cover forms have been standardized. Lundquist's Snow and Ice forms is complete.

Gendel prefers an engineer's field book and desires time to develop forms. Rough weather requires a rough book fastened on by a string. Final forms should rather be Ledger forms kept in the office.

Research scarcely tolerates the uniformity of forms. These must rather be used for routine. Copious notes are inevitable.

Probably Gendel will be willing to arrange for records for copying. This includes relative humidity also.



### Frig Tower

Codd completed a piece of work unfinished last winter. With aid of Linley he descended the chamber of the Frig tower and stiffened the cross braces by connecting opposite joints by wire loops twisted to create stiffening.

Boardman plans to add braces from without.

Shall paint tower white in harmony with the fuel

Dennis Jones offered me a tier of pine wood sort of "tinger". Price of \$8.00 accepted. Not enough for the winter but difficult to obtain wood and coal from Terrace. Coal too is now limited and rationed.

### Honors

Linley has now Prize for  
Junior Engineers in Amer. Soc. Civil  
Engineering for paper on precipitation  
and runoff while member of T. E. A.  
Bernard shared me the notice.

### Precip. Measurements

For first storm Nov. 16-17

No. 1 . . . 0.06 in.

No. 5 July 0.08 in.

No. 7 Storm 9-0.05 in.

No. 2 Storm W. Graph straight line.

Does not seem to have respected.

→ The measuring stick was greasy and not satisfactory to Cavillard because of indefiniteness of line.

### Administration

Bernard thought that I was dissatisfied with Bureau accounts last year.

Rather it was the reluctance of the Regional officers to appear with a tendency at times to obstruct.

Actually the accounts in construction was superb as was the assistance in obtaining a substitute observer in place of H. H. Sanders forced out by Army occupation. The acceptance of correspondence and a narrative in place of formal reports was generous.

It is understood that Dr. Kendall has been assigned to Lake George on a full-time basis but that he should be able to spend a portion of his time at Sacramento.

Suggested that he and I share the noon between us with some overlapping for consultation and unity of program, except that during the latter part of March and until April 3 shall study snow melt in the Appalachian Range and attend the annual meeting of the A.S.H. at Washington.

#### Other Projects

1. The study of relative <sup>summer</sup> precipitation with altitude in the Ruby Mountains, Nevada, will require calcium chloride at least at the ends of the season, few in early November. The precip. cans at the higher elevation peaks and basins, being part of the catch.

The U.S. W. S. battery of cans at the Terrace are being recharged for the winter.

Must place a larger supply of

Calcium chloride in reserve at Jamilla.  
Insufficient this season.

3. At Talca Dam observations are  
being continued as possible accretion  
of snow in the gaps from tree  
crowns after a storm or from drift  
from the ground snow-cover.

The results so far have been  
negative.

Rode an afternoon with Bernard,  
Dinsley, and Codd as far as Paso  
at double rates. Standing-room only  
in the day-coach costs little more  
than travel on the English bus.

Tuesday Nov. 23

Trip to Tree House <sup>9 am</sup> to obtain  
bedding for Soda Springs.

Fog from Floriston to Tuzac  
and toward Talca. The abundant  
moisture from the storms of Nov. 17-  
21 <sup>and the mist</sup> was condensed by the cold  
usually prevailing in Tuzac Canyon

but dissipated by the warmer  
air of the Talca Basin.

Sunshine, therefore, at Talca  
the the ground was still moist  
from previous snow.

Additional photographs for  
publication were made by Ella  
Barnett Park. Two horses should  
be introduced to the art public.

Not as novel as Frank Lloyd Wright's  
designs but a perfect adjustment  
to needs and outlook.

at Danner Lake the fog was  
still billowing on the south side  
where the air was still cold  
in the shade of the mountain.

Lunch at 1:30 pm. at Danner Summit  
Lodge.

#### Furniture

Have been fortunate in obtaining  
at low prices the wood: large maps,  
racing chairs, office desk and  
two office chairs, davenport,  
and shades for snow quarters.

an extra bed belonging to Pennis just  
has been rented for the year at  
\$2.00. Thus sleeping arrangements  
for three.

Pane of glass (15x36 in.) brought  
up safely by LT in a wooden crate.

Precip. Records

Precip. had fallen again and  
later on Nov. 18 after last visit.

Date	No. 1	No. 2	No. 5	No. 7
Nov. 19	0.96		0.91	
" 20	0.21 (snowfall 5 in)	0.60 (19 in of ice)	0.80	
" 21	0.12 (" 3 in)	0	0	
" 22	0 (a great amount of)	0.04	0	
<p><i>Handwritten notes:</i>            No. 2 side to be a lag in Stevens W            of "tripping" the water            method indicates contin-            at test increments.</p>				
<p><u>Summation of Total Mass.</u></p>				
Nov. 1	1.32			
Nov. 23	2.42			
Nov. 2		2.08		
Nov. 5			1.78	
Nov. 7				1.71
Nov. 27	0.06			
Nov. 28	2.90			

from base line.  
 Nov 2.42 in from base line  
 100007

Planned to have Ashton Codd help me to unroll the receiving drum of Stromer. To determine the exact distance initially between the base line and the pen, but owing to the difficulty of replacement without throwing the sheet out of alignment and the shortness of the time, the plan was deferred until Gardel's return.

Fortunately we have the position of the pen Nov. 1 and can maintain the record from that date. These must be frequently observed and measured, for only a week's record at most is visible at one time.

For test and demonstration purposes it is best to leave the sheet intact. The total can be computed when the end of the roll or the season arrives.

→ So far the alignment remains perfect. The time range depends only upon the space available for the weight to descend. This can be increased by pulleys ("bees").

Cans will all be weighed Dec. 1.

→ Thereafter weigh cans at close of each storm or period of unusual weather to obtain my detailed comparisons.

#### Triple Register

Wind direction pans stuck. "West pen is loose - P.C." at screw is loose due to failure of lock-wire. Curly's wires are essential to prevent sagging.

Sunshine record still fails to rise higher than the contacts. Trace on sheet of triple register is ..... but not on. Sometimes it is merely a straight continuous line \_\_\_\_\_.

#### Barograph

The barograph has been found stopped. "Lubric applied to works." Running now. So will be left in place for present. Evidently requires cleaning.

#### Keys

Key to quarters given to Cuillander. He has already been given to Gardel.

Rubber bands used instead of  
chain. Used exclusively by weather  
man and station of weather.

The use of these and mine must be carefully guarded since they open the filling station as well.

Wednesday, Nov. 24 Sentry Box

Fred Pearson has aided in developing the following plan for a sentry box for Gendel's test of temperature recorder, but can only lend partial assistance in its construction.

The 4x4" supports must be clipped from timbers and framed on the field.

The box will stand 10 feet above the ground to afford a stable protection for both instruments and observer.

The entire plan has not been submitted to Gendel for further adjustment to detailed needs.

Shipment of sentry box, furniture and supplies can be made by special train by Pacific Transport Co at \$19.50 minimum for load of 2000 lbs.



- Plan -

### Batteries

Flashlight batteries can be procured under priority rating of AAZ.  
Should obtain a flash for hat in order to leave hands free for instruments.

### Film

Film must be requested thru W.P.S.  
(War Production Board)

285 S. Virginia St. Phone 6153

Forms 541-542 or 837.

Film must be specified as 11B Super XX film. Can request entire amount needed for the season and leave them with the dealer. 2 doz.

Sendel also must be provided film for his camera.

Wednesday, Dec. 1

8:30 a.m. hrs.

Clear, calm, Panhandle still very low.  
Snow on the level at Anner Summit.  
Foggy thick and ice at Soda Springs.  
Hard crust on snow.

Only just time leave in skiffs etc.  
Later: Evidently a means of clearing title  
to the property - providing someone does not  
overbid.

Long Time

"Almost too late" was the greeting. Only  
a signal of eight left. See they are leaving.  
Future unknown. Possibly total arrival  
in hands of Army. Possibly sci. trip  
renewed in the spring.

Lieut. King says finally it will be  
returned to the Jones.

Only one barrel for me at quarters  
but a truck to haul stone road to  
"the garage". There is a road from there.  
How much fuel oil in large tank?

Sunshine Recorder

Sunshine recorder frost-covered. Ice still on slab (just) side. Mercury column slightly like contacts.

Temp.

11 am. Current min. 30°F; H-T 34.5°F

Precipitation Types

Nov. 28 to Dec. 1.

No. 1 Standard, Nov. 30 0.59"

No. 2 Stevens W

Dial 5.5" water running! jitters again? No, Dummy, you're pushing the can down with your measuring stick. How much?

No ice in tank. Stalled!?

→	Before last storm	See list for line 2.42
	Since storm	" " " " 2.74
		0.32 = 0.64" prec.

Tripped by increments of .02, .04, .04 = .04, .08, .08" precip. But total 0.64"

Get on lid of inner case. Gasket of outer door grown old? Try caulking.

Talk with Paul Huber

"Hotel has been turned over to engineers and civilian guards are now in charge. Dennis Jones & George Stiles will have it running as a resort within a month. What you obtain here for filling station."

"It will not be removed from town" -  
Lieut. King.

No. 3 Dptd 15.3<sup>m</sup>

Nov. 18 ... 15.2 (Pulson) = ?

No. 1. Nov. 19 ... 0.96<sup>m</sup>

20 0.21

21 0.12

30 0.259 ?

1.349<sup>m</sup>

Oil line molasses. Film of ice easily breakable - just beneath upper film of oil.

12 Noon - lunch with Army. Met Det Terry, successor to Ed Peering in 1932. Det now retired since three years. Civilian guard at Hotel until Engineer turn it over to come away tomorrow. Terry was eager to introduce himself as one of my long ones before. He corresponded with Jeff.

No. 4 WC 8.35 (19.35)<sup>m</sup>

Ice 0.5<sup>m</sup> thick. Oil on fingers reduced weight to 8.35<sup>m</sup>. Use the level rod instead of finger.

Warmer. Overcast. Ice melting. Ground softening but frozen below.

Soldiers gone with Paul Huber to cut Christmas trees. He has taken Marie's address for a tree.

1:05 pm.

No. 5. Frig. Repts. Total 0.63 in.  
[See No. 2 Streams W. ... 0.64 in.]

Pasture

No. 6 Wt 8.36 (19.36) in.

Ice. not thin.

all ice free from edge of can.

No ice in streams W and Q. Insulated?

2:10 pm.

No. 7. Streams Q

$\frac{1}{3}$  barrel of ice.

Last stem Nov 29-30

0.12
0.20
0.30
0.12
<hr/>
0.64

For month of November

Nov. 1	5.08
Dec. 1	7.72
	<hr/>
	2.64 in.

No. 8 Wt 6.82 (17.82) in.

2:45 pm.

H-T 37.7°F; Min 37.2°F

Dr. Bendel arrived from bus. Had brought his bedding. His travel authority came only yesterday.

Lock on them. skitter jinnied.  
Arthur Colburn had lost his bunch  
of keys when spilled down the hill  
at Crossen Creek in his auto.

No. 9      WE 7:40 (18.40)<sup>in</sup>  
Jen

No. 10     WE 7:23<sup>in</sup>  
Jen

"Exchanged iron - power conductor  
of heat than copper" - Lindel.

"Has two recording anemometers for  
use in measuring wind velocity" - J

Head. 2 more gallons of white but only  
 $\frac{1}{2}$  gal. of grey in place of yellow in lot.

Discussed site of cemetery (further on)  
and took 5:10 pm train to Reno.

Summary

Pres. Log No. 1 unshaded 1.94

" " No. 2 Steam Wt Nov. 1 - 1.38<sup>m</sup>  
 Dec. 1 - 2.74  

$$\frac{1.36}{1.36} = 2.72^m$$

" " No. 3 Cong. Nov. 1. Depth 4.9<sup>m</sup>  
 Dec. 17 added 60.84<sup>m</sup>  
 Nov. 18 Depth 45.2<sup>m</sup>  
 Dec. 1 " 15.3

" " No. 4 Nov. 1 wt 5.80<sup>m</sup>  
 Dec. 1 8.35 = 2.55<sup>m</sup>

" " No. 5 Feig Nov. 1 wt 1<sup>m</sup>  
 Dec. 1  $\frac{3.45}{2.45} = 2.42^m$   
 (4.448)

" " No. 6 Nov. 1 wt 5.95<sup>m</sup>  
 Dec. 1 8.36 = 2.41

" " No. 7 Steam Q Nov. 1 Rem 5.08  
 Dec. 1 7.72 = 2.64

" " No. 8 unshaded. Nov. 1 wt 4.61<sup>m</sup>  
 Dec. 1  $\frac{6.82}{2.21^+} = 2.21^+$

" " No. 9 Nov. 1 wt 4.77  
 Dec. 1 7.40 = 2.63

" " No. 10 Nov. 1 wt 4.58  
 Dec. 1 7.23 = 2.65

Notes. - Outer case of No. 1 found bent over slightly, caused evidently by a fall or striking against on the floor to release snow or ice.  
 Note close agreement of Nos. 2, 7, 9, 10.  
 sig?

Weather Record. November

Date	Max. of	Min.	Case	Summ. Temp.	Wind	Cl.
Nov. 1	52	20			SE	cl
			Wind No. 1	240m		
			No. 2	—		
" 2	55	25			SE	cl
				281		
				389		
" 3	57	22			SE	cl
				350		
				460		
" 4	57	34	T		SE	Stdy
			7 <sup>h</sup> -6 <sup>h</sup>			
				391		
				512		



Nov. 5 57 28

460  
600

F. clu

" 6 58 24

590  
760

E Pt. clu

" 7 60 24

780  
865

W Pt. clu

" 8 63 27

800  
925

SW Pt. clu

" 9 67 25

870  
990

E clu

" 10 67 24

990  
→ 870!

N clu

" 11 61 26

25  
135

N Pt. clu

" 12 57 24

102.5  
212

NH clu

Nov. 13	57	24		E	clr
			210 345		
Nov. 14	57	34		SE	clr
			327 456		
" 15	57	35		SE	clr
			403 547		
" 16	52	27		SE	cldy
			456 602		
" 17	46	32	0.06	E	cldy
			Began 10am 494 648		
" 18	44	39		W	cldy
			530 694		
" 19	43	32	0.96	SW	Stormy
			depending on night. Summary from 615 790		



Nov. 20 36 27 0.21 <sup>average</sup> 5 E *Strong*  
 snowing all day  
 690  
 872

In Pasture

Max. 55<sup>°F</sup> *Bar* 35  
 Min. 21<sup>°F</sup> " 35

Nov. 21 33 21 0.12 <sup>average</sup> 7 E *slly*  
 808  
 942

" 22 45 31 5 E *clr*  
 908  
 → 167

" 23 51 12 2 SE *clr*  
 943  
 205

" 24 <sup>5</sup>50 18 1 SE *clr*  
 16  
 285

" 25 45 21 T SE *clr*  
 260  
 480

Nov. 26 49 22

332  
560

T SE ch

✓ " 27 56 22

395  
608

T SE ch

✓ In Pasture

Max. 51° Point 25  
Min. 12 " 24

✓ Nov. 28 50 21

502  
712

E ch

" 29 52 25

598  
801

NW ch

✓ " 30 44 32 0.59

~~1156~~

701  
912

T NW stormy

Thursday, Dec. 2

Pierman Mfg. Co. was waiting to build the pent house. Original plan with some adaptations were adopted. Gendel remained at mill the entire day to oversee and assist. He was traded work and became a mill man.

The house was completed within the day. approx. cost \$15<sup>00</sup>. The timber for supports was ordered by Robinson from Tennessee Lumber Co. to be delivered at the barn opposite Pasture.

Arrangements made with Nevada Transfer Co. to deliver furniture for quarters and pent house at Soda Springs by Tuesday noon Dec. 7 at latest.

Friday, Dec. 3.

One long day shopping for small but essential items including an oil heater for pent house. We have a lantern but Gendel should have an acetylene lamp. He may have one in his household goods.

Saturday, Dec. 4.

Grandman, Gendel, and Church came to Soda Springs with auto tightly packed with equipment.

Since the most desirable to every opportunity for observation of snow will be given, the greatest possible comfort at work and relaxation should be provided - even though we do not yet know whether we can retain our quarters throughout the year.

The tools from Tucson were already here. Arthur Quilland had reset the instruments.

Gendel broke the frozen turf of the Ostrea and soon had the holes prepared for the legs of the post house towers. He is Arthur's old enthusiastic, willing to tackle field work, and resourcefulness but a trained scientist as well.

All morning intensely for Gendel has been called to Sacramento for Monday morning to receive his

household goods - possibly expedited  
as a Warrenton Bureau shipment.

Sunday, Dec. 5

Morning snowy. Chains on the  
road but barometer rising.

Day cold, wind from east, sun  
mostly clouded. Evidently in a chud  
cup.

#### Precipitation

No. 1 ... 0.032 but prob. 0.035 if  
residue finally is  
added.

Can-lip bent over.

No. 2. Stearns W ... 0

No. 5. Tracy ... .08? diff. to read in  
position 0.07

No. 7 Stearns Q ... 0.05

all four legs of tower erected.

Message from Fletcher that Gendal  
probably not needed until Tuesday  
morning.

The Military Police and Engineers  
seem to be transferring Hotel today  
for rehabilitation.

\* See is eager to obtain 4 Thermo (vacuum) bottles of 3 in. orifice to try my method of measuring the thermal gult of snow on various observers. I suggested Cuillard selected earlier by Lindsey.

He considered that my rock wool insulator was not as accurate as a vacuum and thought he could find them. If not, he mentioned the manufacturers of vacuum bottles. An error of one or two degrees with accurate so small might be serious.

Theromometer has material, particularly Ferguson says, but it is doubtful whether he will build them.

More than thin clouds, than in a clear sky. Barometer rising.

Monday, Dec. 6

A cold east wind, breaking clouds, drifting snow.

Last night  $23^{\circ}\text{F}$ , this afternoon  $32^{\circ}\text{F}$   
Precip. T.

Frame for Dept House completed.

Sendel took the bus for Sacramento at 4:40 pm.\*

Sendel was not the victim of retrenchment in Soil Care. Boardman had resigned, and later was carefully chosen as Snow Specialist by the U.S. Weather Bureau to continue snow studies permanently. This may end the frequent shifting in recent months.

The Hotel goes to Dennis Jones by January 1.

Jeff Boardman has now moved up to Filling Station with me.

Since the Army is definitely retiring why not keep the canvas cat bed



for think providing we can  
retain the present quarters. Gardal  
also has a <sup>bed</sup> spring and mattress  
available for options.

Tuesday, Dec. 7

a frozen morning, a thick covered  
snow, a searing wind but mild act.  
Barometer unsteady. Melting this  
afternoon.

The short ladder in the Posture  
for the movable theometer shelter  
has disappeared. Phoned to Bus  
for another. The truck has been  
delayed.

Jeff is buying out shelf for top  
of Fry Tower. I have mopped  
our office (living) room and hung  
up "The Four Freedoms" by Roosevelt.  
Kant to relines the yellow mottled  
pine walls.

at dusk the furniture, equipment  
and paint cans arrived and were  
stored. I tested my physical  
restlessness on the tail-board of

the van over the railroad rails  
and failed miserably. I had  
packed lumber and furniture  
but in an instant was uncertain  
of the identity of the innards,  
ventures, and lumber needed.  
Frances is trying to message them  
back.

Wednesday, Dec 8

I like and try to recover while  
Jeff moves alone. He could easily have  
created the first house today. Jeff <sup>at Harry</sup> set  
it together ready for lifting. John Johnson,  
an instructor at Harlow, is eager to move  
but cannot now be found.

A call from Oscar and Keith Jones  
to clear up on their stored belongings.  
George Stiles will have the Hotel. The  
filling station may be transferred to  
Dennis but the stores are the personal  
property of Oscar and the range may  
be moved over to their home across  
the road.

I offered to buy the heater and try

the first party in my life  
Chadson

#40 monthly on a long term lease.  
Their decision is uncertain.

Thursday, Dec. 9

Lights at 5:45 am. Next at 7 am there  
was none, nor telephone.

At Game Summit Lodge breakfast  
of coffee on the fireplace hearth.

Wild gale from the east with dust  
all day. Barometer fell 0.01<sup>in</sup>, rising  
by noon.

The trees at Kingsale were uprooted  
in masses and carried down and  
communication wires with them.

Scene resembled devastation by fire.

No buildings injured. Normally, high  
winds blow from the west and the  
west roots are therefore stronger.

This gale was from the east and  
the east roots were "clawed and  
filious". However, some trees were  
broken midway of their height.

The velocity of the gale is uncertain.  
The triple register failed to record  
continuously and the dial readings  
is the absence of Quilland Wednesday

\* The snow cover of Beacon Hill looks hard and dirty. Too much bare soil as a result of dirt. Later the erosion would have been mostly of snow.

morning are uncertain. I was a prisoner within. Luck as bad as the accident.

"Only one wind slot was opened to the lip of a gage."

The penthouse was moved about one inch from its temporary location. Jeff and Harry settled the bedroom. A heavy rug increases the warmth.

Went to dinner but cannot recall my part.

After two brief appearances the lights came on steadily about 9 o'clock.

The wind is still strong.

Friday, Dec. 10.

"The wind is strong but waning."

a pair of spiral bands for the drum of the triple register has arrived from Stevens.

He instructs us to address him at the factory as a means of speedy correspondence.

He is also eager to learn how sensitive Stevens is. He will be

\* Stove also wants the barrel siphon pen to run until dry. It is now completing a year, an unprecedented record, it seems, for its age.

\*\* Reset the oil dial on the heater. The flame since the adjustment, the slight increase in head in the tank seems much higher.

pleased at its general performance.\*

a tank-man (i.e. tuner) pulled up to our tank this morning and I found that the Army was draining our tank. But of course the Engineers were sending more oil to keep the Hotel warm until transferred.\*\*

#### Insulation

Three in. spots on our blating pads and a hot base despite a tunnel-bore stone. Caused by lack of window shades and the expansion of ice in the black ink-well



By heat and by flow, the effect of direct sun-rays must be high as compared with the indirect warmth of the room.

Test this out in degrees of temperature. Bring of two pans to stir the air of the room.

#### Frigy Tower

This afternoon Jeff and Harry have completed the shell on the Frig Tower. The cross timbers for the base of the Frig tower gage must still be put on, and the corner braces to the tower at the ground.