



STENOGRAPHIC NOTES



No. 14

From Friday April 14 1944

To Sunday April 30 1944

No. 26-G

Data for Precipitation in April to folder

Friday, April 14 (cont.)

### Frying Gage

Reset 5pm, but recharged 6:15pm.

Could not find Table of mixing calcium.  
So used the following:

Calcium chloride	1.10 <sup>in</sup>	by 8 <sup>in</sup> dial
Water	2.20 <sup>in</sup>	
Oil No. 10	.10	
	<hr/>	
	3.40	<sup>in</sup>

Pen came to rest at 1.65<sup>in</sup>. [Zero mark]

Camillard prefers to readjust it at 1.00

→ 0. will be so low that the pen might jump beneath the flange.

### Freezing

It is moist and overcast. But there is a slight iciness where wet snow is passed by feet. Otherwise snow fell soft.

### Slush

The snow water table is high.

Slush. Why not drain off? Depression?

→ Investigate at east end of Hotel tomorrow.



### Temperatures

8:30 pm. Calm, overcast 100%.

Teletherm., 35°F

Winn., 31.8°

H-T 34.0°

On stairs

Thermog. (gr) 31.0°

Near snow

Thermog. 31.5°

On snow

Exposed 32.1° just over snow

No. 1 sealed 32.0°

Just covered (No. 5) 32.0°

1 in. below

32.0°

Crust  $\frac{1}{4}$  in. thick.

### Notes

- 1. On new snow crust, dye turned red  
" quickly even in the dark.  
2. But on the better frozen path, the  
" dye turned red only slowly.  
" Is this snow drier?

Snow Slides

Snow slides have fallen from the roof all day and tonight. Afterward shovels the house.

Saturday April 15

Night Temperatures

7:30 am. Clouds with slight momentary rifts.

Tel. therm.	34° F
	Practically the same as last evening
Min.	31°
H.-T	32.5°

On steps Thermog (Jr) 32.0° - <sup>othering</sup> clean of snow

Near snow Thermog 30.2° No snow on it.

Exposed 32.0° Covered by film of snow

lying on snow (No. 5) 32.0° Film of snow fallen on tubes.

Pressed into surface of snow (No. 1) 33.6°

Covered by 3/8 in. fallen snow.

Just beneath snow (No. 4) 34.0°

Sun touched?



Deeper in snow

4 in. (No. 2)	...	32.2° F
18 in. (No. 6)	...	32.0° F
24 in. (No. 7)	...	+0.1° C

In old snow and next to tiny fissures in loose crystals near the ground. So earth warmed.

Crust \*

Newly fallen snow (last night's) 1/4 in. \*

Beneath it, crust 1 in. of snow crystals weathered into ice crystals.

Below crust are unweathered snow crystals.

Dye

The dye planted on crust and in the path is green and purple this morning, but now at noon when the snow is wet has again become red.

\* The frost-snow noted on earlier days is not precipitation tho possibly it is condensation. It had seemed, however, to be a normal part of the snow surface with the crust forming beneath it.

\* H-T : 6 pm to 7:30 am  
 Temp. 35° to 32° to 33° F  
 Humid. 87% to 90% to 80%  
 Radiation - Intensity low.

Stevens S

Cut off the projecting rods in Stevens S and siled the sliding standards for the spring balance. Graphite better?

Marshall found that the threads on the outlet were not cut deep enough to permit the cap to seat firmly on the rubber gasket.

The gasket had not been eaten by the calcium. A gasket of Neoprene, however, was added to the rubber to attain necessary thickness for firm seating. They suffice to hold hot water and probably will hold the calcium.

Pasture Anemometer

4:30 pm.

Anemom. 118<sup>mi.</sup>

Cleaned the instrument with coal oil and siled it, but let the spindle slip like a dart into the floor. Hope that the bottom end that penetrated the wood was not bent. Cups seem responsive to the winds.

Stevens Q

0.03 precip. recorded to day; also by No. 1 gage. Stevens H, however, has only a straight line, for the amount is too light to weigh.

Query: Could the balance be more delicately adjusted? The knife-edge fulcrum are too coarse.

Snow Stake


56<sup>in.</sup> or 55<sup>in.</sup> if the depression at the stake is considered.

### Dye Planted

5:45 pm. on snow west of Headquarters  
on frozen snow-pellets (Eucalyptus).  
Dye immediately mixed with falling  
snow. Remains green.

8 pm. on old snow (coarse loose  
crystals) beneath new snow cover.  
In dark, but dye turned red  
quickly.

Hala was covered by a folded  
canvas. Will the dye percolate  
during the night?

last night's  
last night's dye has followed concentric  
strata  and reached old  
snow where it mingled with  
the moist crystals.

→ Would make an impressive  
solar picture. Try movement  
on a hillside.

### Silica Gel

Dried all can to blue on electric  
plate and placed it with other  
cans in case of Stensens II.

Plenty dry. Forget and left it all night  
on plate turned to "High".



## Temperature and Crust

Hotel

7:30 pm.

Overcast with driving snow  
clouds of frozen pellets. These are  
now  $\frac{3}{4}$  in. deep and some have  
frozen to the porch.

Thermometers	29.8°F
Min.	29.0°
H-T	30.5°

on steps

Thermog. (Gr)	28.0°
---------------	-------

Near snow

Thermog.	28.0°
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almost buried No. 1

30.2°

8-in under snow

32.0°

## Crust

Gravel  $\frac{3}{4}$  in. frozen but loose.

Beneath gravel crust now forming  $\frac{1}{2}$  in.

Ice on gravel by roadside.

Trails firmer.

parts from measuring equipment, April 10 to folder

Sunday, April 16 Drop in temp., 6 in. new snow  
Temp and Coast

6:40 am

Teletherm.	23.5° F	
Mixer	5.4°	} Snow blizzard in shelter slight.
H-T	9.0°	

6 pm to 6 am 32° to 10° F

Humid. " 66% to 88% to 84%.

Fog over pasture and drifting down S. Yuba.

On steps

Thermop. (fr) 4.0°  
Slightly buried in new snow.

In snow.

Thermop. 8.0°  
Snow capped. Snow in crust  
and on thermometer.

6 in. below new snow.

(No 1) On surface of yesterday's snow 30.4° F

8 1/2 in. deep. 2 1/2 in. below old snow 32° F  
(No 5)

10 1/2 in. deep in dry soft snow 4 1/2 in.  
beneath crust of yesterday's snow.  
32° F

### Crust

Crust  $1\frac{1}{4}$ " thick beneath new snow  $5\frac{1}{2}$ " deep.

Consists at bottom of crust of coarse ice grains representing melting on top of fine snow.

The new snow provided fair insulation against advance of near zero temperatures - a fall of less than  $2^{\circ}\text{F}$ . tho the temperature in the upper new snow was  $8^{\circ}\text{F}$ .

### New Snow

Began with frozen snow pellets all yesterday until a snow thunder-storm at 10 pm., followed or accompanied by larger snow crystals. Snow was falling as late as 3 am.

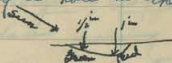
Clear at 6 am. Barometer rising since 8 pm. last evening.

### Dye

Dye in sun on surface of new snow still green at 8 am.  
9 am Dye still green.



→ 9:30 am. Dye deposit acts as opaque causing a hole in the snow surface.



Hole 1 in. deep where most directly exposed to sun's rays and is reddest.

### Freezing in Gages

all gages at Hotel are practically gelatine in texture with most of new snow absorbed.

The Plastic has slight frost deposit on outside of plastic ring but even the Reducer Can has frost thruout its depth. The Army Engg. especially has deposit in its collar tho slight deposit below.

Stevens W is only tank quite liquid because of insulation.

Sufficient reserve or potential storage in all for the storms

No snow adhesions.

Stevens W.  
No. 2 April 15-16.

0.02, 0.08,  $\underbrace{0.03^+, 0.03^+, 0.03^+}_{=0.10}$ , 0.04, 0.04, 0.04 =

0.31 = 0.62 . . .

On 7.02 to 7.33 in on sheet

### Weighing Gages

The low morning temperature and clear sky indicates the close of the present storm period.

So today the gages will be weighed and the snow cover surveyed.

No. 1 Accumulated Apr. 1-15 3.14<sup>in.</sup>

Stevens S. Now repaired W. 11.70<sup>in.</sup> (0.70)

No. 2<sup>\*</sup> Stevens W.  
Apr. 15-16 7.02 to 7.33 = 0.61<sup>in.</sup>

No. 3 Army Gage D. 24.7<sup>in.</sup>  
Punched thru soft porous ice.

No. 4 W. 20.29 (9.29) D. 8.0

Prestone Nit W. 18.84 D. 7.1

Reducing Collar D. 7.2

Plastic W. 11.57<sup>\*(0.57)</sup> D. 7.4  
\*(used light bail)

\* Later: Doubtful. Use 19.61 see below

DAMN!

With Marshall Humphreys' aid attempted to weigh the Reducing Collar gage.

But the balance fell out of its supporting ring, fell to the floor, and snapped the pointer off.

Readjusted the pointer on basis of No. 4 and resoldered it (Marshall's work) Correction now appears to be  $-0.02$  in.

See No. 4 (by Stevens S balance)	W. 12.26 <sup>in</sup>
No. 4 (by repaired U.S.W.B. balance)	W. 20.31
Orig. weight	<u>20.29</u>
Corr.	- 0.02

But Plastic

(by U.S.W.B. balance before injury 11.57 or 0.57)  
(by U.S.W.B. " after repairs 8.61 or 19.61)

Something fishy here in 11.57 or 0.57.

They do not harmonize with each other  
April, Wt was 5.4<sup>in</sup>

Precip. No. 1, April 1-16 ... 3.14<sup>in</sup>

Total weight (theoretical) 8.54<sup>in</sup>.

This corresponds closely to 8.61 (19.61)

On this basis correction may be  $-0.04$  in.



If the 10 / portion of 11.07 is correct.

Why not compare again by means of No. 4 the Stevens S balance and the repaired balance? But a new wire hook was attached to Stevens S, weight possibly 0.2<sup>in</sup>. (In messsack).

→ Solid rings must be used in place of the split ones. Rings and pointers must be dependable rather than cheap.

Completion of weighing with repaired U.S.W.B. balance.

Correction of -0.02<sup>in</sup> should be applied this time to <sup>Reducing, Plastic and</sup> Nos. 6-10 and to No. 4, Preston, ~~Plastic, Redstone~~ next time.

Reducing Callar 20.85 - 0.02 = 20.83

No. 6 *	W	19.58	D.	7.59
No. 7 **	apr 15	4:45 pm		6.20 <sup>in</sup>
	apr 16	12:25 pm		6.55 <sup>in</sup>
				0.35 <sup>in</sup>
On apr. 2				2.95 <sup>in</sup>
apr. 16				6.55 <sup>in</sup>
				3.60 <sup>in</sup>
No. 1 gage				3.14 <sup>in</sup>

→ Pen 13 full.

\* Slot thrown onto edge of can. A line was snapped loose and rehooked itself on the edge of another slot.

\*\* Ice in bucket but thin and floating. Heavier on other hand except No. 2. Stevens which was broken.

No. 8	W	18.93	D. 6.94
No. 9	W	21.98(10.98)	D 8.94
No. 10	W	23.54 (12.54)	D 9.98

Ice found in all cans except Stevens W and a thin film in Stevens Q. The latter are insulated.

### 1:30 pm. Snow Survey

The air was 30.2°F and the snow dry. So the survey was very easy with no adhesions, rather with some tendency for the cores to slip than the cutter.

Snow Survey data sheets (2)

For April 16 to folder

FORM 130

STATE OF CALIFORNIA  
DEPARTMENT OF PUBLIC WORKS  
DIVISION OF WATER RESOURCES  
401 PUBLIC WORKS BUILDING  
SACRAMENTO

CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin South Yuba Basin

Snow Course Soda Springs No. 1

Party J. E. Church

Date April 16, 1944

*Description or Number of Course (1)	Sam-ple Num-ber (2)	§Distance Between Samples (3)	Depth of Snow Inches (4)	Length of Core Inches (5)	Water Content Inches (6)	Den-sity 100 x (a) / (b) (7)	Remarks
		—					
	1	25 1/2	46.5	44.5	18.5		
	2	..	60	56	26.5		Moist soil
	3	..	58	51.7	26.2		Many coarse crystals at bottom
	4	..	58	53.7	28		
	5	..	53.8	50.4	24		
	6	..	58	54.8	28		
	7	..	58.7	55.3	24		

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

§Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated by the circles. Particular care should be taken to note any irregular spacing between samples.

No. 1 of 2 sheets. Comp. by J. E. Church checked by .....

5%  
3  
2.94"  
+ 15 day  
= 0.3



CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin South Yuba Basin

Snow Course Soda Springs No. 1

Party J. S. Church

Date April 16, 1944

*Description of Number of Course (1)	Sample Number (2)	Distance Between Samples (3)	Depth of Snow Inches (4)	Length of Core Inches (5)	Water Content Inches (6)	Density 100 x (6)/(5) (7)	Remarks
		25 ft.	57	56.5	23		
	9	"	60	58.5	24		
	10	"	60	58.5	25.4		
	11	"	57.5	55.7	24.5		
	12	"	60	55.6	23.6		
Average 1-10			57		24.7	433	

99006

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

§Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated by the circles. Particular care should be taken to note any irregular spacing between samples.

No. 2 of 2 sheets. Comp. by JSC checked by \_\_\_\_\_

.5%  
3  
2.94%  
15 days  
= 0.31

*[Faint, mostly illegible handwritten notes on lined paper, possibly bleed-through from the reverse side.]*

Comparison of Surveys

April 1. D. 56.5 <sup>m</sup> W.E. 26.3 <sup>m</sup> Precip. 46.5%
April 16 D. 57.0 W.E. 24.7 " 43.3
Precip. Apr 1-16 3.14 <sup>in.</sup> [Normal Apr. 2.94 <sup>in.</sup> ]
Less 4.74 <sup>in.</sup> Daily for 15 days
Temp. departure for April ? = 0.31

In Pit at Headquarters. Dyes

Last night new snow near door shoveled off and dye inserted 13 in. down in old crystalline snow with canvas spread over. The newly falling snow accumulated 5 in. deep on canvas.

During the night the crust under the new snow was only  $1\frac{1}{4}$  in. thick but beneath canvas  $4\frac{1}{2}$  in. thick. The letter was also covered by the newly fallen snow. Why?

Was the canvas and the air beneath better conductors of cold than the snow beneath the new accumulation?

The dye rose to the bottom of the  $4\frac{1}{2}$  in. crust or approx. 7 in. and even to the canvas showing purple in the cold and spread all around the hole.

But the dye penetrated downward only to  $2\frac{1}{2}$  in. below canvas (or 8 in.).

The crystals are harsh and evidently frozen but they still moist pack.

Query: Did the canvas permit the abnormal entry of cold into the pit? old snow



\* 4:45 pm Dye

Dye up  $\frac{1}{2}$  in, down 4 in.  
Has spread on stratum, 1 in. below surface  
for 2 feet and sunk 4 in.

Crust

Can imagine crust forming.

### In Falling Snow

Dye placed on falling snow  
yesterday <sup>evening</sup> being left untouched to  
see how soon melt-water will  
penetrate to it.

4:30 pm.

Snow now settled from 5 in  
to 3 in. - Dye just turning.

→ \* Current temperature at Pasture 32°F

skiing

The snow yesterday was wet and  
sticky; today it is dry and  
ideal.

Pressure and Melting

New snow develops moisture from  
pressure of feet, wet snowshoes, or  
ski upon it. Hence its slipperiness.  
In Arctic where cold is intense the  
traction is insufficient to melt the  
grains and produce a film surface.  
The snow there is compared to sand,  
i.e. the crystals are super-dry, ice  
kernels.

Crust

Some indication at 5 pm of new crust.

Take 5:10 pm. train - standing room  
only - for Reno.

### Snow Survey Field Books

The original sheets of the Federal and State Coop. Snow Surveys are too impregnated with chemicals for water proofing to take ink, but those of the California Surveys are quite satisfactory.

The last water proofing job was done by the Oregon State Agricultural College, but earlier by J. L. Darling Co., 117 South 8th Street, Tacoma, Washington for the U.S.G.S. Mann thinks "this is the same outfit that treated their (Div. of Invg.) last supply of field forms".

Who did the California work?

→ Unless untreated second sheets are used for pen copies, the California treatment of sheets is much to be preferred for copying by pen and ink.

Saturday, April 22

Remained an additional day at Reno to complete President's "Greetings" at Sandy and hear Josef Hoffmann.

Came an "Special" bus at 9 am arriving at 10:30 am. Bus being taken to Sacramento for repairs. Only passenger all others were permitted on the 8:30 bus "for San Francisco".

No chains but chains necessary two nights ago.

Heavy Srie

River sends message to Gerdel that Mrs Lewis, Truckee has a pair of 8 ft maple srie, wide for heavy packs. \$7.<sup>00</sup> or \$8.<sup>00</sup> without harness. Good for cross-country trips to Tahoe



Gages weighed Friday Noon (Apr. 21)  
for precipitation of April 19-20 by Landel

Gage	wt	stick
4	10.65	9.4
6	9.75	8.8
8	8.92	8.0
9	12.40	10.3
10	13.95	11.3
Eng. (3)		25.1
P	8.91	8.5
PC	9.78	8.8
R	not weighable	7.5
St. S	12.92	9.1
Q	3.90"	
W	8.13"	

See under

### Color Views of Dye

"Dug pit near porch, Tuesday, where you had some <sup>of the</sup> dye. Took 3 Kodachrome pictures in pit" - Gerdal.  
He dug a long trench to get good focus.

### Electric Light and Power

Dennis has a bill for 4 mos for \$69.<sup>00</sup> for this building. Returned by Army and paid by him.

He will ask explanation for high amount. It seems to him far too high.

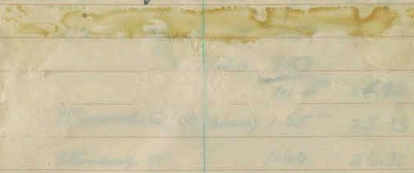
Can it be the electric plate or water heater? The latter should be on a separate circuit but the plate has been plugged in with the lights.

### Crust of Last Night (?)

Crust on new snow in shade 2 in. deep but in sun  $\frac{7}{8}$  in.

*[Faint, mostly illegible handwritten notes at the top of the page, possibly describing survey procedures or equipment.]*

12:30 pm. Snow Survey  
Long cores and easy driving.  
Finished 2 pm.



*[Faint handwritten notes and numbers, possibly a table or list, partially obscured by the stain.]*

4 Snow survey data sheets for April 22, 1999 to folder

*[Faint handwritten notes and numbers at the bottom of the page, possibly a continuation of the survey data or a summary.]*



No Melting April 16-22?

April 16. Snow Survey	24.7 <sup>in.</sup>
NO. 1 April 19	0.59
" 20	0.53
	<u>1.12<sup>in.</sup></u>
Stevens Q (at Course)	1.25 <sup>in.</sup> 25.95
Stevens W	1.60 26.30
Stevens S	1.22 25.92

April 22. Snow Survey 26.0<sup>in.</sup>  
Note Stevens Q at the Course  
is the best record house.

Crust and Weather

at Hotel crust in shade 2<sup>in.</sup>, in sun  $\frac{7}{8}$ <sup>in.</sup>  
apparently last night.

In Pasture:

2 pm. Current min 55°F (Talethens. 56.7°)  
(Min last night 15°F)

H-T 57.5° (Min 18°)

8 pm to 2 pm 42.5 to 36.5 (midnight)  
to 18 (8 am) to 57 (2 pm)

Humidity 8 pm 100% to 66 to 100 (2 am)  
to 9 am, then to 22% at 2 pm

Light intense. Scarcely a cloud.  
Shuts my eyes behind amber. Burns  
my face.

Snow stake 59<sup>in</sup>. Can be deflected  
to 57 or even to 55<sup>in</sup>.  
Snow survey 59.8<sup>in</sup>.

### Stevens W. Sensitiveness

4:30 pm.

Reu movements April 19-20 :

0.02, 0.04, 0.04, 0.03, 0.03, 0.04, 0.03,  
0.03, 0.04, 0.03, 0.04, 0.04, 0.04, 0.04,  
0.04, 0.06, 0.02, 0.02, 0.02, 0.04

Acc = 7.33 to 8.07 = 0.74<sup>in</sup>. (average 0.037)  
Total = 1.38 meter equiv. = 0.074<sup>in</sup>.)

April 21:

8.07 - 8.10 = 0.03 or 0.06<sup>in</sup>.

The greatest sensitiveness appears to be  
0.04<sup>in</sup>. or 4 times less than by stick gage.  
or better than 0.05 divisions on U.S.V. Co.  
spring balance, which, however, can be  
read to 0.01 s.

The wire cables should cause no  
friction but the knife-fiducium on the  
balance looks rusty.

No need apparently to use the test washers

4:30 pm. Temp Comparison  
Telokhem. 55.1°F  
Min. in shelter 51.0°

~~XXXX~~ Notes and Temp.

Pasture

6:15 pm Sun 30° from horizon.  
NW of Teatla Staked

Notes: N. Stake dye on surface  
Stake 2 " 1 ft  
" 3 " 3 ft  
" 4 " 4 ft.

Dye in 2, 3, and 4 buried under snow  
with cores replaced in hole and tamped

Temps: at 2 in, 10 in, 50 in. at ground (estimated)

Cont.

Snow cold but not yet crusting,  
sky overcast with thin cirrus and  
cumulus.

Temp. and Crust

Hotel  
6:40 pm

In shelter {  
Min. 44.5° F  
H-T 45.5°  
Thermog 45°  
Thermog (x) 44.5°

Teltherm. at 6:55 pm 48.6°

Crust just forming.

8:25 pm. Cloud cap on Summit, overcast.

Teltherm. 44.9° F

Min 38°

H-T 38.5°

On stairs Thermog. (x) 34.5°

On snow Thermog. 33.5° (down glass)

Sealed over in snow 31° (down - frost)

1 in. under 32° (tube moist)

Trodden snow paths frozen.

Crust on snow cover  $\frac{1}{4}$  in. thick.

Water and ground unfrozen.

→ Crust in packed path  $\frac{1}{2}$  in.

Transfer of heat easier because more packed and wetter.

8:50 pm. Sky clear again.



Sunday, April 23 Descent again.

Counted 23 species on morning  
train from west.

Temps and Crusts

7 am.

Telotherm 36°F  
Min. 30.2° (night 26.6°)  
H-T 32.0° (min. night 28°)  
6 pm to 7 am 45.5° to 28 to 33 to 32.5°F  
Humid 70 to 90% (10 pm to 7 am 90%)

Frost everywhere on platform but  
medium thin.

On steps

Thermog. (Jr) 30° (min. night 26°F)

As snow Thermog. 29° (min. night 27°)  
Rime heavier.

(No. 4.) Sealed an end in snow  
28.5 - corr. 0.2 = 28.3  
Frozen into the snow.

(No. 2) - 2 in beneath 28.4°  
at bottom of snow crust.

(No. 7) - 6 in deep -0.1°C

(No. 5) 19 in deep 32°

Crusts: Snow crust  $1\frac{1}{4}$  in thick  
Packed (snow-ice) trail. Crust  $4\frac{1}{2}$  in thick  
Ice is a good conductor of cold.  
Wet crust semi-packed at edge  
of path 3 in.

→ Crust depth according to water in  
snow, i.e. wetness of snow.

7:50 am

Melting

Frost dripping in melting from  
wood and metal on platform.

Temperature in Snow

Pasture

8:10 am

Crust only  $\frac{3}{4}$  in. deep

$1\frac{1}{2}$  in. deep (No 6)  $32^{\circ}\text{F}$

18 in. deep (No. 3)  $32^{\circ}$

54 in (bottom) No. 1  $32.2^{\circ}$

Tube moist

Ground-snow temp. Cloth plug on top

New dye planted last evening on  
surface is green.

### Depths of Various Types of Crust

- Crust on entrapped snow  $\frac{3}{4}$  in.  
" lightly packed by passing snowshoes.  
" where packed down by  $\left. \begin{array}{l} \text{much snowshoeing as at} \\ \text{this experiment} \end{array} \right\} 1 \text{ in.}$   
" deep pressed by foot  $1 \frac{3}{4}$  in.  
" Pressure heavy. Foot sank 3 in. Print now gone.  
" on ski trail much traversed  $6 \frac{1}{2}$  in.

### Dye

8:10 am. New dye on surface green.

8:35 am Sun now out.

1. New dye red at edges.
2. Yesterday's dye on soft surface red yesterday but purple this morning. Now in sun turning red.  
→ Penetration  $\frac{3}{4}$  in. down yesterday but soon congealed.

The dust from the dye penetrates about as far —  $\frac{1}{2}$  to  $\frac{3}{4}$  in.

3. Dye planted 1 foot deep.

Penetrated  $2\frac{1}{2}$  in. more to old crystalline snow where it spread widely on the ceiling of the old or base of the newer, finer snow without penetrating crystals at all. Hale purple in upper 2 in but red deeper.

4. Dye planted 3 feet deep.

Penetrated to bottom where the snow moist-packs.

Quite granular. Dye 75 to 70 to 90 intense.

Only ice button at bottom is clear except for being slightly tinged.

Too frozen to admit water and dye.

Soil moist but not wet.

#### Query

Is this percolation? or film transfer of color? The snow moist to wet packs.

There are dye bands where crusts do not permit the water to drain. Here water is concentrated.

Number size and descent of dye



→ Note drip in snow arch at office door. Is water in a film reservoir here? What is its density? Ice mainly.

Above 3 ft on walls of sampler holes the dye has penetrated from the hole only approx. a half inch except along a stratum as in No. 2 or slightly elsewhere.

Was the sampler holes warmed by pressure of sampling?

The reservoir of film water seems to be below 3 ft.

### 5. Four Feet down.

Dye has reached bottom along two or three strata but sparingly.

Snow in this hole crush packs and is evidently colder.

Temp.

Current min. 41.80 F

H-T 42.2°

858 am 46 to 28 to 31 to 30; Humid. 100%

Stevens Q

Present reading 7.80 in

ⓐ Out of level.  
Snow pressure on gauge.

Crust Melting

Crust breaking. Especially the  $\frac{3}{4}$  to  $1\frac{1}{4}$  in snow now penetrated by the warmth of the sun!

→ Evidently the crust being icy transfers heat rapidly, as should snow of high density or ice crystals.

The path is becoming soft. Hint and tramping are heat sources.

Density of Snow Cover

Pasture. By sampler, 2 for each type. Depth is length of core.

1. Top.	D. 9.2	Water Eq.	3.4	Dens.	37.0%
	" 9.6	"	3.6	"	37.5
2. Middle	" 7.0	"	3.0	"	42.9
Coarser Crystals	" 7.2	"	3.2	"	44.4
3. Bottom	" 22.2	"	11.2	"	50.5
	" 22.4	"	11.0	"	49.1

Some crust in all.

2 pm. Snow Arch Fallen

Snow-ice arch fell at 2 pm. while I was resting. Shook the house.

Now a new pane of glass in vestibule must be put in.

Who's to blame? Too late to nail board over window for pounding might release the mass.

The window could have been removed but I thought the arch would melt in place.

→ Now I can not study percolation from it.

Next winter two heavy bars should be nailed over the window and adjoining ones before snowslides start. This is at least the second winter.

### Rate of Melting

Pasture  
5:14 pm

N. Stick(s). Depth 59 in. Planted 8:19 pm  
Dye penetrated 33 in. Today.

Snow moist pores except 6 in. at bottom that crush pores.

S. Stick (a) Rye planted last evening.  
No night movement probable.

Dawn 18<sup>in</sup>.

Stuffed at 4 shales and spread  
but broke them.

6 pm.

### New Tests

Rye on surface.

N. Stick (b) Rye planted 2 ft deep.

S. Stick (k) " " 3 ft deep.

### Temp. and Crust

Crust forming where trodden.

Current min. 39.2°F

H-T . . . 40.0°

Storm clouds, wind SW, overcast.

Crust on untouched snow  $\frac{1}{4}$  in thick.  
but mealy path still mealy.

### Temp. Inversion

Hotel.

6:40 pm. Insts checked and set. //

In shelter {  
Min. 38°F  
H-T 39°  
Thermog. 39°  
Thermog (fr) 38°

6:55. Teletherm 43.4°



8:35 pm.

Teletherm.	38.3° F
Min	34.8°
H-T	36.0°

On steps	Thermog. (gr)	34.5°
On snow	Thermog.	35.5° ✓
	Sealed therm.	32.2°

Few flakes of snow (?)

Snow crust  $\frac{1}{4}$  in.

Footprint frozen 1 in ←

9 pm. Teletherm 36.8°

Monday, April 24

Temp. Inversion (cont.)

6:45 am. Fall of temp. moderate, humid. high.  
This morning heavy cirrus 60% of sky.

Teletherm.	31.4° F
Min.	24.7°
H-T	27.5°

8 pm to 6 am 36 to 26.5°

Humid. 76 to 86 to 70 to 74%

Steps.

Thermog. (gr)	24°
---------------	-----

On snow

Thermosy. 25°F

Sealed (No. 5) 23.5°  
On and in snow.

4 in. below (No. 2) 32.0°

[Cust. 1/4 in but granules congealed  
loosely to 3 1/2 in. So No. 2 is just  
below the "frost line".

→ 2 1/2 in. below (No. 7) +0.4°C

[Is this because bulb is dark red  
and opaque. Reading was slightly  
higher on exposure to air but  
fell below 0°C when brought  
into the cold vestibule.]

→ Test this therm. more near  
the surface before sunrise and  
immediately after.

7:15 am.  
Pasture

2 1/2 in deep (No. 4) 32°F = 31.8°F  
[In air dropped to 31.5°F]

7 in. deep (No. 3) . . . 32.0°

17 in. deep (No. 1) . . . 32.0°

at bottom (approx 58 in)  
(No. 6) . . . 32.0°

\* Blanketed with cloth in hole.  
Bottom of tube moist, top has pieces of crystals frozen.

### Crust

(a) Total crust  $2\frac{1}{2}$  in.  
but initial crust  $1\frac{1}{4}$  in.; then dry snow  
Next ice crust with coarse loose  
crystals beneath that moist - pack.

(b) Total crust  $4\frac{1}{2}$  in.  
Top  $1\frac{1}{4}$  in.  
Soft new snow  $\frac{3}{4}$  in.  
Frozen coarse crystals  $2\frac{1}{2}$  in.

### Temperature etc

8 am. Current min.  $26^{\circ}\text{F}$   
H-T . . .  $28^{\circ}$  (Wain. night  $26$   
8 to 8 am:  $39^{\circ}$  to  $26^{\circ}$  (at 7 am) to  $28^{\circ}$   
Humid. 60 to 56 to 100 to 78 to 98 to 66%

Last night overcast, this morning cirrus  
and stratus 60% over sky.

### New Dye. Melting Hour

7:30 am. New dye planted in sun.  
Still green.

Dye planted last night is green  
but melting marks are purple

9 am. Both dyes still green. Cold

10 am H-T  $31.0^{\circ}\text{F}$ . Cold. Dyes on snow now red

## Dyes in Snow

N. Stien (6) Depth 55<sup>in.</sup>

Dye 2 ft down.

Most (dye) in hole spread on stratum  
11 to 13 in. below surface as well  
as 3 in. in radius from the hole.

Top 4 in. of hole purple.

- (1) Sampling. At 2 ft dye spread and descended  $9\frac{1}{2}$  in. further via three strata, (or stopped at  $33\frac{1}{2}$  in.).
- (2) A second sampling dye seemed to have gone to bottom <sup>(55<sup>in.</sup>)</sup>. Snow moist-faces but a few moments after exposure to air was frozen hard (i.e. after being compressed by the hand).  
Radiation!
- (3) At third drive, dye found 11 in. below 2 ft. (or 35 in.)
- (4) Total drive 54 in.  
Dye within 12 in. of bottom (or 42 in.).



S Stick (b) Depth of snow 58 in.  
Dye planted at 3 ft. (36 in.)  
Hole showed still at 40 in.

Dye goes to bottom. Snow moist-  
crust-packs.

4 or 6 in from bottom core  
moist-packs except bottom

→ But snow is water gray,  
so water filled.

(+) Conclusion: Wet bottom snow carried  
dye even at night. The dye  
stopped at other points less wet.

→ Retract? Frozen crystals down  
sampler holes on Mt. Rose due  
to entry of cold air as suggested  
by Bundy?

But alternating hardness and  
softness in body of snow shown  
in sampling? Is there not here  
the transfer of heat?

### Snow Surface Warming

10 am.

The black dirt at depot and mealy path are soft.

The high slush is due to damming of the runoff from the snow.

Similar perhaps in melt on city streets or is rapidity here the cause?

4:30 pm.

Snowing caraway seeds or tiny Tapioca. Trace so far.

But Max. temp. in Pasture only  $37^{\circ}\text{F}$  (H-T) and current is  $31.5^{\circ}$ . Humid 88%.

Crust cracks under the snowshoes.

Max. at Hotel (max. therm)  $45^{\circ}\text{F}$ .

Hotel

### Temps and Crusts

5:15 pm.	Teletherm	$34.0^{\circ}\text{F}$
Inchelten	Min.	$30.0^{\circ}$
	H-T	$32.0^{\circ}$
	Thermog	$30.0^{\circ}$
	Thermog. (Jr)	$30.0^{\circ}$

6 thermos. planted.

Crust  $\frac{3}{8}$  to  $\frac{5}{8}$  in. thick.

Thermog. on snow  $30.5^{\circ}\text{F}$ .

Pasture

6pm

Crust  $\frac{1}{2}$  in. thick with dry tapioca snow  
 $\frac{1}{8}$  in. deep on top.

Nye

Warning Nye.

Made hole  $2\frac{1}{2}$  in. deep in snow.

Spread 3 feet down slope and  
2 feet across in coarse crystals  
that resist-freeze.

Percolated down 10 in, of which  
6 in. is solid saturation.

Then scripped 4 in. to final stratum.

New Dye Projects

6:30pm

1. Small stick N: dye planted Sunday night  
Apr. 23 and still untouched.
2. Tall stick. Nye 12 in. down.

See 3 pages down -  
Next morning.

X

X

3. Small stick <sup>E</sup>: Dye on surface.  
Green
4. Next small stick E. Dye 2 ft deep.
5. Last small stick E. Dye 3 ft deep
6. Tall stick E. Dye 6 in. deep in  
warm snow that moist-faces.

### Temps and Crust

Hotel

6:50 pm

Teletherm 32.8°F

Wm. 29.4°

H-T 31.5°

Humid 64%

Clouds 90%

On steps

Thermog. (gr) 30.0°

On snow

Thermog. 30.0°

Sealed in snow 32.0°

why? { 1 in. down (No. 7) in shade in snow +0.04°C <sup>0.4°?</sup>  
" " (No. ) white bulb therm. 32.2°F

Crust 3/4 in. thick.



→ An platform, snow pellets melted  
on boards and frozen in tiny  
humps, but on snow pellets  
are loose and dry.  
Precip. T or 0.006 in.

Sun still  $15^{\circ}$  above horizon, but  
behind clouds.

Planes are riding above clouds.

9 pm. Sky clear. Crescent moon in west.

→ Soil still soft and water unfrozen.  
How different! the snow is frozen!  
# and tramped snow more deeply  
frozen.

Teletherm.  $38.4^{\circ}$  F. A cold night.

I had set my snow thermometers  
for a mild one.

Tuesday, April 25

a clear, calm day. Frost on the roofs. The sun is rising earlier. So today must be up early.

Hotel

6:30 am

Teletherm 21.6° F

Min. (current) 9.0°

H-T 12.0°

6 pm to 6 am. 32° to 12° direct unobscured fall

Humid. 64 to 53 to 88%. Frost.

Steps

Thermog. (gr) 7° F

Current

Thermog. 7.5°

Sealed (No. 1)  
in current,  
frozen down 9.6°

1 1/2" deep (No. 3) 22.0°

1 3/4" " (No. 6) 16.0°

2" " (No. 7) -7.4°C = 18.7°F

6" " (No. 2) 28.2°

12" " (No. 5) 32.0°

Ground and pack everywhere frozen,  
the ice on 6 in. pack called reality, to be broken  
by the sled.

### Crust

Crust 6 in.

On top of crust is new snow,  
which is dry to moist-packs.

In internal zone beneath crust,  
the snow crushes.

Ice formed on outer ends of  
them and elsewhere where frozen  
into the new crust.

Vane and sunshine tube frosted,  
also particularly the thermog. on snow.  
Wind direction pens of triple register  
wound but little in night, because  
of shorting in circuit due to frost  
under bell cover, but started actively  
at 8 am.

at 8:45 am. sunshine record  
still a straight line and is  
still straight at noon, but at  
2:30 pm. has been recording.

### Breakfast

For once had an interval in  
the observations for a "hearty breakfast."

Nlyes

Pasture  
9 am.

1. Nlye of Sunday evening (Apr. 23)  
Snow depth 56<sup>in.</sup>

(a) Has penetrated 20<sup>in.</sup>

Top 10<sup>in.</sup> crusts.

Next 10<sup>in.</sup> moist-crust-packs.

(b) Nlye penetrated 32<sup>in.</sup>

Top 10<sup>in.</sup> crusts.

Next 12<sup>in.</sup> moist packs.

Remainder crust-packs or crusts.

2. Nlye on snow of last evening (Apr 24)

at 9 am. red.

at 9:35 am has sunk  $\frac{1}{4}$ <sup>in.</sup> in  
surface and penetrated  $1\frac{1}{2}$ <sup>in.</sup>

yet only pin points of moisture  
on top of snow on palm of hand

→ Does red dye melt itself down?

3. Nlye planted at 6<sup>in.</sup> depth

where snow moist last evening.



# Dye still green at base of sampler hole but where absorbed, red.

# (a) Penetrated 9 in. down or 15 in. beneath surface to stratum where it spread.

Snow at stratum crushes or the granules will not pass.

(b) Second cross-section  
Dye only 3 in. below planting or 9 in. below surface.  
Too cold last night.

H. Dye planted at  $12\frac{1}{2}$  in. below surface.  
Depth snow 54 in.

$5\frac{1}{2}$   
 $12\frac{1}{2}$   
 $4\frac{1}{2}$   
 $5\frac{1}{2}$

(a) Dye within 5 in. of bottom  
[Hole 22 in + dye 27 in + blank 5 in = 54 in]

Dye active from 9 in. below surface  
Upper part crushes but from 12 in. down the snow resist-passes.  
Bottom 10 in. crushes, but above that crush-passes.

#  
 $5\frac{1}{2}$   
 $12\frac{1}{2}$   
 $4\frac{1}{2}$   
 $5\frac{1}{2}$   
 $32$

(b) Dye only within 34 in. of bottom.  
at end of dye 6 in. moist-packs.  
Next 10 in. crush-packs.  
Bottom 17 in. crushes.

(c) Dye penetrates to bottom  
Snow moist-packs entire  
distance except bottom.  
But bottom is red to pink.  
Must have frozen since dye?  
But it crushes or crush-packs.

5. Dye Planted at 2 ft (24 in.)  
Depth of snow 54 in.

(a) Dye penetrated to 37 in. below  
surface or 13 in. below planting.  
at 37 in. snow resists passing  
and crushing. Further below  
it crushes.

at 10, 20, 24 in. below surface  
dye spreads.

(b) Continuing planting hole to bottom  
of snow.  
Dye penetrated to 36 in. below  
surface or 12 in. below planting.  
(at 24 in.)

at 34 in. the snow resists crushing  
but below that it crushes.  
Snow therefore colder

6. Dye Planted 37<sup>ft</sup> (36<sup>in</sup>) Down.  
Depth of snow 54 in.

Dye 11 in. below 37 in. dug, or  
48 in. below surface of snow,  
or within 6 in. of bottom.

Bottom 6 in. resists packing,  
next 6 in. crush-packs, and  
next 5 in. resist-packs.

→ The dye penetrated to the snow  
that resisted packing.

Calor found in strata at 15,  
20, 24, 26<sup>in</sup> and from 36<sup>in</sup> down.

### Crust

New, topica snow  $\frac{1}{4}$  in. deep.  
Soft and dry.

New snow  $\frac{1}{2}$  in. frozen.

Old crystalline snow  $4\frac{1}{2}$  in frozen.

Total crust 6 in.

The snow below 6 in. is dry, granulated, soft, with tendency to pack.

Frost stopped at 6 in. below base of Tapioca snow.

### Temperature

10:45 am

Current min. 35.6°F

H-T 37.0°

8 pm to 8 am 32.0 to 10.5°F

Humid. 86 to 65 to 100%

### Gages Frozen

No. 9-10. Ice plates but loose.

" 6 and 8 Ice covered by oil, loose

No. 7. Only an intimation of ice.

### Crust Melting

Crust yielding to a footprint.

Tapioca snow packs - moist entire depth of  $\frac{1}{4}$  in.

Ald snow beneath it dis-congealed or friable 1 in. hard below.

Total soft snow at 11 am  $1\frac{1}{4}$  in.



This makes surface yield  
to footprint or scrie.

#### Red Dye

The red dye has penetrated  
2 in. and is spreading on still  
frozen snow.

It has even sunk  $\frac{1}{2}$  in. into  
frozen crystals below the  $1\frac{1}{2}$  in.  
soft-snow line.

It radiates heat but not  
greatly in excess of natural  
melting.

#### Dirt

The dirt path is the first to  
soften.

#### Hotel

#### Ice in Cans

1 pan Ice in all presip. cans except  
No. 1 (dry) and No. 2 insulated

In No 4 Cans of ice  $1\frac{1}{2}$  to 2 in. thick.

In No. 3 Army Eggs. Heavy plate  
with punchable hole in center  
and tendency to break up  
except in outer rim of ice.

Now 2 sticks of wood in tank

No. 2 and No. 7 show no T  
of precip. of yesterday (0.006<sup>in</sup>).

Contents of No. 2 fluid.

Marked data on both 2 and 7.

Temp.	Min. (current)	40°F
	H-T	41.5°

## Posture

### Snow Melting

Snow melted 2 in to crystals now  
wet but still congealed.

Top of snow a labyrinth of crystals  
badly "water-set" and supported  
by their own trellis of mesocrye.

What a crystal cavern open to the sky!

H-T 41°F

Footprints from 1 to 5 in deep, <sup>the latter depth</sup> caused  
by pressure on the dis-congealing  
crystals.

Now good for skiing.

### Dye!

\* The Fuchsin has descended 13 in or more despite the crust. Has percolating water met there it and run rampant in the softer snow below?

There is a whole reservoir of red below. From elsewhere?

Must sample the vicinity.

→ Does red dye descend irrespective of water movement - thru the film water medium?

### Therm. Tubes

A cork came loose in snow this morning. Gave 3 another dip in paraffin.

Nye

Pasture

4:15 pm

Anem. 141.5 mi.

H-T 41°F

Snow stake 52 in.

Melting

Crust now melted to  $3\frac{3}{4}$  in depth.  
Dis-cangaled deeper: Can penetrate  
snow easily with yard stick  
to 13 in.

Nye

Snow depth 53 in.

Nye has now penetrated to bottom.  
Calor intense 5 to 8 in. above bottom.

So cold night (9°F) and crust of 6 in.  
will yield with max. temp. of 41°F.



\* Corn snow had become so wet with rain that it would not pile up but flowed out flat like dust.

Friday, April 29

Arrived 10:30 am.

It had rained yesterday and today. Slugs on porch.

Fog from Grass Lake to Summit last night. Ceiling above poles here. So thick Arthur Canilland took 2 hrs 40 min. to drive the normally trip requires only 1 hour.

at 7 am. auto of a man left snow near Norden. He was crushed but a nurse passenger escaped. Arthur and Frances offered shelter to her and spread the alarm. They are much shaken.

### Resetting Instruments

Hotel

11:30 am.

Min. (current) 50°F; H-T 51°F

{ Dry bulb 46.8°  
{ Wet " 39.6

Pacture

12 Noon

On the snow { Dry bulb 46°F  
 Wet " 42.  
 Min (Current) 46.2°

Max. for max	57.2°F	Reset 48°
Min. ...	7.4°	47.2°

Stevens W

5:30 pm.

Apr. 27 8.09 to 9.01 = 0.02 = 0.04  
 8.01 to 8.04 = 0.03 = 0.06

Apr. 28 8.04 to 8.06 = 0.02 = 0.04  
 0.14

No. 1 Gage, 0.13 in.

3:30 pm.

Planted dyes - 2 stations.  
 Misting

Snowstore 47 or 48 in; anem. 333.5 in.

H-T Max. for day 50.5°F

Humid. 12N to 3:30pm: 60 to 76 to 56%

Clouds 84%

Stevens Q

Apr. 20 or 21?	7.90 <sup>in</sup>
" 28	7.88 <sup>in</sup>
	<u>0.08<sup>in</sup></u>

5:45 pm

Stevens S

2.10 (13.10)<sup>in</sup>

Dye on Gravel

# at the office, dye has colored the gravel but not the clay.  
 Last year it did not color gravel or mud.

Humboldt Water Table

Gardel eager to study water table in soil laboratory as next step in analyzing Humboldt phenomenon.  
 I approve for I am fully contented to have discovered the principle, and am glad to leave the details to others.

"But the salary is comparable only to a senior student's now" - Gardel.

### Results on Dyes

# "When thru cover the dye descends to bottom in an hour." Only 10% free water still. No descending water. Dye strong and will diffuse easily.  
I suggested "film water".

→ But he noted later today that by midafternoon the dye had penetrated only half way and does not spread widely.

A phenomenon to study further.

### Crusts

In a depth of 40<sup>in</sup>, crusts were found at 4 $\frac{1}{2}$ , 6, 8 $\frac{3}{4}$ , 9, 11<sup>in</sup>.

### The 3:30 pm. dyes

# Most from these made two comet tails. Fine flush with spots. Why the spots?

→ Not all crystals of snow become red.  
Study.



at 6:25 pm

E. Dye. Depth 51 in.

Dye descended to within  $12\frac{3}{4}$  in of bottom

$2\frac{1}{2}$  in of core at bottom water gray.  
Water ran from sampler.

Top of snow met. - pieces, very wet but not dripping.

W. Dye. Depth 49 in.

(1) Dye penetrated only within 31 in of bottom or 18 in. down.

Top 6 in. met. - pieces.

Next 12 in (to ice stratum) moist. - pieces.

Next  $27\frac{1}{2}$  moist. - crushes or recists.

Last  $3\frac{1}{2}$  in. water gray and water can be squeezed from it.

(2) Second drive 5 in. from (1) confirms the first.

Dye has penetrated only to the ice stratum or 17 in. and really stopped  $\frac{1}{4}$  in. from crust.

Bottom  $2\frac{1}{2}$  in water gray.  
Water squeezes readily and

almost copiously from it.  
Lower part as before crush-pieces  
or resists.

### Three New Tests

W to E.

- (1) Surface
- (2) On crust
- (3) at 26 in.

6:50 pm  
Temp. Min 43°F  
H-T 44°

Hotel  
7 pm Min. 43.7°  
H-T 44.3°  
Thermog. 44.0°  
Thermog. 38°!

peas in shelter until after dinner

### Temps and Crust

9 pm Teletherm. 46.2°F  
Min. 35.5°  
H-T 38°

Breath visible

Thermog. (gr) 31° - Readjusted to 38°

Thermog. 36°

[4 thermos. set in pasture]

9:45 pm

Teletherm. 41.5°F

Min 32.5

H-T 34.2

On steps Thermog. (gr) 32.0

Thermog. 30.5

Sealed in slot  
in snow 31.5

### Crusts

Hotel

Pasture

9 pm 1/2 in

9:30 pm

3/4 in

9:45 pm 1 in

Paths of earth and water soft.

Beaten paths very hard.

Crust will not yet bear person.

\* Ground frozen, rubbery. Soil made porous by crystal structure of frozen moisture.

Saturday, April 29

Hotel

6:15 am.

Frost on roofs. Fog as high as trees. Snow dry frozen. Shell ice on paths.

Temp. and Crust

Telotherm 35°F

Min. 27.2°

[Night 25.8°]

H-T 30.0°

[Min. 28°]

10 to 6 am. 45 to 28 to 30°

Humid. 86%

[But seems saturation = 100%  
Test.]

Steps. Thermog. (jr) 28°  
(Frost on glass)

Snow

Thermog. 26°

(Heavy glaze on glass)

Sealed therm. (No. 1) 26.3°

(Means deep in open snow)

Bulb projecting at surface  
(No. 3) 26.0°

5 in. deep (No. 2) 32°

Crust 5 1/2 in.



Pasture

6:50 am Sunrise. Birds

Temps in Snow

1 in. deep in open trench (No. 6)	24°F
1 1/2 in deep (No. 4)	26.5 - 0.2 = 26.3°
4 in deep (No. 5)	32.0°
6 in. deep (No. 7)*	0°C

\* Care out of tube and ice crystals around bulb of therm.

Crust 5 in.

→ Note that crust is frozen deeper than 32°F.

→ Segregate 32° and freezing? [See later Monday morning]

Algae

No. 1. Dye on surface green and frosted.

But where exposed to sun frost dripping in melt from leavers

Inoculation

of thermometer shelter. Sun only  
10° above horizon

Temp.

Winn. 31.9° (Night 25°)

#-T

8 to 7 am 40° to 28° to 32° F

Humid. 100%

Triple Register

Wind direction pens started by  
frost last night.

Melting

8 am a film of moisture shining  
now on ground

Temp., Crusts, Melting

→ Compare today's min. 25°F  
and last week's 9°F with crusts  
and day's melting.

→ Body of snow 32°F. So time  
given to penetrate the crust is the  
melting factor rather than the  
intensity of the frost.

Compare series of  $31^{\circ}$  to  $50^{\circ}$  F  
with  $9^{\circ}$  to  $41^{\circ}$  F for melting and  
runoff rates.

### Ryes and Textures

Yesterday's E. Depth 48 in.

Top 6 in crumbles.

Next 17 in moist-packs or crumbles

Bottom 21 resists passing.

except extreme 2 in (water gray)  
moist-packs.

### Last Night's Planting

(1) Rye on surface. At 8 am turning  
red. Has penetrated  $\frac{3}{4}$  in. only.

(2) Rye started on crust 7 in. deep.  
Penetrated  $15\frac{1}{2}$  in. (at 24 in) further, or  
to within 24 in. of ground.

Top 4 in broken. uncertain of type.  
crumbles.

Next 2 in moist. crumbles.

" 6 in resists.

Next 7 in. passes moist to wet.  
Bottom 24 in. moist. passes.  
Extreme bottom  $2\frac{1}{2}$  in. drips when  
pressed.

Snow seemingly dormant.

(3) Nlys started at 26 in. Depth gauge 43 in.  
→ Dye to bottom or 17 in.  
Soil wet.

Bottom  $2\frac{1}{2}$  in. wet. passes,  
almost squeezes water

The <sup>bottom</sup> center or 17 in. moist. passes.

The top 26 in. crushes at  
surface but remainder moist.  
Crumbles.

### Melting

Rin joints of moisture on joints  
of hand  
Dyes are now all red.

at 9 a.m.  $\frac{1}{4}$  in. snow has loosened.  
Snow now crushes 1 in. under foot.

52? → Compare yesterday's melting at  
31° and 42°F with today's melting  
at 25° and 56°F.



1 pm.

The crust is now soft to the ice at 3 in. if existent or to final crust at 9 in. down, existing last evening.

The third inch is not fully loose.

Footprints  $1\frac{1}{2}$  in. deep but deeper at times to 3,  $4\frac{1}{2}$ , 5 in.

No (1). Last evening's planting on surface (39.5 in deep core) has penetrated 32.5 in or 7 in. from bottom.

Top 12 in. dry to wet crust. porous

Center wet crust porous.

Bottom 12 in moist. porous equally.

Classic diffusivity of Dye: Kitchen Test.

2:30 pm.

Gerdel suggested that Freshman possesses high diffusivity so that it will quickly dye even quiet water to the bottom of a high cylinder.

Its strength gives it unusual coloring power.

The only available dish was a kettle of 9 in. diam. and 5 in. depth of water.

Placed in it a half-dozen single grains of dye.

These floated in the water like comets or nebulae in the sky, the grains being the heads or diffusing centers.

The tails emanating from the grains did not sink but floated at the level of their grainy line or curve or a thin thread if the grain moved forward, as long even as  $\frac{2}{3}$  distance around the kettle before it faded out.

Two or three grains sank and clung to the side or bottom of the enamel ware with their attendant threads of red clinging firmly with them.

The test was infinitesimal and therefore visible in all places.

Relative Capacity of  
sand and gravel.

Plainly the dye color followed  
the grain, spreading very slightly,  
but did not sink.

Geardel noted that his dye sank  
but did not spread. This has been  
my long observation. The dye  
color must therefore follow or  
be borne by descending or flowing  
water. Its physics should follow  
that of water in its diffusion  
and gravitational movement.  
It does not spread independently.

Thames Refined

The paraffin flows from the  
ends of the tubes and the cones  
pull out in the frozen snow

→ Why not faster cones in with  
shells? Its handy and abundant.  
The paraffin can be used for redipping

### Snow Survey

2:30 pm. I was joined by a rancher-scientist who had read often the daily reports of depth of snow at Soda Springs and desired to learn the snow-survey method of forecasting.

The application of snow percent to stream-gaging cleared the problem to his complete satisfaction.

He became an eager questioner of various details and my assistant.

3 Snow Survey data sheets for April 29 to folder



STATE OF CALIFORNIA  
 DEPARTMENT OF PUBLIC WORKS  
 DIVISION OF WATER RESOURCES  
 401 PUBLIC WORKS BUILDING  
 SACRAMENTO

 CALIFORNIA COOPERATIVE SNOW SURVEYS  
 SNOW SURVEY NOTES

 Drainage Basin South Yuba  
 Snow Course Soda Springs No. 1  
 Party J. E. Church and Oullocken  
 Date April 29, 1944

*Description or Number of Course (1)	Sample Number (2)	Distance Between Samples (3)	Depth of Snow Inches (4)	Length of Core Inches (5)	Water Content Inches (6)	Density 100 x (w)/(v) (7)	Remarks
	1	25	35	33.5	17		
	2	48.2	48.2	47.2	24.4		Sail covered
	3	"	45.5	40.7	19.0		
	4	"	46.3	45.3	24.5		Water running from core.
	5	"	42.5	41.5	21		
	6	"	47.2	44.4	24.6		Water running out.
	7	"	47	44.8	21.3		
	8	"	47.5	47.5	23.5		Water - gray core. Capillary water 1/2 in.
	9	"	49.5	46.7	25.5		Loaded with water. Drains some. Capillary water 3/4 in.
	10	"	47.2	44.8	25		Water running out. Capillary water 3/4 in.
Average 1-10			45.6		22.5	49.3	

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

§Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated by the circles. Particular care should be taken to note any irregular spacing between samples.

No. 1 of 2 sheets. Comp. by J. E. C. checked by

Water is moving  
 There has been a loss of 3.5 in. of  
 water from the snow since Apr. 22, 1944.  
 Measurements with dye movement.

CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin South Yuba  
Snow Course Soda Springs No. 1  
Party J. Church and Culver  
Date April 29, 1944

*Description or Number of Course (1)	Sample Number (2)	Distance Between Samples (3)	Depth of Snow Inches (4)	Length of Core Inches (5)	Water Content Inches (6)	Density 100 x (6)/(4) (7)	Remarks
	11	25	45.3	44.5	21.4		Capillary water 0.3 in.
	12	"	45.8	42.5	22.3		capillary water 0.7 in.
Near N. 9							Top of snow only. Today's melting snow
				3.3	1.9	57.6	
				3.3	1.8	54.5	
Kodachrome - Cross or Thin Section							
Pit		Top	6.0		2.8	46.7	Weathered
		Middle	25.2		4.0	48.2	Coarser
		Bottom	8.3		4.0	48.2	Finer
							Water standing on grass at bottom of pit.

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

§Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated by the circles. Particular care should be taken to note any irregular spacing between samples.

No. .... of ..... sheets. Comp. by ..... checked by .....

Water is Melting  
There has been a loss of 3.5 in. of water from the snow since Apr. 22, 1944. Measurements with dye movement.

I too had come to the point of assuming color movement on a film of water.

### Days Temp.

5:30 pm

Min 47.2° F

H-T 48.5°

8 to 5 pm 40 to 54 to 48.5°

Humid. 50% to 28 to 67%

### Days Plantings

W. On surface

Middle 16" deep below crusts

E 6" deep on crust.

### Temps and Crust

8:00 pm. Overcast, calm. On sea beach.

Min 41.5

H-T 42.5

Thermop. 42°

Thermop (jr) 43°

Planted Thermo. Nos. 1, 2, 3.

Birds sleeping goodnight.

Pasture

8:30 pm

Planted thermos. 4, 5, 6, 7.

Crust  $\frac{1}{8}$  to  $\frac{5}{16}$  in. thick.

Temp.

Wind, 37°F Can see breath,

H-T 38.2°

Humid 100%

Hotel

9:00 pm

Telithermos. 47.7°F

Wind 36.6°

H-T 38.0°

→ Humid 82% Test this.

On step Thermog (x) 37.5°

On snow Thermog. 34.2°

Sealed (No. 1) 32°

In snow surface

Crust  $\frac{1}{2}$  in.



Water flowing slowly down road and path, but seems to be diminishing. No freezing of soil or waters.

Sunday, April 30

Hotel 6 am. Temps & Coasts

Teletherm.	35° F (fall of 12.7° F)
Min	25.5°
H-T	28°

8 to 6 am 42 to 28°

Humid 80 to 84%

On Step

Thermog. #1	27°
Same post	

On Snow

Thermog. <u>Stage</u>	26°
-----------------------	-----

Sealed (No. 1) 24.8°

2 in. (No. 2) 30.0°

7 in. (No. 3) 32.0°

Coast 4 1/2 in.

Broke 2 thermos. <sup>inter tubes.</sup> cutting them from

wet crystals become hard frozen.  
 Should have shipped them out  
 live fossils. Easier in dry unfrozen  
 snow. Nos. 2 and 3. Can be readily  
 repaired.

### Pasture

6:45 am

Sealed in surface (No. 5)	22.0°F
2 in. (No. 4)	27.5-0.2 = 27.3°
3 1/2 in. (No. 6)	31.2°
8 in (No. 7)	+ 0.2°C! = 32.4°F

### Dye

No. W. Dye on surface green.  
 Rinse and net 1 in. yesterday.

### Crust

Crust 5 in. thick.

### Temp.

Min. 29.6°F  
 H-T 29.5°  
 8 to 7 am 40 to 27 to 29.5°F  
 Humid. 100 to 90 to 100 to 88 to 98  
 to 90 to 88%

→ Frost, solid freeze.

→ Better compute degree hours  
above or below 38°? rather than  
max. and min.

8 am. Road softening.  
Trace of melting.

Classic → Dyes

1. W-dye. 1 in. down
2. Middle dye. <sup>4 1/2 in. depth;</sup> planted 16 in. deep.  
Now to bottom.

Water squeezed from soil.

Capillary water 3 1/2 in. Water squeezed  
out.

Top. 9 in. frozen. Resists.

Below - dry crishes.

Farther below crush-packs.

3 1/2 to 15 in below wet moist packs.

Last 3 1/2 in. squeezes water.

3. E. dye 43 in depth. Planted 6 in deep  
on crust.

(a) Dye only 15 in. down thru crust

→ or 28 in. from bottom.

### Melting on Beacon Hill

Because Beacon Hill tilts toward the morning sun, the snow was far softer by late forenoon than in the Pasture. The angle of slope or incidence is very important in watersheds.

The snow was much too wet and therefore sticky for skiing. "Too slow and trippy" - Marshall!

Top 5<sup>in</sup> dry-crusts.

Next 30<sup>in</sup> moist crust. pores

Bottom moist-met pores.

(b) 44<sup>in</sup> depth.

Dye 18<sup>in</sup> (approx.) down.

About 10<sup>in</sup> frozen.

Then moist-met pores.

### New Dye

Planted day dye E of others on surface

### Old Dye

W. dye now red and 2<sup>in</sup> down.

### Melting\*

Surface of snow met to hands, but not loose.

Crusts under foot  $\frac{1}{4}$ <sup>in</sup>.

→ Query: What is snow's penetration in melting? See Hand's article.

Road soft and thickly muddy.

10:30 am.

Snow softened to depth of  $1\frac{1}{2}$ <sup>in</sup>.  
Hard lower.

2:45 pm.

Crust loosened to 3<sup>in</sup> and even



to 5 in. by thrusting with yard stick.

### Dye

W-Dye of last night. Depth 39.5 in.

Dye within 2 in. of bottom, which  
moist-packs.

Earth squeezes water.

Balance of core wet crush-packs.

Upper half rich red.

The condensation of water is  
uneven even where there are  
no strata.

E-Dye 40 in. depth.

Dye to within 2 1/2 in. of bottom.

Soil wet.

Color deep to within 12 in. of bottom.

Bottom 12 in moist crush-packs.

Balance very wet crush-packs.

### Temp.

Min (current) 54.7°F

H-T 56°

8 to 2 pm 34 to 58°F

Humid. 64 to 78%

Average footpoint 2 1/2 in. deep on  
present crust.

### Transport

Mr Tucker came with two sons, his wife and a daughter-in-law for a holiday with his Sno-Cat.

He took Becky and Family, Peter Lawlor of New Zealand and me beyond Ice Lakes into Ice Lakes Canyon toward French Meadows.

Snow slides had stopped just above the road.

Then we climbed Beacon Hill above Lower Tow with trailer but wet corn snow too slushy to give motor a footing to climb on.

Descended to Lake Norden and ran nose into 2 feet of water trying to turn round and back from a steep point.

The soft snow crystals were beaten down 12 to 18 in in backing up a very steep slope. The motor succeeded when the snow was shoveled down so motor could climb upon it.

Mr Tucker's plans to make a higher track.

Returned in early afternoon. Drove a toboggan with injured girl from ski town. Could run over the rough bare tracks of Railroad.

3:10 pm anemometer Pasture 493<sup>mi.</sup>

5 pm. All off on train.

### Hotel Temp. and Const

7:45 pm.

In Shelter {  
Min. 47.0° F  
H-T 48.0°  
Thermog. 48.5°  
Thermog. (T) 52°!

Reset at 46° to meet drop of others to 46°.

Meantime planted 3 thermos. in snow.

Pasture - Clean and calm.

Dye (new plantings)

W. Dye on snow

Middle. 4 in deep on crust.

E. 17 in. deep.

Planted 3 thermos. in snow.

Crust 1/4 in. thick.

H-T seems to read 41° F but dark.

Hotel

8:40 pm

Teletherm.

53° F

Wier.

40°

H-T

42°

On step (a) Thermog (fr)

38°

On snow (b) Thermog.

5 ft. lower than (a) 38°

(c) Sealed in snow (No. 1) 32.2°

→ 5 in. lower than (b)

Coast  $\frac{1}{4}$  to  $\frac{1}{2}$  in. deep.

// NB. Nye brilliant in Pasture where snow is very wet.

Precip.	Snow on Ground Feet
Apr. 1 0	52 <sup>in.</sup>
" 2	50
4 0.35 <sup>in.</sup>	51
8 0.45	48
11 1.09	56
12 0.54	59
13 0.03	56
14 0.19	56
15 0.03	56
16 0.46	54
19 0.59	56
20 0.53	62
21 T	60
24 T	55
27 0.01	47
28 0.12	47

Total Precip. for April 4.39<sup>in.</sup>



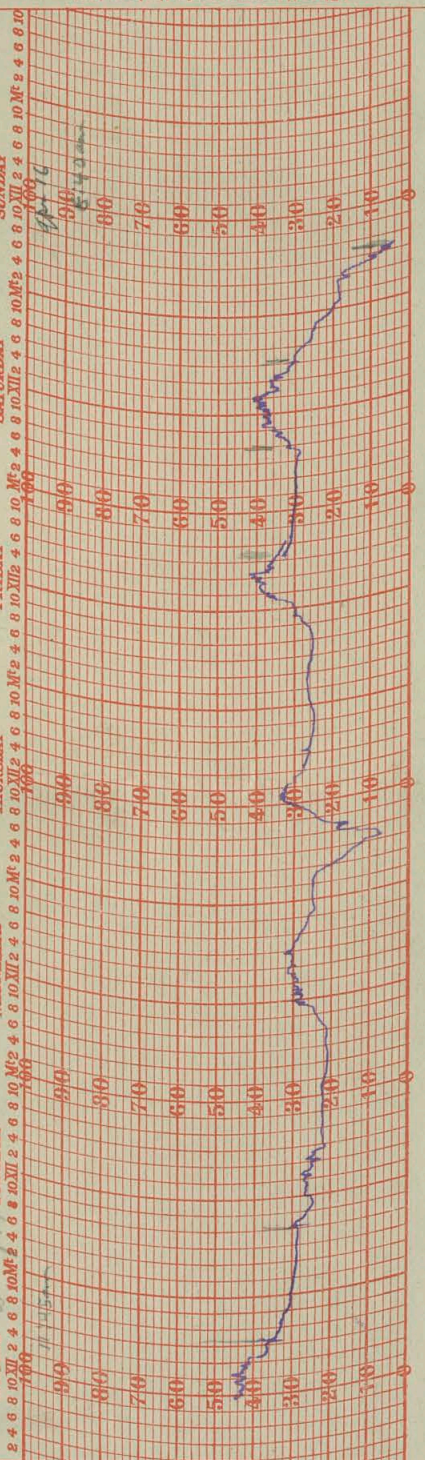
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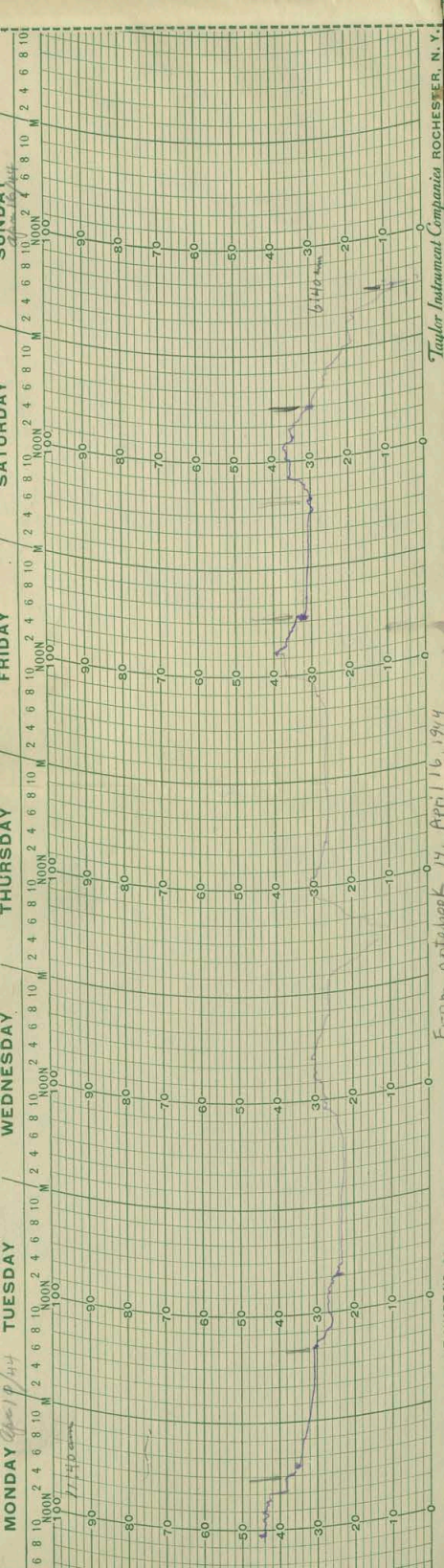
Baltimore, Md., U. S. A.

Station *Seaton Springs*

Week Ending *April 17, 1944*



(Place this margin under the brass bar.)





**FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS**

State California  
 Drainage Basin South Yuba Basin  
 Snow Course Soda Springs No. 1  
 Party J. S. Church  
 Date April 16, 1944

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	46.5	44.5	82.5	101	18.5		
	2	60 -2	58	82.5	109	26.5		Moist soil
	3	59 -1	57	83	108	25.2		Dry course upper 1/2
	4	58 -1	49.2 4.5 53.7	82	110	29.0		
	5	53.8	50.4	83	107	24.0		Dry
	6	58	54.8	82.5	110.5	28.0		
	7	59 -3	55.6 -3	66	90	24.0		3 lengths surface bottom

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

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Notebook 14, April 16, 1944



FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin South Yuba Basin  
 Snow Course Sadai Springs No. 1  
 Party J. E. Church  
 Date April 16, 1944

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	8	57	56.5	66	89	23.0		
	9	60	58.5	66	90	24.0		
	10	60	58.5	66.2	91.6	25.4		
	11	57.5	56.7	66	90.5	24.5		
	12	60	55.6	66	89.6	23.6		
1-10		57.0				24.66	43.3%	
3 pm			22.2 mi					Snowstake
H-T			35°F					56 of 55
Wind			124°					

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

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FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin South Yuba Basin  
 Snow Course Soda Springs #1  
 Party J. S. Church  
 Date April 22, 1944

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	50	47	66	87.6	26.6		
	2	61 -1.5	59.5 -1.5	66.5	93.4	26.9		Wet earth
	3	60.5	59	66.5	93	26.5		
	4	61.5	58.5	66	93	27		
	5	56.5	55.7	66	91.7	25.7		
	6	61 -4	59 -4	66	94	28		
	7	63	61	66	94	28		Bottom moist crushed pieces under pressure

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

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NOTEBOOK 14, April 22, 1944

FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State California  
 Drainage Basin South Yuba Basin  
 Snow Course Soda Springs #1  
 Party J. S. Church  
 Date April 22, 1944

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks	
	8	61.5 -5	58.8 -5	66.5	90	23.5			
	9	63	59.5	66.5	94	27.5			
	10	63 -4	59.5 -4	66.5	92	25.7			
	11	62	60	66.5	92.4	25.9			
	12	60.6	58	66	92	26		Hint embedded in bottom of core	
	extra	Top (mid) plane, hard old snow crystals caught the moist bottom moist pieces							
	av. 1-10		59.8			26.0	43.5		

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

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STATE OF CALIFORNIA  
DEPARTMENT OF PUBLIC WORKS  
DIVISION OF WATER RESOURCES  
401 PUBLIC WORKS BUILDING  
SACRAMENTO

CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin South Yuba Basin

Snow Course Soda Springs #1

Party J. E. Church

Date April 23, 1944

*Description or Number of Course (1)	Sam- ple Num- ber (2)	§Distance Between Samples (3)	Depth of Snow Inches (4)	Length of Core Inches (5)	Water Content Inches (6)	Den- sity 100 x (6)/(4) (7)	Remarks
	1	25.4	50	47	21.6		
	2	↓	59.5	58	26.9		Wet card
	3		60.5	59	26.5		
	4		61.5	58.5	27		
	5		56.5	55.7	25.7		
	6		60.6	58.6	28		
	7		63	61	28		

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

§Always start measurements for sampling from the *initial* point as shown by the sketch map of the course and follow the spacing for samples as indicated by the circles. Particular care should be taken to note any *irregular* spacing between samples.

No. 1 of 2 sheets. Comp. by J.E.C. checked by \_\_\_\_\_

CALIFORNIA COOPERATIVE SNOW SURVEYS  
SNOW SURVEY NOTES

Drainage Basin South Yuba Basin

Snow Course Sida Springs #1

Party J. Schumacher

Date April 22, 1947

*Description or Number of Course (1)	Sample Number (2)	Distance Between Samples (3)	Depth of Snow Inches (4)	Length of Core Inches (5)	Water Content Inches (6)	Density 100 x (g)/(cc) (7)	Remarks
		—					
	8	25 <sup>1/2</sup>	61	58.3	23.5		
	9	12	63	59.5	27.5		
	10		62.6	59.1	25.7		
	11		62	60	25.9		
	12		60.6	58	26		
Extra	— Hint embedded in bottom of core. Top (now) snow pieces, hard old snow crystals from the melt. Bottom melt pieces.						
aver. 1-10			59.8		26.0	43.5	

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.

§Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated by the circles. Particular care should be taken to note any irregular spacing between samples.

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FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State California  
Drainage Basin South Yuba  
Snow Course Soda Springs No. 1.  
Party J. F. Church  
Date April 29, 1944

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	1	35	33.5	66	83	17		
	2	49 -8	48 -8	66.1	90.5	4.4		Soil soaked
	3	45.5	40.7	66.2	85.2	19.0		
	4	46.3 -3.0	42.3 -3.0	66.5	91	24.5		Water coming from core
	5	42.5	41.5	66.5	87.5	21		
	6	47.5 -3	44.7 -3	66	90	24.6		Water coming out

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

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From Notebook 14, April 29, 1944

FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State California  
Drainage Basin South Yuba  
Snow Course Soda Springs No. 1  
Party J. F. Church  
Date April 29, 1944

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	7	47	44.8	66.5	87.8	21.3		
	8	46.8	45.7	66.5	87	20.5		
	(6)	47.5	47.5	66	89	2.3		Water may come to capillary water 1/2"
	9	49.5	46.7	66	91.5	25.5		Loaded with water. Knives some capillary water 3/4"
	10	47.2	45.2	66	91	2.5		Water remaining on capillary water
	10	45.6				22.5	49.3	
						8.5		100% 8.5 in.

\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. 2 of 3 sheets. Comp. by..... Checked by.....  
Does capillary water

FEDERAL AND STATE  
COOPERATIVE SNOW SURVEYS

State California  
Drainage Basin South Yuba  
Snow Course Soda Springs No. 1  
Party J. F. Church  
Date April 29, 1944

*Description or Number of Course	†Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Empty Tube	Weight of tube and Core	Water Content Inches	Density Per Cent	Remarks
	11	45.5 -2	44.7 -2	66	87.4	21.4		Capillary water 0.3"
	12	45.8	42.5	66	88.3	2.3		Capillary water 0.7"
	13							
	14							
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\*Show number or description as given on sketch map, i.e., "Course No. 1," or "Major Course," or "N 5° E," etc.  
†Always start measurements for sampling from the initial point as shown by the sketch map of the course and follow the spacing for samples as indicated. Particular care should be taken to note any irregular spacing between samples.

No. 3 of 3 sheets. Comp. by..... Checked by.....  
Water standing on the ground at bottom