Form No. 144

May 2, 1946

FEDERAL-STATE COOPERATIVE SNOW COVER SURVEYS

FEDERAL, STATE AND PRIVATE AGENCIES

SURVEY NOTES

Snow Surveying is completely explained in Miscellaneous Publication No. 380, United States Department of Agriculture.

Brief Directions and Suggestions for Snow Cover Sampling

(1) The usefulness of snow cover surveying depends primarly on the care and honesty of the men actually doing the field work.

(2) The work of the snow cover surveyor is often laborious, especially in stormy weather, and men willing to undertake such work can usually be depended upon to do their best and record the results faithfully.

DIRECTIONS FOR USING THE SNOW SAMPLER

A. **Care of Sampler:**

(1) In transporting sampler, extreme care should be used to guard it against injury; it can be easily dented.

(2) When sampling on steep slopes do not cling to the sampler to avoid sliding down hill; the tube is easily bent.

(3) Keep the sampler covered inside and out with a thin coating of shellac or paraffin. The inside coating can be applied by pulling through a swab soaked or wet with shellac.[1] This coating not only prevents corrosion but tends to keep moist snow from adhering to the tube.

(4) Since ice and rock sound and feel alike when struck by the sampler, be careful to determine what the substance is; ice will not blunt the cutter, rocks will.

(5) Keep the cutter sharp and the orifice true to its original diameter (1½ inches inside in case the Mt. Rose Steel Tube is used; and 1.485 in case the improved Utah Aluminum Tube is used).[2]

B. **Measuring for Samples:**

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. Note any irregular spacing between samples. Care should be used in spacing by tape measurements, so that the samples taken different years on the same course will be at the same spots.

(1) Plunging the tube should be avoided. In driving, a steady downthrust is preferable to twisting, because with the latter a small amount of snow enters the slots. However, a minimum amount of twisting aids in the driving and also facilitates the quick cutting of the thinner crusts. Plunging should be entirely unnecessary. In case the sampler sticks or freezes down, a light twist will usually release it.

(2) The presence of temperatures below 32 degrees F. in the snow, while the temperature of the air is above freezing, often causes the snow to adhere firmly to the orifice of the cutter after a depth of from 10 to 12 feet has been reached. This difficulty can be met in three ways.

(*a*) Withdraw the sampler when cutter becomes clogged and clean cutter and tube thoroughly. Push the tube rapidly through the snow without stopping until bottom is reached but do not plunge tube. Repeat until a complete core is obtained.[3]

(*b*) In case sampling is being done in the forest, keep the sampler in the shade as much as possible to keep it cold.

(*c*) The best method of all is to sample when the temperature of the air is at or below freezing, or late in the season when the temperature of the deep snow has risen to 32 degrees F. At these times sampling is easy and rapid.

In some cases, where not too far from a night's lodging, time can be saved by taking the samples in the morning or evening instead of during the warm part of the day.

C. **Weighing the Sample.**

Before taking the sample, place the empty sample tube in the cradle hanging from the scales. If the Mt. Rose scale is used, turn the pointer back to zero. If the standard tubular scale is used, record the weight empty in proper column in field book. When the sample has been taken, place the sampler in the cradle and record the weight for tube and core. For the Mt. Rose scale this reading equals the water content of the snow core. For the standard tubular scale the water content is given by the difference between the reading empty and the reading for tube and core. The zero setting in the case of the Mt. Rose scale, and the "empty" reading for the standard tubular scale should be checked at frequent intervals (not more than 5 measurements).

If dirt is picked up by the cutter it should be cleaned out with knife before weighing the sample, and proper deduction made before recording length of core or depth of snow.

D. **Recording:**

The snow cover survey sheets are made in pads of two sizes, the smaller being white and the larger pink. Only the white waterproof pads are to be used for field notes. The larger pink pads are to be used to make copies from the white field sheets as soon as possible after each survey. Instructions regarding the disposition of the pink copy sheets will be issued for each State and where necessary for each drainage basin, since the needs will require some variation in this respect.

Appropriate covers are to be provided for protection of field notes. Sketch maps showing points of observation are pasted to the inside of the covers.

Use pencil only for recording field measurements. Fill in complete description of course, party, date, etc.

If the depth of core is very much less than the depth of snow, the reason should be determined and noted under "Remarks." In case of doubt regarding the core, determine the density (water content divided by depth gives density) and compare with that of other adjacent measurements about which there is no doubt. "Remarks" should include special items as to the character of snow, nature and condition of soil or other bottom reached by the cutter, whether wet, dry, frozen, etc.

Any extended remarks as to weather conditions at the time of survey or shortly before the survey, unusual difficulties encountered, etc., may be placed on the back of the sheet, as one side only is to be used in recording the snow measurements.

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[1]Or paraffin.

[2]If the cutter is broken or badly worn, send first tube section with cutter attached to your regional snow survey office for repair or replacement.

[3]A complete core is evidenced when length of core compared to snow depth is approximately the same throughout a course.

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course Soda Springs #1

Party J. D. Goldsmith

Date 5-2-46

*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	21	19.5	35	48	13		
	2	22	17.5	35	46	11		
	3	23	17.5	35	47	12		
		~~23~~	~~20~~	~~35~~				
	4	23	20	35	50	15		
	5	23	20.5	35	50	15		
	6	22.5	18	35	47	12		
	7	22	18.5	35	47	12		
	8	21	17.5	35	46	11		

Samples taken 9 A.M.

8) 101 / 12.6

*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.....of.....sheets. Comp. by.....Checked by.....

8) 177.5 / 22.2 / 12.6 / 56.8%

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course Soda Springs #1

Party J. D. Johansen

Date 5-2-46

*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	19	15	36	45.5	9.5		
		1'			47			
2 PM	2	19.5	16.5	36	47	11		
	3	19	16.5	36	47.5	11.5		
Samples Taken 2	4	18.5	16	36	47	11		
	5	18	15.5	36	46	10		
	6	18	15	36	46	10		
	7	19	15	36	46	10		
	8	20	14	36	45	9	8	82.0 / 10.25

*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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Loss 2.4

No. ..... of ..... sheets. Comp. by ..... Checked by .....

8 / 151 / 18.9 / 10.2 / 54.0 %

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course Soda Springs #1

Party J. J. Johansen

Date 5-2-46

*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	16	14	36	45	9		-0.25
	2	17	14	36	45	9		-0.25
	3	17	14	36	45	9		-0.25
	4	17	15	36	46	10		-0.25
	5	18	15	36	45	9		-0.25
	6	18.5	14.5	36	45	9		-0.25
	7	18	14	36	45	9		-0.25
	8	17.5	13.5	36	43.5	7.5		-1

Sampling alone at 5 PM temp in shade 1/46

*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.....of.....sheets. Comp. by.....Checked by.....

8) 136.3 / 17.0 Total loss 3.7 Loss 1.9

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course Soda Springs #1

Party J. L. Johnson

Date 5-3-46

*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	17	17	35	44	9		-1.7
	2	17	15.5	35	45	10		-0.2
	3	15.5	12	35	42.5	7.5		-0.8
	4	15	9	35	41	6		-0.2
	5	17	13.5	35	45	10		-1.5
	6	17	16.5	35	46	11		-0.8
	7	17	16.5	35	46	11		-0.5
	8	18	16.5	35	46	11		8) 75.5 / 9.4

9 AM

Samples taken

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Yuba + 0.5

No.....of.....sheets. Comp. by.....Checked by.....

8) 127.8 / 16.0 / 9.4 / 58.8

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course Soda Springs #1

Party J. J. Johansen E. Johansen

Date 5-3-46

*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	13	11	35	43	8		-0.25
	2	13	10.5	35	43	8		
3 PM	3	12	12	35	42	7		-.02
	4	12	11.5	35	42.5	7.5		
Samples taken at	5	13	11	35	43	8		
	6	14	11.5	35	43.5	8.5		
	7	13	12.5	35	44	9		-.25
	8	13	13	35	44.5	9.5		2) 65.5 / 8.2
	8) 103	12.9		8.2		63.6%		

*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.

Loss 1.2 in.

No.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course Soda Springs #1

Party J. S. Woodward

Date 5-3-46

*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	12	10.5	35	43	8		
	2	12.5	9.5	35	41	6		
	3	13	11.5	35	42	7		
	4	14	13	35	43	8		
	5	14	15	35	44	9		
	6	13.5	12.5	35	42	7		
	7	13	11.5	35	43	8		
	8	14	10.5	35	42.5	7.5		8) 60.5 / 7.6
	8) 111	13.9		7.6)	54.7	7.0		

Samples taken at 6 PM

*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.

Loss 0.6

No.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course Soda Springs #1

Party J. L. Johansen J. Church

Date 5-4-46

*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	16	16.5	35	45	10		
	2	16	18	35	47	12		-1.0
	3	15	17	35	45.5	10		
	4	17	17	35	47	12		
	5	15	16	35	45.5	10.5		-1.0
	6	15	15	35	45	10		
	7	15	18	35	45.5	10.5		-2
	8	15.5	15	35	44.5	9.5		8) 84.5 10.6
Samples taken at 10.5 AM	8)	120.5	15.1	10.6		70.2%		

*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.

Gain 3.4

No.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course Soda Springs #1

Party J. S. Johnson

Date 5-4-46

*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	12	13	35	45	10		-0.25
6 PM	2	13	13.5	35	45	10		-0.25
	3	13	13	35	44	9		-0.5
Talbert	4	13	13.5	35	45	10		-0.4
	5	13	13.5	35	45	10		-1.0
Samples	6	13.5	14.5	35	46	11		-0.9
	7	13	12	35	43	8		
	8	12	12.3	35	44	9		-0.4
	8)	98.8	12.4			9.6	77.4%	

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8) 77.4
9.6

No.....of.....sheets. Comp. by.....Checked by.....

Loss 10%

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State .....

Drainage Basin .....

Snow Course .....

Party .....

Date ..... San Juan Mts. .....

*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

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin Truckee River

Snow Course Donner Lake

Party J. L. Johansen

Date 5-3-46

*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	7.5	7.5	35	40.5	5.5		-1.0
	2	14	13	35	42.5	7.5		
	3	33	32.5	35	52.5	17.5		-1.0
	4	New	5 snow			0		
	5	15.5	15.5	35	44	9		-0.7
	6	23	23	35	46	11		-0.2
	7	11.5	10.7	35	41.5	6.5		
	8	38	38	35	55	20		
	9	21.5	21	35	45.5	10.5		-1.1
	10	24.5	23	35	47	12		-0.7
	11	21	20	35	45	10		-1.0
	11	203.9	18.5	11	109.5	10.0	54.0%	

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No.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course Donner Pass

Party J. D. Johansen

Date 5-3-46

*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	no	snow					
	2	11	10.5	35	41			Rock
	2A	10	9.5	35	41			—
	3	25.5	25	35	50			
	3A	28	27.5	35	51			
	4	no	snow					
	5	22	19.5	35	43			
	5A	24	21.5	35	42.5			

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No.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So. Fork Yuba River

Snow Course Soda Springs

Party Johansen & Johansen

Date 5-3-46

*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	12	11.5	35	42	7		
	2	16	14	35	45	10		-.25
	3	11	11	35	42	7		
	4	16	17	35	48.5	13.5		
	5	10	11	35	43.5	8.5		
	6	13	12	35	43	8		-.25
	7	14	14.5	35	45.5	10.5		
	8	14	15	35	45	10		-1.5
	~~1200.2~~							

*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. 1 of 2 sheets. Comp. by ..... Checked by .....

8) 106 13.2 8) 74.5 9.3 70.5

8) 74.5 9.3

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So. Fork Yuba River

Snow Course Soda Springs

Party J. Shawver + E. Shawver

Date 5-3-46

*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
	9	24	17.5	35	47	12		
	10	18.5	19.5	35	49	14		
	11	24	20	35	48	13		
	12	9	8.5	35	41	6		
	13	21	19	35	46.5	11.5		-.25
	13)	200.2			13)	131.0		
		15.4				10.1		65.6%

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No. 2 of 2 sheets. Comp. by ..... Checked by .....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin Truckee River

Snow Course Donner Lake

Party J. D. Johansen

Date 5-5-46

*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	20	snow			0		
	2	12	11,5	35	41	7		
	3	26	24,5	35	49	14		-0,2
	4	0						
	5	7,5	7,5	35	41	6		-0,4
	6	19	18	35	45	10		-0,25
	7	0						
	8	34	33	35	53	18		
	9	19	18	35	44	9		-1,2
	10	19	17	35	45	10		-0,5
	11	16	15	35	44	9		-0,2
	12	0				0		

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No. ..... of ..... sheets. Comp. by ..... Checked by .....

12) 150 / 12.5 / 12) 83 / 6.9 / 55.2%

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course Soda Springs #1

Party J. I. Johansen

Date 5-5-46 5³⁰ PM

*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	0				0		
	2	0				0		
	3	0				0		
	4	9	9	35	42.5	7.5		
	5	0				0		
	6	0				0		
	7	8	9	35	41	6		8) 20.5
	8	9.5	10	35	42	7		2.6
13.3	9	15	9.5	35	40.5	5.5		Hollow underneath
	10	11	9.5	35	41.5	6.5		
	11	14	12	35	44	9		
	12	5.5	6	35	39	4		-0.5
	13	10.5	10	35	42.5	7.5		

Loss 2 days 6.7 daily

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

3.4

†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.......... of.......... sheets. Comp. by.................. Checked by..................

13) .82 / 6.3 13) 53 / 4.1 / 65.1%

Form No. 144

May 13 1946

FEDERAL-STATE COOPERATIVE SNOW COVER SURVEYS

FEDERAL, STATE AND PRIVATE AGENCIES

SURVEY NOTES

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(2) When sampling on steep slopes do not cling to the sampler to avoid sliding down hill; the tube is easily bent.

(3) Keep the sampler covered inside and out with a thin coating of shellac or paraffin. The inside coating can be applied by pulling through a swab soaked or wet with shellac.[1] This coating not only prevents corrosion but tends to keep moist snow from adhering to the tube.

(4) Since ice and rock sound and feel alike when struck by the sampler, be careful to determine what the substance is; ice will not blunt the cutter, rocks will.

(5) Keep the cutter sharp and the orifice true to its original diameter (1½ inches inside in case the Mt. Rose Steel Tube is used; and 1.485 in case the improved Utah Aluminum Tube is used).[2]

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(1) Plunging the tube should be avoided. In driving [illegible] countered, etc., may be thrust is preferable to twisting, because with [illegible] only is to be used in recording snow enters the slots. However, a mi[illegible] the driving and also facilitates [illegible] Plunging should be entirel[illegible] freezes down, a light t[illegible]

(2) The prese[illegible] while the temp[illegible] to adhere f[illegible] feet ha[illegible]

or badly worn, send first tube section with cutter attached survey office for repair or replacement.
re is evidenced when length of core compared to snow depth is e same throughout a course.

In some cases, where not too far from a night's lodging, time can be saved by taking the samples in the morning or evening instead of during the warm part of the day.

C. **Weighing the Sample.**

Before taking the sample, place the empty sample tube in the cradle hanging from the scales. If the Mt. Rose scale is used, turn the pointer back to zero. If the standard tubular scale is used, record the weight empty in proper column in field book. When the sample has been taken, place the sampler in the cradle and record the weight for tube and core. For the Mt. Rose scale this reading equals the water content of the snow core. For the standard tubular scale the water content is given by the difference between the reading empty and the reading for tube and core. The zero setting in the case of the Mt. Rose scale, and the "empty" reading for the standard tubular scale should be checked at frequent intervals (not more than 5 measurements).

If dirt is picked up by the cutter it should be cleaned out with knife before weighing the sample, and proper deduction made before recording length of core or depth of snow.

D. **Recording:**

The snow cover survey sheets are made in pads of two sizes, the smaller being white and the larger pink. Only the white waterproof pads are to be used for field notes. The larger pink pads are to be used to make copies from the white field sheets as soon as possible after each survey. Instructions regarding the disposition of the pink copy sheets will be issued for each State and where necessary for each drainage basin, since the needs will require some variation in this respect.

Appropriate covers are to be provided for protection of field notes. Sketch maps showing points of observation are pasted to the inside of the covers.

Use pencil only for recording field measurements. Fill in complete description of course, party, date, etc.

If the depth of core is very much less than the depth of snow, the reason should be determined and noted under "Remarks." In case of doubt regarding the core, determine the density (water content divided by depth gives density) and compare with that of other adjacent measurements about which there is no doubt. "Remarks" should include special items as to the character of snow, nature and condition of soil or other bottom reached by the cutter, whether wet, dry, frozen, etc.

Any extended remarks as to weather conditions at the time of survey or shortly before the survey, unusual difficulties encountered, etc., may be placed on the back of the sheet, as one side only is to be used in recording the snow measurements.

---

[1]Or paraffin.

[2]If the cutter is broken or badly worn, send first tube section with cutter attached to your regional snow survey office for repair or replacement.

[3]A complete core is evidenced when length of core compared to snow depth is approximately the same throughout a course.

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Nevada California

Drainage Basin Truckee River

Snow Course Donner Lake

Party J. D. Johansen

Date 5-12-46

*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	0				0		
	2	0				0		
	3	16	14	20	27	7		
	4	0				0		
	5	0				0		
	6	5	5	20	22	2		
	7	0				0		
	8	21	20.5	20	30	10		- 0.5
	9	5.5	5.5	20	22	2		- 0.25
	10	7	7	20	23	3		- 0.25
	11	0				0		
	12	0				0		
	(12)	53.5			(12)	24		
		4.5				2.0		44.4 %

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin Truckee River

Snow Course Donner Lake

Party J. Johanson & E. Johanson

Date 5/13/46

*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				0	0		
	2				0	0		
	3	8.5	8.5	18	23.5	5.5		
	4				0	0		
	5				0	0		
	6	5.	5.5	18	22	4		- 1 in
	7				0	0		
	8	11	11	19	26			
	8A	14		20.5	27	6.5		

*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.

No.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin Truckee River

Snow Course Donner Lake

Party J. Johanson + E. Johanson

Date 5/13/46

*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
	9	5	5	21	22	1		1.5
	10	4	4.5	19	24	5		-1
	11				0	0		
	12				0	0		
	1-12	33.0			1-12	22		
		2.8				1.9		67.8%

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin South Fork Yuba

Snow Course 5 Sample Cornice Donner Pass

Party J. D. Johansen

Date 5-18

*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	126	99,5	34	105	71		Not to ground. Solid ice
	2	129	127	34	114,2	70.2		Rock not ground
	3	154	137	34	127,5	93,5		solid ice
	4	160	132,5	34	125	91		wood & Rock
		172	136,5					
	5	172	136,5	34	126	92		Rocks & needles
	5)	741			5)	417.7		
		148.2				83.5		56.3%

*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. Particular care should be taken to note any *irregular* spacing between samples.

No.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State .....

Drainage Basin .....

Snow Course Donner Pass

Party J.J. and J.E.C.

Date May 21, 1946.

*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	111 −.8	90	34	98	64		1.7" wet mud at bottom above sand Core hard.
	2	121	114.5 +1.5	34	104	70		Snow wet Crushed
	3	143	139	34	124	90		Soaring
	4	142	126	34	122	88		Ice is waterlogged snow 1/4 in
	5	159	150 +1.7 Est.	34	123	89.7		On rock No crusts
						(89.7		
	5	875.2			5	401.7		
		175.0				80.3		45.9%

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples taken for comparative
Drainage Basin weight morning and night
Snow Course at Johansen house
Party Soda Springs
Date 5-24-46 10 AM

*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
-0,8	1	36	36	13	32	19		376 grams
-1,0	2	35	35	13,5	32	18.5		373 "
	3	32	32	13,8	32	18.2		375 "
	4	35	35	13,8	32,5	18.7		381 "
	5	35	35	13,8	33,9	20.1		391,2 "
		173				94,2		
Dirt	6	35,5	35,5	13,8	34,2	20,4		398,3 "
	7	35	35	13,8	33	19,2		385,5 "
	8	35,5	35,5	13,8	32	18,2		370,0 "
	8	277,2			8	152,38		3050

*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.....of.....sheets. Comp. by.....Checked by.....

34.6 19.0 54.9% 381.0

2

295 I

10

965

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples taken to compare weight

Drainage Basin morning and night

Snow Course at Johnsen House

Party Soda Springs

Date 5-24-46 6 PM

*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
Dirt 1/2"	(1)	34 0	33 4	32 0	14 0	18 0		365.6 Gr.
Dirt	(2)	33 5	33 0	31 5	13 8	17 7		365 5/8 Gr.
Dirt. 1"	(3)	35 5/8	34 5/8	31 0	13 8	17 2		365 0 Gr.
Dirt. 1"	(4)	35 0	35 0	31 0	13 8	17 2		366 7/8 Gr.
Rock -	(5)	35 5/8	34 5/8	30 5/8	13 8	16 7		364.1 Gr.
	5)	173.5			5)	87.4	5)	1826.9
		34.7			17.5	50.47%		365.3

*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. Particular care should be taken to note any *irregular* spacing between samples.

No.....of.....sheets. Comp. by.....Checked by.....

295
88,5
383 5

82,5
295
277 5

83,6
295
378 6

84,7
295
379 1

83,5
295
378,5

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples taken to compare

Drainage Basin weight morning and night

Snow Course near Johansen House

Party Soda Springs

Date 5-25-46 10 AM

*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
-1,5"	1	39	37,5	13,8	33	19.2		383,5 gr.
Rock	2	37,5	37,5	13,8	33	19.2		384,5"
-0.9	3	38	38	13,8	32	18.2		377,5"
-0,7	4	38	38	13,8	33	19.2		378.6 "
Rock	5"	37	37	13,8	33	19.2		379,7
	6	37	37	13,8	33	19.2		383,0
	7	38	37	13,8	32,5"	18.7		378,5
	8	36	36	13,8	32,2	18,4		378
	8)	297,4		8)	145 1.3	8)		3043.3

*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. Particular care should be taken to note any *irregular* spacing between samples.

No.....of.....sheets. Comp. by.....Checked by.....

37.2 18.9 50.8% 380.4

295
80,5
383.5

295
105,5

97
295
392

96
295
391

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples taken to compare weights

Drainage Basin morning and heights at

Snow Course Johansens Hause

Party

Date 5-27-46 9 AM

*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	42	42	14	36	22		410,5 gr.
-0,5	2	39	39	14	34	20		394,5 "
-1,7	3	41	40,5	14	34	20		393,2 "
	4	40	39	13,8	34	20,2		395,- "
	5	39	38	13,8	34,1	20,2		400,5 -
-0,8	6	39	39	13,8	33,8	20,0		391,-
	7	39	38	13,8	33,8	20,0		392,- "
-0,8	8	38,5	38,0	13,8	33	19,2		383,5

*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.

20.2 / 51.5% / 395.0

No.....of.....sheets. Comp. by.....Checked by.....

8) 313.7 / 39.2 8) 160.6 8) 3160.2

92.5
295
295
411.0

102
295
397

92
295
387

93
295
388

88
295
383

8 c

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples taken to compare weights

Drainage Basin morning & night at

Snow Course Johansen House Soda Springs

Party J. D. Johansen

Date 5-27-46

*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	41	41	13,8	35	21,2		411,0 gr.
	2	40	39	13,8	34,1	20,3		397,0 "
	3	39,5	38,5	13,8	33,8	20,0		388,0 "
	4	37,5	37	13,8	32,5	18,7		383,0 "
	5	38,5	38	13,8	33,5	19,7		387
	5)	196,5			5)	99,9	5)	1966
		39,3			20,0		50,9%	393,2

*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.....of.....sheets. Comp. by.....Checked by.....

98,5
295
393,5

95,5
295
390,5

96,5
295
391,5
21,5
413,0

86,5
295
381,5

7,72
295
37212

6,05
295,0
356,5

62,6
295
357,6

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples Taken To compare weights

Drainage Basin morning and night at

Snow Course Johansen house Soda Springs

Party

Date 5-29-46 9 30 AM

*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	39	39	14.2	31	16.8		393.5 gr.
	2	38	38	14.2	34	19.8		390.5 "
	3	38	37	14.2	35	20.8		395 - "
	4	37	37.5	14.2	36	21.8		413 - "
	5	34.5	34.5	14.2	33	18.8		372.2
	6	32.5	32	14.2	31.5	17.3		356.5
	7	35	35.5	14.2	33.2	19.3		381.5
	8	33.5	32.5	14.2	31.5	17.3		367.6

7

*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. ..... of ..... sheets. Comp. by ..... Checked by .....

35.9 19.0 52.9% 382.4

8) 287.5 8) 151.9 8) 3054.8

96,5
295
391,5

101
295
396

85
295
380

56,5
295
351,5

67
295
362

48,5
295,0
343,5

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples taken to compare weights

Drainage Basin morning and night at

Snow Course Johnson Creek Soda Springs

Party

Date 5-29-46 1:30 PM

*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	36	36	14.1	35	20.9		396 gr.
	2	38	37	14.1	34	19.9		391.5 "
	3	37	36	14.1	33.5	19.0		380.5 "
	4	35	34	14.1	32.5	18.4		380 "
	5	35	34	14.1	32.5	18.4		380 "
	6	33	32	14.1	32	17.9		362 "
	7	31	30	14.1	31	16.9		351.5
	8	30	29	14.1	30	15.9		343.5

*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.

No.....of.....sheets. Comp. by.....Checked by.....

34.4 18.4 53.5% 373.1

8) 275 8) 147.3 8) 2985

96,5
295,-
391,5

87
295
382

83,5
295,-
378,5

78,6
295
373,6

69,5
295,-
364,5

57
295
352

38,7
295,-
338,7

42
295
337

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State: Samples taken to compare weight

Drainage Basin: morning and night for

Snow Course: Ir Church at Johansen house

Party: Soda Springs

Date: 5-30-46 9:30 AM

*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	36,5	36,5	14.2	35	20.8		391,5 gr.
	2	36,5	35,5	14.2	33,8	19.6		382,- "
	3	34,5	34,5	14,2	33	18.8		378,5 "
	4	34	34	14,2	33	18.8		373,6 "
	5	32,5	32	14,2	32	17.8		364,5 "
	6	30	29	14,2	31	16.8		352,- "
	7	28	27,5	14,2	29	14.8		338,7 "
	8	27	27	14.2	29	14.8		337, "

*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.......of.......sheets. Comp. by.............. Checked by..............

32.4 17.8 54.9 365.6

8) 259 8) 142.2 8) 2924.8

77	75	69
295,–	295,–	295
372	370	364,–
66,5	59,–	49,5
295,–	295	295,–
360,5	354,	344,5
56,–	41	
295	295	
351	336	

FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS

State Samples taken to compare

Drainage Basin weight morning and night

Snow Course for Dr Church

Party

Date 5-30-46 6 30

*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	34,5	34	14,2	32,5	18.3		372,0 gr
	2	33,5	33,5	14,2	32	17.8		370,0 "
	3	33	32	14,2	32	17.8		364, — "
	4	32	30	14,2	31	16.8		360,5 "
	5	30	29	14,2	30	15.8		354, — "
	6	24,5	24	14.2	29,9	15.7		344,5 "
	7	26	25	14.2	30	15.8		351, — "
	8	26	24,5	14.2	29.1	14.8		336, — "

*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.

29.9 16.6 55.5% 356.5

No.........of.........sheets. Comp. by.................Checked by..............

8) 239.5 8) 132.8 8) 2852

67
295
362

65,8
295,—
360,8

55
295
550

55,4
295,—
350,4

50
295
345

48,5
295,—
343,5

36,6
295,—
331,6

34
295
329

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples taken to compare

Drainage Basin weight morning and night

Snow Course by Johansen hause

Party

Date 5-31-46

*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
-0,7	1	33	33	14,2	32	17,8		362.gr.
-0,5	2	32	32	14,2	31,8	17,6		360,8 "
-0,5	3	32	30	14,2	30,5	16,3		350,0 "
	4	31	30	14,2	30,5	16,3		350,4 "
	5	29	28	14,2	30	15,8		345,0 "
	6	28	27,5	14,2	30	15,8		343,5 "
	7	26	26	14,2	28	13,8		331,6 "
-0,8	8	25	25	14,2	28	13,8		329, "

*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. ..... of 29,2 sheets. Comp. by 15.9 54.4% 346.5 Checked by .....

8) 233.5 8) 127.2 8) 2772.3

64.4
295
3594

77
295
372

71
295
366

75.8
295
370.8

69.6
295
364.6

72
295
367

63.2
295
358.2

65.5
295
360.5

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples taken to compare
Drainage Basin weight morning and
Snow Course night at Johansen house
Party Soda Springs
Date 5-31-46 5:30 PM

*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	32,5	31,5	14,2	31,9	17.7		359,4
	2	33,5	32	14,2	32,1	17.9		366 -
	3	33	32,5	14,2	31	16,8		372
	4	32	31	14,2	33	14.8		370,8
	5	32	30	14,2	30	13.8		367
	6	31	30	14,2	31.9	17.7		358,2
	7	32	31	14,2	31.9	17.7		360,5
-.06	8	33	32.5	14,2	32	17.8		364,6

*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.

33.3 16.8 52.0% 364.8

No.....of.....sheets. Comp. by.....Checked by.....

8)258.4 8) 134.2 8)2918.5

69,5	68,5	85,5
295	295	295
364,5	363,5	380,5

90,5	55,2	70	70,5	67
295	295	295	295	295
385,5	350,2	365	365,5	362,-

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples taken compare weight
Drainage Basin morning and night
Snow Course at Johansen house Soda
Party Springs
Date 6-1-46 9 AM

*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	32,5	32,5	14,2	32	17.8		364,5 gr.
	2	32	32	14,2	31,9	17.7		363,5 "
	3	33	33	14,2	33,6	19.4		380,5 "
	4	34	34	14,2	34	19.8		385,5 "
	5	31,5	31	14,2	30,5	16.4		350,2 "
	6	33	33	14,2	32	17.8		365,- "
	7	32	32	14,2	32	17.8		365,5 "
	8	32	31,5	14,2	31,9	17.7		362,0 "

*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........of 32.5 sheets. Comp. by 18.0 55.4% Checked by 367.0

8) 260 8) 144.4 8) 2936.7

63,4	74,8	78,3	66,7	76,5
295	295,-	295,-	295,-	295
358,4	369,8	273	361,7	371,5

67		
295	64,-	48,-
	295	295
362,-	359,-	343

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples taken to compare

Drainage Basin weight morning and night

Snow Course at Johnson Shaw

Party Soda Springs

Date June 2-46 9 AM

*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	30.5	30	14.2	31.9	17.7		358.4 gr.
	2	31	30.5	14.2	32	17.8		369.8 "
	3	31	31	14.2	33	18.8		373.3 "
	4	30.5	30.5	14.2	31.9	17.5		361.7 "
	5	31.5	31.5	14.2	33	18.8		371.5 "
	6	30.5	30.5	14.2	31.9	17.7		362.- "
	7	30	30	14.2	31.9	17.9		359.- "
	8	30	30	14.2	31.9	17.7		343.- "

*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. ..... of ..... sheets. Comp. by ..... Checked by .....

30.6 18.0 58.8 362.3

8) 245 8) 143.7 2898.7

54,	64,5	58,5	60,5	57,5
295	295	295	295	295
349	359,5	353,5	355,5	352,5

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weight
Drainage Basin morning and night taken
Snow Course at Johnson House
Party Gould Spencer
Date 6-2-46 7PM

*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	29	28	14,2	30,5	16.3		349.- gr
	2	30	29	14,2	31	16.8		359.5 "
	3	30,5	30,5	14,2	30,5	16.3		353.5 "
	4	29	29	14,2	31	16.8		353.5 "
	5	29	29	14,2	31	16.8		352.5
	5)	147.5		5)	83	5)		1770.0
		29.5			15.7	53.2%		354.0

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples taken daily at

Drainage Basin Loner Pass contact for

Snow Course Dr Church

Party J. I. Johansen

Date 6-2-46 10 AM

*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	86	77	34	85	51		Dirt
	1a	82	74.5	34	91.9	57.9		
	2	93	90	34	91.-	57		
	3	114.5	110	34	108	74		
	4	120	107	34	111.5	77.5		Dirt
	5	126	120	34	113	79		
	5)	535.5			5)	345.4		
		107.1			69.1	64.5%		

*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.

No.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples at Donner Pass Cornice

Drainage Basin taken daily for Dr Church

Snow Course

Party J. S. Johansen

Date 6-1-46 1 PM

*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	83	82	34	87,9	3.9		
	2	106	95	34	96	62		
	3	110	102,5	34	111	77		
	4	127	114	34	118	84		2 snits
	5	136	128	34	117	83		
	5)	562			5)	359.9		
		112,4			72.0		64.1 %	

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples taken ~~daily~~ daily

Drainage Basin on Donner Pass for D. Church

Snow Course

Party J. I. Johnson

Date 5-31-46 4 PM

*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	89	82.5	34	88.1	54.1		
	2	96.5	92.5	34	94	60		-1.0
	3	114	106.5	34	109.5	75.5		wood
	4	122	120	34	112	78		
	5	131	104	34	113	79		
	5)	552.5			5)	346.6		
		110.5			69.3		62.7%	

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS

State 5 Samples taken daily at

Drainage Basin Donner Pass Cornice for

Snow Course Fr. church

Party

Date 5-30-46 2 PM

*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	96	91	34	98	64		-1.5
	2	92	88	34	91.9	57.9		
	3	130	112	34	115.5	81.5		
	4	136	109	34	112.0	78.0		-1.6
	5	138	134.5	34	116	82		
	5)	588.9			5)	363.4		
		117.8			72.7		61.7%	

*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.........of.........sheets. Comp. by.................Checked by.................

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples taken daily at

Drainage Basin Donner Pass & Comet

Snow Course for Dr Church

Party J. D. Johansen

Date 5-29-46

*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	93	80	34	91	57		
	3	115	86	34	103	69		
	2	106	104	34	99	65		
	4	140	125	34	121.5	87.5		
	5	151	144	34	123.5	89.5		
	5)	605.			5)	368		
		121.0		73.6		60.8	%	

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples taken daily for

Drainage Basin Dr Church at O

Snow Course Donner Pass Cornice

Party J. V. Johansen

Date 5-27-46

*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	99	97	34	93	59		
	2	118	118	34	100,5	66.5		
	3	140	136,5	34	117	83		
	4	134	123	34	119,5	75.5		
	5	154	150	34	122	88		
	5)	645			5)	372		
		129.0			74.4	.577	57.7%	

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples taken daily

Drainage Basin Ft. Sn Church

Snow Course Donner Pass

Party J. S. Johansen

Date 4-25-46

*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	109	102	34	97	63		
	2	128	119	34	105	71		-1,0
	3	132	130	34	115	81		
	4	141	135,5	34	120	86		
	5	156	144	34	120	86		
	5)	666			5)	387		
		133,2			77,4		58,1 %	

*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.....of.....sheets. Comp. by.....Checked by.....

96,2
295
7912

293
81
376

78
295
373

80
295
370

86
295
381

103,3
295,1
3983

90,5
295,1
2855

75
295
370

70,6
295
3656

38 | 1710

Form No. 144

June 3, 1946

FEDERAL-STATE COOPERATIVE SNOW COVER SURVEYS

FEDERAL, STATE AND PRIVATE AGENCIES

SURVEY NOTES

Snow Surveying is completely explained in Miscellaneous Publication No. 380, United States Department of Agriculture.

Brief Directions and Suggestions for Snow Cover Sampling

(1) The usefulness of snow cover surveying depends primarly on the care and honesty of the men actually doing the field work.

(2) The work of the snow cover surveyor is often laborious, especially in stormy weather, and men willing to undertake such work can usually be depended upon to do their best and record the results faithfully.

DIRECTIONS FOR USING THE SNOW SAMPLER

A. **Care of Sampler:**

(1) In transporting sampler, extreme care should be used to guard it against injury; it can be easily dented.

(2) When sampling on steep slopes do not cling to the sampler to avoid sliding down hill; the tube is easily bent.

(3) Keep the sampler covered inside and out with a thin coating of shellac or paraffin. The inside coating can be applied by pulling through a swab soaked or wet with shellac.[1] This coating not only prevents corrosion but tends to keep moist snow from adhering to the tube.

(4) Since ice and rock sound and feel alike when struck by the sampler, be careful to determine what the substance is; ice will not blunt the cutter, rocks will.

(5) Keep the cutter sharp and the orifice true to its original diameter (1½ inches inside in case the Mt. Rose Steel Tube is used; and 1.485 in case the improved Utah Aluminum Tube is used).[2]

B. **Measuring for Samples:**

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. Note any irregular spacing between samples. Care should be used in spacing by tape measurements, so that the samples taken different years on the same course will be at the same spots.

(1) Plunging the tube should be avoided. In driving, a steady downthrust is preferable to twisting, because with the latter a small amount of snow enters the slots. However, a minimum amount of twisting aids in the driving and also facilitates the quick cutting of the thinner crusts. Plunging should be entirely unnecessary. In case the sampler sticks or freezes down, a light twist will usually release it.

(2) The presence of temperatures below 32 degrees F. in the snow, while the temperature of the air is above freezing, often causes the snow to adhere firmly to the orifice of the cutter after a depth of from 10 to 12 feet has been reached. This difficulty can be met in three ways.

(*a*) Withdraw the sampler when cutter becomes clogged and clean cutter and tube thoroughly. Push the tube rapidly through the snow without stopping until bottom is reached but do not plunge tube. Repeat until a complete core is obtained.[3]

(*b*) In case sampling is being done in the forest, keep the sampler in the shade as much as possible to keep it cold.

(*c*) The best method of all is to sample when the temperature of the air is at or below freezing, or late in the season when the temperature of the deep snow has risen to 32 degrees F. At these times sampling is easy and rapid.

In some cases, where not too far from a night's lodging, time can be saved by taking the samples in the morning or evening instead of during the warm part of the day.

C. **Weighing the Sample.**

Before taking the sample, place the empty sample tube in the cradle hanging from the scales. If the Mt. Rose scale is used, turn the pointer back to zero. If the standard tubular scale is used, record the weight empty in proper column in field book. When the sample has been taken, place the sampler in the cradle and record the weight for tube and core. For the Mt. Rose scale this reading equals the water content of the snow core. For the standard tubular scale the water content is given by the difference between the reading empty and the reading for tube and core. The zero setting in the case of the Mt. Rose scale, and the "empty" reading for the standard tubular scale should be checked at frequent intervals (not more than 5 measurements).

If dirt is picked up by the cutter it should be cleaned out with knife before weighing the sample, and proper deduction made before recording length of core or depth of snow.

D. **Recording:**

The snow cover survey sheets are made in pads of two sizes, the smaller being white and the larger pink. Only the white waterproof pads are to be used for field notes. The larger pink pads are to be used to make copies from the white field sheets as soon as possible after each survey. Instructions regarding the disposition of the pink copy sheets will be issued for each State and where necessary for each drainage basin, since the needs will require some variation in this respect.

Appropriate covers are to be provided for protection of field notes. Sketch maps showing points of observation are pasted to the inside of the covers.

Use pencil only for recording field measurements. Fill in complete description of course, party, date, etc.

If the depth of core is very much less than the depth of snow, the reason should be determined and noted under "Remarks." In case of doubt regarding the core, determine the density (water content divided by depth gives density) and compare with that of other adjacent measurements about which there is no doubt. "Remarks" should include special items as to the character of snow, nature and condition of soil or other bottom reached by the cutter, whether wet, dry, frozen, etc.

Any extended remarks as to weather conditions at the time of survey or shortly before the survey, unusual difficulties encountered, etc., may be placed on the back of the sheet, as one side only is to be used in recording the snow measurements.

---

[1]Or paraffin.

[2]If the cutter is broken or badly worn, send first tube section with cutter attached to your regional snow survey office for repair or replacement.

[3]A complete core is evidenced when length of core compared to snow depth is approximately the same throughout a course.

58,- 56,5 58,5 61,- 72,5 82,5 70,5
295 295,- 295,- 295 - 295,- 295,- 295,-
353,- 351,5 353,5 356 367,5 377,5 365,5

64
295

359

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weights

Drainage Basin morning and night taken

Snow Course at Johansen Butte Soda Springs

Party

Date 6-3-46

*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	29	28	14.2	31	16.8		353.- gr
	2	29	28.5	14.2	31	16.8		357.5 "
	3	28.5	28.5	14.2	31	16.8		353.- "
	4	28.5	28.5	14.2	31	16.8		353.5 "
	5	29	28	14.2	31.5	17.3		356.- "
	6	30.5	30	14.2	32	17.8		367.5 "
	7	32	31	14.2	33	18.8		377.5 "
	8	31.5	31	14.2	32	17.8		365.5 "

*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.

No.....of.....sheets. Comp. by.....Checked by.....

29.7 16.0 53.9% 359.5

8) 237.5 8) 133.9 8) 2876.5

29	38,8	30,5	48,5	66,5	53,3
295,-	295,-	295,-	295,-	295,-	295,-
324	3338	3255	343,5	361,5	348,3

64	61,5
295,-	295,-
359	356,5

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weight

Drainage Basin morning and night taken

Snow Course at Johansen house Soda Springs

Party

Date 6-4-46 9 AM

*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	23	23	14.2	27.9	13.7		324.- gr.
	2	25	25	14.2	29	14.8		333.8 "
	3	24.5	24	14.2	28	13.8		325.5 "
	4	24.5	24.5	14.2	29.5	15.3		343.5 "
	5	27	27	14.2	31.9	17.7		361.5 "
	6	27	27	14.2	30.5	16.3		348.3 "
	7	27.5	27.5	14.2	31.9	17.5		395.- "
	8	27.5	27.5	14.2	31.5	17.3		391.5 "

*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.

No. of 24.5 sheets. Comp. by 15.8 64.5% 348.8 Checked by

8) 196 8) 126.4 8) 2791.1

77,6 66,5 57,5 43,- 49,7 43,6

295 295,- 295,- 295,- 295,- 295,-

372,6 361,5 352,5 338 344,7 338,6

42,5 72-

295,- 295-

237,5 367

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weight morning and night taken

Drainage Basin

Snow Course at Johansen House

Party

Date 6-4-24 6 30

*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	29	29	14,2	30,5	16.3		372,6 gr
	2	28,5	28,5	14,2	31,9	17.7		361,5 "
	3	28	27	14,2	30	15.8		352,5 "
	4	28	26,5	14,2	29	9.8		338 "
	5	27	26,5	14,2	29	14.8		344,7 "
	6	26	25	14.2	29	14,8		338,6 "
	7	25,5	25,5	14,2	29	14,8		237,5 "
	8	32	28	14,2	32	17.8		367,- "

*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. ..... of 28.0 sheets. Comp. by 15.12 54.3 To 339.0 Checked by .....

8) 224 8) 121.8 8) 2712.4

50,5	50,5	44,4	56,1	56,5	52,-
295,-	295,-	295,-	295,-	295,-	295,-
345,5	345,5	339,4	351,-	351,5	347,-

41,7 | 48,6

295,- | 295,-

140,7 | 3436

.690

71 | 490
426
640
639
100

.68

91 | 620
546
740
728
120

.624

85 | 530
510
200
170
300

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to company weight
Drainage Basin morning and night taken
Snow Course at Johnsen Lake
Party
Date 6-5-46 9 AM

*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	28	28	14.2	30	15.8		345.5 gr.
	2	27.5	27	14.2	29.9	15.7		345.5 "
	3	28	27.5	14.2	29.5	15.2		339.4 "
	4	28	28	14.2	30.2	16.0		351.- "
	5	28	28	14.2	30.5	16.3		315.5 "
	6	29	28	14.2	30	15.8		347.- "
	7	27.5	27.5	14.2	29	14.8		240.7 "
	8	26	26	14.2	29.9	15.7		343.6 "

*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. ..... of ..... sheets. Comp. by ..... Checked by .....

27.8 15.7 58.1% 328.5

8) 222.3 8) 125.3 8) 2628.2

38
29,5
333

30
29,5
325

37,5
29,5
332,5

49,5
29,5
344,5

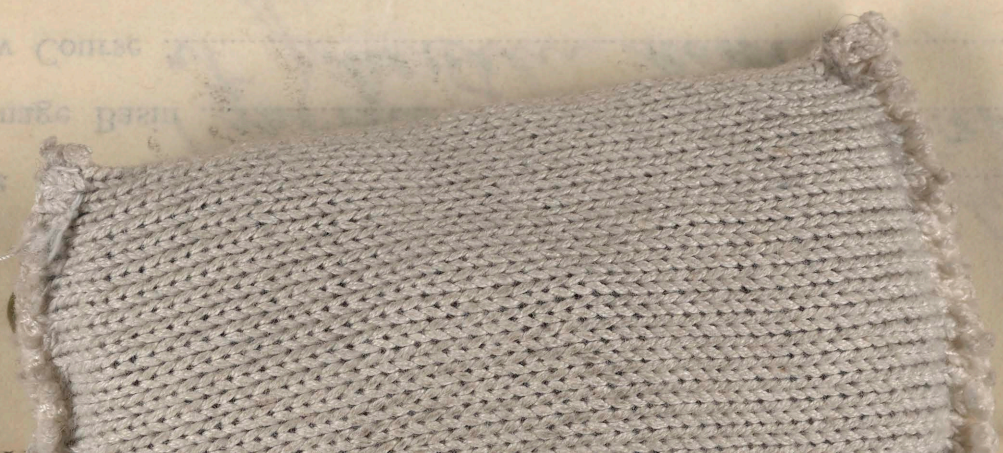
44,2
29,5
339,2

58
29,5
353

49,-
29,5
344

378
29,5
334,8

30,7
29,5
325,7



FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weight

Drainage Basin morning and night taken

Snow Course at Johnson Lake

Party

Date 6-5-46 5 PM

*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	26	26	14,2	29	14.8		333,- gr.
	2	26,5	24,5"	14,2	28	13.8		325,- "
	3	23,5"	25"	14,2	29	14.8		332,5" "
	4	27	26	14,2	30	15.8		344,5" "
	5	27	25,5"	14,2	29,9	15.7		339,2 "
	6	26	26	14,2	31	16.8		353,- "
	7	25,5"	25,5"	14,2	30	15.8		344,- "
	8	24,5	24,5"	14,2	29	14.8		332,8 "

*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.

26.0 15.3 58.8% 310.6

No.....of.....sheets. Comp. by.....Checked by.....

8) 208 8) 122.3 8) 2704

43,5	39,-	33,4	30,7
295,-	295,-	295,-	295,-
3385	334	328,4	325,7

26,5	31,-	18,-	27,8
295,-	295,-	295,-	295,-
321,5	326,-	313,-	312,8

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weight

Drainage Basin morning and night taken

Snow Course at Jokerdem Ranch

Party

Date 6-6-46 9 AM

*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	26	27	14.2	29.5	15.3		338.5 gr
	2	25.5	25	14.2	28.5	14.3		334.- "
	3	25	25	14.2	28	13.8		328.4 "
	4	25	26	14.2	28	13.8		325.7 "
	5	25.5	25.5	14.2	27	12.8		321.5 "
	6	24.5	25.5	14.2	27.5	13.3		326.- "
	7	23	23	14.2	26.5	12.3		313.- "
	8	24	24	14.2	27	12.8		322.8 "

*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. 34.8 of sheets. Comp. by 13.6 54.8% 326.2 Checked by

8) 198.5 8) 108.4 8) 2609.9

295

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weight

Drainage Basin measured and weight

Snow Course taken at Johnson House

Party Soda Springs

Date 6-6-46 6 30 PM

*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
-.5	1	25	25	14.2	29.9	15.7		335.5
	2	25	23	14.2	28	13.8		326.5
-1	3	25	25	14.2	29	14.8		338
-.5	4	25	24.5	14.2	28.5	14.3		343.5
	5	25	23	14.2	29	14.8		336.5
	6	24	23	14.2	27	12.8		317.0
-.04	7	24.5	24	14.2	27	12.8		319.8
	8	23.5	22	14.2	26.5	12.3		313.6

*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. ..... of 24.4 sheets. Comp. by ..... Checked by .....

13.9 57.0% 328.8

8) 195.9 8) 111.3 8) 2630.4

0,3	40	20	63	49,7
295	295	295	295	295
295,5	335	315	258,5	342,7

50,5	35,4	35,3
295	295	295
345,5	320,4	330,3

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weight

Drainage Basin morning and night

Snow Course taken at J. Johansen Ranch

Party

Date 6-7-46 9 AM

*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	21	21	14.2	25	10.8		295.5 gr
	2	24	25	14.2	29	14.8		335.- "
	3	21.5	22	14.2	27	12.8		315.- "
	4	25.5	25.5	14.2	31.5	17.3		358.5 "
	5	25.	24.5	14.2	30	15.8		342.7 "
	6	24	26.5	14.2	30	15.8		345.5 "
	7	24.5	24.5	14.2	29	14.8		329.4 "
	8	24	24	14.2	28.5	14.3		330.3 "

*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. Particular care should be taken to note any *irregular* spacing between samples.

No. ..... of 23.7 sheets. Comp. by 14.6 Checked by 61.6% 330.3

8) 189.5 8) 116.4 8) 2642.9

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to Compare Weight

Drainage Basin Morning & Night

Snow Course Taken by John Johnson

Party

Date 6/7/46 6:45 P.M.

*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	Grams Remarks
Dirt	1	22 5/8	22 5/8	20.	30	10		324.5 G.R.
No Dirt	2	22,5	22,5	20	30,5	10 1/2		324,5
No Dirt	3	22,5	22,5	20	33	13		324 -
No Dirt	4	23	22	20	32	12		321,5
No Dirt	5	20	18	20	30,1	10 1/2		233.8
Bottom	6	21	21	20	33 1/2	13 1/2		263.8
Bottom	7	21 5/8	19 5/8	20	31 5/8	11 5/8		244.7
Bottom	8	22	21 5/8	20	32 1/2	12 1/2		258.3
		2.69		11.2		5.11%		287.0
	8)	17.50			8) 92.7		8)	2296.1

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weight

Drainage Basin morning and night taken

Snow Course at Johansen Meadow

Party Soda Springs

Date 6-8-45 9 AM

*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	22	22	20	32	12		250.0 gr
	2	22	23	20	33	13		261.7 "
	3	22	22	20	32	12		248.2 "
	4	21.5	23	20	32	12		251.7 "
	5	21	23	20	33	10		257.6 "
	6	22	23	20	32	12		246.1 "
	7	21	21	20	32	12		246.6 "
	8	21.5	22	20	32	12		252.4 "

*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. ..... of 21.6 sheets. Comp. by 11.9 Checked by 55.1 % 251.7

8) 173 8) 95 8) 2014.3

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weight

Drainage Basin morning and night

Snow Course taken at Interlaken house

Party Soda Springs

Date 6-8-46 6 PM

*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	19.5	19.5	20	37	17		239.2
	2	19	19	20	37	17		235.2
	3	17	17	20	35.9	15.9		220.5
	4	20	20	20	37.9	17.9		241.0
	5	19.5	19	20	37.9	17.9		240.0
	6	19.5	19.5	20	38	18		244.2
	7	18.5	18.5	20	37	17		230.3
-.5	8	19	19	20	36	16		230.4

*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.

Error 2.

No. ..... of 17.8 sheets. Comp. by 17.1 Checked by .....

96.1 to 235.1

8) 154.5 8) 136.7 8) 1880.8

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Samples to compare weight
Drainage Basin taken at Johansen house
Snow Course Soda Springs
Party 5 PM
Date 6-19-46 ~~Noon~~

*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	20	22	32	45	13		Dirt
	2	30	30	32	50	18		Dirt
	3	45	46½	32	61	29		Dirt
	4	42	44	32	62	30		Rock
	5	60	52	32	63	31		Dirt
	5)	197			5)	121		
		39.4			24.2		61.4	%

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State .....

Drainage Basin Samples .....

Snow Course Dunbar Swamp .....

Party J. Johansen + E. Johansen .....

Date 6-16-46 .....

*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	23	22	32	46	14		
	2	32	32	32	51.5	19.5		
	3	54	45	32	59.5	27.5		
	4	61	58	32	70	38		
	5	74	65	32	72	40		-1
	5)	244.			5)	139.		
		48.8			27.8		57.0%	

*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. 1 of 1 sheets. Comp. by ..... Checked by .....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin

Snow Course

Party

Date 6-17-46 9 AM

*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	20	19	32	42	10		Dirt
	2	15	17	32	41.5	9.5		
	3	36	41	32	58	26		Solid ice
	3a	42	48	32	58	26	✓	— " —
	4	66	53	32	66	34.	✓	Dirt
	4a	67	45	32	61	29		"
	5	66	64	32	72	40		"
	5)	209			5)	128.5		

*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.

No.....of.....sheets. Comp. by.....Checked by.....

41.8 25.7 61.5%

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State .....

Drainage Basin .....

Snow Course .....

Party .....

Date ..... 6-16-46 4 PM

*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	30	30	32	51,5	19.5		Decomposed granite
	2	38	36	32	54	22		Rock
	3	62	61,5	32	72	40		Too much dirt over
	3a	63	56	32	68	36		Dirt
	4	66	64	32	73	41		Rock
	5	86	73	32	77	45		Rock
	5)	282			5)	167.5		
		56.4			33.5		59.4 %	

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS

State 5 samples taken daily for

Drainage Basin Dr. Church at

Snow Course Donner Pass Cornice

Party J. I. Johansen

Date 6-13-46 5 PM

*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
	2	46	43	32	58	26		
	1	29	27	32	49.5	17.5		
	3	73	58	32	69.5	37.5		
	3a	57	57	32	67	35		
	4	70	69.5	32	77	45		
	5	72	72	32	78	46		
	5)	290			5)	172		
		58.0			34.4		59.3%	

*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. Particular care should be taken to note any *irregular* spacing between samples.

No.............of.............sheets. Comp. by.........................Checked by.....................

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples taken daily for

Drainage Basin Ja Church at

Snow Course Donner Pass Cornice

Party J. I. Johansen

Date 6-12-46 11 AM

*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	30	29	32	49	17		Rock
	2	62	48,5	32	63	31		
	3	55	57,5	32	70	38		Hard ice in many layers
	4	74	76,5	32	85	53		Too much dirt in not clean
	4a	80	75	32	80	48		Rock
	5	77	78,5	32	83	51		Rock
	5)	298			5)	190		
		59.6			38.0		63.8 %	

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples taken daily

Drainage Basin at Donner Pass Jct.

Snow Course Dr. Church

Party J. D. Johansen

Date 6-11-46 5 PM

*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	41	41.5	33	57	24		
	2	49	49	33	62	29		
	3	65	47	33	62	29		
	3a	77	77	33	80	47		
	4	79	79	33	84	51		
	5	95	87	33	87	54		
	5)	341			5)	205		
		68.2			41.0		60.1%	

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 samples taken daily for

Drainage Basin In Church at J

Snow Course Tongue Pass

Party J. L. Johansen

Date 6-10-46

*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	32	32	32	50	18		
	2	48	48	32	60	28		
	3	59	58	32	72	46		
	4	82	335	32	85	53		
	5	91	81	32	81	49		
	5a	91	90	32	88	56		
	5)	312			5)	201		
		62.4			40.2		64.4 %	

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State .....

Drainage Basin 5 Sample Course.

Snow Course Donner. Summit.

Party Johansen, Cadd, Bennion.

Date June 9, 1946

*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)	51	50 5/8	53	85	32	62 7/8	Rock
	(2)	62	62	53	92 5/8	39 5/8	63 7/8	Rock
	(3)	81 1/2	80	53	105	52 1/2	64 1/2	Dirt
	(3A)	71 1/2	71 1/2	53	102	49 1/2	69 1/2	ICE
	(4)	91 1/2	90 1/2	53	115	62	68 1/4	Dirt.
	5	85 1/2	84 1/2	53	106	53	62 1/4	Rock
	5)	370			5)	238.5		
		74.0			47.7		64.4 %	

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples taken Daily.

Drainage Basin at Donner Pass Cordine

Snow Course

Party J. A. Johansen

Date 6-7-4 4 PM

*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	49	13.	43	30.5		Rock
	2	63	62	13	51	38		—11—
	3	74	73	13	69	56		
must have lost some core	3a	83	71,5	13	61	48		Rock
	3b	98	72	13	61			Dirt bit bottom
	4	93	92,5	13	75	62		Rock
	5	104	101	13	79	66		Dirt
		76.8			50.5		65.8%	
	5)	384			5)	252.5		

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples taken daily

Drainage Basin at Donner Pass Cornice

Snow Course

Party J. I. Johansen

Date 6-26-46 4 PM

*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	59	53	35	69.5	34.5		Dirt
	a	53	52	35	66			Rock
	2	73	71	35	79.9	44.9		
	3	86	86	35	87.5	52.5		
	4	102	95	35	100	65		Dirt
	5	107	98	35	100	65		
	5)	427			5)	260.9		
		85.4			52.2		61.1%	

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 Samples taken daily

Drainage Basin at Donner Pass Canuce

Snow Course

Party J. L. Johansen

Date 6-5-46 4 PM

*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	63	59	35	72	37		
	2	71	70.5	35	80	45		
	3	98	92.5	35	96	61		
	4	97	96.5	35	98	63		
	5	Pin Dropped out of						
Tiring wrench no more sampling till repaired								
		82.7			51.5	62.6 %		

*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. ..... of ..... sheets. Comp. by ..... Checked by .....

4) 329 4) 206

FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS

State 5 Samples taken daily for

Drainage Basin Dr. Church

Snow Course Donner Summit

Party J. I. Johansen

Date 6-4-46 4 PM

*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
Strong wind!								
	1	69	67	36	78	42		
	2	76	75	36	81.9	45.9		
	3	110	85.5	36	89	53		
	4	115	107.5	36	107	71		} nuts
	5	120	111.5	36	106	70		
	5)	490		5)	281.9			
		98.8			56.4		57.1%	

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State 5 daily samples

Drainage Basin Donner Summit

Snow Course 5 samples

Party Jan Andrews

Date June 3, 1946

*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	73	70	34	79	45		
	3	94	88	34	99	6.5		
	2	80	79	34	84	50		
	3a	106	100	34	101	67		-1.5
	4	114	106	35	108	73		-1.5
	5	122	117	35	109	74		
	5)	495			5)	309		
		99.0			61.8		62.4%	

*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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Form No. 144

FEDERA

FE

Snow Surveying

Brief Directi

(1) The us
care and honest
(2) The w
cially in stormy
usually be deper

DIRECT

A. Care of Sa

(1) In trar are should be used to guard it against injury; it can be easily dented.

(2) When sampling on steep slopes do not cling to the sampler to avoid sliding down hill; the tube is easily bent.

(3) Keep the sampler covered inside and out with a thin coating of shellac or paraffin. The inside coating can be applied by pulling through a swab soaked or wet with shellac.[1] This coating not only prevents corrosion but tends to keep moist snow from adhering to the tube.

(4) Since ice and rock sound and feel alike when struck by the sampler, be careful to determine what the substance is; ice will not blunt the cutter, rocks will.

(5) Keep the cutter sharp and the orifice true to its original diameter (1½ inches inside in case the Mt. Rose Steel Tube is used; and 1.485 in case the improved Utah Aluminum Tube is used).[2]

B. Measuring for Samples:

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. Note any irregular spacing between samples. Care should be used in spacing by tape measurements, so that the samples taken different years on the same course will be at the same spots.

(1) Plunging the tube should be avoided. In driving, a steady downthrust is preferable to twisting, because with the latter a small amount of snow enters the slots. However, a minimum amount of twisting aids in the driving and also facilitates the quick cutting of the thinner crusts. Plunging should be entirely unnecessary. In case the sampler sticks or freezes down, a light twist will usually release it.

(2) The presence of temperatures below 32 degrees F. in the snow, while the temperature of the air is above freezing, often causes the snow to adhere firmly to the orifice of the cutter after a depth of from 10 to 12 feet has been reached. This difficulty can be met in three ways.

(*a*) Withdraw the sampler when cutter becomes clogged and clean cutter and tube thoroughly. Push the tube rapidly through the snow without stopping until bottom is reached but do not plunge tube. Repeat until a complete core is obtained.[3]

(*b*) In case sampling is being done in the forest, keep the sampler in the shade as much as possible to keep it cold.

(*c*) The best method of all is to sample when the temperature of the air is at or below freezing, or late in the season when the temperature of the deep snow has risen to 32 degrees F. At these times sampling is easy and rapid.

Form No. 144

FEDERA

FEDERAL, STATE AND PRIVATE AGENCIES

SURVEY NOTES

Snow Surveying is completely explained in Miscellaneous Publication No. 380, United States Department of Agriculture.

Brief Directions and Suggestions for Snow Cover Sampling

(1) The usefulness of snow cover surveying depends primarily on the care and honesty of the men actually doing the field work.

(2) The work of the snow cover surveyor is often laborious, especially in stormy weather, and men willing to undertake such work can usually be depended upon to do their best and record the results faithfully.

DIRECTIONS FOR USING THE SNOW SAMPLER

A. Care of Sampler:

(1) In transporting sampler, extreme care should be used to guard it against injury; it can be easily dented.

(2) When sampling on steep slopes do not cling to the sampler to avoid sliding down hill; the tube is easily bent.

(3) Keep the sampler covered inside and out with a thin coating of shellac or paraffin. The inside coating can be applied by pulling through a swab soaked or wet with shellac.[1] This coating not only prevents corrosion but tends to keep moist snow from adhering to the tube.

(4) Since ice and rock sound and feel alike when struck by the sampler, be careful to determine what the substance is; ice will not blunt the cutter, rocks will.

(5) Keep the cutter sharp and the orifice true to its original diameter ($1\frac{1}{2}$ inches inside in case the Mt. Rose Steel Tube is used; and 1.485 in case the improved Utah Aluminum Tube is used).[2]

B. Measuring for Samples:

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. Note any irregular spacing between samples. Care should be used in spacing by tape measurements, so that the samples taken different years on the same course will be at the same spots.

(1) Plunging the tube should be avoided. In driving, a steady downthrust is preferable to twisting, because with the latter a small amount of snow enters the slots. However, a minimum amount of twisting aids in the driving and also facilitates the quick cutting of the thinner crusts. Plunging should be entirely unnecessary. In case the sampler sticks or freezes down, a light twist will usually release it.

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(*b*) In case sampling is being done in the forest, keep the sampler in the shade as much as possible to keep it cold.

(*c*) The best method of all is to sample when the temperature of the air is at or below freezing, or late in the season when the temperature of the deep snow has risen to 32 degrees F. At these times sampling is easy and rapid.

In some cases, where not too far from a night's lodging, time can be saved by taking the samples in the morning or evening instead of during the warm part of the day.

C. Weighing the Sample.

Before taking the sample, place the empty sample tube in the cradle hanging from the scales. If the Mt. Rose scale is used, turn the pointer back to zero. If the standard tubular scale is used, record the weight empty in proper column in field book. When the sample has been taken, place the sampler in the cradle and record the weight for tube and core. For the Mt. Rose scale this reading equals the water content of the snow core. For the standard tubular scale the water content is given by the difference between the reading empty and the reading for tube and core. The zero setting in the case of the Mt. Rose scale, and the "empty" reading for the standard tubular scale should be checked at frequent intervals (not more than 5 measurements).

If dirt is picked up by the cutter it should be cleaned out with knife before weighing the sample, and proper deduction made before recording length of core or depth of snow.

D. Recording:

The snow cover survey sheets are made in pads of two sizes, the smaller being white and the larger pink. Only the white waterproof pads are to be used for field notes. The larger pink pads are to be used to make copies from the white field sheets as soon as possible after each survey. Instructions regarding the disposition of the pink copy sheets will be issued for each State and where necessary for each drainage basin, since the needs will require some variation in this respect.

Appropriate covers are to be provided for protection of field notes. Sketch maps showing points of observation are pasted to the inside of the covers.

Use pencil only for recording field measurements. Fill in complete description of course, party, date, etc.

If the depth of core is very much less than the depth of snow, the reason should be determined and noted under "Remarks." In case of doubt regarding the core, determine the density (water content divided by depth gives density) and compare with that of other adjacent measurements about which there is no doubt. "Remarks" should include special items as to the character of snow, nature and condition of soil or other bottom reached by the cutter, whether wet, dry, frozen, etc.

Any extended remarks as to weather conditions at the time of survey or shortly before the survey, unusual difficulties encountered, etc., may be placed on the back of the sheet, as one side only is to be used in recording the snow measurements.

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[1]Or paraffin.

[2]If the cutter is broken or badly worn, send first tube section with cutter attached to your regional snow survey office for repair or replacement.

[3]A complete core is evidenced when length of core compared to snow depth is approximately the same throughout a course.

FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS

State

Drainage Basin

Snow Course

Party

Date Feb 20

*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	77	69.2	82	116	34		Soil moist pieces, also sand which becomes gray mud squeezing
		-1	-1					
		~~Temp~~ +0.1°C						
	9							
		Rest of core also						compact
		but is not so moist						
	9	75.5	50.3	82	108.2			Ice moist ... frozen in
		-1	-1					
Ram		75.5	66.2	82	116			Coarse crystals
		~~Temp~~ +0.2°C - ...						in way
at 31 in.		Temp. 0°C						

*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.........of.........sheets. Comp. by.................Checked by.................

FEDERAL AND STATE

COOPERATIVE SNOW SURVEYS

State ....

Drainage Basin ....

Snow Course ....

Party ....

Date ....

*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
~~To 1 crust~~			2½ in. -			Surface 2–3 mm		
			& co[illegible]					
		2.5	cc	82	83	Moist pack		
To 2nd crust			~~[illegible]~~ in			1 mm		
			37 in			Dry pack		
		37	36.8	82	95.6	13.6		
To 3rd c		~~13~~	13	82	88	6		
				2-3 mm icy				
To 4th			23.3	82	94.6	12.6		Too frozen to pack much
			-.8					
			1–3 mm		but frozen			
		in longer						
Total depth			74.5					

*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.

No..........of..........sheets. Comp. by.................Checked by..........

Sunset

Surface becoming dry

Open [illegible]

6:20 Crust frozen
3/8 in. Temp at [illegible] 41.5°
HT 41

Cat just in [illegible]

In sealed tube
On surface of snow
still moist +0.6°C
On frozen crust +0.6 ~~[illegible]~~ to 0.5°
radiation from porous
crystals

Snow stake 73 in

Feb 14 - 1 [illegible]
5:45 [illegible]

Find a splicing
pin

December 1946

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Anemometers	1	512.0			723.5	760.1	804.0	835.7	868.2	938.2	100.0	222.9	281.0	339.7	365.5	420.0	539.0
	2	755.0			037.2	106.1	142.6	186.7	238.0	284.0	484.0	637.4	695.2	722.0	755.0	796.0	937.5
	9	6939.0			7355.3	7451.4	7521.3	7598.9	7667.8	7752.6	8059.3	8265.2	8346.7	4391.7	84424	8512.8	8774.0
	10	5504.0			5800.9	5847.3	5863.0	59001	5925.4	5976.9	6264.8	6456.5	6493.5	6508.4	6530.3	6565.5	6736.9
	11	002.0			302.5	368.8	405.5	486.5	501.5	570.0	—	—	003.0	042.5	079.0	123.0	261.0
Temperatures																	
Hotel		+40°			+33.5°	+31.2°	+29°	+24°	+32.5°	-	-	—	+33.5°	+51°	151°	—	+34°
Max		+43°			+40°	+36°	+33°	+34°	+42°	+42°	+46°	+54°	+55°	+55°	+56°	+46°	+43°
Min		+26°			+33°	+32°	+26°	+11	+26°	+16°	+12°	+18°	+11°	+13°	+14°	+23°	—
Pasture		+37°			+32°	+30°	+27°	+21.5°	+29.5°	—	—		+29°	+46°	+48.5°	—	+31.5°
Max		+44°			+38°	+34°	+30°	+30.5°	+41°	+55°	+42°	+47°	+50°	+51°	+53°	+42°	+40°
Min		+22°			+30°	+30°	+22°	+8°	+24°		+20°	+15°	+7.5°	+7°	+9.5°	+18°	—
Snowstick		113"			23"	26"	30"	29"	58"	28°	26	25"	26"	25"	25"	25"	24"

		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Anemometers	1	741.0	897.0	134.0	302.1	347.5	365.8	487.7	598.7	639.0	678.0	777.5	852.0	883.8	146.5	239.2
	2	125.6	303.2	608.2	815.0	869.0	903.7	035.0	142.1	196.4	250.2	361.4	415.9	455.6	804.7	913.5
	9	8994.3	9264.9	9727.5	0050,0	0130.6	0196.2	0361.5	0539.3	0618.8	0683.3	0879.0	1943.0	1026.6	1545.3	1715.7
	10	7000.4	7269.9	7696.3	8008.0	8052.8	8090.3	8231.1	8389.8	8446.5	8487.6	8606.9	8626.5	8660.8	9148.4	9309.4
	11	452.7	634.7	—	165.5	218.5	262.2	375.4	498.5	551.3	608.7	750.2	812.3	850.0	223.6	344.0
Temperatures																
Hotel		+25°	+34°		+49°	+42°	+40°	+40°	+32.5°	+34°	+32°	+23°	+25°	+23°	+22°	+34°
Max		+30°	+43°	47	+55°	+48°	+50°	+55°	+34°	+48°	+36°	+30°	+38°	+31°	+28	+50°
Min		+18°	+14°	28	+32°	+19°	+31°	—	+29°	+20°	+26°	+23°	+ 2°	+18	+16°	+ 3°
Pasture		+24°	+33°	—	+48°	+41°	+40°	+35°	+31°	+32°	+28°	+22°	+23°	+20°	48.5°	+30°
Max		+27°	+38°	44	+52°	+47°	+48°	+46°	+34°	+47°	+35°	+30°	+40°	+30°	+25°	+45°
Min		+17°	+12°	24	+29°	+15°	+29°	—	+28°	+19°	+25°	+22°	+0°	+16°	+13°	−1°
Snowstick		24"	—	24"	23"	21"	22"	21"	22"	24"	27"	31"	31"	35"	30"	29"

January 1947

Anemometers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	307.6	625.0	798.2	941.0	032.6	279.4	378.1	449.0	516.3	580.3	612.4	707.7	843.2	002.5	129.3	357.7
2	001.6	402.6	555.5	699.4	767.6	034.0	184.1	234.3	271.7	353.4	383.6	455.9	614.2	720.3	974.6	194.6
9	1837.0	2459.2	2680.4	2891.4	2991.6	3368.3	3598.3	3680.4	3764.2	3855.0	3897.5	4032.8	4277.9	4544.8	4892.1	5219.4
10	9409.7	0032.5	0250.7	0453.8	0519.8	0882.8	1094.5	1119.8	1153.4	1201.3	1222.5	1313.7	1546.9	1775.8	2085.4	2439.9
11	412.8	848.7	003.5	151.1	214.0	473.1	630.0	695.2	753.2	832.4	856.4	950.0	143.3	337.2	566.0	794.8
Temperature																
Hotel	+28°	+26°	+25°	+41°	+40°	+33°	+34°	+36°	+30°	+40°	+36°	+19°	+15°	+17°	+20°	+28°
Max	+36°	+30°	+37°	+47°	+57°	+37.5°	+51°	+55°	+59°	+53°	+58°	+28°	+22°	+23°	+30°	+39°
Min	+22°	+14°	+10°	+19°	+18°	–	+22°	+12°	+8°	+15°	+15°	+19°	+15°	+17°	+2°	+16°
Pasture	+26°	+21.5°	+22°	+34°	+33°	+30.5°	+37.5°	+35°	+27°	+35°	+32°	+17°	+13°	+14°	+19.5°	+25°
Max	+31°	+25°	+34°	+43°	+53°	+34°	+50°	+52°	+54°	+48°	+46°	+26.5°	+18°	+18°	+22°	+33°
Min	+18°	+12°	+8°	+16°	+14°	–	+18°	+7°	+9°	+11°	+10°	+12°	+13°	+13°	+5°	+14°
Snowstick	29"	27"	27"	–	26"	26"	26"	25"	25"	24"	24"	26"	30"	34"	32"	30"

Anemometers	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	449.8	535.5	607.5	705.8	779.2	855.0	923.4	970.0	056.5	183.2	284.3	461.5	516.1	627.0	683.2
2	293.6	341.4	408.8	514.4	606.1	615.4	676.9	737.9	814.6	940.4	056.6	191.7	307.5	381.0	435.4
9	5362.8	5456.4	5552.4	5717.4	5796.6	5885.8	5979.4	6051.9	2993.9	6374.7	6551.4	6776.8	6964.8	7150.5	7243.1
10	2557.3	2614.5	2656.5	2760.5	2802.3	2839.0	2875.7	2918.2	6175.2	3121.3	3242.4	3428.0	3587.1	3750.9	3830.3
11	880.0	955.0	032.0	147.0	—	288.0	354.2	420.0	500.0	646.0	782.0	988.3	097.2	241.7	314.7
Temperature															
Hotel	+33°	–	+33°	+41°	+30°	+48°	+43°	+44°	+40°	+35°	+19°	+15°	+17.5°	+25°	+31°
Max	+45°	+56°	+48°	+46°	+57°	+53°	+53°	+50°	+48°	+41°	+28°	+21°	+28°	+31°	+39°
Min	+1°	+3°	+4°	–	+4°	+6°	+14°	+21°	+11°	+31°	–	+15°	+17.5°	+14°	+4°
Pasture	+29°		+32.5°	+35°	+26.5°	+45°	+42°	+41°	+37°	+33.5°	+17°	+13°	+15°	+22°	+27°
Max	+48°	+51°	+41°	+40°	+51°	+46°	+48°	+44°	+42°	+37°	+25°	+18°	+20°	+26°	+32°
Min	−1°	−1°	−1.5°	–	−1°	−6°	+6°	+15°	+4°	+28°	–	+13°	+13°	+8°	−1°
Snowstick	30"	–	29"	29"	28"	28"	28"	27"	26"	27"	34"	–	50"		–

February - 1947

Anemometers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	738.6	774.0	871.9	953.3	0407	133.8	194.0	252.2	296 3	—	424.6	582.4	595.3	662.3	727.5
2	452.5	500.0	602.3	668.9	729.5	846.0	908.6	981.2	020.7	077.5	145.0	285.7	356.5	433.3	492.0
9	7262.3	7343.2	7477.5	7568.3	7652.0	7810.2	7902.3	7988.4	8054.3	8124.6	8226.8	8484.5	8527.5	9636.5	8737.0
10	3848.2	3896.0	3996.3	4060.7	4101.2	4242.9	4206.9	4365.0	4307.7	4419.7	4482.8	4647.8	4607.0	—	4766.2
11	351.6	403.4	503.3	574.3	637.0	759.0	810.0	870.4	928.2	992.7	077.2	216.6	281.2	368.7	429.0
Temperature															
Hotel	+40°	+42°	+41°		+36°	+45°	+40°	+42°	+32°		+34°	+34°	+46°	+45°	+39°
Max	+51°	+48°	+55°	+58°	+48°	+57°	+52°	+47°	+34°		+35°	+40°	+49°	+54°	+47°
Min	+4°	+20°	—	+12°	+18	+25°	+20°	+18°	+32°		+15°	+32°	+20°	+20°	+22°
Pasture	+33.5°	+36°	+39°		+36.5	+45°	+40°	+37.5	+39.5	+33°	+33°	+32.5°	+42	+43°	+37.5
Max	+43°	+42°	+50°	+54°	+51	+50°	+46°	+42°	+32°	+36°	+41°	+37°	+44	+48°	+42°
Min	-1°	+14°	—	+6°	+12	+22°	+14°	+12°	+28°	+24	+8°	+29°	+16°	+17°	+18
Snow Depth	48"	46"		41"	40"	38"	38"	37"	41"	42"	41"	43"	42"	41"	40"

	16	17	18	19	20	21	22	23	24	25	26	27	28
Anemometers 1	608.3	871.0	984.0	037.8	155.4	229.4	309.6	413.1	525.0	597.8	698.4	826.0	945.0
2	588.2	689.7	804.0	871.8	032.4	105.1	175.5	342.5	475.2	527.4	654.0	803.0	933.4
9	8869.1	9005.2	9191.9	9293.4	9532.1	9629.3	9752.2	9975.8	0169.2	0301.7	0446.1	0667.3	0880.0
10	4857.0	4957.9	5126.9	5189.2	5391.2	6477.4	6554.6	5747.0	5906.6	6007.7	6120.0	6295.7	6447.5
11	533.4	639.8	—	820.9	991.3	136.7	159.5	321.8	457.5	558.4	660.0	819.2	983.8
Temperature													
Hotel	+28°	+35°	+47°	+48°	+43°	+44°	+47°	+50°	+50°	+50°	+32°	+28	+34°
Max	+34°	+40°	+52°	+52°	+45°	+54°	+50°	+52°	+56°	+57°	+44°	+32	+39°
Min	+28°	—	+27°	+13°	+35	+18°	+20.5°	+29°	—	+19°	+22°	+28	+25°
Pasture	+26.5°	—	+45°	+42°	+36°	+40°	+45°	+46°	+47°	+43°	+28°	+26	+30°
Max	+32°	—	+46°	+46°	+38°	+44°	+45°	+47°	+47°	+47°	+38°	+28	+34°
Min	+26°	—	+23°	+8°	+20°	+13°	+16°	+25°		+14°	+16°	+26	+21°
Snow Depth	43"	43"	41"	40"	39"	39"	39"	38"	38"	36.5"	36"	37"	36"

March 1947

Anemometers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	983.0	099.5	201.3	236.8	353.6	434.0	482.5	562.0	632.0	840.0	900.4	102.6	247.0	351.0	409.0	504.3
2	972.5	109.2	242.6	298.5	440.3	535.1	495.0	687.0	752.1	989.0	050.5	252.4	402.8	516.2	595.4	714.8
9	0939.7	1139.4	1333.4	1428.8	1643.8	1785.0	1878.8	2021.1	2150.6	2447.4	2596.1	2898.3	3098.4	3273.8	3388.5	3546.9
10	6481.7	6627.1	6771.5	6816.7	7007.0	7137.0	7200.5	7297.7	7375.1	7573.6	7688.6	7996.0	8178.0	8331.3	8412.7	8540.0
11	022.6	177.0	316.0	373.4	529.3	639.3	700.2	811.0	900.3	100.5	200.3	433.2	580.0	705.3	784.1	882.0
Temperature																
Hotel	+33°	+28°	+26°	+30°	+30°	+32°	+28°	+30°	+31°	+30°	+33°	+44°	+47°	+45.5°	+45°	+51°
Max	+36°	+32°	+30°	+33°	+33°	+44°	+37°	+34°	+34°	+38°	+46°	+49°	+52°	+55°	+62°	+57°
Min	+30°	+37°	+26°	+24°	+20°	+10°	+15°	+24°	+22°	—	+15°	+30°	+17°	+14°	+32°	+23°
Pasture	+30°	+26°	+24°	+26°	+26°	+29°	+25°	+28°	+29°	+29°	+32°	+41°	+41°	+41°	+38°	+47°
Max	+32°	+28°	+27°	+28°	+29°	+37°	+30°	+30°	+30°	+33°	+38°	+43°	+46°	+49°	+55°	+50°
Min	+25°	+22°	+24°	+22°	+17°	+6°	+8°	+21°	+18°	+18°	+8°	+25°	+23°	+22°	+27°	+18°
Snow Depth	40"	45"	65"	60"	58"	55"	56"	57"	58"	65"	64"	64"	60"	57"	55	53"

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	559.5	638.6		884.1	935.5	027.3	136.5	—		314.1	350.0	367.5	443.5	545.0	—
2	781.0	842.9		189.1	279.5	334.5	459.7	525.3		656.6	710.0	751.3	639.7	937.5	027.3
9	3642.0	3726.9		4206.5	4340.8	4441.8	4632.0			4919.0	5000.0	5065.0	5408.1	5347.1	5474.9
10	8593.9	8639.6		9073.5	9170.2	9280.0	9325.4			9497.4	9589.0	9550.6	9637.3	9721.9	9800.0
11	950.2	028.7		377.3	460.1	530.0	680.0	740.0		880.5	936.3	991.8	090.1	205.5	285.6
Temperature															
Hotel	+57°	+39°			+52°	+39°	+32°	—		+49°	+37°	+34°	+32°	+32°	
Max		+58°		+54°	+62°	+44°	+37°			+59°	+41°	+40°	+38°	+38°	
Min		+22°		+25°	+28°	+26°	+26°			+22	+28°	+32°	+32°	+28°	
Pasture	+53°	+32°			+47°	+38°	+30°	+34°		+45°	+37°	+33°	+30°	+32°	
Max		+52°		+47°	+55°	+40°	+32°	+47°		+55°	+37°	+34°	+33°	+34°	
Min		+18°		+20°	+30°	+25°	+23°	+2°		+18°	+25°	+28°	+28°	+24°	
Snow Depth	50"	48"		47"	44"	40"	46"	44"		42	42	39"	—	52"	50"

April 1947

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Anemometers 1			813.0	916.0	018.1	063.4	152.9	232.3	309.9	344.0	535.3	798.3	966.0	057.0	138.0
2			280.0	337.0	439.9	502.7	6063	671.6	763.5	780.7	952.8	387.0	649.5	705.7	788.0
9			5816.0	5976.4	6137.5	6219.9	6370.5	6487.9	6611.6	6658.1	7038.7	7519.4	7802.4	7954.6	8073.5
10			0031.7	0162.8	0290.9	0338.8	0461.7	0539.7	0637.0	07004	1002.1	1464.8	1730.3	1845.7	1925.5
11			542.0	659.5	776.0	833.2	948.4	030.9	120.0	1543	413.0	769.2	975.3	095.0	175.0
Temperatures															
Hotel			+26°	+32	+30°	+43°	+38°	+31	+43°	+50°	+48°	+50°	+48°	+63°	+45°
Max			+33°	+40	+41°	+46°	+45°	+40	+45°	+26°	+50°	+58°	+62°	+66°	+69°
Min			+24°	+4	+28°	+28°	—	+31	+22°	+26°	+28°	+39°	+45°	—	+27°
Pasture			+27°	+30	+30°	+39°	+33°	+30	+40°	—	+47°	+51°	+45°	+64°	+48°
Max			+28°	+32	+36°	+45°	+40°	+35	—	—	+47°	+52°	+57°	+65°	+62°
Min			+19°	-1	+24°	+25°	—	+28	+17°	—	+24°	+33°	+41°	—	+20°
Snowstick			60°	—	55°	50°	53°	—	50°	—	48"	45"	42"	39"	35"

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Anemometers 1	207.0	307.0	366.4	436.9		601.0	667.3	731.2		819.5	009.1	237.7	301.0	367.1	474.0
2	871.0	013.0	057.0	138.1		322.2	427.0	510.6		613.9	888.7	162.6	240.8	338.5	450.0
9	8195.1	8346.8	8455.1	8570.3		8854.5	8994.0	9100.2		9245.2	9633.6	0013.6	0131.5	02506	1368.0
10	2008.9	2100.4	2214.4	2306.5		2518.5	2639.9	2708.5		2824.4	3200.4	3527.5	3601.0	3685.3	3773.2
11	261.5	333.5	445.3	533.6		744.3	850.0	—		057.3	340.5	619.6	704.0	790.5	871.0
Temperatures															
Hotel	+60°	+43°	+54°	+58°		+34°	+45°	+52°		+44°	+48°	+38°	+42°	+49°	+67°
Max	+67°	+52°	+57°	+60°		+45°	+47°	+54°		+53°	+50°	+58°	+50°	+54°	+68°
Min	+28°	+30°	+28°	+17°		—	+26°	+23°		+27°	+34°	+29°	—	+29°	+30°
Pasture	+57°	+40°	+58°	+34°		+32°	+44°	+47°		+40°	+47°	+37°	+41°	+47°	+65°
Max	+60°	+48°	+58°	+54°		+41°	+44°	+49°		+46.5°	+47°	+50°	+47°	+49°	+65°
Min	+23°	+27°	+23°	+24°		—	+22°	+18.5°		+23°	+32°	+26°	—	+26°	+26°
Snowstick	33	30	—	24		24"	20"	17"		12"		6"	3"	0"	

Soda Springs

Anemometer &

Temp. Readings

for

Dec. 1946

Jan, Feb, Mar, Apr.

1947

Dear Winfred.

Here are the anemometer readings. Hope they are O.K. The ship tank readings will come soon.

Eleanor

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So. Fork Yuba River

Snow Course Soda Springs

Party J. Johansen Jr & E. Johansen

Date 2-28-47

*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	29	23			12.5		Ice
	2	33	26			13.5		✓
	3	30	24			14		Dirt
	4	37	30			15.5		✓
	5	39	32			16		Grass
	6	39	30			15		✓
	7	41	33			16.5		✓
	8	35	30			14.5		Dirt
	9	36	29			13.5		✓
	10	35	28			12.5		✓
	11	35	29			13.5		✓
	12	39	31			15		✓
	Tot	428				172		
	Av	35.7				14.3	40.1%	

*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 California

Drainage Basin So Yuba

Snow Course Soda Springs

Party J & E Johansen & P G & E men

Date 3-1-47

*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
	9	36	29			13.5		Dirt
	10	35	28			12.5		"
	11	35	29			13.5		"
	12	39	31			15		"
12)		428				172		
		35.7				14.3		40.8

*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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COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Fk Yuba

Snow Course Soda Springs

Party J & E Johansen & PG & E men

Date 3-1-47

*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	29	23			12.5		Ice
	2	33	26			13.5		"
	3	30	24			14		Dirt
	4	37	30			16.5		"
	5	39	32			16		Grass
	6	39	30			13		"
	7	41	33			16.5		"
	8	35	30			14.5		Dirt

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So. Fork Yuba River

Snow Course Kiski

Party J Johansen & E Johansen

Date 2-28-47

*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	37	30			13.5		DIRT
	2	40	34			16		✓
	3	43	36			17		GRAVEL
	4	47	38			17.5		DIRT
	5	52	44			19		✓
	6	50	42			18		✓
	7	55	46			19.5		✓
	8	55	45			18.5		✓
	9	52	46			19		✓
	10	49	40			18.5		✓
	11	48	40			19		✓
	12	39	30			18		✓
	13	44	38			18.5		✓
	14	46	41			19		✓
	15	50	46			20		✓
	16	54	46			22		OVER →

*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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OVER

Snow	Water
TOT. 761.0	293
AVG. 47.6	18.3

Dens = 38.4%

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Calif

Drainage Basin So Fork Yuba

Snow Course Nisku or Summit

Party J & E Johansen & P.G. & E Surveyors

Date 3-1-47

*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	37	30			13.5		Dirt
	2	40	34			16		Gravel
	3	43	36			17		"
	4	47	38			17.5		Dirt
	5	52	44			19		"
	6	50	42			18		"
	7	55	45			18.5		"
	8	55	46			19.5		"

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Fork Yuba

Snow Course Rubicon or Summit

Party J. & E Johansen & P G & E men

Date 3-1-47

*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
	9	52	46			19		Dirt
	10	49	40			18.5		"
	11	48	40			19		"
	12	39	30			18		"
	13	44	38			18.5		"
	14	46	41			19		"
	15	50	46			20		"
	16	54	48			22		"
	16)	761				295		

*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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47.6 18.3 38.4 %

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So. Fork Yuba River

Snow Course Donner Summit

Party J. Johansen & S. Johansen

Date 2-28-47

*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	24	22			10		Rock
	2	27	24			10.5		"
	3	30	25			11.5		"
	4	35	30			13		"
	5	48	40			17.5		"
	6	40	34			15		"
	7	70	60			25.5		Dirt
	Tot	274				103		
	Ave	39.0				14.7	37.7%	

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Calif

Drainage Basin So Fork Yuba

Snow Course Donner Pass

Party J & E Johansen & P G & E Surveyors

Date 3-31-47

*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	24	22			10		Rock
	2	27	24			10.5		"
	3	30	25			11.5		"
	4	35	30			13		"
	5	48	40			17.5		"
	6	40	34			15		"
	7	70	60			25.5		Dirt
	7)	274				103		
		39.1				14.7		37.6 %

*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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COOPERATIVE SNOW SURVEYS

State California

Drainage Basin Truckee River

Snow Course Donner Lake

Party J. Johnson & E. Johnson

Date March 5, 1947

*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	38.0	34.5	23	36.0	13		-1" 2" ice
	2	37.0	35.0	23	36.0	13		-.5" 2" ice
	3	36.5	36.5	23	38.0	15		-.5 4" ice
	4	31.0	31.0	23	33.0	10		-.5 2" ice
	5	39.0	34.5	23	35.5	12.5		3" ice
	6	38.0	34.0	23	35.0	12		-1" 1" ice
	7	42.5	35.5	23	37.0	14		-1" 2" ice
	8	38.0	34.0	23	35.0	12		1" ice
	9	39.5	31.0	23	35.0	12		-1" 2" ice
	10	34.0	33.0	23	34.0	11		2" ice
	11	33.0	30.0	23	34.0	11		1" ice
	12	38.5	36.0	23	35.0	12		3" ice
	13	31.5	29.0	23	33.5	10.5		2" ice
	Tot	476.5				158.0		
	Av.	36.7				12.2	33.2%	

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Yuba

Snow Course Soda Springs

Party J. & E. Johansen

Date 3-26-47

*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	42.0	36.0	23	43	20		Dirt
	1a	42.5	40.5	23	43	20		"
	2	42.5	32.5	23	43	20		"
	3	45	34.5	23	42.5	19.5		"
	4	45	32	23	45	22		Sample driven on
	4a	47	37	23	48	25		Truckee Road
	5	41	32	23	45.5	22.5		Tractor tracks
	6	49	30	23	42	19		
	7	46	34.5	23	43.5	20.5		

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Yuba

Snow Course Soda Springs

Party J. & E Johansen

Date 3-26-47

*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	52	37.5	23	44.5	21.5		-2.5 Dirt
	8a	49	37	23	43.5	20.5		-2" "
	9	46	34	23	39	16		"
	10	45	32.5	23	42.5	19.5		-1" "
	11	44	33.5	23	43.5	20.5		
	12	44	33.5	23	43.5	20.5		
	13	52.5	33.5	23	43	20		
								596.5
13)	591					264.5		5.5
								591.0
		45.5				20.3		44.6%

*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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COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Yuba

Snow Course Soda Springs

Party J & E Johansen

Date 3-31-47

*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	53	46			21		Ice
	2	51	43			20,5		"
	3	54	49			21,5		"
	4	52	43			20,5		Mud
	5	55	49			22		"
	6	54	49			22		Grass
	7	54	51			23		"
	8	52	44			20,5		"

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Yuba

Snow Course Soda Springs

Party J & E Johansen & PG&E men

Date 3-31-47

*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
	9	52	46			21		Dirt
	10	54	51			23,5		"
	11	53	50			22,5		Grass
	12	58	53			24,5		"
12	)	642				262.5		
		53.5				21.9		40.9 %

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Yuba

Snow Course Kirkwood Summit

Party J & E Johansen & PG&E men

Date 5-31-47

*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	53	46			20,5		Dirt
	2	58	52			22		"
	3	74	66			30,5		Gravel
	4	68	62			30		Dirt
	5	75	67			30,5		"
	6	74	64			30		"
	7	79	71			32,5		"
	8	76	68			30,5		"

*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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FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Yuba

Snow Course Kistaic or Summit

Party J & E Johansen & P.G. & E men

Date 3-31-47

*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
	9	75	66			29.5		Dirt
	10	73	66			29		"
	11	70	62			28		"
	12	66	58			27.5		"
	13	57	51			24.5		"
	14	59	54			25		"
	15	66	59			27.5		"
	16	63	56			26.5		"
	16) 1086					444		

*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.....of.....sheets. Comp. by.....Checked by.....

67.9 27.8 40.9

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Yuba

Snow Course Donner Pass (Summit)

Party J. E. & Johnson

Date 3-24-47

*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	39	33	23	40	17		Rock
	2	43.5	42.5	23	44	21		"
	3	43	37	23	42	19		"
	3a	42	36	23	42	19		"
	4	25	22.5	23	34	11		"
	5	68	43	23	52.5	29.5		Dirt
	5a	68	41	23	48.5	25.5		"
	6	38.5	27	23	38.5	15.5		Rock
	6)	257				113		

*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.....of.....sheets. Comp. by.....Checked by.....

42.8 18.8 43.9 %

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Yuba

Snow Course Donner Pass

Party J & E Johansen

Date 3-31-47

*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	39			19,5		Rock
	2	64	55			25,5		"
	3	49	41			20		"
	4	47	40			20		"
	5	69	58			30,5		"
	6	43	37			17,5		"
	7	115	103			53,5		Dirt
	7)	433				184,5		
		61,8				26,6		43,0 %

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin Truckee River

Snow Course Donner Lake

Party J. & E Johansen

Date 3-24-47

*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	17	16	23	31	8		Dirtie
	2	23	22	23	37	14		"
	3	25	25	23	36	13		"
	4	18	19	23	32	9		"
	5	25.5	24.5	23	35	12		"
	6	26.5	23.5	23	34.5	11.5		"
	7	26	23	23	36	13		
	8	21	21	23	36	13		

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin Truckee River

Snow Course Donner Lake

Party J. & E. Johansen

Date 3-24-47

*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
	9	30	27	23	37	14		Dirt
	10	22	21.5	23	34	11		"
	11	23	23	23	36	13		"
	12	23	22	23	34	11		"
	13	16	17	23	33.5	10.5		"
This course has 3 inches of Dee on the top of the Dirt								
13	296					154		
		22.8				11.8		51.8%

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Calif.

Drainage Basin Truckee River

Snow Course Donner Lake

Party J. & E. Johansen

Date 4-1-47

*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	13	12			7		Dirt
	2	22	18			11		
	3	24	22			12,75		
	4	24,5	23,5			13		
	5	17	17			9		
	6	26	26			13		
	7	27	20,5			11,5		
	8	21	16,5			9,5		

*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.

No.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State Calif

Drainage Basin Truckee River

Snow Course Donner Lake

Party J & E Johansen

Date 4-1-47

*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
	9	29	25			14.2		Dirt
	10	21.5	20.5			10.5		
	11	24	23			13		
	12	22	19.5			10		
	13	12	12			6		
	3 inches on the top of the dirt all over this course							
	13) 283					138.5		
		21.8				10.7		49.1 %

*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.....of.....sheets. Comp. by.....Checked by.....

FEDERAL AND STATE
COOPERATIVE SNOW SURVEYS

State California

Drainage Basin So Yuba

Snow Course Donner Pass Course

Party J. & E Johansen

Date 3-27-47

*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	71,0	68			35,5		Dirt
	2	82,5	75,5			38		Rock
	3	97	95			42		"
	4	175	134			70		Dirt
This course is all drifted								
			Snow					
4)		426				185,5		
		106,5				46,4	43,6 %	

*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.....of.....sheets. Comp. by.....Checked by.....

F. Vonsild

The Physics of Snow-Melt

1. The problem of elevation of instruments.
2. Radiation, a major phase.
   (a). Nocturnal freezing.
   (b). True frequently seen in overcast.
3. Melting from above, subject to temp. of air.
4. Descent of melt-water Gravitational pull vs the capillarity suspension,

Freezing of Surface.

Green at upper edge.

Red one crystal down.

Radiation from surface or deeper?

Is red due to melted film and hence delay in freezing?

July 1946

1946-47

Soda Springs
July 28, 1946.

3 pm

SS.	D.	17.46
	W.	21.92
No. 4	D	18.55
	W	20.90
2X8		16.50

Need cal. chloride
300#

No. 3 - Army	Center	22.61
	NE edge	22.61
No. 2 -	Center	19.2
Stevens W	NW	19.21
4 X 8	E	16.11
	W	16.30
	S	16.20
	N	16.26
	Center	16.45

Sucto No. 1	D,	9.50
No. 9 (3/4 gage)	W	20.83
	D	18.48
No. 10	W	21.11
	D	18.52
No. 8	W	17.52
	D	15.80
No. 6	W	18.40
	D	16.93
Drip Tank		.077
Stevens Q.	14.8 =	
	0.60	

Oiled Anemometer
at No. 11 - Santa Fe
Rattling ceased

Aug. 19 (Monday)

Phone from "Whitey". Can paint platforms at Soda Spgs tomorrow.

Caught 6:30 pm bus. Colorful sunset.

Many passengers Reno to Truckee. Some at Truckee. Two girl observers also for Donner Pass Observatory

8 pm. arrived tobed.
Phoned Johnny but did not come

Trains no bother

Fare 20¢

Aug. 20. Bkft 87¢

Lunch 15¢ + 14

Repaired anemometer record on triple register

Dinner 45¢

but Ashton had probably done so earlier. Wind almost calm.

=

Gave 1 gal. white paint
1 gal + 2 qts sky gray

9:15 am
Max. tem 79°F
Min 44° (Reset 73°)

Sep 22
Fare $1.09
Sep 23
Bfst 87¢
3 lunches $2.55

Need —

Shaving cream
Felt for wind direc.
#16 pen
mirror
—
Clean course at Pass
Black paint + Chinese red
1 camel hair brush – Trimming brush

Get Hat, jug, suit

Monday Sep. 23/46.

Came last night at 8:15 am.

Called Johnnie

Up at 6 am.

Stevens S. Gage 12.52 in

Sep. 2 11.60

Gain 0.92

Snow 6 in. 0.92

No. 1 — (With funnel)

Stevens 0.98 in

~~Wind direc~~

Sunshine,

sometimes records,

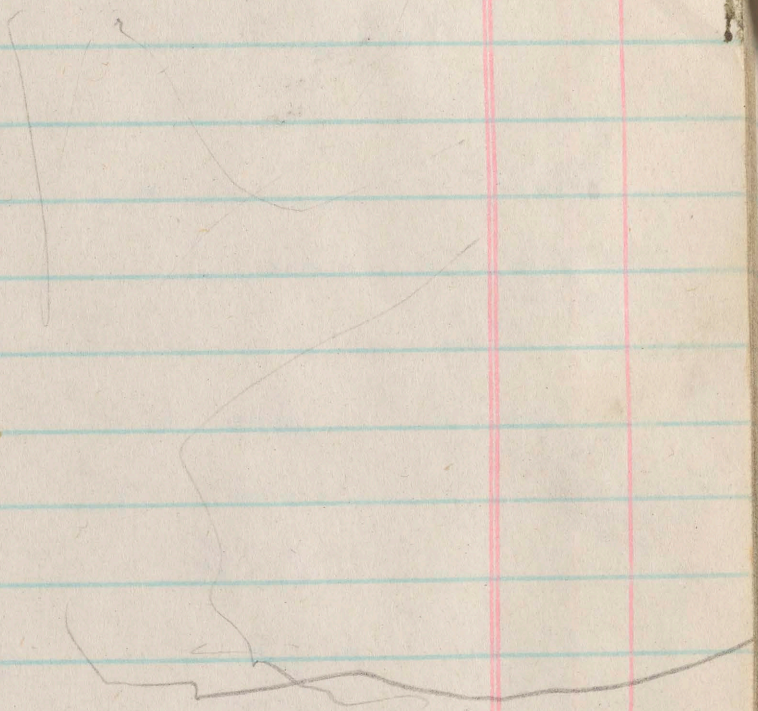
sometimes not for

entire 24 hrs.

This morning column

down and sluggish

48
47



Monday, Sep. 30/46.

9 am.
Battery being charged 12.5.5
Water O.K.

With Eleanor -
To Truckee.
10:30 am Changed to winter sheet.
Humid. Dry 64° F.
Wet 51° Diff 13
= 38%
Temp. - H-T ? approx
Therm ? 1½° F off

Tank still full - above scale. Tight now?

Donner Pass

H-T 54° Therm 55.5°
Still 1 day slow - Pen

farther to right.
→ Can jeweler shorten hair spring?

Pipes need straightening to vertical.
Ground should be raised.

Pasture 3 pm

H-T 51.5
T - 52°

Dry 52.0
Wet 47.5 = 70%
But later
D, 48
W 47 } = 93%
Raining H-T diff. 87-97%
See graphs

Laid out black painting for Eleanor. More painting 4 pm. Ady 1 J.

Replaced chairs in H-T at Hotel.

Too dry to record high at once,

Battery 4:30 pm 1250
Still charging.

Expenses
Fare $2.21
Bkft 77¢
Lunch 85¢

Book case,

Height 5 ft
Width (outside) 2 ft 4 in
Between shelves 13 in
Depth — ?

Thundershowers

Triple Register

4:30 pm, Dandy overcast.

Column of smoking recorder still ½" above contacts.

But line still straight. What's loose?

New pink pad put on wind-direction pens by Arthur Guillard.

Friday Oct 4.

Eleanor brought H-T (Pasture 11 Ft) to Reno to drive out pin and insert new humidity liners

Brought also the thermograph from Tower Pass for regulation and took back the rebuild thermographs

Tues. October 8

Eleanor reported that her humidity liners were failing to work.

Johnnie is testing all drift tubes. All

are now full. 10 x
the recent snow and
rain.

So have postponed
trip to bring down
the guns and valves.

Promised to come up
Oct 14 —

Sunday Oct 13/46.

Expenses

Ticket	2.01
Bkfst	1.02
Phone	20¢
Lunch	82¢

Brought to Soda Opp by the Sandorfs (Irvin and Norma) after talk to Campus Club

9pm —

Called Johansens

Have pumped pans. Pasture pan emptied — ready.

→ Wishes to test others during week.

"Battery found dry but refilled. apparently dead, at least no reading. Trickle charger plugged in".

Immediate test by me gave

5 cells 1275

1 cell 1240.

Evidently dry cells had quickly recovered.

Night call from Ashton Codd.

1. Agrees on continuity of records at Mt Charleston.

Wants to compare flow of artesian wells with precip. on Mt. C.

Can provide precip. can and spring balance from Snow Laboratory.

2. Doubtful about going to Lamoille Canyon.

3. Well dry at snow lab. Only 2 ft deep in "solid rock"! Tried thru fissures. Must refill it from stream.

— Soil Priming —

4. Creek dry in August.
First
1 Storm of approx. 1/2 in. Water failed to affect it
But second storm of 0.95 in. caused it

to flow.

Will therefore 2½ in water prime the soil for snow melt? Soil is shallow, snow is normally deep. So factor is small.

— Melting by Slopes —

Two more flumes being put in to measure two tiny basins — one tilted toward sun and the other away from sun.

A good move. Present flume represents too many aspects toward sun. Must specialize — like our drip tanks.

Has abundance of 3/4 in. caps needed for test of tanks.

Talked about India. Some day he may be able to go to Spain or Iran, or China or Korea. The future broadens out.

Monday Oct. 14

Battery

Selected cell 1275

Weak cell now 1260.

Shall plug them in for a brief time more.

Met Eleanor at 8 am to reset all thermometers.

She has become adept.

Leaves early for Marin—

Need
✓ bicycle wrench
hammer
longer screwdriver
pliers

—

Sunshine recorder.
Needs tiny roundheaded screw
for locking contact wire.

Contacts tightened, but
no response. Column fix
up tube. Need ammeter?

Wed. October 23 / 46.

To Donner Pass and Donner Lake for drip pans.

Walter Bedell and Soil Conservation truck and J & C.

Clouds over Pass but broke up.

Some water and shell ice in drip pan. Also some ice in valve. Tank full of water.

Black Jack was warm and had melted ice somewhat.

→ To keep pan black

at Donner Lake
difficult to unscrew
valve because
sleeve over valve
was soldered
down and could
not be drawn
over parallel with
intake pipe.
→ Use be extra
coupling - also more
graphite and tar
paint.
Lunch at Truckee.
Trip 9 am — 2 pm.

Costs Iodine 15¢
Lunch 1.28 $

With Walter K.

Oct 31

3:30 pm Donner Lake

Pumped down to 1394

~~Refilled~~ ~~1.19~~

Flushed can thoroly

Refilled 1.19 No oil

~~Needl~~

Sleeve & pipe 6 in.

1½ in. pipes

3 pipe wrenches 12 & 24 in.

1 crescent wrench 8 in.

Donner Pass

Brought sand and cement. Pipes too short.

Need 1½ in - 2 ft and air pipe ½ in - 12 in.

Valve rod found broken in transit.

Oct 31

Costs —

2 Lunch 2.20

2 Dinner 1.60

Nov. 1 Fare $.09 Sacks — Reno.

Lunch 2.00

Dinner 1.90

Nov 2, Truckee - Reno 75¢

Breko 1.40

Lunch 1.10

Brought ladders for new tanks and book case.

Home with Walter.

Reno 7:30 pm.

Friday

Nov. 1 — Bus at 9 am.

Brought pipes from Jack Ryan.

Mild —

Flushed Donner Pass tanks and connected it up —

Building stone pier under pipe from pan to tank.

Pipe sprung by weight of snow. Also sank by resting on two points of rock.

Remained all night at Hotel.

Saturday Nov. 2

Wind strong during night.

Stronger this morning 25 mi. an hour.

Too wild to go to Cave.

Tree blown down this morning at 9 A.M. lights and heat off.

Repair men gone toward Ice Lake.

Selected sites for drip pans.
1. South of river on sawmill site.
2. at point of timber South of Tilling Station half way to railroad

→ slopes similar but mild.

Army Eng. gage $1\frac{1}{8}$ in lower than Stevens W. Must raise it to same level.

Removing Russian wind shield to make room for 2x8 in gage.

On its site will be placed the California storage gage (Revised U.S. Engineers form Fred Paget). Desire to study snow cap formation.

Gages SS and No. 4 frozen solid.

Nos. 2 (Stevens W) has possible trace of floating ice; No. 3 (U.S.E. C.) entirely liquid.

Monday Nov 4

Reno - Soda Spgs -

Calm, clear, cold.

Reset insts in Pasture

— Expenses —

Nov 4. Reno - Soda Spgs 1.09

Lunch .10

Dinner .50

Nov. 5, ~~Brkf~~ 1.00 Lunch 1.10

Nos 3 and 4 and 55

and 6, 7, 8 - all liquid again!

Only 1 fair day.

Eleanor reset Pass and Donner Lake.

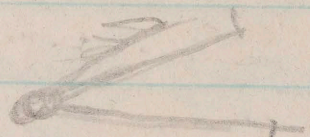
Hairs better but traces still confined.

---

at Donner Pass

Finally got salve

Tuned up -
Braces excellent
but need stiffer ends.

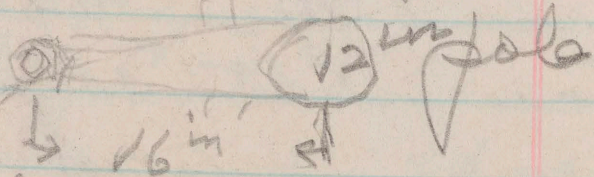


Chain long enough -
apparently ice in bottom.
Ice but water on it.

Needed -
Additional braces.

1 -

3



Value
pipe 3/8" inside.
Pipe might much better
have back 1/2". Somewhat
weak.

Tuesday Nov 5

Overnight. Helped Eleanor with amendments on ballot.

Breakfast at 6:30 am.

Eleanor on election board.

Laying pier to support drip pan.

Tried blowtorch to thaw drip tank.

Marker for snow survey line this winter. On crows nest. ? feet from pole.

---

9 ft W to E.

5 to N from pole 24 ft

But rocks 8 + 17 ft from pole

Monday Nov. 11/46.

Phoned John Johansen

Today cemented drip pan in place - Cold east blizzard, but used calcium chloride water.

Will place more supporting stones under pipe from pan to tank.

Will raise Can No 3 (Army) 18 in. higher.

Plan to compare prec. gages after each heavy storm with snow/cover

nels. Sparks.
O12M-F

up, male, A.
months old.
O16M-O18E

tered Cocker
them at 354
N6M-F

Cocker pup-
433 Tonopah
N7M-N13E

ps. Phone
N8M-N11E

haired Fox
O15M-O18E

93

ER"
ICKS

mpshire Red,
Barred Rocks
per hundred.
ultry supplies

STORE
ST.

further notice.
edies available

1934	Auburn Six Conv. Coupe	295
1933	Chevrolet Pickup	395
1934	Buick sedan	395
1936	Dodge sedan	395
1936	Chevrolet Sedan	407
1937	Ford Sedan	446
1935	Chevrolet sedan	467
1936	Pontiac sedan	489
1935	Plymouth sedan	495
1936	Lincoln Zephyr sedan	595
1937	Chrysler Sedan	662
1937	Packard Conv. Coupe	695
1936	Ford convert. sedan	657
1939	Buick sedan	795
1940	Nash convert. coupe	795
1938	DeSota 7-pass. Sedan	1059
1940	Lincoln Zephyr sedan	1744
1941	Lincoln Zephyr sedan	2135

House Trailers and Luggage Trailers

McCAUGHEY MOTORS
515 S. Virginia
Phone 7255

1942 HUDSON Super Six, heater and radio, $1463. Within OPA ceiling. Many other good used cars to choose from. Terms or trade. 2-1637, Sawyer Motor Service, 340 Lake.
N9E-N13M

1942 FORD JEEP, good condition, $800. Within OPA ceiling. Terms or trade. Many other good cars to

ON U. S. HIGHWAY 40

HOUSE trailer, 1943 Mainline, 27-ft. Excellent condition, beautiful interior. Reasonable price. Can be seen, Lincoln Park Motel, East of Sparks.
O31M-N13E

THREE gallon Cub water heaters for trailer or small apartment. Thermostatic control. $42.50. Sawyer Motor Service. 340 Lake St. Phone 2-1631.
S21E-F

1941 PRAIRIE Schooner trailer, excellent condition. Reasonable. Private party. Mrs. James Frazer, Old Orchard Trailer Court.
N9M-N11E

NEW, modern lightweight 18-ft. house trailer. Home for 4. Butane for cooking. $675. At Fred Osburn Ranch, Doyle, Calif.
N2M-TF

FOR SALE — 1943 Barton luggage trailer. Fair condition. Reasonably priced. Phone Sparks 2597.
O25M-F

STREAMLINED, lightweight camping trailer. May be seen any time. $285.
N7M-N9E

ONE 27-ft. trailer, also trailer with cozy, lean-to room. Parking spaces. Mrs. Binns, Chism Court. West 2nd St.
N3M-N12E

25-FT., 1945 Glider house trailer. Butane equipment. Will consider selling 1946 Ford pickup with same.

October Is Second Coldest Month on Record for Reno

With an average temperature of 45.5 degrees, last month was the seceond coldest October of record in Reno, being exceeded only in 1919, when the mean temperature fell to 45 degrees, according to a summary of climatical data issued yestereday at the Hubbard Field station of the U. S. Weather Bureau.

A new all-time minimum record was set, however, when the mercury dropped to a low of 12.7 degrees, October 29. A low of 13 degrees also was recorded on the 31st. Night temperatures averaged unusually cold, with lows a freezing, or below, on 22 days, and almost continuously after the 6th.

On the other extreme, high temperatures of 77 and 78 degrees occurred on the 13th and 25th. On 20 days, however, the average temperature was below normal.

Moisture was much in evidence, with total precipitation for October being 0.51 inch, or, 0.15 inch above the long time normal. There were six days with measureable precipitation, and four with a trace. There was a trace of snow on three days.

There were 12 clear days, 9 were cloudy and 10 partly cloudy. There was 68 per cent. of the possible sunshine.

Considerable wind was noted, with the highest velocity of 32 miles per hour recorded on the 17th.

Monday Nov. 11/46.

Phoned John Johansen

Today cemented drip pan in place - Cold east blizzard, but used calcium chloride water,

Will place more supporting stones under pipe from pan to tank,

Will raise Can No 3 (Army) 18 in. higher,

Plan to compare prec. gages after each heavy storm with snow/camera

To detect loss in cans. Keep record movement record.

Need an anemometer above Norden to compare with Soda Springs and Pass.

Take meas. of cans on Dec. 1 - Recharge then.

Sunday - Nov 17/46

Paid

Expenses
5 bundles markers
6.00
1 Brkft (Reno) .35
2 Lunches (Trucker) 2.47

Left Reno 8 am,
3 Drip tanks etc

Johnnie sold last night.
He will erect all
3 pans and tanks
the hot water pipe for ?

Batteries 1225

Placed tanks on location.

"Mrs Whitey" offered.

ma for Dennis
the dinner off the
hotel kitchen for
same rate as for
present bedroom -
Steam heat, private
toilet - He would like
to have a suite
of my room and
bath adjoining -
But calls cannot
be missed and
must have treatment
necessary - Going to
India. Must wait
until next summer.

2 x 8 pres gage being moved.

Fred Paget brings Sesto gage up on Wed.

Paraffin -

Planned to pour paraffin around rough outlet of old pans

1. But Pasture pan has slush and water in it - Overflowing?

2. Donner Pass Pan has water over the throat.

Some particles of ice floated out of throat. Valves not frozen.

Frozen? Overfull?
→ Must measure and pump both.
Phone Johnnie.

Keep intake uncovered or deeply covered?
Fill with salt, Chlor, and water above outlet until permanent snow falls?

Be sure valve is carried under ice.

Donner Lake -
Pan empty but layer of snow in it.
Snow only slightly wet.
All buried 2 Grams ago.

Forgot -

Rake, oilcan

Saturday Dec. 7

Into the clouds with Walter Bodell.

Took Thermog., Sacto Tank, Stacks calcium chloride - 7 covers for drip pans.

Brought back to Reno the sake.

Need snow shovel.

Lunch for 2 - $1.60

Water low again.

Ashton Codd brought his snow motor to unload our truck - → aided in raising Engr Gage 17 in. to height of Steam W.

→ Left Thermog. to exchange for Thermog. at Donner Lake.

"Four smaller cans recharged Dec. 4 (?) - No ice in them."

Should have had cover plates for the cover pans! Melting snow a problem - by freezing in feed pipe!

Sacto Gage -

Painted dead black with paraffin overlay

No hanging apron to throat.

Double thick wind-

Shield.

Adhesion of Snow

Ashton has noticed that the black cans collect no snow but the galvanized cans do.

Evidently even the sun filtering thru the thin clouds heats up the black metal.

Ashton desires to borrow the Canyon Bridge for the year.

Walter Wilson came to Laboratory last

week and came over to see me.

* Forrest Rhodes has been made Coordinator of Snow Research for the Army Engineers.

Sund

On Frid
and Mar
Reno. T
home b
to educ
children

Dec 5, 1946

Recharge 4-55-6-8

gage.	wt. out.	Depth out.	wt in.	depth in
4	24.89	Full	8.19	6.5
S.S.	30.60	22.75	11.75	6.75
6.	24.46	23.25	8.55	7.1
8	23.35	21.5	8.01	6.75

recorded.
J. Graham

Sunday Jan 5/47

On Friday Jan 3, Ashton and Marie called at Reno. They want more home life and chance to educate their children.

So he has resigned from the Weather Bureau.

Today Ralph Brown brought me views of India, Burma Road asphalted and after entire years. So fast must be law.

Ledo Road only graveled and began to wash out at last monsoon.

He will forego an entire semester for the chance to go with me.

— Expenses —

Jan 5

Taxis	4.50
Fare & 5.5 pgs	2.10
Ski mittens	3.50

Jan 6

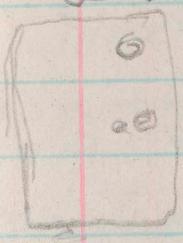
Bkfst	.10
Gas	2.22
Lunch	.55
Fees ride & Card	

Purchased -

Clothing for India

— Need —

1 Gen Calendar Pad 1947



Strong east wind —

Bus at 3:25 pm -

Road dry all way.
Continuous snow
only at foot of Donner Lake

Thin ice for large
areas of lake. Water
drawn considerably
down.

Two buses - a third
one at Summit to
gather up the skiers
and more Special Bus
at Soda Sp for Norden
ing skiers)

Hotel active - Want
more snow -
Office full - Johnnie
and Eleanor are happily
busy - in ski school.
but are planning to

carry on my work.

Miss Whitey happy this cold spell with our electric heaters. A life saver during cold period. Will add a new coil for me.

Cold? At Reno
Friday 5 am 7°F
Saturday " 8°F
Sunday " 14°F

"Will it snow now?" said Taxi Driver

Office used as accident operating room.

Jan. 6 -
Barometer going down steadily. Snow?
Strong E wind (30 mi) even from Truckee upward

thru Pass.

Too windy to test thermometers and humidity.

So purchased ski clothing at Soda Spgs and Hardin, Webs at Truckee.

Eleanor brought me to Reno.

Brought Thermog. & snow thermog from S. Springs and H-T from Truckee for cleaning.

Monday Feb 3 /47

Clyde Houston took Alder box and sampler to Soda Springs.

Snow sampler from Fred Paget but extra section taken with auger

Monday Feb 3 /47

Clyde Houston took Clear box and samples to Soda Springs.

Snow samples from Fred Paget but extra section taken with auger

Tues Aug 22?

Lions game at Hinsdale
Hot at 80°F?

Haxies -
Out - In N.W.

Gum Turpentine

John ?

Col. Faulkner
U.S.E. Division off.
South Pacific Division
Calif & Sonoma
Balfour Bldg., S.F.

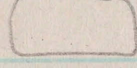
Kolb of U.S.E.
went to M.E.T.
Wm Cassidy took Kolb's
place.

Orde.

1 Faulkner.
2 O.J. Stanley -
3 Wm Cassidy.
4 W.T. Nelson + Miller P.T.A.

Light in bathroom
Milk glass — porcelain

—

Back door light.
Cord. 

—

Reflector lights
Drill

—

Canvas strips for chairs

—

Ruth Kern
Reprints from Tree News
Lock-box Keys.

—