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GLACIER MEASUREMENT REPORT FOR 1951

Rocky Mountain N. P.

by Edwin C. Alberts, Park Naturalist

Submitted, Oct. 10, 1951

IMPORTANT

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ARNO B. CAMMERER,
Director.

*incl. 1 map
15 x 20/2 in.*

1951 GLACIER REPORT

The annual traditional glacier observation trip was made on August 28, 1951 by members of the naturalist staff. The trip was combined with a visitor tour. The party was under the direction of Seasonal Park Naturalist J. Heberte Heger, aided by Ranger Naturalists Benjamin Slater and Richard Heidleman. Also aiding the party were Assistant Chief Ranger Harold Edwards and Seasonal Ranger Mike Sweet. Forty-seven visitors made the trip successfully. The usual route was taken over Flattop Mountain, with descent to Tyndall Glacier being made in the Hitching Post Draw. The ledge route was blocked by snow and no pictures were made at Station P-3 therefore. The day began with fog and cold, but as the day progressed the weather turned fair.

Andrews Glacier. Measurements were made from points X' and X'' as has been customary. The distance from the presumed nearest glacier ice to X' was 165 feet, (in 1950 this distance was 194 feet). The distance from X'' to the nearest presumed glacier ice was 63 feet, (in 1950 this distance was 68 feet). The figures suggest an apparent advance of the ice, and certainly the "snout" now covers slightly more territory, as indicated in the photographs. However, the south side of Andrews Glacier, adjacent to Taylor Peak, reveals much more of the cirque wall on the peak than in 1950. Previously this south side was well filled in with snow, and presumably, ice. The body of Andrews Glacier has more marked "hog's back" aspect than in some previous years.

Tyndall Glacier. Tyndall presented more than the usual problems of measurement. The gorge was filled with fog when first reached, and the ice "snout" was found to have advanced right to the points of stations X and X'. Mr. Heger felt that these rocks had shifted, as well, for half of the rock which is used for Station X' had been broken off. The ice was but three inches from touching Station X', at the surface. Measurement from Station X to nearest surface ice was 10 feet. (In 1950 this distance was logged as 94 feet). In 1942 Station X' was also recorded as being "at ice". Altogether there are so many possibilities for variation in judgment here that we must rely almost entirely on photographs if the report is to be of any value. A small pond of water covered the ice at this area, with possible ice on the bottom. Since both points X and X' appear to have been disturbed and perhaps moved appreciably, there is increasing evidence that the actual base of the glacier underlies this morainal debris utilized as reference points.

Conclusions. Few are being drawn by the writer in view of the extremely rough character of these measurements. The figures for Andrews are less erratic than those for Tyndall, and suggest that here the "snout" has advanced although the body of the glacier may be appreciably smaller. For Tyndall, the photographs suggest, if the measurements are disre-

garded, that the snout has advanced and the body of the glacier has increased in volume somewhat. These reports may serve some purpose as references for the meteorological data which appear on the next pages. These data are compiled from the U. S. Weather Bureau Climatological Data Publications, and from records (for snow depths) in the Chief Ranger's Office of this National Park. The photographs which follow these tables show 1950 and 1951 views from essentially the same points, and were made by Mr. Hegar.

It is the writer's hope that this project may be worked out, for 1952, with the U. S. Geological Survey. It will probably require an overhauling, but the results of the work may be of some more scientific value.

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TABLE I

Weather Statistics for 1951 Report

ESTES PARK	Aver.	Max.	Min.	Days -32°	Precip.
Aug.-1950	57.3	82	33	0	.67
Sept.-1950	51.0	80	28	6	1.56
Oct.-1950	49.9	76	22	15	.22
Nov.-1950	37.7	63	-25	15	1.07
Dec.-1950	35.8	58	-9	18	.20
Jan.-1951	24.8	53	-17	28	1.05
Feb.-1951	29.3	58	-39	23	.57
March-1951	30.5	57	-10	28	.45
April-1951	38.3	62	11	22	.94
May-1951	48.8	79	23	12	3.15
June-1951	51.9	77	25	7	2.12
July-1951	63.1	86	33	0	2.04
Aug.-1951	60.0	81	37	0	3.44

Average, 1950-
1951 (13 mos.) 44.5

Total Days-174
-32°

Total Precip. - 17.48

GRAND LAKE	Aver.	Max.	Min.	Days -32°	Precip.
Aug.-1950	53.0	80	29	12	.86
Sept.-1950	48.6	80	22	17	2.07
Oct.-1950	43.8	71	18	31	.22
Nov.-1950	29.0	55	-15	29	2.05
Dec.-1950	18.8	45	-23	31	1.85
Jan.-1951	15.0	46	-25	31	1.70
Feb.-1951	18.4	51	-41	28	1.36
March-1951	22.3	51	-10	31	.75
April-1951	33.0	58	0	30	1.76
May-1951	44.3	74	15	23	1.34
June-1951	46.4	73	23	26	2.05
July-1951	55.8	82	25	1	1.66
Aug.-1951	53.7	80	27	12	2.51

Average, 1950-
1951 (13 mos.) 37.1

Total Days - 302
-32°

Total Precip. - 20.18

TABLE II

Andrews Glacier

<u>Year</u>	<u>X' to "Glacier Front"</u>	<u>X'' to "Glacier Front"</u>
1932	48' 7"	
1933	58' 10"	
1934	139' 0"	
1935	66' 0"	(Station established in 1938)
1936	No measurements	
1937	96' 10"	
1938	32' 3"	48' 11"
1939	92' 0"	23' 0"
1940	170' (est.)	16' 9"
1941	212' 5"	54' 3"
1942	155' 8"	49' 1"
1943	No measurements	No measurements
1944	253' 0"	79' 2"
1945	210' 6"	65' 7"
1946	224' 9"	60' 8"
1947	201' 9"	66' 0"
1948	210' 0"	56' 0"
1949	164' 0"	64' 0"
1950	194' 0"	68' 0"
1951	165'	63'

Remarks: Judgment of the field party as to "nearest glacier ice" varies; this doubtless explains the erratic figures.

TABLE III

Tyndall Glacier

<u>Year</u>	<u>Station X' to "ice"</u>
1932	30' 8"
1933	63' 4"
1934	72' 5"
1935	38' 6"
1936	No measurements
1937	196' 9"
1938	62' 4"
1939	105' 4"
1940	56' 0"
1941	No measurements
1942	At ice
1943	No measurements
1944	56' 3"
1945	54' 4"
1946	112' 11"
1947	5' to ice
	180' to possible "glacier ice"
1948	260' to "foot of glacier"
	(adjusted from an erroneous measurement from Station X, not X')
1949	106'

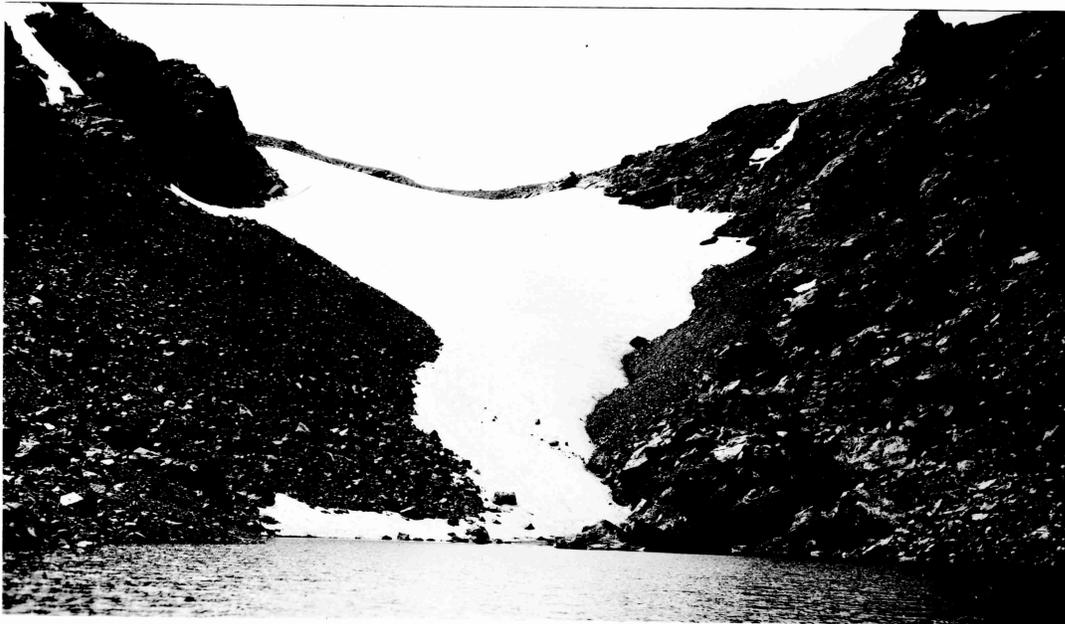
Remarks: (1) Station X, used in 1948, was 300' from "nearest glacier ice". In 1949 a line from this station measured but 126'. (2) It is apparent from above table that measurements at Tyndall Glacier are highly erratic, with much variation in observer's judgment of actual glacier terminus.

1950	Station X Same as 1948 94'	Station X' 110'
1951	Station X 10 feet	Station X' about 3 inches

TABLE IV

SNOW DEPTHS AND WATER CONTENT FOR PARK

Dates	1951		1950		1949		Mean		No. of Years for Mean
	Snow D.	H ₂ O							
#116 Copeland Lake (Alt. 8,600')									
Jan. 31	30.30"	6.40	15.00"	3.80	20.90"	6.50	22.06	5.56	3
Feb. 28	24.20	7.50	15.10	3.64	19.50	5.80	19.65	5.57	3
Mar. 31	24.70	7.82	9.18	3.23	23.8	7.3	19.23	6.12	3
Apr. 30	13.55	4.91	1.55	0.73	1.90	0.60	5.66	2.08	3
#41 Wild Basin (Alt. 10,000')									
Jan. 31	54.30	15.70	33.80	8.40	43.20	14.40	32.21	7.97	13
Feb. 28	54.12	18.25	39.00	11.04	45.54	15.46	39.76	10.55	14
Jan. 31	61.54	21.62	43.58	13.71	61.40	19.60	45.61	13.83	14
Apr. 30	59.33	22.42	39.00	14.48	42.16	15.96	39.77	14.15	14
#115 Deer Ridge (Alt. 9,050')									
Jan. 31	23.80	4.30	17.40	3.00	26.70	7.50	22.63	4.93	3
Feb. 28	27.20	7.30	18.00	4.00	25.9	8.0	22.60	6.65	3
Mar. 31	30.86	8.90	15.84	4.20	32.40	8.70	26.35	7.26	3
Apr. 30	23.20	7.40	7.70	0.85	6.00	2.30	12.30	3.51	3
#95 Hidden Valley (Alt. 9,550')									
Jan. 31	40.30	9.00	34.70	7.20	40.60	11.00	30.35	6.68	11
Feb. 28	45.60	12.50	37.40	8.67	43.10	12.50	37.55	8.99	11
Mar. 31	51.50	15.57	38.00	11.50	64.00	17.80	43.19	12.14	11
Apr. 30	55.50	18.30	44.90	12.50	44.90	15.60	44.69	13.43	11
#127 Grand Lake (Alt. 8,600')									
Jan. 31	35.91	6.83	25.91	3.91	35.40	8.70	32.40	6.48	3
Feb. 28	36.41	8.87	23.83	5.16	36.20	9.90	30.12	7.01	3
Mar. 31	37.25	10.45	25.95	6.04	43.40	11.40	35.53	9.29	3
Apr. 30	22.25	5.83	—	—	12.5	4.40	17.40	5.05	2
#64 North Inlet (Alt. 9,000')									
Jan. 31	21.10	6.70	18.70	3.80	33.35	9.15	23.02	5.29	13
Feb. 28	34.85	9.40	25.42	5.72	29.50	7.90	30.63	7.50	14
Mar. 31	38.50	11.25	27.45	7.60	42.05	12.60	32.45	9.33	14
Apr. 30	27.80	7.70	21.15	5.82	17.75	5.22	22.54	7.19	14
#12 Phantom Valley (Alt. 9,038')									
Jan. 31	35.56	9.37	28.40	5.40	37.81	10.25	25.24	5.64	15
Feb. 28	42.75	12.62	26.71	6.71	36.62	10.81	32.50	8.24	15
Mar. 31	43.68	16.00	31.21	9.90	45.41	13.06	33.78	9.81	15
Apr. 30	31.87	11.21	18.96	6.46	17.18	6.12	17.63	6.22	14
#65 Lake Irene (Alt. 10,600')									
Jan. 31	57.21	17.77	41.35	10.71	57.07	19.42	47.33	12.84	13
Feb. 28	70.35	23.14	54.78	17.07	66.71	26.09	58.93	17.57	14
Mar. 31	79.92	30.21	61.35	20.85	83.14	29.85	65.66	21.66	14
Apr. 30	84.31	34.50	66.64	21.00	62.64	26.14	65.23	24.34	13



Andrews Glacier. General View, looking west across lake.
August 28, 1950

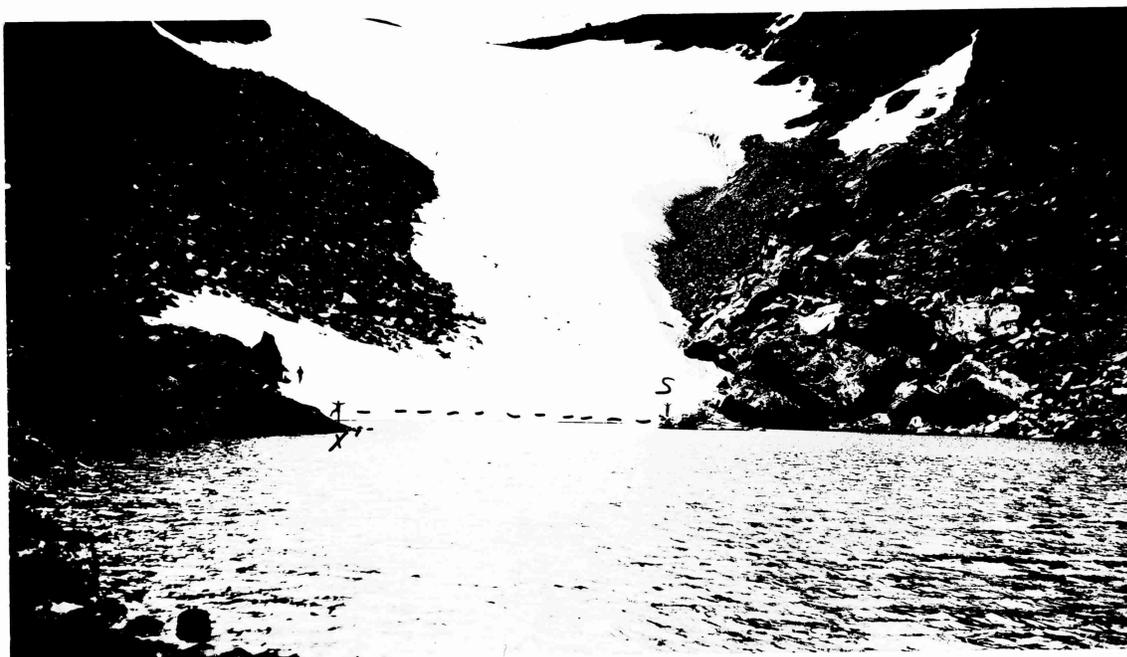


Andrews Glacier. General view, as in figure above.
August 28, 1951

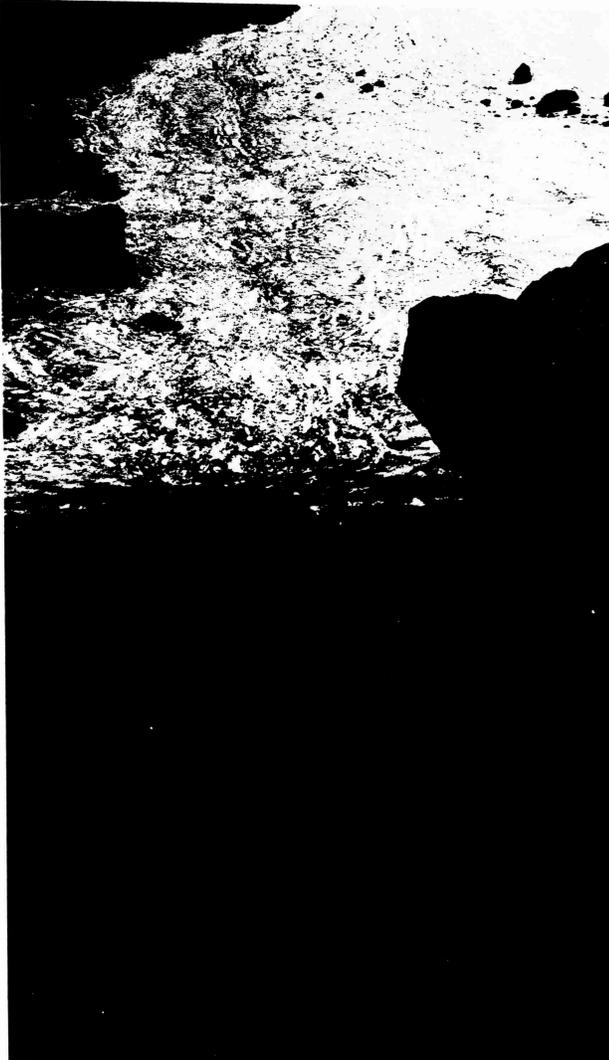
-9-



Andrews Glacier. August 28, 1950, showing man on points
S* and the presumed "nearest glacier ice" in snout.



Andrews Glacier. Same view as above. August 28, 1951
Figure S stands for snout.



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Andrews Glacier. Looking up
glacier "snout" from delta.
August 28, 1950



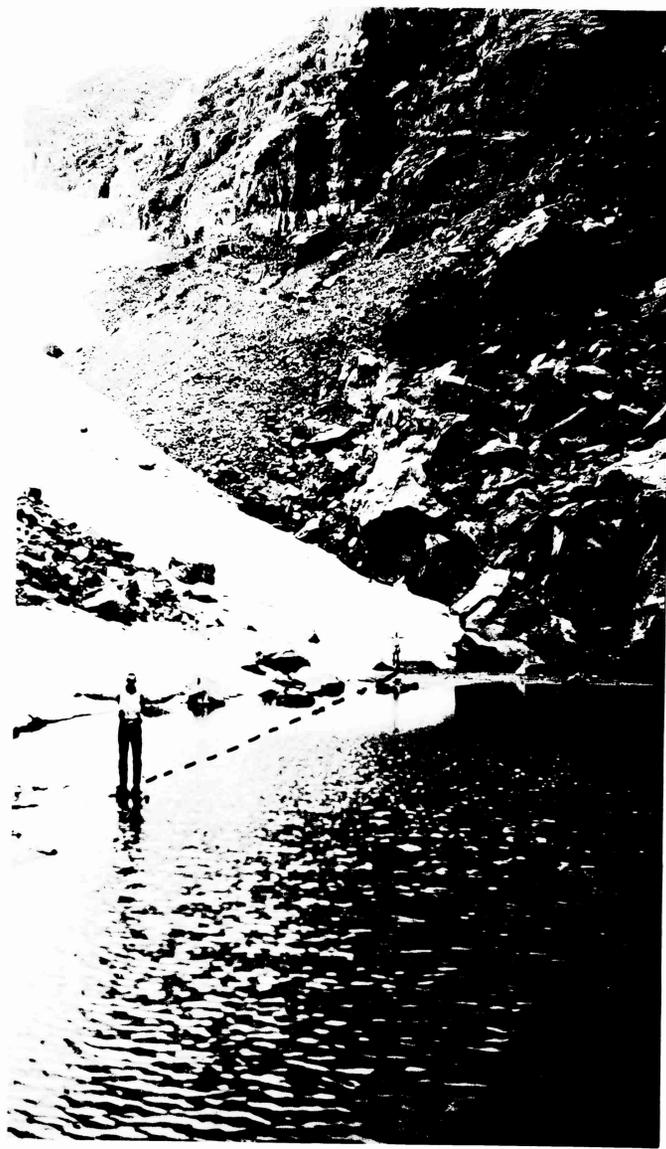
Andrews Glacier. Looking up
glacier "snout" from delta.
August 28, 1951



Andrews Glacier. View south, showing delta, lake shore, and presumed snout of the glacier. August 28, 1950.



Andrews Glacier. Same view as above approximately. August 28, 1951



Andrews Glacier. View along line of measurement from point K'. Man in foreground is standing on 2'. August 28, 1950



Andrews Glacier. Same view as above. August 28, 1951

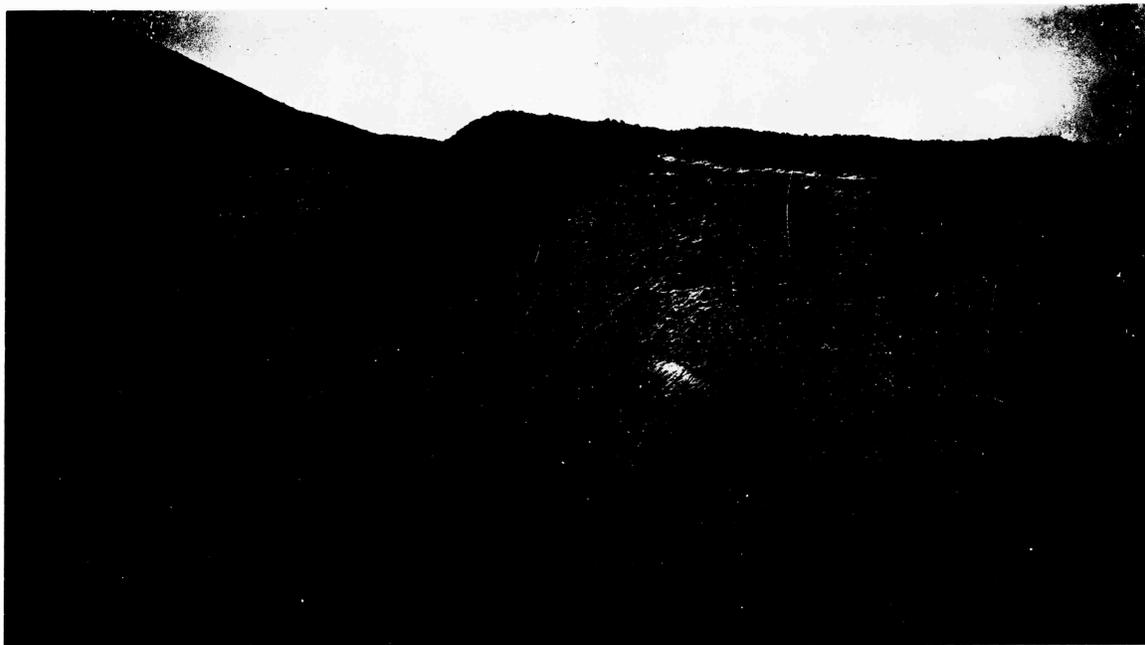


Andrews Glacier. View down
the glacier toward delta and
across the glacial pool.
August 28, 1951



Andrews Glacier. Same view as above.
August 28, 1951

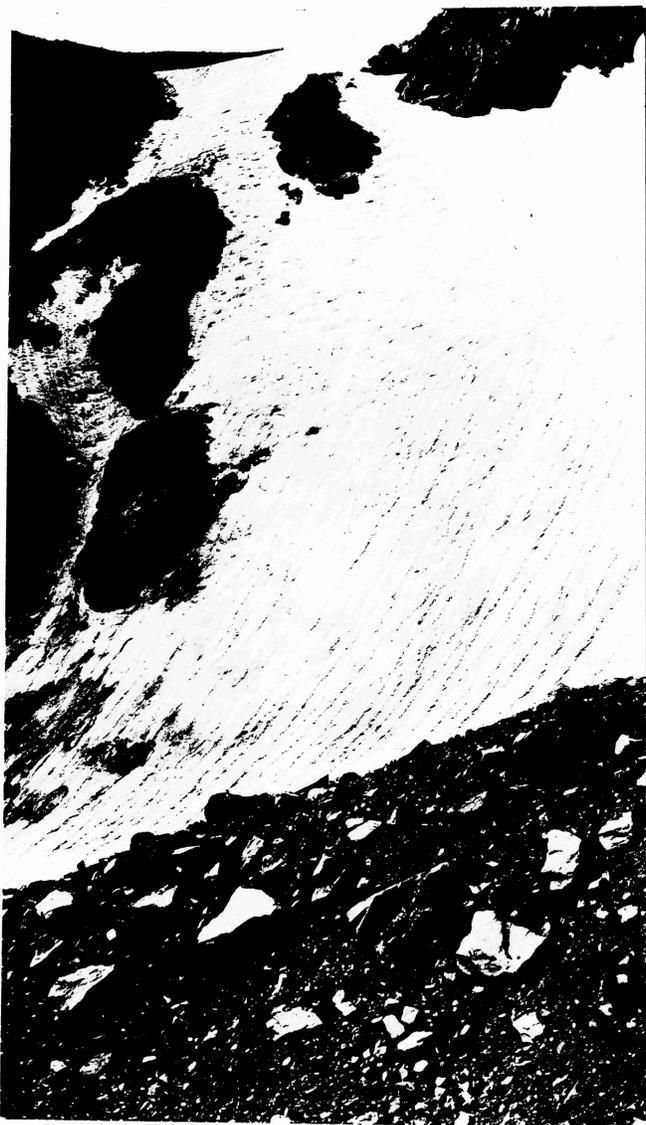
-15-



1950



1951--Thorn Point P-3
Tyndall Glacier. Bergschrund area at head of the glacier,
from Flattop Mountain, 1950 and 1951 seasons. (1951 shot
was from a different angle due to P-3 being under snow).



1950



1951--from Point P-1
Tyndall Glacier. General view
of glacier from the north.

Plate 9. Tyndall Glacier



Tyndall Glacier. Recessional moraine, base of Tyndall Glacier, showing base points X and X'. There is some reason to suspect that actual "nearest glacier ice" really lies beneath the moraine debris. X' is actually a few feet left of 1949 position, which was buried by snow. August 28, 1950



Tyndall Glacier. Same view as above, August 28, 1951



Tyndall Glacier. Recessionalal moraine, base of glacier, showing base points from which tape measurements to assumed "nearest glacier ice" are made. Ban at X' is about ten feet left of actual X', which was covered by snow. Man in foreground is at end of supposed glacier snout. August 28, 1950

Tyndall Glacier. August 28, 1951. Above picture was impossible to get since snout was deep within the glacial pool. The snow was about 10 feet from X and flush against X'. (Refer to picture on Plate 10.)



General view of glacier front
 from point between X' and
 1950 P-2. August 28, 1950

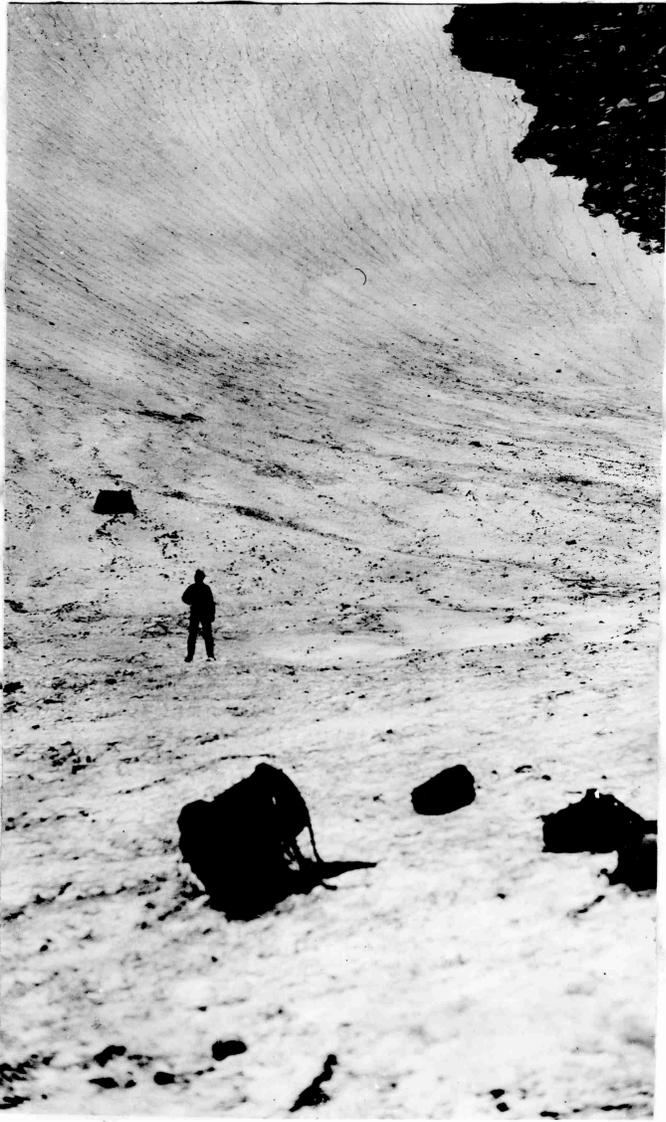


View similar to above. Man is at
 point X; snout is ten feet be-
 yond in the water.

August 28, 1951



Plate 12. Tyndall Glacier



View along line from Point X,
to "nearest glacier ice".
Man is at supposed glacier
snout. August 28, 1950



Similar view from Point X. Ice
was about 10 feet from X, deep
within glacial pool.
August 28, 1951

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Added picture from P-1 showing
glacial ice (dotted line)
and the two base points X
and X'. August 28, 1951

Plate 14. Tyndall Glacier

See M1
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