

DITCH

RECONNAISSANCE

FIELD NOTES.

Whl's Extension.

6

Box Z

FIELD BOOK

6

TILS 361 LOCATION

attle's Extension.

.....

C. J. White,

80

ENGINEER.

...1921....

Cass Co.

Course	Brg.	Length	Rise Fall	Total Dist.	ELV = 35.2 ELV
0-1	S81°30'W	460'	fall 0.3	460'	34.9
1-2	N66°45'W	320'	fall 0.9	780'	34.0
2-3	N33°W	330'	rise 0.1	1110'	34.1
3-4	S87°W	430'	fall 1.1	1540'	33.0
4-5	S87°15'W	560'	Fall 0.5	2100'	32.5
5-6					
5-6	N85°W	390'	fall 0.9	2490'	31.6
6-7	S65°W	325'	fall 1.1	2815'	30.5
7-8	S42°30'W	650'	fall 1.3	3465'	29.2
8-9	S65°45'W	530'	fall 1.5	3995'	27.7
9-10	N79°45'W	720'	Rise 1.8	4715'	29.5
10-11	N46°30'W	740'	fall 1.6	5455'	27.9
11-12	N32°40'W	1300'	fall 1.2	6755'	26.7
12-13	N10°45'E	665'	rise 2.0	8420'	28.7
13-14	N52°20'W	520'	fall 2.0	8940'	26.7
14-15	S86°30'W	1080'	rise 1.5	10020'	28.2
15-16	N55°45'W	1300'	fall 1.9	11320'	26.8
16-17	N53°30'W	1200'	rise 0.6	12520'	27.4
17-18	N56°15'W	1900'	rise 1.0	13420'	28.0

Tobls Extension.
2-4-21
CJW-CJB-M.W.

Remarks

Sta 0 = Zinc Br. Inst at 1.
Inst at 3
Store is N19°E - 900' from Point 3
Inst at 5
all swamps at Point 5
(Ht = 5.2 Center wire on 8.5 = V.A. = +0°55'
Inst at 5, object at Point 4)
Inst at 7
(Enter open meadow at Point 8)
Creek is at com
Inst at 9
(Creek enters from side south at Point 9)
(High Land 250' L Point 10) (Shot taken at 10 on old bridge about 2' higher than creek)
(Bridge on main Road about Point 10 - 100'
500' L - High Land at Point 11
Inst at Point 11
Shot Point 12 taken on ice of creek
Inst at 13 on Bank of creek
Shot Point 14 taken on ice of creek
Inst at 15 on Bank of Creek
(enter large open meadow at 15)
Shot Point 16 taken on ice
Inst at 17 on Bank of creek
End of Survey shot taken in middle of meadow

Battles Extension.

Feb. 8, 1921

CSW - CSB, M.W. 3

Course	Length	Rise or Fall	Total Dist.	EV. (81.3)
0-1	584°E. 440'	v = -0°57' I = 440	440'	R. 7.3 = 81.2
1-2	556°30'E 1160'	v = -0°31' I = 1160	1600'	F 10.4 = 78.2
2-3	53°15'E 660'	rise 0.3	2260'	78.5
3-4	527°30'W 715'	fall 1.7	2675'	76.8
4-5	555°45'W 205'	R = 1.0	2880'	77.8
5-6	510°10'E 540'	F = 1.3	3420'	76.5
6-7	515°45'W 710'	F = 0.7	4130'	75.8
7-8	55°E 410'	F = 0.35	4540'	75.45
8-9	527°45'W 445'	F 0.2	4985'	75.2
9-10	541°20'E 685'	F = 0.9	5670'	74.3
10-11	N70°45'E 980'	F = 0.65	6650'	73.6
11-12	557°45'E 2680'	v = +0°7' I = 2680	9330'	R 5.4 = 66.0
12-13	563°45'E 1450'	v = +0°24' I = 1450	10780'	F. 10.2
13-14	540°E 690'		11420'	FR. 2.0

#1 = on Top old Dam. T @ 1. (Creek Bottom about 250' wide)
 (Dam 7' High)
 (Tain 2 taken on ice = Creek Bottom 250' wide)
 Big Swamp on left.
 #3 = on ground in meadow. Inst C3 = ~~600'~~
 #4 = on ice = Meadow about 300' wide.
 #5 = on Bank of Creek T @ 5. Swamp on R of P. 5
 Creek Bottom = 250' wide.
 #6 = on ice = Creek Bottom = 200' wide
 (Creek Bottom widened out to 400' between #5 and #6)
 #7 = on ice T @ 7. Creek Bottom about 300' wide
 #8 = on ice = Creek - 700' wide
 #9 = on ice T @ 9 = Creek Bottom very wide
 Rod. 8.5 H.I. = 5.2 V = +1°7'
 Creek enters from right 200' R. of Pt. 9 = 511° W.
 #10 = on ice = Creek Bottom 500' wide
 #11 = on Bank of Creek T @ 11 = Creek Bottom 400' wide
 (C.S.W. Fall in - Cup Rope)
 Swamps at left of #11. Meadow widens out between
 #11 & #12 = 800' wide
 #12 = on top of old Dam on bridge = Bridge = 11.0' above ice
 Creek enters from R about 400' down stream
 from #12 swamp along creek (12-13 Creek Bottom
 in 800' wide)
 #13 = on Bank of Creek T @ 13 = Meadow about 600' wide
 C. wire on 7.5 V = +0°26' = H.I. 5.2 #14 = on ice
 Small creek enters from L down stream from #13 = 200'
 Big Swamp on left at same place
 Pole Bridge across Creek - 400' below #14

Course	Brg	Length	Rise on Fall	Total Dist.	Object
				11420	69.6
14-15	S 81° 30' E	1040'	I = 10.90	12460'	R. 3.4
15-16	S 79° E	886'	F. 3.7	13340'	65.9
16-17	S 65° 45' E	1200'	R. 0.8	14540'	66.7
17-18	S 56° 45' E	776'	V = +0° 15' I = 7.70	15310'	R. 3.4
18-19	S 75° 15' E	1550'	F = 0.4	16860'	62.1: Ice old Brd.
π = 19	S 7° 30' W	225'			
19-20	S 46° 30' E	1320'	F = 7.8	18180'	61.9
20-21	S 75° 30' E	V.A. 0° 10' I = 3.40	R = 4.5 by 0° 10' method.	1168 ft	
π = 21	S 29° 15' W	530'	5.5 lower than # 21	60.9	River
21-22	S 42° E	570'	F = 5.7	60.7	
22-23	S 53° 15' E	620'	R 4.8	65.5	
π = 23	S 8° W	330'	5.7 lower than # 23	59.4	River
23-24	S 24° 30' E	910'		R. 5.1: 71.2	
24-25	S 81° E	1560'	V = +0° 20' I = 15.60	F 9.0: 62.2	
π = 25	N 86° W	1000'	2.8 lower than # 25	61.2	River
25-26	S 59° 45' E	1000'	2.8 lower than # 25	59.4	

4

Meadow 800' wide @ #15
 #15 = on bank of creek = TC #15 = Banks of creek 3' High.
 Course on 8.5 V = +0° 17' = H1 = 52'
 #16 = on ice = Meadow along river = 900'
 #17 = on bank of creek TC #17 = meadow = 900'
 Creek Bank is about 3' high
 #18 = on Bridge = Bridge 5.8 above ice. That taken on Creek.
 Road to P.P. 4 Road to Mildred. Sec. cor about
 90' from Bridge. Ditch on side of road to
 Mildred. Bridge is 30' wide in deer
 #19 = on old Road grade = TC #19 = Swamp 600' wide
 ice = 7.65' lower than ground at #19
 #20 = on ice = Between 20 & 21 meadow is 500' wide
 #21 = on High Land
 Ditch line goes from #20 to π = 21 #1
 #22 = on ice = Swamp about 300' wide
 #23 = on High Land = Swamp about 400' wide
 Ditch line goes from 22 to π = 23 #1 (Creek from 23 #1
 to 25 #1)
 #24 = on High Bank
 Course on 6.5 V = +0° 48' H1 = 52'
 #25 = on High Land (Bld = Bridge over Creek between
 24 - 25)
 (River near Road Suppans)
 #26 = on Creek Bank (Creek from 25 #1 to
 26)
 Only Swamp #26

Course	Trig.	Length	Rise or Fall	Total distance	Height
		1466'	by Trig. not stadia.		57.4
26-27	N51°45'E	310'	V.A. = 0°4' I = 1.70	6.2 Higher than #26	65.6
27-28	S33°E	310'	V = -1°49' I = 3.10	F.98	55.8 River
28-29	S68°E	470'	V = -1°2' I = 5.50	F.99	55.7
29-30	N8°30'E	260'	V = -3°27' I = 2.60	F.15.6	55.4 River
30-31	N76°E	740'	V = -1°11' I = 7.40	F.15.3	55.7
31-32	S53°50'E	520'	F.0.8		54.9
32-33	S25°30'E	365'	F.0.3		54.4
33-34	S71°45'E	820'	V = +0°20' I = 8.20	R.4.8	59.2
34-35	N41°30'E	1400'	V = +0°12' I = 14.00	F.4.9	54.3
35-36	N70°40'E	500'	(407' I = 3.0 By Trig)	F.1.9	52.4
36-37	S65°E	1400'	F = 1.8		50.6
Quit for day @ 5:05 P.m. Getting too dark.					
37-38	N62°30'E	235'	level		50.6
38-39	S75°15'E	560'	R.0.2		50.8
39-40	S62°E		V = 2°14' I = 2.70	R.10.5	61.3
40-41	N53°56'E		V = 0°43' I = 7.20	F.9.0	52.3

5

Trig survey along creek on both sides

#27 = on high land T@ #27

(Ditch line goes from #26 to T@ #27 #1)

#28 = on ice = Creek bottom 800' wide

#29 = on Highland T@ #29 = Trig survey left #29

→ C. wire on 8.5 VA = -0°50' H.I. = 5.2

(Ditch line goes from #28 to T@ #29 #1)

#30 = on Bank of creek = large swamp

#31 = on ice T@ #31 = Large open swamp to R.

→ 900' to high land on left of #31 (ditch enters river)
(300' above #30 L)

#32 = on ice = 800' to High land on left.

#33 = on ice T@ #33 = 600' to high land on left

#34 = on Highland

#35 = on Bank of creek T@ #35 = Creek bottom 800' wide

#36 = on Creek Bank (C. wire on 8.5 VA = +0°15' H.I. = 5.2)

open meadow about 1200' across

#37 = on ice = T@ #37 = meadow about 1000' across

T@ #38 on ice.

#39 on ice near shore (Point 39 is near N+S section line)

T@ #40 on High Bank S. side River. River = 50' N. of #40

#41 on Cr. Bank - 2' Bank

T.	Object	Brg.	Dist.	R or F.	Elev.
60	59	N61°45'W.	610'	L.	46.3
60	61	S10°10'E.	1260'	L.	46.3
62	61	S52°45'W.	920'	F. 0.6	45.7
62	63	N72°30'E.	450'	L.	45.7
64	63	N47°W.	V. -0°31' I. 7.55'	R. 6.8	52.5
"	river	S24°E.	200'	6.9 lower than 64.	45.6
"	65	S50°15'E.	V. -0°40' I. 6.00'	F. 7.0	45.5
66	65	N88°45'W.	V. 0°08' I. 5.0'	F. 1.0	2130 = 44.5
66	67	S45°E.	415'	F. 2.5	42.0
68	67	N74°15'W.	680'	F. 3.2	38.8
68	69	S45°30'E.	470'	F. 1.6	37.2

460
520 69
200 74
72

60 on ice. middle of River. Snow mound.
 along River. 61 on ice at bend below Lawler Hill
 62 in ice 50' W. of R.R. Bridge. (along river)
 63 on ice. (Bridge openings = 12.6 wide
 " = 6.3 high.
 64 on Top of Road. (5 openings in river proper)
 • 260' E. of end of Bar and 140' E. of center of river.
 65 on ice.
 66 on ice water level = 1.0' lower than ice @ 66
 (rapids @ 66)
 67 on ice. rapids
 68 on ice.
 69 on ice. - entire fall = 44.1

Point	depth.		
69	2' w.	gravel	Rocky bottom
68	2' w.	"	"
67	2'	"	"
66	3' w.	"	"
65 1/2	3' "	"	Bottom halfway 65 to 66.
65	2'	Gravel + sand.	
64	4'		at Bridge
63	2'	gravel.	
62	2'	gravel @ R.R. Br.	
61	2'	gravel + Rocky.	
60	2'	gravel + sand.	
59	3'	gravel + sand.	
58	2'	gravel + sand.	
57	2 1/2'	gravel + sand.	
56	6' w.	1' muck.	gravel bottom.
55	4' w.	1' Muck.	Sand Bottom
54	2' w.	gravel bottom.	
53	6' w.	Boulder bottom @ Br.	
52	2' w.	gravel.	52-53 = average
51	2' w.	gravel.	
50	2 1/2' w.	gravel.	
49	2'	"	
48	2'	"	
47	3'	"	
47-200	8' w.	@ 15' down found hard bottom.	7' muck.
47-150'	5' w.	@ 7' hard bottom.	

about 1000 n. of 4-1.
 #1 = 7' w. - 19' no bottom getting stiff
 #2 = 5' w. - 18' no bottom - getting stiff 8

#45 = 3' w. - 1/2' mud @ 4' gravel bottom

Point #44 - 4' w. - @ 12' mud no bottom

#42 - 3' w. Mod + clay bottom some sand

#41 - 3' w. - Mod bottom.

#40 - 2' w. - Gravel bottom no current.

9 2'

33 R.W.
3 fence beam
30
8
22 Edited to sec. line
8
14
7

5 1/4 Sec. 28.

6" Oak S.W. 20.7'

Original W.P.B.T. stump N. 33.6'

1/4 Cor = 255' west of Loo Track.

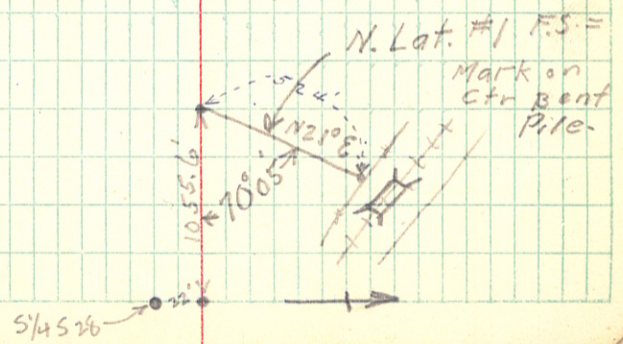
Bridge Lat. North #1.

0+00 = a point 1055.6' W. of $S\frac{1}{4}$ S28 and 22' N.

F.S. East on Parallel line + turn
angle of $70^{\circ}05'$ Lt. Mag. Brq = $N21^{\circ}E$. to
a ~~514~~ Blaze on Pile in middle
bent of 500 line Br.

This Lat = 524' long. ending @
500 R/W line.

of S. Line



Sand Lake Outlet

Branch

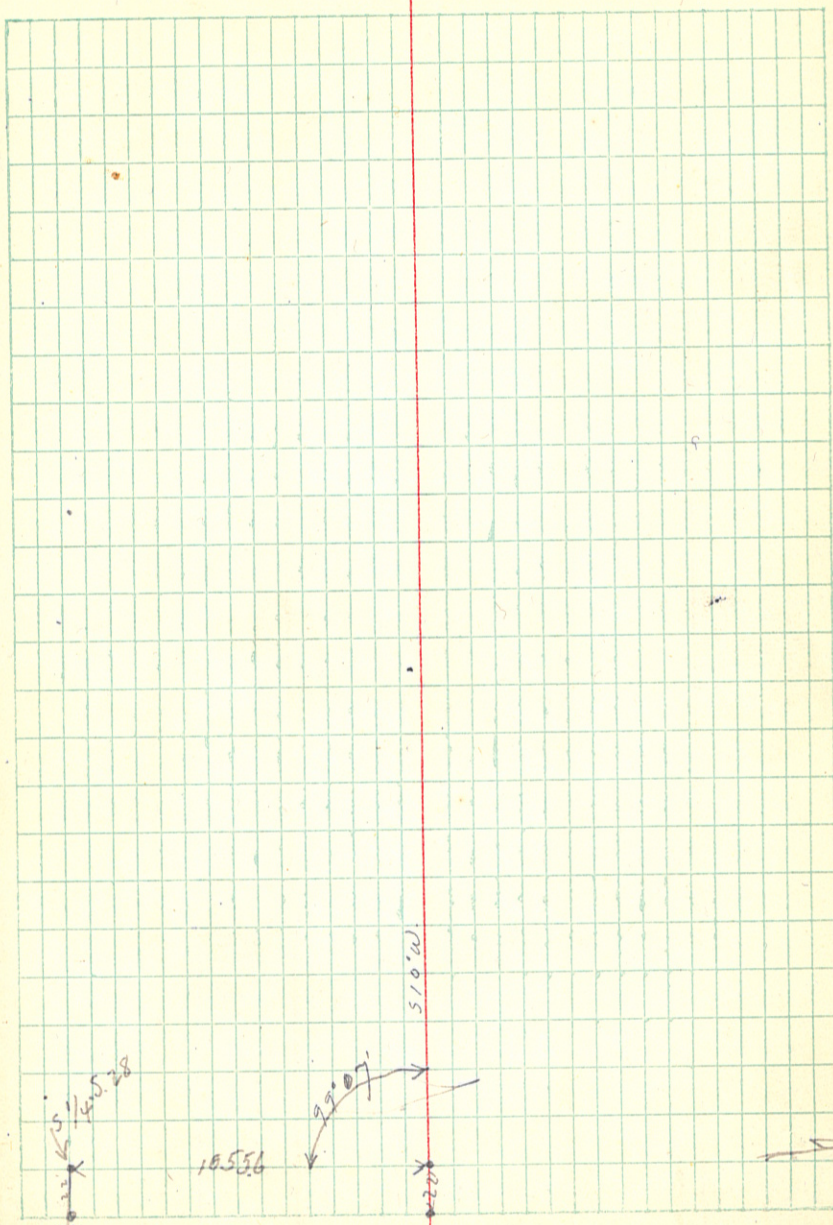
48+34 End. = ^{Big} Edge water Sand Lake

48+34
26
2234

26+00 $\Delta 63^{\circ} 28'$
 $\Delta 63^{\circ} 28'$ 553° E

0+00

S10°W. Van 8°30'



Triangulation

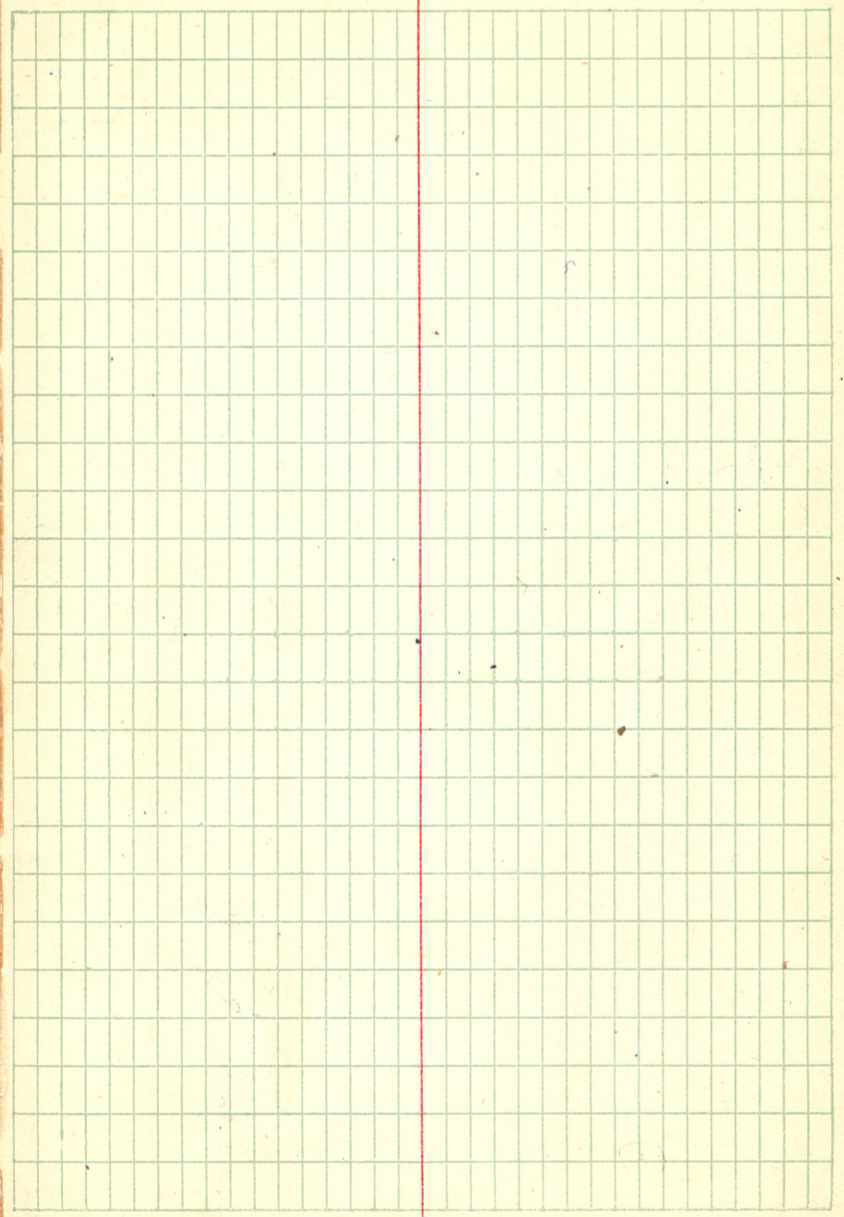
Inst at.	Printings From	To.	Angle.	
sta. 20. Sand L. Br.	0+00	Δ5	113°36'L	✓✓
sta. 26 Sand L. Br.	0+00	Flag 22' N. of SW Cor S 28.	36°09'L	✓
sta. 15 Sand L. Br.	0+00	Δ6	17°41'R.	✓
"	"	Flag 22' N. SW Cor S 28	54°11'L.	✓
"	"	Δ5	135°01'L.	✓
0+00 main Aitch. f.	SW Cor S 28 (22' N)	S 1/4 S 29 (22' N)	0°03'R.	✓
"	"	Δ5	60°30'L.	✓ ←
"	"	Δ6	168°22'L.	✓
22' N. of SW Cor S 28	Point 22' N. S 1/4 S 29	Point 22' E + 22' N of SW Cor S 29.	0°59'R.	✓
"	0+00 M.D.	Δ6	2°30'R.	✓
"	Point 22' N S 1/4 S 29	Crooked S 1/4 S 29.	4°28'R.	✓
sta 33 on M.D.	Point 22' N. S 1/4 S 29	"	11°55'R.	✓
"	"	Δ2	37°53'R.	✓
"	SW Cor S 28 (22' N)	Δ2	142°06'L.	✓
"	22' N. of S 1/4 S 29	Δ3	32°58'L	✓
"	Δ2	Δ3	70°51'L.	✓
"	Δ2	Δ4	91°29'L.	✓
"	Δ3	Δ4	20°39'L.	✓
"	Δ4	Δ6	125°02'L.	✓
"	Δ6	SW Cor S 28 (22' N)	1°23'L.	✓
"	SW Cor S 28	Δ4	126°25'R.	✓
"	"	S 1/4 S 28	0°04'L.	✓
"	Δ6	Δ2	143°30'L.	✓
"	sta. 41	sta. 48.95	24°59'L.	✓

126 25
125 11
123

36°09'

32°58'
37°53'
69 111
70°51'

12



+80 End. 2 legs **Main Ditch H.**

84
83 H.L. 150' L.

84 x 180
18 x 150
6

18 x 20
15 x 20
27.61

79
78+50 Δ 6° 10' L. H.L. = 100' L.

75+89± Δ 42° 20' R. Creek to Moon L

75 x 89.4
48 x 95.5
2693.9

48+95± Δ 33° 37 1/2' L. 57° W Var 8° 30'

41+00 Δ 50° 02' L.

41 x 00
17 x 19
27.81

17+19 Δ 0° 06' R. Point 22' N. of SW Cor 328

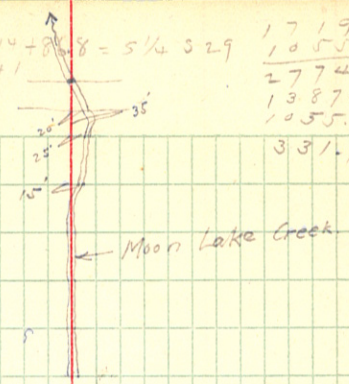
3+31-7 Set w/16 Cor. on Dec. line -

0+00 n 88° 45' W. Var 8° 30'

179 60 44+80.8 = 5 1/4 329
129 55 41
50 02

1719
1055.6
2774.6
1387.3
1055.6
3311.7

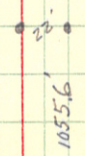
13



H.L. 50' L.

5/4 5.29 = 386.8 cu. of Δ 41 on Back Tang
Produce

88° 45'
- 06'
88° 39'



5/4 528 →

W 1/4 Cor

Dec 33

Plater

Aspen 6 S 72 E 13 links

Spur 6 N 28 W 11

6.6

7.3

Typical Area: add
 $\frac{1}{2}$ Top and base distance
 and multiply by Cut.

Ex.

24' Top - 4' base. 10' cut.

$$\left(\begin{array}{l} 24' + 4' = 28' \div 2 = 14' \text{ average} \\ 14' \times 10' = 140' = \text{Area} \end{array} \right)$$

Take average End Area
 and multiply by distance
 in feet and divide by
 27 Cu ft. to get Cu. yds.

$$\begin{array}{r} 80000 \\ 23 \\ \hline 240000 \\ 160000 \\ \hline 1840000 \end{array}$$

FILE NO.

Field book
 #85

Levels on Main Ditch, Tils Location, G.T.
 Big Sand Lake T. Seal M.W.

LEFAX PILING INDEX

0	+5	T	-5	rod-	Elev	Remarks
B.M.	3.50	94.58			91.08	Sp. 6' Ash - 20' L Sta. - 46+50
48+34				5.07	89.51	loc Sand Lake
45+30				3.8	90.8	
44+10				3.8	90.6	
45				4.8	89.8	
42				4.4	90.2	
T.P.	4.10	95.87	2.81		91.77	on top sta 42
38				4.7	91.2	
34				4.4	91.5	
T.P.	5.14	96.86	4.15		91.72	on top sta. 34
30				4.8	92.1	
26				4.5	92.4	
T.P.	5.29	97.80	4.35		92.51	on top sta - 26
20				4.8	93.0	
15				4.7	93.1	
T.P.	4.90	98.38	4.32		93.48	on top sta 15
10				4.7	93.7	
5				4.6	93.8	
T.P.	4.83	98.92	4.29		94.09	on top sta. - 5
0+00				4.8	94.1	
5+24.0				3.8	95.1	Lat #1 to R.W. See Line
B.M.				3.20	95.72	on Fence Post on See Line - R-W
0+00				4.8	94.1	
4				4.9	94.0	
T.P.	4.34	98.60	4.66		94.26	on top sta - 4
8				4.7	93.9	
12				4.8	93.8	
T.P.	4.56	98.36	4.80		93.80	on top sta - 12

Levels on MAIN Ditch Tils Location

92
92
13

LEFAX FILING INDEX

①	+S	T	-S	Rod	Flv.	
		98.36				
16				4.7	93.7	
20				4.6	93.8	
T.P.	4.40	98.19	4.57		93.79	ON AX STA-20
24				4.8	93.4	
28				5.0	93.2	
T.P.	4.41	97.64	4.96		93.23	ON AX STA-28
B.M.				2.80	94.84	200' R. STA-30 - 4" Pop.
32				4.5	93.1	
36				4.8	92.8	
T.P.	1.80	96.93	2.51		95.13	Top of Stake
40				4.3	92.6	
41				4.6	92.3	
45				4.8	92.1	
T.P.	3.88	96.46	4.35		92.58	ON ROCK
B.M.				3.35	93.11	ON ROCK - 40' R. STA-47
49				4.7	91.8	
53				4.9	91.6	
T.P.	4.40	96.16	4.70		91.76	ON AX - STA. 53
57				4.7	91.5	
61				5.3	90.9	
T.P.	4.25	95.33	5.08		91.08	ON AX - STA-61
65				4.8	90.5	
69				5.2	90.1	
T.P.	4.15	94.35	5.13		90.20	ON AX - STA. 69
73				5.5	88.9	
75				6.2	88.2	
+75				5.8	88.6	

LEVELS ON MAIN DITCH /s Location

LEFAX FILING INDEX

①	+S	π	-S	Rod	Elv.	
+80		99.35				
+80				4.1	90.3	
+89.9				4.1	90.3	
T.P.	2.50	91.45	580		88.95	ON AX-STA-75+89.9
77				3.7	87.8	
78				4.2	87.3	
79				4.8	86.7	
81				6.3	85.2	
82				7.0	84.5	
+30				6.7	84.8	
83				7.3	84.2	
84				7.7	83.8	
84+80				8.1	82.4	
B.M.				3.16	88.29	On Tam. - 30' R Sta. 78 - Nail

Great Lake

Extension-Tils Location

LEFAX FILING INDEX

①	+ S	π	- S	Rod	Flv.	
B.M.	373	96.84			93.11	on Rock 40' R. STA-47
0400				5.0	91.8	
4				4.7	91.9	
10				4.5	92.3	
T.P.	2.35	96.78	241		94.43	on old stake
14				4.6	92.2	
18				4.9	92.4	
T.P.	2.06	97.24	1.60		95.18	on old stake
22				4.5	92.7	
26				4.4	92.8	
T.P.	3.80	97.35	3.69		93.55	on old stake
30+388				4.3	93.0	
B.M.				3.20	94.1	Nail-4" Tam-60'L-S.W. Cor. D. 29
34				4.4	92.9	
T.P.	1.95	97.52	1.78		95.57	on snag
38				4.5	93.0	
42				4.5	93.0	
T.P.	4.66	97.88	4.30		93.22	on old stake - 42
46				4.7	93.2	
48+60.0				4.3	93.6	
T.P.	3.20	98.01	3.07		94.81	on snag
52				4.5	93.5	
54+40				4.6	93.4	
59				2.2	95.8	
T.P.	10.60	106.41	2.20		95.8	
59+50				9.6	96.8	
60				10.8	95.6	
61				10.7	95.7	

Green Lake - Extention

Tils Location

102 88
426
10814

LEFAX FILING INDEX

0	+s	T	-s	Prod	Elv	
		106.41				
61+50				9.9	96.5	
+80				6.1	100.3	
+85				5.0	101.4	
62				4.7	101.7	
B.M.	353	105.73		4.21	102.20	62+25-Nail Burnt Stub-25' R
63	353			4.7	101.0	
67				5.8	99.9	
T.P.	7.34	109.07	4.00		101.73	on stub
71				4.7	104.4	
+30				4.1	105.0	
+50				4.8	104.3	
72				5.0	104.0	
75				5.4	103.7	
T.P.	4.26	108.14	5.19		103.88	on AX - sta 75
79				4.3	103.8	
+20				5.1	103.0	price
				5.14	103.00	on Green Lake
T.P.	3.04	107.65	3.53		104.61	on Rock
T.P.	7.60	107.91	7.34		100.31	on AX.
				8.8	99.1	Elv - Middle of Bag.
B.M.				6.03	101.88	on Tel. Pole
STA 66				9.6	98.3	End of Lateral #2
62				7.1	100.8	
T.P.	2.60	102.56	7.95		99.94	on snag
61				2.1	100.5	
59				4.1	98.5	
56				4.7	97.9	

Lateral # 2

Tils Location

LEFAX FILING INDEX

0	+3	T	-5	Rod	Elv.
		102.56			
57				5.0	96.6
50+58.5				5.1	96.5
T.P.	242	100.75	4.23	5.6	98.33 on old str
48+50				6.1	95.1
46				6.5	94.6
44				6.5	94.2
43+116				6.3	94.4
43				5.7	95.0
42+75				4.3	96.4
41+116					
T.P.	5.09	101.94	3.90	8.3	96.85
40+25				8.9	93.6
38+81.5				8.6	93.0 Bot old dirt
37+38					93.3
T.P.	3.90	98.00	7.84		94.10 on Rock
33				4.7	93.3
28				4.4	93.6
T.P.	4.29	97.96	4.33		93.67 on Ax-stn-28
24				4.6	93.3
20				4.2	93.7
T.P.	3.94	97.90	4.00		93.96 on Ax-stn-20
16				4.5	93.4
12				4.6	93.3
T.P.	4.00	97.48	4.42		93.4 on Ax-stn-12
8				4.6	92.9
4				5.0	92.5
T.P.	4.23	97.02	4.69		92.7 on Ax

Lateral #2

Tils Location

LEFAX FILING INDEX

0	+5	T	-5	Rod EIV.	
		9702			
1.782.				4.3	92.7
0+00				4.7	92.3
B.M.			3.83	93.19	= 93.11 = .08 incl.

Levels by C.J.D.

~~93.19~~
93.1

0	+5	π	-5	Rod	Elv.
BC.	242+888	=	0°00'		
	243	=	1°21'	PI.	243+67.8
	+25	=	4°06'	A	33°59'
	+50	=	8°51'	D	22°
	+75	=	9°36'	T	80°
	244	=	12°21'	R	262.0
	+25	=	15°06'	Lg	154.5
	+483	=	17°00'		

Course	Brg	Length	Latitude + N - S	E Dep. + -	W?	Total Lat.	Total Dep.
0-1	S 84° E	440'	45.99	437.59		- 45.99	+ 437.59
1-2	S 56° 30' E	1160'	640.20	967.32		- 686.19	+ 1404.91
2-3	S 3° 15' E	660'	658.94	37.42		- 1345.13	+ 1442.33
3-4	S 27° 30' W	415'	368.11		191.62	- 1713.24	+ 1250.71
4-5	S 55° 45' W	205'	115.37		169.45	- 1828.61	+ 1081.26
5-6	S 10° 15' E	540'	531.52	95.32		- 2360.13	+ 1176.58
6-7	S 15° 45' W	710'	683.34		192.72	- 3043.47	+ 983.86
7-8	S 5° E	410'	408.44	35.73		- 3451.91	+ 1019.59
8-9	S 27° 45' W	445'	393.82		207.20	- 3845.73	+ 812.39
9-10	S 41° 20' E +	685'	514.35	452.39		- 4360.88	+ 1264.78
10-11	N 70° 45' E +	980'	323.10	925.21		- 4036.98	+ 2189.99
11-12	S 57° 45' E +	2680'	1430.06	2266.60		- 5467.04	+ 4456.59
12-13	S 63° 45' E +	1450'	641.33	1300.49		- 6108.37	+ 5757.08
13-14	S 40° E +	640'	490.27	411.38		- 6598.64	+ 6168.46
14-15	S 81° 30' E +	1040'	153.71	1028.56		- 6752.35	+ 7197.02
15-16	S 79° E +	880'	167.91	863.83		- 6920.26	+ 8060.85
16-17	S 65° 45' E +	1200'	492.84	1094.15		- 7413.10	+ 9155.00
17-18	S 56° 45' E +	770'	422.19	643.94		- 7835.29	+ 9798.94
18-19	S 75° 15' E +	1550'	394.63	1498.87		- 8229.92	+ 11297.81
19-#1	S 7° 30' W -	225'	223.07		29.37	- 8452.99	+ 511268.44
19-20	S 46° 30' E +	1320	408.67	957.52		- 9138.59	+ 12255.33
20-21	S 75° 30' E +	1168'	292.46	1130.74		- 9431.05	+ 13386.07
21-#1	S 29° 15' W -	530'	462.42		258.97	- 9893.47	+ 513127.10
21-22	S 42° E +	570'	423.59	381.41		- 9854.64	+ 13767.48
22-23	S 53° 15' E +	620'	370.91	496.77		- 10225.60	+ 14264.25
23-#1	S 8° W -	330'	326.7		45.93	- 10552.39	+ 514218.32
23-24	S 24° 30' E +	910'	828.05	377.37		- 11053.66	+ 14641.62
24-25	S 81° E +	1560'	244.01	1540.80		- 11297.66	+ 16182.42
25-#1	N 86° W -	1000	69.80		997.6	- 11227.86	+ 15184.82
25-26	S 59° 45' E +	1000	503.80	863.80		- 11801.46	+ 17046.22
26-27	N 51° 45' E +	1466'	907.59	1151.26		- 10893.87	+ 18197.48
27-#1	S 33° E +	310'	259.9	168.83		- 11153.85	+ 18366.31
27-28	S 60° 45' E +	550	268.74	479.87		- 11162.61	+ 18677.35
28-29	S 68° E +	470'	176.06	435.77		- 11338.67	+ 19113.12
29-#1	N 8° 30' E +	260'	257.14	38.43		- 11081.53	+ 19151.55
29-30	N 76° E +	740'	179.02	718.02		- 11159.65	+ 19831.14
30-31	S 9° E +	430	424.11	67.26		- 11584.36	+ 19898.40
31-32	S 53° 50' E +	520'	306.37	419.79		- 11891.23	+ 20318.19
32-33	S 25° 30' E +	365	329.44	157.13		- 12220.67	+ 20475.32
33-34	S 71° 45' E +	820	256.19	778.75		- 12477.46	+ 21254.07
34-35	N 41° 30' E +	1400	1048.58	927.65		- 11428.88	+ 22181.72
35-36	N 70° 40' E +	1500	496.63	1415.40		- 10932.25	+ 23597.12
36-37	S 65° E +	1400	591.25	1268.82		- 11523.90	+ 24865.94
37-38	N 62° 30' E +	235	108.51	208.44		- 11415.39	+ 25074.38
38-39	S 75° 15' E +	560	142.58	541.54		- 11557.97	+ 25615.92
39-40	S 62° E +	270	126.15	238.40		- 11684.72	+ 25854.32
40-41	N 53° 50' E +	720	424.90	581.26		- 11259.82	+ 26435.58
41-42	N 32° E +	420'	356.18	222.56		- 10903.64	+ 26658.14
42-43	N 87° 45' E +	600	23.56	599.54		- 10880.08	+ 27257.68
43-44	S 36° 10' W -	490'	395.58		289.16	- 11275.66	+ 26968.52

	Brg.	Length	Latitude		Depth		Total Lat	Total Dep.
			N+	S	E	W		
44-45	S 41° 15' E	675'		507.48	445.06		- 11275.66	+ 26968.52
45-46	S 50° 45' E	160'		101.23	123.90		- 11783.14	+ 27413.58
46-#1	N 37° 45' E	240'	189.77		146.93		- 11694.60	+ 27684.41 ✓
46-#2	N 30° E	590'	510.95		295.00		- 11373.42	+ 27832.48 ✓
46-#3	N 73° E	680'	198.81		650.28		- 11685.56	+ 28187.76 ✓
46-#4	S 59° 30' E	1000		507.50	861.60		- 12391.87	+ 28399.08 ✓
46-#5	S 44° 45' E	1000		710.20	704.00		- 12594.57	+ 28241.48 ✓
46-#6	S 15° E	960'		927.29	248.47		- 12811.66	+ 27785.95 ✓
46-47	S 15° 45' E	1240'		1193.49	336.55		- 13077.86	+ 27874.03
47-48	S 88° E	515'		17.97	514.68		- 13095.83	+ 28388.71
48-49	N 59° E	380'	195.71		325.72		- 12900.12	+ 28714.43
49-50	S 62° 15' E	570'		265.40	504.44		- 13165.52	+ 29218.87
50-51	N 82° 45' E	810'	102.22		803.52		- 13063.30	+ 30022.39
51-52	S 57 E	460'		250.54	385.79		- 13313.84	+ 30408.18
52-53	N 89° 10' E	1860'	27.01		1859.81		- 13286.83	+ 32267.99
53-54	S 89° 45' E	1180'		5.19	1179.99		- 13292.02	+ 33447.98
54-55	S 47° 15' E	880'		597.34	646.21		- 13889.36	+ 34094.19
55-56	S 64 E	830'		363.85	746.00		- 14253.21	+ 34840.19
56-#1	S 77° E	1180'		265.50	1149.79		- 14518.71	+ 35989.98 ✓
56-57	S 73 E	2060		602.24	1969.98		- 14855.45	+ 36810.17
57-58	S 84° 45' E	1130'		103.39	1125.25		- 14958.84	+ 37935.42
58-59	S 46° 45' E	1600		1096.31	1165.42		- 16055.15	+ 39100.84
59-60	S 61° 45' E	610'		288.72	537.33		- 16343.87	+ 39638.17
60-61	S 10° 10' E	1260'		1240.22	222.39		- 17584.09	+ 39860.56
61-62	N 52° 45' E	920'	556.86		732.32		- 17027.23	+ 40592.88
62-63	N 72° 30' E	450'	135.31		429.18		- 16891.92	+ 41022.06
63-64	S 47 E	755		514.91	552.17		- 17406.83	+ 41574.23
64-#1	S 24 E	200		182.71	181.35		- 17589.54	+ 41655.58 ✓
64-65	S 50° 15' E	600		383.66	461.31		- 17790.49	+ 42035.54
65-66	S 88° 45' E	2130'		46.43	2129.47		- 17836.92	+ 44165.01
66-67	S 45 E	415		293.44	293.44		- 18130.36	+ 44458.45
67-68	S 74° 15' E	680'		194.57	654.46		- 18314.93	+ 45112.91
68-69	S 45° 30' E	470'		329.42	335.23		- 18644.35	+ 45448.14
Totals			6111.65	27394.99	50842.97	2382.02		
Less For Side Shots.			1226.47	3865.46	4344.68	1331.87		
Net Total Traverse			4885.18	23529.53	46498.29	1050.15		

Range of Lat = -18,644.35 ft. = 3.53 miles.
 Range of Dep. = +45,448.14 ft. = 8.6 miles
 3.53 miles
 52.6 inches.

Green Lake Lat.

71 0 P.O.T.

68

64

62+00 0 P.O.T.

54+40 $\Delta 40^{\circ}55' L.$ $n 22^{\circ}30' w.$

54+40
148+60

5 80

48+60 $\Delta 17^{\circ}05' R.$ $n 18^{\circ}30' E.$

48+60
30+38.8

18 21.2

30+38.8
6+25.1

24+13.7

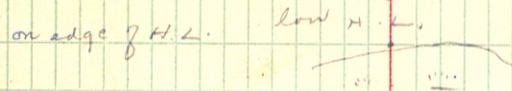
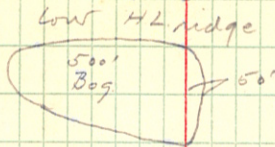
$n 1^{\circ}30' E$ $Var 8\frac{1}{2}^{\circ} E$

30+38.8 $\Delta 88^{\circ}43' R.$ (sw Cor S. 29) a point 22' E + 22' N of corner.

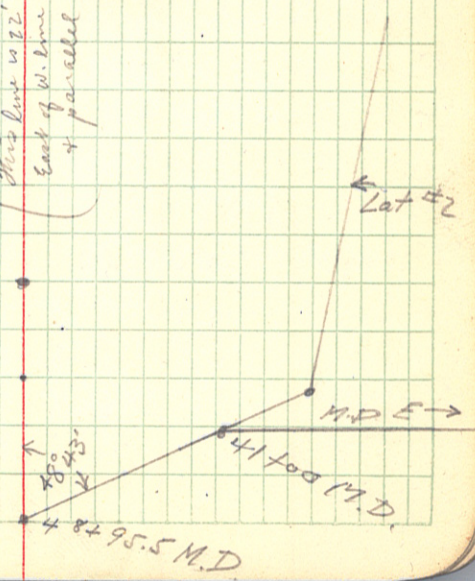
20+00 P.O.T.

6+25.1 $\Delta 79^{\circ}12' L.$ = a point 22' N of Sec. line + 220' west of S $\frac{1}{4}$ S29

0+00



(This line is 22' East of W. line of S29 + parallel to it.)



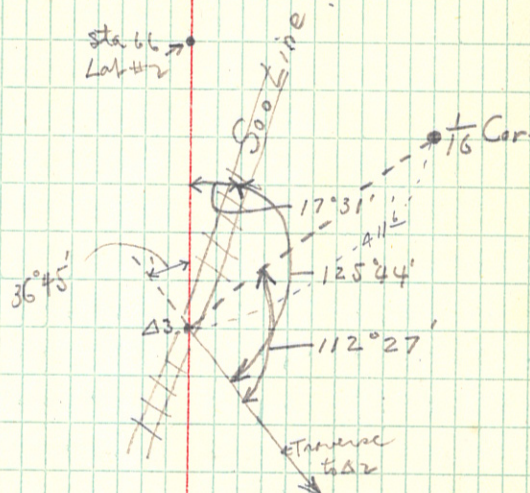
Check Traverse

Course Length \angle

$\Delta 4$	250.5	= Sta 66 on Lat #2
$\Delta 3$	1124.3	$36^{\circ}45'R$ \rightarrow down last Tang on lat #2 ### +### ?
$\Delta 2$	456'	$12^{\circ}16'L$ = n° Cor. 529.47 @ 8.30
$\Delta 1$	678'	$50^{\circ}12'R$
\Rightarrow	79+20	$60^{\circ}37'R$
\downarrow	79+20	End. Edge of Green Lake
	11+60	Enter Lake Meadow

7920
5440
2480

To Connect end of y.l. lar with end of Lar #2.

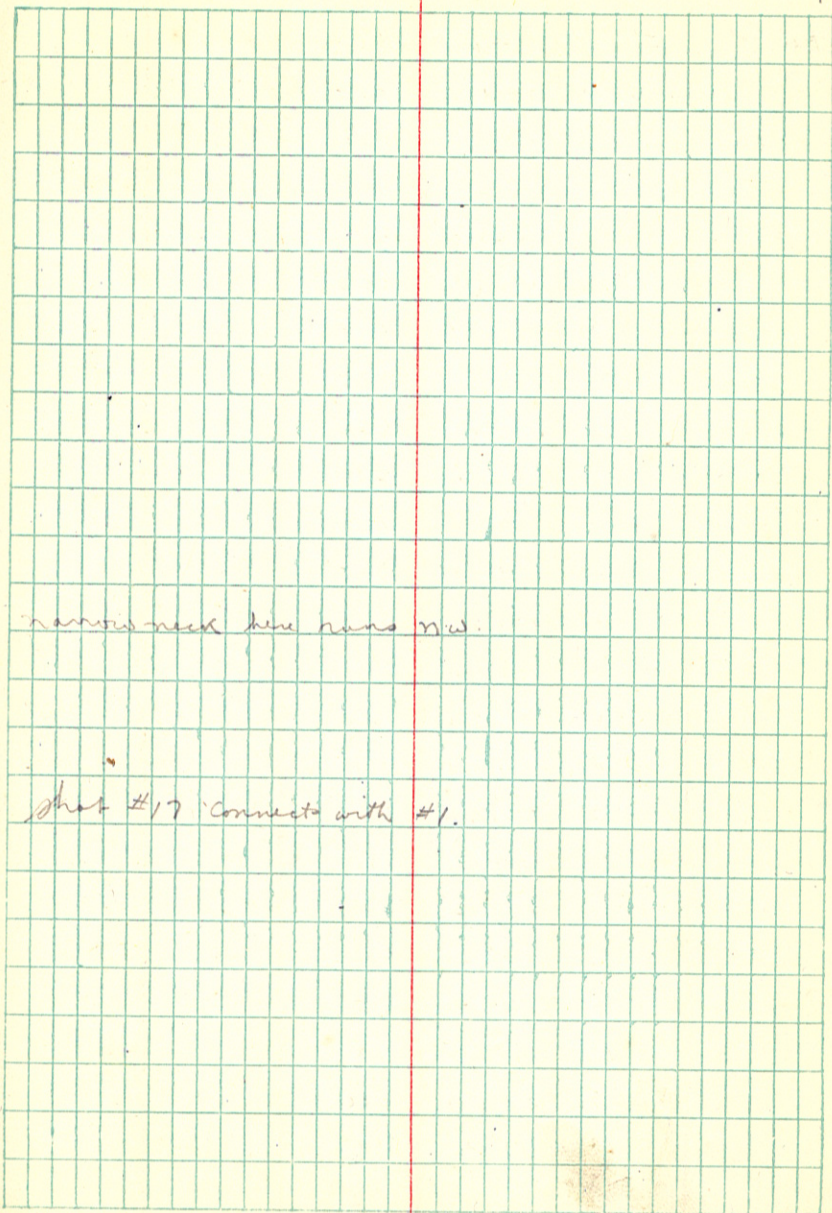


= a point on the Soo Track in line with last Tang of Lar #2. produced.

Stadia Traverse of

Area E. of Track on Upper end,

A	Object.	Brg.	Dist.
□-56	E.S. 1	S71°30'E.	500'
"	" 2	N89°E.	450'
"	" 3	N70¼E.	520'
"	" 4	N60½E.	660'
"	" 5	N46½E.	770'
"	" 6	N40½E.	660'
"	" 7	N35½E.	510'
"	" 8	N26E.	380'
"	" 9	N10E.	260'
"	" 10	N9½W.	335'
"	" 11	N33½W.	290'
"	" 12	N55½W.	340'
"	" 13	N77W.	360'
"	" 14	S80W.	360'
"	" 15	S60½W.	320'
"	" 16	S53W.	250'
"	" 17	S26½W.	125'
64 Lot #2	E.S. #1	S77E.	230'
"	" #2	N55E.	260'
"	" #3	N35E.	395'
"	" 4	N24E.	550'
"	" 5	N9½E.	685'
"	" 6	N4½W.	650'
"	" 7	N20½W.	660'
"	" 8	N37½W.	660'



π	Object	Brg	DIST
64 ^{Let} _{#2}	ES. 9	n54w.	650'
"	" 10	n59°w	525'
"	" 11	S23 $\frac{1}{4}$ E.	160'
Traverse #1 West of Track. \rightarrow			
□ 1	Δ 3 on Track Check Traverse	n78 $\frac{1}{4}$ E.	510'
"	ES. 1	n0 $\frac{1}{2}$ W	450'
"	" 2	n23 $\frac{1}{2}$ W	325'
"	" 3	n50W	465'
"	" 4	n68W	470'
"	" 5	W	700
"	" 6	S74 $\frac{3}{4}$ W	735'
"	Sec Cor.	S74 $\frac{10}{10}$ W	610'
"	ES 7	S53W	615'
"	" 8	S44 $\frac{1}{2}$ W	715'
"	" 9	S31 $\frac{1}{2}$ W	730
"	" 10	S24 $\frac{3}{4}$ W	920
"	" 11	S9W	965
"	" 12	S4 $\frac{3}{4}$ E	785
"	" 13	S16E	530
"	" 14	S44 $\frac{1}{2}$ E	470'
"	" 15	S59 $\frac{1}{2}$ E	540'
"	" 16	S70 $\frac{1}{2}$ E	740
"	" 17	S75 $\frac{1}{4}$ E	790

Edge R/d. N. edge of swamp

S. edge of swamp on E. R/W line.

W side R/d. on N Edge Swamp

R/W on S side of swamp

Green Lake Traverse.

& surrounding swamp.

21

T	O	Brg.	Dist.
□ 1	Δ check Traverse	578 ³ / ₄ E.	650' ✓
"	ES 1	586 ³ / ₄ E	540
"	" 2	788 ¹ / ₂ E	335'
✓	E.L. 1	786 ³ / ₄ E	265
"	" 2	766 E	285
✓	ES 3	770 ³ / ₄ E	410'
✓	" 4	757 E	465
✓	" 5	743 E	460
"	E.L. 3	739 ¹ / ₂ E	345'
✓	" 4	724 ¹ / ₂ E	400
"	ES 6	722 ¹ / ₂ E	510
✓	" 7	75 E	590
"	E.L. 5	72 ¹ / ₂ E	520
✓	E.L. 6	76 W	590
"	E.S. 8	76 W	700
✓	" 9	712 ¹ / ₂ W	800
"	E.L. 7	715 W	780
✓	" 8	717 W	940
"	" 9	722 W	1080
✓	" 10	726 ¹ / ₂ W	1200
"	ES 10	727 ³ / ₄ W	1380
✓	" 11	732 W	1450
✓	E.L. 11	733 ¹ / ₂ W	1270
✓	" 12	738 W	1260
"	ES 12	738 ¹ / ₄ W	1620

Δ edge of swamp.

□ in Green Lake

		G.L.	
π	\odot	Brg	Dist
□1	ES 13	n43W	1600
"	" 14	n45W	1460
"	" 15	n49½W	1430
"	EL 13	n46W	1160
"	" 14	n50½W	1080
"	ES 16	n59W	1160
"	" 17	n65W	1140
"	" 18	n70¾W	1100
"	" 19	n72W	940
"	EL 15	n65½W	795
"	" 16	n68½W	725
"	" 17	n77W	715
"	ES 20	n79W	810
"	" 21	n88¼W	865
"	" 22	S82¾W	900
"	EL 18	S85W	725
"	□2	S73W	725
□3	□2	n79½E	1200
"	ES. 1	n2¼W	1180
"	" 2	n5½W	940
"	" 3	n15¾W	1080
"	" 4	n18¾W	780
"	" 5	n23½W	670
"	" 6	n33½W	590
"	" 7	n47W	520

540 590

1180

470

500

470

900

500

1100

8480

4834

524

13838

22

□2 on edge Lake

□3 on top high hill just S. of meadow.

T	E.L.		Traverse	
	O	Brg	Dist.	V.A.
□3	E.S. 8	n59 $\frac{1}{2}$ w	610'	
"	" 9	n69w	630	
"	" 10	n68 $\frac{1}{2}$ w	530'	
"	" 11	n78 $\frac{1}{4}$ w	415'	
"	" 12	S88w	460'	
"	" 13	S88 $\frac{1}{4}$ w	630'	
"	" 14	S82 $\frac{3}{4}$ w	740'	
"	" 15	S75w	830'	
"	" 16	S64w	900'	
"	" 17	S53 $\frac{3}{4}$ w	880'	
"	" 18	S46 $\frac{1}{2}$ w	860'	
"	" 19	S39 $\frac{1}{4}$ w	740'	
"	" 20	S32w	690'	
"	" 21	S24w	630'	
"	" 22	S14 $\frac{3}{4}$ w	590'	
"	" 23	S6w	570'	
"	" 24	S	470 570	
"	" 25	S10 $\frac{1}{2}$ w	470'	
"	" 26	S26 $\frac{1}{2}$ w	400'	
"	" 27	S25 $\frac{1}{4}$ w	300'	
"	" 28	S40w	280'	-4°43'
"	" 29	S66w	235'	-5°00'
"	" 30	n89 $\frac{1}{4}$ w	215'	-5°27'
"	" 31	n54w	170'	-7°54'
"	" 32	n9 $\frac{1}{2}$ w	230'	-5°32'

485
970

G.I. *Tromsø*

π	\odot	Brg	Dist	V.A.
□ 3	□ 4	n 9 E.	240	-5°19'
□ 5	□ 4	550 ³ / ₄ W	640	
"	E.S. 1	545W	540	
"	" 2	537W	470	
"	" 3	522 ¹ / ₂ W	400	
"	" 4	51 ³ / ₄ E.	450	
"	" 5	514 ¹ / ₄ E	490	
"	" 6	526 ¹ / ₂ E	450	
"	" 7	545 ³ / ₄ E	430	
"	" 8	549 ¹ / ₄ E	545	
"	" 9	546 ¹ / ₂ E	710	
"	" 10	546 E	900	
"	" 11	546 ¹ / ₂ E	1070	
"	" 12	552 E	1100	
"	" 13	558 E	1080	
"	" 14	568 ¹ / ₄ E	1070	
"	" 15	577 E	1020	
"	" 16	584 ¹ / ₄ E	1060	
"	" 17	n 87 ³ / ₄ E	1040	
"	" 18	n 83 E	1000	
"	" 19	n 86 ³ / ₄ E	780	
"	" 20	n 79 ¹ / ₂ E	710	
"	" 21	n 70 ¹ / ₂ E	700	
"	" 22	n 64 ¹ / ₂ E	830	
"	" 23	n 61 ¹ / ₄ E	970	

□ 5 on small island 100' diameter.

565
1130

G.L. Traverse

⌈ ○ Bg Dist V.9.

□5	ES 24	756E	1130
"	EL 1	734 ³ / ₄ W	665
"	" 2	739W	575
"	" 3	752 ¹ / ₂ W	450
"	" 4	770W	400
"	" 5	W	385
"	" 6	579W	375
"	" 7	569W	300
"	" 8	565 ³ / ₄ W	210
"	" 9	788 ¹ / ₄ W	125
"	" 10	740W	110
"	" 11	77 ¹ / ₂ E	90'
"	" 12	771 ¹ / ₂ E	95'
"	" 13	562 ¹ / ₂ E	180'
"	" 14	580 ¹ / ₂ E	275'
"	" 15	785E	425
"	" 16	779 ¹ / ₂ E	525
"	" 17	766 ¹ / ₄ E	620
"	" 18	750E	730

ES. 24 = Point of Beg. = Δ1 Check Traverse.
EL 1 connects with □2

Point 16 = Sta. 79+20 = end of G.L. Lab.

Connects with E.L. 1 from □1

North Shore Traverse			
Δ	\circ	Bog	Dist
$\square 1$	$\square 0 = 629E$	$n61\frac{1}{2}W$	750'
"	E.S. 1	$n51\frac{1}{2}W$	630'
"	" 2	$n43W$	570'
"	" 3	$n38W$	480
"	" 4	$n40W$	390
"	" 5	$n52W$	280
"	" 6	$n71W$	190
"	" 7	$S70W$	150
"	" 8	$S44W$	190
"	" 9	$S30W$	270
"	" 10	$S22W$	440
"	" 11	$S11W$	580
"	$\Delta 1$	S.	540'
$\square 2$	$\Delta 1$	$n69\frac{1}{4}W$	500'
"	E.S. 1	$n72W$	350'
"	" 2	$n77\frac{1}{2}W$	230
"	" 3	$n89\frac{1}{2}W$	135
"	" 4	$S36W$	90
"	" 5	$S14E$	110
"	" 6	$S52E$	200
"	" 7	$S35E$	300
"	" 8	$S33\frac{1}{2}E$	410
"	$\square 3$	$S32\frac{1}{4}E$	580
$\Delta 2$	$\square 3$	$S31\frac{1}{4}W$	240'
"	E.S. 1	$S2\frac{1}{2}W$	190

$\square 1$ on high hill. 62 on edge of swamp.

~~E.S. 10~~ $\Delta 1$ Triangulation Sta.

Narrow meadow runs $n.30^\circ E.$ from E.S. 3. about 400' opening up from
50' wide to 150' at end

meadow 100' wide runs from this point $n.30^\circ E.$ to Big lateral Bog

$\square 3$ on edge of swamp.

$\Delta 2 =$ Triangulation Sta. $\Delta 2$

Δ	○	Brg	Dist
$\Delta 2$	E.S. 2	527½ E	200
"	" 3	527 E	350
"	" 4	534 E	490
"	" 5	531 E	630
"	" 6	525 E	750
"	" 7	517½ E	890
"	→ □ 4	515° 00' E	1000
(22m) 5/4 Sec 29	□ 4	745° W	1240'
"	→ E.S. 1	741½ W	1140
"	" 2	739¾ W	1000
"	" 3	735 W	860
"	" 4	734½ W	710
"	" 5	731 W	570
"	" 6	720½ W	400
"	" 7	720¼ W	245
"	" 8	511 W	140
"	" 9	53 E	225
"	" 10	521 E	240
"	" 11	540 E	230
"	" 12	555½ E	230
"	" 13	787 E	250

□ + in E.S.

5/4 is an edge of Swamp Point 7 connects with 1/4 Cor.
 (22m) 1/4 Cor connects with point 8

30
30+388
5012
520

West shore Traverse

π	\odot	Brg	Dist
$\square 1$	$\square 0 = 629$	$718 \frac{3}{4} E.$	425
"	E.S. 1	$75 \frac{3}{4} E.$	280
"	E.S. 2 = W/4 Cm 529	$564 \frac{3}{4} E.$	260'
"	E.S. 3	557 E	370
"	$\square 2$	538 E	380
$\square 3$	$\square 2$	$725 E.$	500'
"	E.S. 1.	"	260'
"	" 2	586 E	120'
"	" 3	553 W	235'
"	" 4	532 W	645'
"	" 5	522 W	700'
"	" 6	514 $\frac{1}{2}$ W	540'
"	$\square 4$	$511 \frac{1}{4} W$	720'
$\square 5 = \frac{54 \times 36}{64}$	$\square 4$	$726 \frac{1}{4} W$	725'
"	E.S. 1	750 W	630'
"	" 2	770 W	520'
"	" 3	589 W	530'
"		West	
"	" 4	572 W	450'
"	" 5	552 W	420'
"	" 6	521 W	570'
"	SW Cor post S. 29 (not the flag)	$531 \frac{1}{4} W$	583'

\square on edge of swamp 42 to E.S. 1 + E.S. 1 to $\square 1$

Swamp line to the NW Cor

$\square 2 = E.S.$

$\square 4 = E.S.$

To Chambers Sta

Edge Swamp is 100' South of Cor. & runs parallel with E+W ditch line to Sta 26 at 100'S

South Shore Traverse

Big Dist. U.G.

□ 1	□ 0 = ^{Sta 23} _{G.L.}	740 1/2 W	1020'
"	ES. 1.	754 W	1060
"	" 2	763 W	790
"	" 3	770 W	900
"	" 4	780 W	880
"	" 5	788 1/2 W	570'
"	" 6	573 W	440
"	" 7	549 W	350
"	" 8	525 W	320
"	" 9	510 1/2 W	450
"	" 10	52 W	590
"	" 11	58 E	680
"	→ Δ 3	512 3/4 E	760
□ 2	→ Δ 3	738 1/4 W	515
"	→ ES 1.	762 W	470
"	" 2	586 W	390
"	" 3	568 W	700
"	" 4	566 1/2 W	980
"	" 5	560 W	920
"	" 6	557 W	840
"	" 7	548 3/4 W	980
"	" 8	536 W	1020
"	" 9	530 W	1140
"	" 10	524 W	1270
"	Δ 4	515 1/2 W	1200

570
490
460
420

29

connects with swamp line 100' S of Sta 26

Incongruence Sta Δ on E.S.

π	\odot	Brg	Dist
□2	ES 11	59W	1060
"	"12	S	1000
"	"13	575E	690
"	"14	589E	700
"	"15	787E	860
"	"16	782½E	1000
"	□3	781½E	1140
□4	□3	524W	670
"	ES 1	513W	470
"	"2	516E	480
"	"3	538E	630
"	"4	552E	700
"	"5	568E	750
"	"6	587E	600
"	"7	772E	560
"	"8	759E	600
"	"9	737E	630
"	□5	731¾E	705
□6	□5	538¾W	550
"	ES 1	516W	500
"	"2	53½E	650
"	"3	515E	830
"	"4	522E	1000
"	"5	533E	1060
"	"6	544E	1020

570
" "

30

Opening in swamp between shots 12 + 13
which runs S.E. For outline of this
see "S.E. Connecting Traverse".

□3 on E.S.

low brush flat lays south of Point 355

low brushy point, should be partly
included in bog.
□6 = Sta 31 m.D.

This should be
figured about 200'
stronger than shown
w/ brushy edge of meadow
and not being able
to see actual
shore

A	O	Big Dist	
□6	ES.7	549½E	860
"	" 8	552E	730

A few shots from Sta 31 m.s.

	to	n. edge of meadows.	
Sta 31.	ES.1	n69½E	430
"	" 2	n61E	220
"	" 3	n	110
"	" 4	n8W	310
"	" 5	n31½W	480
"	" 6	n48W	610

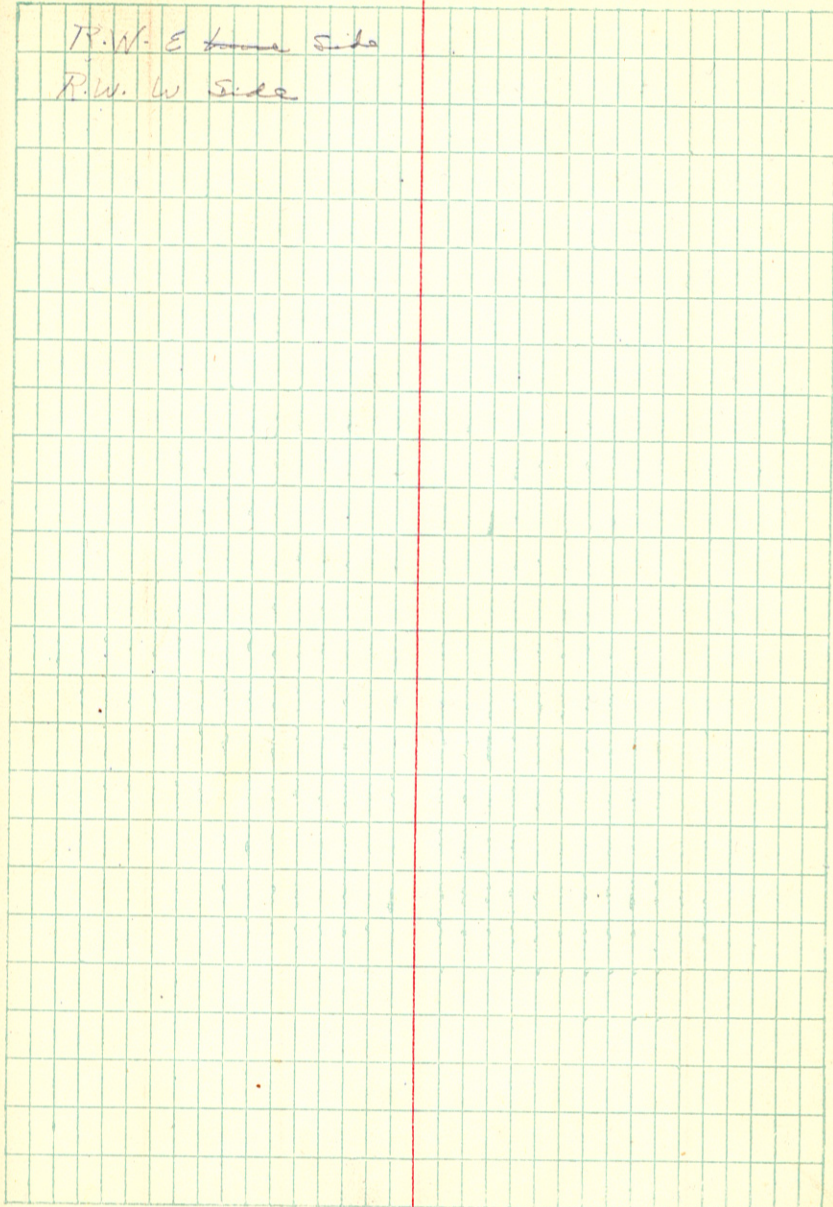
This connects with traverse directed from other m.s. points.

near block snag. Connects with Lat #2 Traverse (East side)

Lat # 2 Bog Traverse

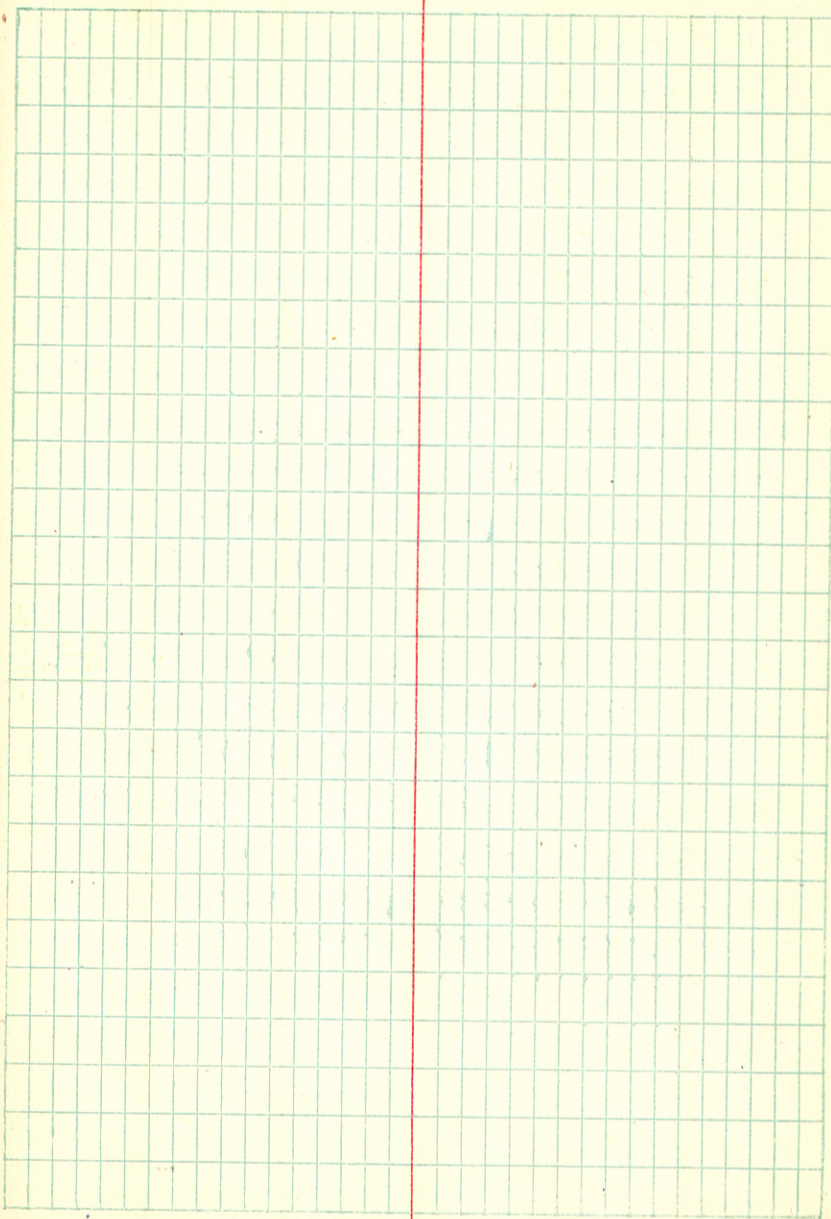
π	○	Brg	Dist.
28	W # 1	N 3° W	1300'
"	E # 1	N 69° E	1000'
"	W # 2	N 11 1/2° W	850'
"	E # 2	N 82° E	840'
"	W # 3	N 27 1/2° W	690'
"	E # 3	N 80° E	850'
"	W # 4	N 90° W	730'
"	E # 4	S 60° E	880'
"	W # 5	N 57 1/2° W	1000'
"	E # 5	S 26° E	1300'
"	W # 6	N 80° W	1400'
"	E # 6	S 17 1/2° E	1400'
"	W # 7	S 72° W	1100'
28	W # 8	S 66° W	1300'
20	E # 7	S 24° E	730'
"	W # 9	N 85 3/4° W	1600'
"	W # 10	S 82 3/4° W	1500'
"	W # 11	S 71 1/2° W	1400'
"	W # 12	S 66 3/4° W	1400'
"	W # 13	S 55° W	1300'
"	W # 14	S 51° W	1100'
"	W # 15	S 47° W	1200'
8	W # 16	N 78 1/2° W	850'
"	E # 8	N 42° E	220'

P.W. E side
P.W. W side



Lat #2 Bog Traverse

π	⊙	Beg	Dist
8	E#9	N74 $\frac{1}{2}$ E	220
"	W#17	S77 $\frac{1}{2}$ W	600
"	W#18	S71W	500
"	E#10	S75 $\frac{1}{2}$ E	390
"	W#19	S44W	390
"	E#11	S50E	570
"	W#20	S34 $\frac{3}{4}$ W	220
"	W#21	S13 $\frac{3}{4}$ W	290
"	W#22	S15W	420



N.E. show Traverse.

34

T	O	Brg.	Dist
□ 1	□ 0 = 260 ^{near} total	S 22 1/4 W	1340
"	E.S. 1	S 33 W	1000
"	ES 2	S 40 1/2 W	780
"	ES 3	S 52 W	610
"	E.S. 4	S 66 1/2 W	520
"	E.S. 5	S 82 W	380
"	ES 6	N 51 1/2 W	180
"	ES 7	N 11 1/2 E	290
"	□ 2	N 22 1/2 E	425
□ 3	□ 2	S 3 W	400
"	E.S. 1	S 21 W	400
"	ES 2	S 35 W	500
"	E.S. 3	S 51 1/2 W	500
"	ES 4	S 62 1/2 W	430
"	ES 5	N 79 W	380
"	ES 6	N 53 1/4 W	430
"	ES 7	N 32 1/4 W	490
"	ES 8	S 61 1/2 E	650
"	ES 9	S 45 E	630
"	E.S. 10	S 24 E	650
"	□ 4	S 11 1/2 E	590
□ 5	□ 4	N 11 W	265
"	E.S. 1	N 51 W	210
"	ES 2	N 89 W	250
"	ES 3	S 62 1/2 W	165

□ 2 = ES

R.W. Line

R.W. "

□ 4 = E.S.

π	O	Trig.	Dist.
□ 5	ES 4	S 6 C	170
"	ES 5	S 25 E	330
□ 5	□ 6	S 35 E	515
□ 7	□ 6	N 84 W	590
"	ES 1	S 83 W	400
"	ES 2	N 53 E	440
"	ES 3	N 71 E	500
"	ES 4	N 83 E	280
"	ES 5	S 70 E	500
□ 7	□ 8	S 58 $\frac{1}{2}$ E	790
□ 9	□ 8	N 29 $\frac{3}{4}$ W	400
"	ES 1	N	390
"	ES 2	N 6 E	575
"	ES 3	N 40 $\frac{1}{2}$ E	510
"	ES 4	N 47 $\frac{1}{2}$ E	290
"	ES 5	N 88 E	260
"	ES 6	S 77 E	200

□ 6 = ES.

□ 7 = ES

P.W. Line

P.W. Line

□ 8 = ES

□ 9 = 0100 main ditch

P.W. Line

P.W. Line

S. E Bay Traverse

	①	Trig. Dist.	
7 ^{main} Tide	W#1	S62 $\frac{1}{4}$ W	1300
"	W#2	S55 $\frac{1}{2}$ W	1180
"	W#3	S48 $\frac{1}{2}$ W	1020
"	W#4	S38W	1000
10 ^{small} Lake Branch	W#1	W	1070
"	E#1	N23 $\frac{3}{4}$ E	700
"	W#2	S77W	1190
"	E#2	N53E	540
"	W#3	S69 $\frac{1}{4}$ W	1340
"	E#3	S68E	174
"	W#4	S60 $\frac{3}{4}$ W	1520
"	E#4	S26E	590
"	W#5	S51 $\frac{3}{4}$ W	1560
"	E#5	S4E	600
"	W#6	S42 $\frac{1}{2}$ W	1380
20 ^{small} Lake Branch	W#1	S83W	600
"	E#1	N49E	450
"	E#2	N57E	285
"	W#2	S54W	500
"	E#3	S63E	285
"	W#3	S35W	560
"	E#4	S34 $\frac{3}{4}$ E	435
"	W#4	S27 $\frac{3}{8}$ W	770

neck of swamp opening to SW at #5

S.E. T Bay Traverse			
\bar{A}	\odot	Reg.	Dist.
26 ^{Sand Lake} Trench	E #1	N82 $\frac{3}{4}$ E	470
"	W #1	S30 $\frac{1}{2}$ W	345
"	E #2	S74 $\frac{3}{4}$ E	465
"	W #2	S8 $\frac{1}{2}$ W	470
"	E #3	S64 $\frac{1}{2}$ E	650
35 ^{Sand Lake} Trench	E #1	N4E	265
"	W #1	S71W	330
"	E #2	N14W	200
"	W #2	S33W	240
"	E #3	N70 $\frac{1}{2}$ E	220
"	E #4	S87E	300
"	W #3	S11 $\frac{1}{2}$ W	300
"	E #5	S82 $\frac{1}{2}$ E	430
"	E #6	S63E	680
"	W #4	S11E	590
"	W #5		

Sta 40 = 100' L - 200' R. Swamp

" 42 = 100' L - 100' R "

" 45 = 80' L - 80' R "

" 46 = Swamp turns to Round Lake

" 47 = 100' L - Round Lake on R

S.E. Connecting Traverse.

T	0	Trsq.	Dist.	V.A.
□ 1	□ 00	N 34 $\frac{1}{4}$ E	820	V.A. = 1° 42'
"	N #1	N 6 E	900	
"	S #1	N 16 $\frac{3}{4}$ E	820	
"	N #2	N 14 $\frac{1}{4}$ W	800	
"	$\frac{1}{4}$ 32-33	N 18 E	780	
"	N #3	N 0 $\frac{1}{2}$ W	510	
"	S #2	N 25 E	660	
"	N #4	N 18 W	230	
"	S #3	N 24 $\frac{1}{2}$ E	460	
"	N #5	N 4 $\frac{1}{2}$ W	255	
"	N #6	N 57 $\frac{1}{2}$ W	330	
"	S #4	N 27 $\frac{1}{2}$ E	220	
"	N #7	N 38 $\frac{1}{4}$ W	325	
"	S #5	N 41 W	58	
"	N #8	N 50 W	410	
"	S #6	S 52 $\frac{1}{2}$ W	140	
"	N #9	N 51 W	470	
"	N #10	N 55 $\frac{1}{2}$ W	460	
"	S #7	S 23 $\frac{1}{2}$ W	300	
"	N #11			
"	□ #2	S 50 W	425	
□ 3	□ #2	S 41 E	520	
"	N #1	N 33 E	280	
"	N #2	N 16 $\frac{1}{2}$ E	345	
"	S #1	S 21 E	510	

□ 00 = □ #5

 $\frac{1}{4}$ 32-33 = E.S.□ #2 = ES - S. side
□ #3 = in swamp

SE. Connecting Traverse

Π	○	Trig	Dist	V.A.
□ 3	N# 3	N 3 W	340	
"	N# 4	N 26 W	220	
"	S# 2	S 3 1/2 W	370	
"	N# 5	N 49 1/2 W	190	
"	N# 6	N 61 1/2 W	300	
"	S# 3	S 33 1/2 W	360	
"	N# 7	N 86 1/2 W	325	
"	S# 4	S 51 1/2 W	430	
"	N# 8	N 88 W	375	
"	□ 4	S 76 W	470	
□ 5	□ 4	S 64 E	137	
"	□ 6	S 45 W	160	
□ 7	□ 6	S 43 1/2 E	240	
"	N# 1	S 60 E	130	
"	N# 2	N 61 E	115	
"	S# 1	S 5 W	190	
"	N# 3	N 61 E	205	
"	N# 4	N 34 E	245	
"	S# 2	S 21 W	300	
"	N# 5	N 8 E	300	
"	N# 6	N 4 E	500	
"	S# 3	S 48 W	360	
"	S# 4	S 70 W	400	
"	N# 7	N 8 1/4 W	650	
"	□ 8	S 87 W	570	

In plotting this swamp allow 100' extra
both sides. Shot taken from Sta □ 3

N# 8 connects with □ 4 = end of swamp

□ 4 = E.S. = S. side swamp

□ 5 = low ridge high land drain west into

big Bog. □ 6 = E.S. = Head of second little swamp

□ 7 = in Swamp

□ 8 = E.S.

S.E. Connecting Traverse

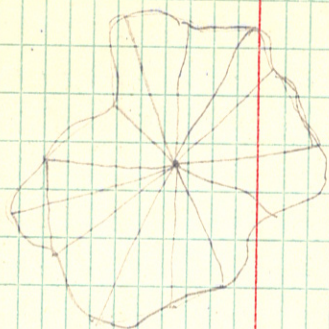
π	\odot	Trig.	Dist.	V.A.
□ 9	□ 8	S 63 $\frac{1}{2}$ E	338	
"	N [#] 1	N 45 E	830	
"	S [#] 1	S 4 E	110	
"	N [#] 2	N 21 E	800	
"	N [#] 3	N 22 E	500	
"	N [#] 4	N 37 E	370	
"	N [#] 5	N 43 $\frac{1}{4}$ E	200	
"	N [#] 6	N 12 W	320	
"	N [#] 7	N 29 W	420	
"	□ 10	N 76 $\frac{3}{4}$ W	750	

□ 9: in Swamp.

□ 10 = S + 0.68 main line

Triangulation.

Δ	From	To	\angle s.
6+25' GL Lat.	0+00 GL	Sta 75+89.4 M.L.	12°16' R.
"	"	$\Delta 4$.	23°48' R.
"	"	$\Delta 3$	38°15' R.
"	SW 329	SW. 329	100°48' R.
"	"	$\Delta 2$	161°40' R.
"	"	$\Delta 1$	149°44' R.
Sta 20 GL Br.	6+25' GL	48+95.5' M.L.	22°24' R.
"	"	$\Delta 3$	67°45' R.
"	"	$\Delta 2$	77°41' L.
"	"	$\Delta 1$	103°44' L.
SW Cr 29 22 E+N.	6x25'	$\Delta 1$	77°04' L.
"	"	$\Delta 2$	51°12' L.
54+40 GL.	48+60 GL.	Flag w/ E w/ 1/4 329	120°17' R.
"	"	$\Delta 1$.	80°02' L.
62 GL.	54+40	Flag w/ E w/ 1/4	8°50' R.
"	"	"	"
$\Delta 2$	$\Delta 1$	Flag w/ E w/ 1/4 329	3°29' R.
"	"	SW Cr 329	75°39' L.
"	"	$\Delta 3$	118°18' L.
"	"	Sta 75+89.4 M.L.	124°33' L.
"	"	$\Delta 4$	117°52' L.
"	"	Flag w/ 1/4 329	148°43' L.



92.3
1.5
91.8
92.0

Triangulation
Continued.

From	To	L ^s	
5/4 S. 29 ⁶² W	48+95.5 M.L.	SW Cor 529 (22' N)	80° 21' R. ✓
"	"	Δ 2	136° 02' R. ✓
"	"	Δ 1	126° 09' R. ✓
"	"	Point 22' E 4 W/4 S 29	123° 54' R. ✓
"	SW Cor 529 (22' N)	"	43° 32' R. ✓
"	"	Δ 1	45° 48' R. ✓
"	"	Δ 2	55° 41' R. ✓
"	"	Δ 3	56° 12' L. ✓
"	"	Δ 4	73° 06' L. ✓
"	Δ 4	Δ 2	128° 47' R. ✓
"	"	Δ 1	118° 54' R. ✓
"	"	W/4 529 22' E.	116° 39' R. ✓
Sta 4 m. N. Lat #2	SW Cor 528-22' N.	ahead m Lat N. #2	100° 21' L. ✓
Sta 18 lat #2	1+82 lat #2	Δ 2	93° 26' R. ✓
48+95.5 M.D.	41+00	Δ 6	44° 11' R. ✓
"	"	Δ 4	160° 43' R. ✓
"	"	Δ 3	187° 43' R. ✓
"	Δ 6	SW Cor 528 (22' N)	6° 05' L. ✓
"	"	5/4 529 22' N.	72° 35' L. ✓
"	"	Δ 2	106° 58' L. ✓
"	"	(rather Δ 1 or with SW Cor 529	117° 58' L. ✓
"	"	SW Cor 529	158° 29' L. ✓

KEITH'S RAILROAD CURVE TABLES.

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HOW TO USE KEITH'S TABLES.

EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle
of Intersection or I. P. = 23° 20' to the R. at Station
542+72.

Ext. in Tab. IV opposite 23° 20' = 120.87
120.87 ÷ 12 = 10.07. Say a 10° Curve.

Tan. in Tab. IV opp. 23° 20' = 1183.1
1183.1 ÷ 10 = 118.31.

Tab. V correction for A. 23° 20' for a 10° Cur. = 0.16
118.31 + 0.16 = 118.47 = corrected Tangent.

(If corrected Ext. is required find in same way)
Ang. 23° 20' = 23.33° ÷ 10 = 2.3333 = L. C.

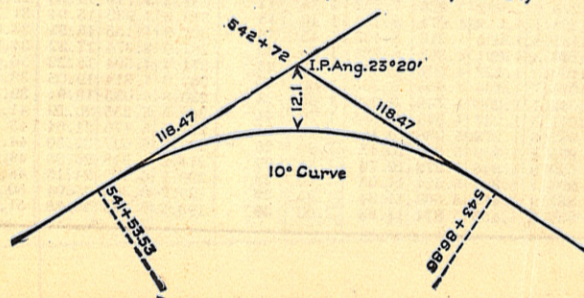
2° 19½' = def. for sta.	542	I. P. = sta.	542+72
4° 49½' = " " "	+50	Tan. =	1.18.47
7° 19½' = " " "	543	B. C. = sta.	541+53.53
9° 49½' = " " "	+50	L. C. =	2.33.33
11° 40' = " " "	543+	E. C. = Sta.	543+86.86
	86.86		

100 - 53.53 = 46.47 × 3' (def. for 1 ft. of 10° Cur.) = 139.41' =
2° 19½' = def. for sta. 542.

Def. for 50 ft. = 2° 30' for a 10° Curve.

Def. for 36.86 ft. = 1° 50½' for a 10° Curve.

(These tables are published in Field Books of
KEUFFEL & ESSER CO., New York, N. Y.)



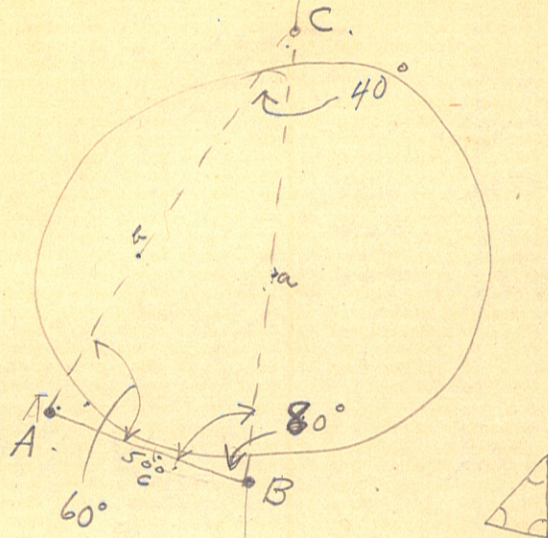
Natural Tangents.

Deg.	0'	10'	20'	30'	40'	50'	Deg.	0'	10'	20'	30'	40'	50'	Deg.	
0	0000	0029	0058	0087	0116	0145	89	40	8391	8441	8491	8541	8591	8642	49
1	0175	0204	0233	0262	0291	0320	88	41	8693	8744	8796	8847	8899	8952	48
2	0349	0378	0407	0437	0466	0495	87	42	9004	9057	9110	9163	9217	9271	47
3	0524	0553	0582	0612	0641	0670	86	43	9325	9380	9435	9490	9545	9601	46
4	0699	0729	0758	0787	0816	0846	85	44	9657	9713	9770	9827	9884	9942	45
5	0875	0904	0934	0963	0992	1022	84	45	1.0000	1.0058	1.0117	1.0176	1.0235	1.0295	44
6	1051	1080	1110	1139	1169	1198	83	46	1.0355	1.0416	1.0477	1.0533	1.0599	1.0661	43
7	1228	1257	1287	1317	1346	1376	82	47	1.0724	1.0786	1.0850	1.0913	1.0977	1.1041	42
8	1405	1435	1465	1495	1524	1554	81	48	1.1106	1.1171	1.1237	1.1303	1.1369	1.1436	41
9	1584	1614	1644	1673	1703	1733	80	49	1.1504	1.1571	1.1640	1.1708	1.1778	1.1847	40
10	1763	1793	1823	1853	1883	1914	79	50	1.1918	1.1988	1.2059	1.2131	1.2203	1.2276	39
11	1944	1974	2004	2035	2065	2095	78	51	1.2349	1.2423	1.2497	1.2572	1.2647	1.2723	38
12	2126	2156	2186	2217	2247	2278	77	52	1.2799	1.2876	1.2954	1.3032	1.3111	1.3190	37
13	2309	2339	2370	2401	2432	2462	76	53	1.3270	1.3351	1.3432	1.3514	1.3597	1.3680	36
14	2493	2524	2555	2586	2617	2648	75	54	1.3764	1.3848	1.3934	1.4019	1.4106	1.4193	35
15	2679	2711	2742	2773	2805	2836	74	55	1.4281	1.4370	1.4460	1.4550	1.4641	1.4733	34
16	2867	2899	2931	2962	2994	3026	73	56	1.4826	1.4919	1.5013	1.5108	1.5204	1.5301	33
17	3057	3089	3121	3153	3185	3217	72	57	1.5399	1.5497	1.5597	1.5697	1.5798	1.5900	32
18	3249	3281	3314	3346	3378	3411	71	58	1.6003	1.6107	1.6212	1.6319	1.6426	1.6534	31
19	3443	3476	3508	3541	3574	3607	70	59	1.6643	1.6753	1.6864	1.6977	1.7090	1.7205	30
20	3640	3673	3706	3739	3772	3805	69	60	1.7321	1.7437	1.7556	1.7675	1.7797	1.7917	29
21	3839	3872	3906	3939	3973	4006	68	61	1.8040	1.8165	1.8291	1.8418	1.8546	1.8676	28
22	4040	4074	4108	4142	4176	4210	67	62	1.8807	1.8940	1.9074	1.9210	1.9347	1.9486	27
23	4245	4279	4314	4348	4383	4417	66	63	1.9626	1.9768	1.9912	2.0057	2.0204	2.0353	26
24	4452	4487	4522	4557	4592	4628	65	64	2.0503	2.0655	2.0809	2.0965	2.1123	2.1283	25
25	4663	4699	4734	4770	4806	4841	64	65	2.1445	2.1609	2.1775	2.1943	2.2113	2.2286	24
26	4877	4913	4950	4986	5022	5059	63	66	2.2460	2.2637	2.2817	2.2998	2.3183	2.3369	23
27	5095	5132	5169	5206	5243	5280	62	67	2.3559	2.3750	2.3945	2.4142	2.4342	2.4545	22
28	5317	5354	5392	5430	5467	5505	61	68	2.4751	2.4960	2.5172	2.5386	2.5605	2.5826	21
29	5543	5581	5619	5658	5696	5735	60	69	2.6051	2.6279	2.6511	2.6746	2.6985	2.7228	20
30	5774	5812	5851	5890	5930	5969	59	70	2.7475	2.7725	2.7980	2.8230	2.8502	2.8770	19
31	6009	6048	6088	6128	6168	6208	58	71	2.9042	2.9319	2.9600	2.9887	3.0178	3.0475	18
32	6249	6289	6330	6371	6412	6453	57	72	3.0777	3.1084	3.1397	3.1716	3.2041	3.2371	17
33	6494	6535	6577	6619	6661	6703	56	73	3.2709	3.3052	3.3402	3.3759	3.4124	3.4495	16
34	6745	6787	6830	6873	6916	6959	55	74	3.4874	3.5261	3.5656	3.6059	3.6470	3.6891	15
35	7002	7046	7089	7133	7177	7221	54	75	3.7321	3.7760	3.8208	3.8657	3.9136	3.9617	14
36	7265	7310	7355	7400	7445	7490	53	76	4.0108	4.0611	4.1126	4.1653	4.2193	4.2747	13
37	7536	7581	7627	7673	7720	7766	52	77	4.3315	4.3897	4.4494	4.5107	4.5736	4.6382	12
38	7813	7860	7907	7954	8002	8050	51	78	4.7046	4.7729	4.8430	4.9152	4.9894	5.0658	11
39	8098	8146	8195	8243	8292	8342	50	79	5.1446	5.2257	5.3093	5.3955	5.4845	5.5764	10

Deg.	0'	10'	20'	30'	40'	50'	Deg.
80	5.6713	5.7694	5.8708	5.9758	6.0844	6.1970	9
81	6.3138	6.4348	6.5606	6.6912	6.8269	6.9682	8
82	7.1154	7.2687	7.4287	7.5958	7.7704	7.9530	7
83	8.1443	8.3450	8.5555	8.7769	9.0098	9.2553	6
84	9.5144	9.7882	10.078	10.385	10.711	11.059	5
85	11.430	11.826	12.250	12.706	13.197	13.727	4
86	14.300	14.924	15.605	16.350	17.169	18.075	3
87	19.081	20.206	21.470	22.903	24.542	26.432	2
88	28.636	31.242	34.368	38.189	42.964	49.104	1
89	57.290	68.750	85.940	114.588	171.885	343.77	0

Natural Cotangents.

Handwritten calculations and numbers:
 $.8660$
 500
 1200
 $.6428 \sqrt{433.0000}$
 4.36

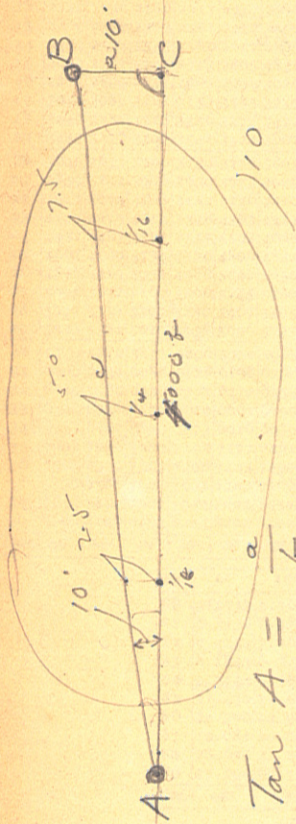


Handwritten trigonometric identity:
 $\sin A : \sin C :: a : c$
 180
 140
 40

85
6.80
1.70

$V = 0.4'$

20
50
70



$$\tan A = \frac{a}{b}$$

$$\sin A = \frac{a}{c}$$

4'

$$.0925 \frac{100}{2000}$$

$$4000 \overline{) 18.0000}$$

$$\underline{20000}$$

$$\underline{20000}$$

$$0$$

$$\frac{.0025 \sqrt{2000}}{50000}$$

78
2
156

340

340

340

$$300 = \frac{1030.93}{137.45}$$

$$\underline{1168.38}$$

$$300 = 1030.9$$

$$\frac{40 = 137.5}{340 = 1168.4}$$

8.5
52
 13.7
 - 0.3

 13.4
2
 26.8

7.65
52
 12.85

850
290
 560

580
2
 7160

85
83
 32
2
 640

5.9
2
 11.8

785
2
 770

5240
2
 10560

85
33
 52
2
 10.4

77
2
 154

850
405
 445

85
41
 44
42
 880

825
05
 775
2
 1550

2111
2121
 1000
202
 430
707
 1230

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1½ TO 1.

FOR SINGLE TRACK EMBANKMENT.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	7.0	7.2	7.3	7.5	7.6	7.8	7.9	8.1	8.2	8.4	0
1	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.6	9.7	9.9	1
2	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.2	11.4	2
3	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	3
4	13.0	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	4
5	14.5	14.7	14.8	15.0	15.1	15.3	15.4	15.6	15.7	15.9	5
6	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	6
7	17.5	17.7	17.8	18.0	18.1	18.3	18.4	18.6	18.7	18.9	7
8	19.0	19.2	19.3	19.5	19.6	19.8	19.9	20.1	20.2	20.4	8
9	20.5	20.7	20.8	21.0	21.1	21.3	21.4	21.6	21.7	21.9	9
10	22.0	22.2	22.3	22.5	22.6	22.8	22.9	23.1	23.2	23.4	10
11	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6	24.7	24.9	11
12	25.0	25.2	25.3	25.5	25.6	25.8	25.9	26.1	26.2	26.4	12
13	26.5	26.7	26.8	27.0	27.1	27.3	27.4	27.6	27.7	27.9	13
14	28.0	28.2	28.3	28.5	28.6	28.8	28.9	29.1	29.2	29.4	14
15	29.5	29.7	29.8	30.0	30.1	30.3	30.4	30.6	30.7	30.9	15
16	31.0	31.2	31.3	31.5	31.6	31.8	31.9	32.1	32.2	32.4	16
17	32.5	32.7	32.8	33.0	33.1	33.3	33.4	33.6	33.7	33.9	17
18	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4	18
19	35.5	35.7	35.8	36.0	36.1	36.3	36.4	36.6	36.7	36.9	19
20	37.0	37.2	37.3	37.5	37.6	37.8	37.9	38.1	38.2	38.4	20
21	38.5	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	21
22	40.0	40.2	40.3	40.5	40.6	40.8	40.9	41.1	41.2	41.4	22
23	41.5	41.7	41.8	42.0	42.1	42.3	42.4	42.6	42.7	42.9	23
24	43.0	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	24
25	44.5	44.7	44.8	45.0	45.1	45.3	45.4	45.6	45.7	45.9	25
26	46.0	46.2	46.3	46.5	46.6	46.8	46.9	47.1	47.2	47.4	26
27	47.5	47.7	47.8	48.0	48.1	48.3	48.4	48.6	48.7	48.9	27
28	49.0	49.2	49.3	49.5	49.6	49.8	49.9	50.1	50.2	50.4	28
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	29
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	30
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	31
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	32
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	33
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	34
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	35
36	61.0	61.2	61.3	61.5	61.6	61.8	61.9	62.1	62.2	62.4	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.