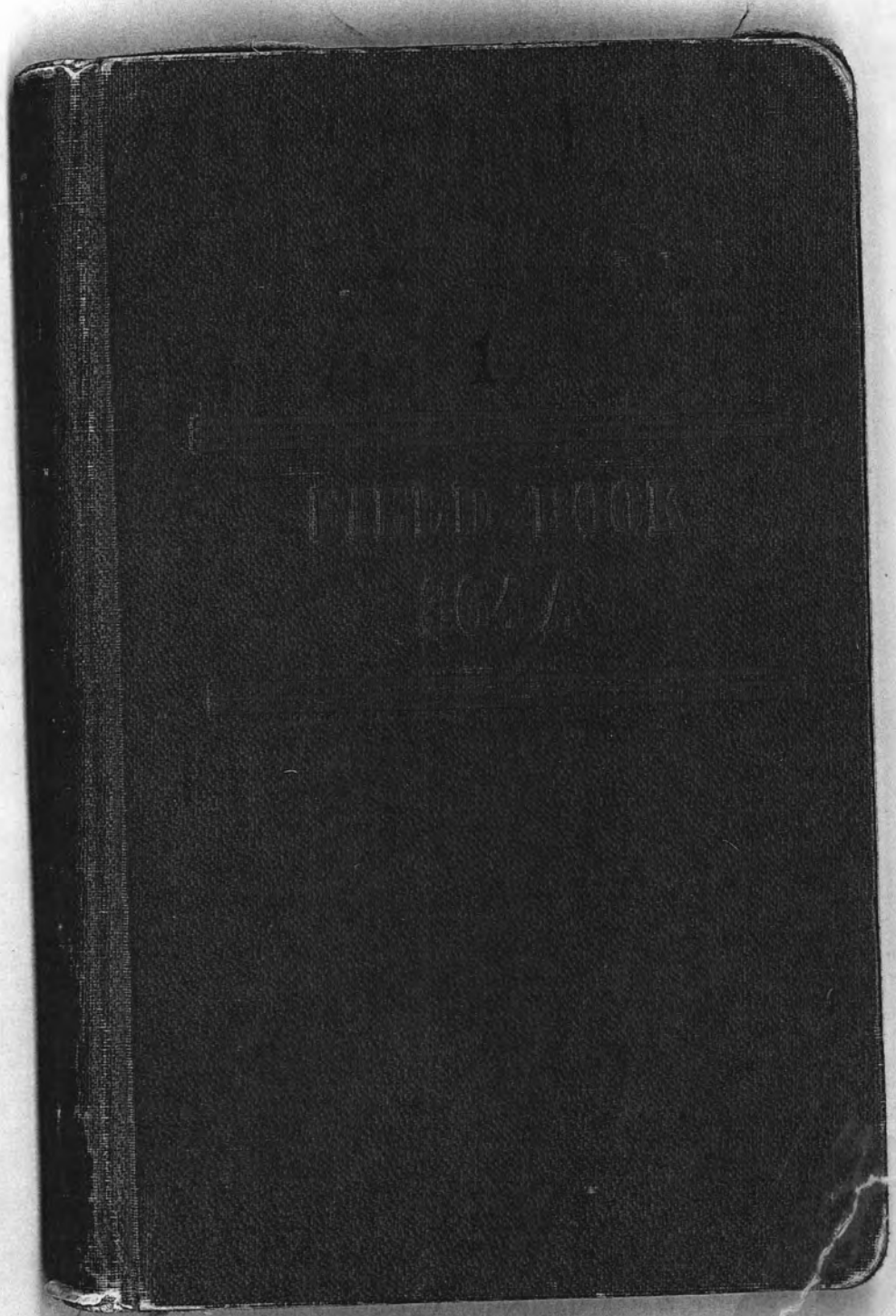
Field Book 364A



KEUFFEL & ESSER CO.

DRAWING MATERIALS
AND
SURVEYING INSTRUMENTS.
NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

TABLES FOR EXCAVATIONS AND EMBANKMENTS.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
ROADWAY 18 FEET WIDE. SIDE SLOPES 1 TO 1.
FOR SINGLE TRACK EXCAVATION.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	0
1	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	1
2	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	2
3	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	3
4	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	4
5	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	5
6	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	6
7	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	7
8	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	8
9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	9
10	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	10
11	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	11
12	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	12
13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	13
14	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	14
15	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	15
16	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	16
17	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	17
18	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	18
19	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	19
20	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	20
21	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	21
22	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	22
23	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	23
24	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	24
25	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	25
26	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	26
27	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	27
28	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	28
29	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	29
30	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	30
31	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	31
32	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	32
33	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	33
34	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	34
35	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	35
36	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	36

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

For Keith's Railroad Curve Tabels see end of book.

Check # 15.462
Voucher # 1599*
date July 12th '38 Amt $51.00
Ray Hall
Signed
F. M. Holmes

229-039

15-51

Check # 50,764.
Voucher 1188 CCC date Aug. 7 '38
Amt. $27.50
Ray Hall
signed F. M. Holmes.
Rec'd Aug 9th Finance officer. USA

36" leaves - web
1 pr work gloves / size (canvas)

Section Diagram

I

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56	7	"	"	
48	10	"	5	cruising.
32	2	"	"	"
56	12	"	5	
60	13	"	"	Range line
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79	1-12-13	"	"	Traverse Project (4)
97	23-24	"	"	" " "
100	8-17-18	38	6	" (3)
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108	4+5	"	"	Road straightening
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110	27	"	"	
120-134	5	"	"	Road #14
137	4	38	5	Tp. line

Sec 6-38-6

W NW¼

June 21st 1938 Fair 75°

Rang'r Hall with E. Dusczynski, Tongier, Zello & Rozneck.

Check. Tp. cor.

Rec Measurements from 4 ours all come together within .01

Move post fence 10' N.

→See page 17←

Ours

Rm S40°W 320°

N24¾W 335°30

N13E±

S42E.

See page 17

Rm S on Rm on N2°E (S 0°-52'E)

0.0 Tp cor.

7.97 E Rd.

10.557 hub (.07⁵)

12.32 hub at rec. for ¼ S

12.02 correct W. .086 for ¼

Tam post { B Pine 5 N42W .77
N2°E " 3 N24E .85⁶

12.61⁷ fence .723 S of fence cor S+E

2.61 S 69°-99'

12.27⁵ hub .01⅓ W of S.d & stake down.

24.23⁹ hub (.173) .95 W of fence

27.00 " (.19¼)

Pr Zero party

31.50 hub at N edge road by stake

NW cor E .89
Tam N 2° W 84°-30' .146
.22⁷

Old post down at orig ¼.
in swale
Orig post & mark .58.7⁴
N 2° E B Pine 7" N 14° E .89
W 5° N 23° W .989 6.527

See page 53

∴ 31.534 at W 225 to cor

.032 = long. 0°-24½' fall E.

S −0°-52' E

S 0°-27½' E .179'-32.5

32.32 Rec
31.534 M.
32.32 .786 short
1.032 per ch. x20 = .432
20.
19.568
12.32

Book 3 P. 6
Re meas = 32.53⁶ ch / Mar 20 '39

2

3 #2 Sec 6

June 22nd Fair. 80°
Same party.
NE×6 Found Vaughans? post in old RR grade NW SE. Checks with one stop - fronting south fork where large tree has been removed.

Newt. N 2°25' E
{ Jack pine 6" S 58° W .56'
" " S 26½ E .79'
Orig? N 35° W
hole "

S. on McCoys road mon. N 2°-10' E
0.0 Sec Cor. (5-6-31-32)
4. to 7 meas down slope 6°-20
= 4+2.962 = .018
7.
7.53 Enter swamp
8.70 over "
" to 9.40 meas up slope. 22°-10'
.90 × Cos. = .067

12.837 McCoys ⅛ on line. .334
13.50 Hub Rec dist for Temp. ⅛ S.

13.817 sta E .363 for ⅛ cor.
13.798 " " " " "
.019 north

Drive pitch post & tie to McCoys trees
{ W. Pine 13" N 35½ W 1.133
{ Jack 6" N 3½° W .709

19.00 hub at top .50 of slope to Lake. College bns. S 52° W. chain 6 ch.

24.44 Rec. for O.C.

21.75 hub + lay off .57 Base NE ¼ 6.60 ch.
23.243 fall .3' E. .586 } Iron at McCoy MC
.493

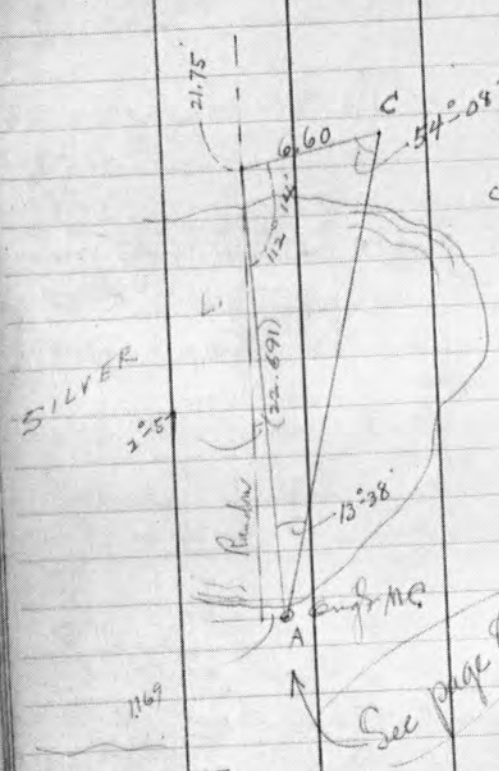
Orig MC set 5+6 on 13 t. OK with marks. S. chorc. Stub of SW 8 Other gone.
Drive new post by McCoys stake & mark
McCoys trees { W. Pine 6" S 10½° W .09
" 12 N 83 E .33
S 48½ W .12
Var 2°-10' E
Orig

4 Sections to Mile 45.

5

6-38-6

℄



All angles turned — excess = 1'

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

$= \frac{6.6 \times .81038}{.23571}$

$= 22.691$

$\times \sin 2°59 = 1.169$

$\times \cos = 22.66$

21.75
+ 22.66
44.41 fall | 1.169 W } AC

.02632 = tang.

S. chain
1°-30.5'
+ 2 10
3°-40' & var
True line

44.41 meas. random
43.45 rec
43.45 | .96 surp.
.02 = 1 : sin ∠ × 13.50 = range 13.50
also 13.718 × .0263 = .363 correction Eq.

Cos. 1°-30.5' = .999655

6-38-6

6

North ½ line.
June 23rd 1933 Rainy. 70°
Same party.

Run Edy on random from N ¼ W — by angle & to S. off random. 87°-58'

0.0 ¼ cor.
Set stakes on line every 5.00 ft

5.00		.015	
10.00		.03	
15.00		.045	
20.00		.061	
25.00		.077	
29.87	Intersect E+W fence	.092	June 24th 1933
34.18	" N+S — 8.5' S		Finish line corrected with assistance of foreman.
	fence cor.		
35.00		.107	
40.00		.122	
45.00		.138	
50.00		.153	
54.40	Rock	.166 N.	
55.		.168	
60.		.184	Tan. 10°-32'
65.		.199	.00306
70.		.214	

74.624 N ∠ N to point ¼ cor. .228

7

Sec. 1 - 38 - 5

NE ¼

June 24th 1933 3 hrs.
Ray H. Hall. Asst. Albrow. Post.
Run traverse from Tp cor. westerly
as follows.

Assume ℄ NE ¼ as Meridian.

①	N 0°-24½'W	on random extended	.98.
②	269°-12 = S 89°-12' W	20.00	
	falls in line bet ℄ Rd. & E fence.		
③	S. 0°-24½'E		.98
④	269°-12'	20.00	
	to hub.		
Thence ∠ W to N.	80°-36		.95

No Temp ¼ cor bet 36 + 1 set by SE
orig only. Other gone
(Will locate orig. spot definitely later.
with chord or by true Az. from B.T.
N. B. ——— 11S meter give increase in
mag. var. 5°-15'E at Tp. cor.
7°-20'E at ¼ S (36 - 1)

1 - 38 - 5

8

Sin 80°-36' = .98659 × .95 = .937 fall S.
Cos " = .1633 " = .155
+ 40.
= 40.155 run and.
20.078

= 93.7
46.8

∴ correct sta 20.078 N at 90° .46⁸ for ⅛

269°-12'
− S 89°-12' W

.07⁸

∴ at 20.078
+ .006
20.084

Turn off Meridian line
+ at .46⁸ N. = ⅛ cor.
Approx. ℄ Road.

∴ 40.155 | .937 Tang. 1°-20' cos .99973
.02333 =

20.082

True length = 40.165 chs.
from ⅛ cor N 89°-37' W.
True

June 26th 1933 75° Fair
Same crew except Emil Jorgen replaces Zello.

¼ Sec. 36 + 1 (N 38 - 5)
Set ⊗ over ΔE BT stp
Mag var 4°-47' E (7°-20 US - 2°-33)
Turn N 25° W .30 + full .01² Wlg Jorg

Set new post .30 from stp = about 3 lk. Wlg ? Reg.

Line of N&S fence to E .044 = 2.9'
" " fence w to N. .038 = 2.5'

Post as set reads N 25° W from stp on Var 2°-55' E.

Transit over post to Sun. Camp Time
① 9:07 AM.
Set Az of 155° on BT. Assumed
Sun alt obs. 47°-45'
" Az " 106°-50'

② 9:11 AM alt. 48°18' Az 107°-44'
± Squirrel L. Tower to 281°-53'

Run ⊗ after setting E⅛ cor bet 36 + 1
" set by 0° Az. A6⁸
from sta. 20.084

Mag. var on this line (parallel Range L.)
2°-18' E.

E⅛ 4 1-38-5 200°-30' ⌀.

Tang Az, V. 1°-37' { Jack Pine 10" N 59½° W 1.638
Y.P. stp. 24" S 32°-48' E. .353 107°-12'

Wire fence to E .218

Foreman Hunt continues picket line ⊗.

11.1

Secs. 36-39-5
+ 31 39-6

Offset E 10 lks from Concrete mons in roads at SE ex Sec 25-39-5

& Run S ℄ parallel to ℄ Town Road.

0.0 peg .10 E ℄ Mon
20.00 hub (on .10 offset) comes in W ditch

19.972 corner E .24 + set ½ - nail
found cut
D.P. 4½ x 4 6" deep
Stack 4" 5 60° 46' E .38
Fence post S 73° W .319
20.07 wire fence thru W.
22.46 E Road S W ℄
26.00 hub on same offset

Obs. sun - Camp time 180° Assumed for line S.

① 3:48.5 Alt 39°-43'
Az 261°-35'

② 3:56.7 V 38°-18'
H 263°-05'

30.00 Tally stake
32.00 hub (corner E .445)
continue on same 10 offset

→ Navy Jack 5" N 64½ E 17.2' P.C. no vis.

8/13/38

——— continue on page 14 ———

12

Polaris Obs.
at Blue Lake Camp in NE¼ NE¼ 1-38-5
June 26th 1933 at 10:03.5 ± M.C. Pac. time
Hub on campus 300' ± S. of office
∠ Polaris to ½ arrow on front of warehouse
left to right = 1°-08"

(Calc. by K+E thus Angle gives azimuth of Polaris at obs. as 0°-59' E
+ ∠ 1 08
½ arrow = N 2°-07' E

Calc— H.C. for June 15th 8:05.2 Am Gwch.
-26
11 x 3.93
-43.1
7:22.1 June 26
1.
7:21.1 H.C. Blue L.
-12:
4:38.9 hrs

5.987 x .116 =

Std time obs. 10:03.5 PM
+ .8
Loc time 10:04.3
+ 4 38.9
14:43.2
+ 2.3
14:45.5 = t

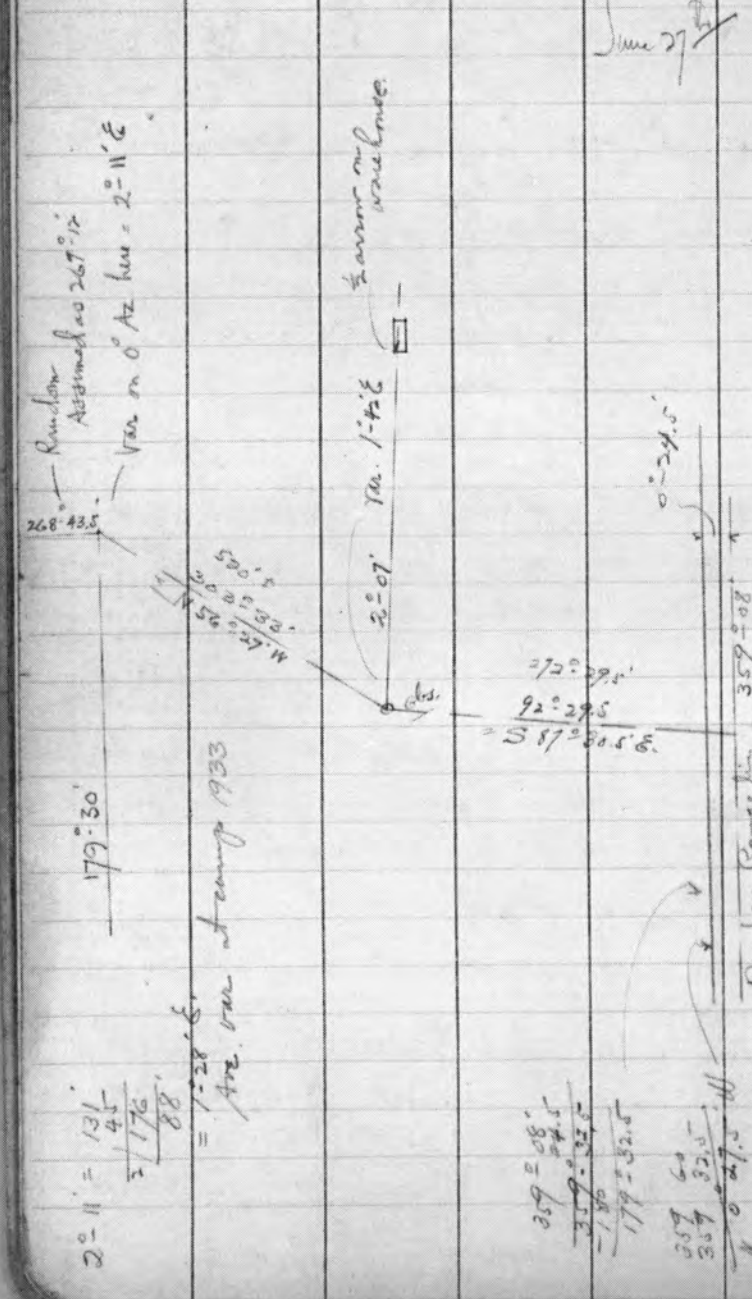
hrs x .116 = 14.77 / 2.35 .16

	44°	45°-49'	46°
14:40	55.6	57.3	57.5 (1.9
14:45.5		0°-58.9'	
15:00	1°-01.2'	63.2	1°-03.4 (2.2
		5.9	

∴ Polaris is 0°-59' E of North

Sec 1 - 38 - 5

June 27th



Secs 36 + 31

continued from page 11

June 27th 1933 80° F. Fair
9:30 AM
R. H. Hall with J. E Brazynski. G. Tongsteen.
Rosenek + Ernst Jerger.
Resume random W 31 - 39 - 6 after hooking
up Polaris results at camp.

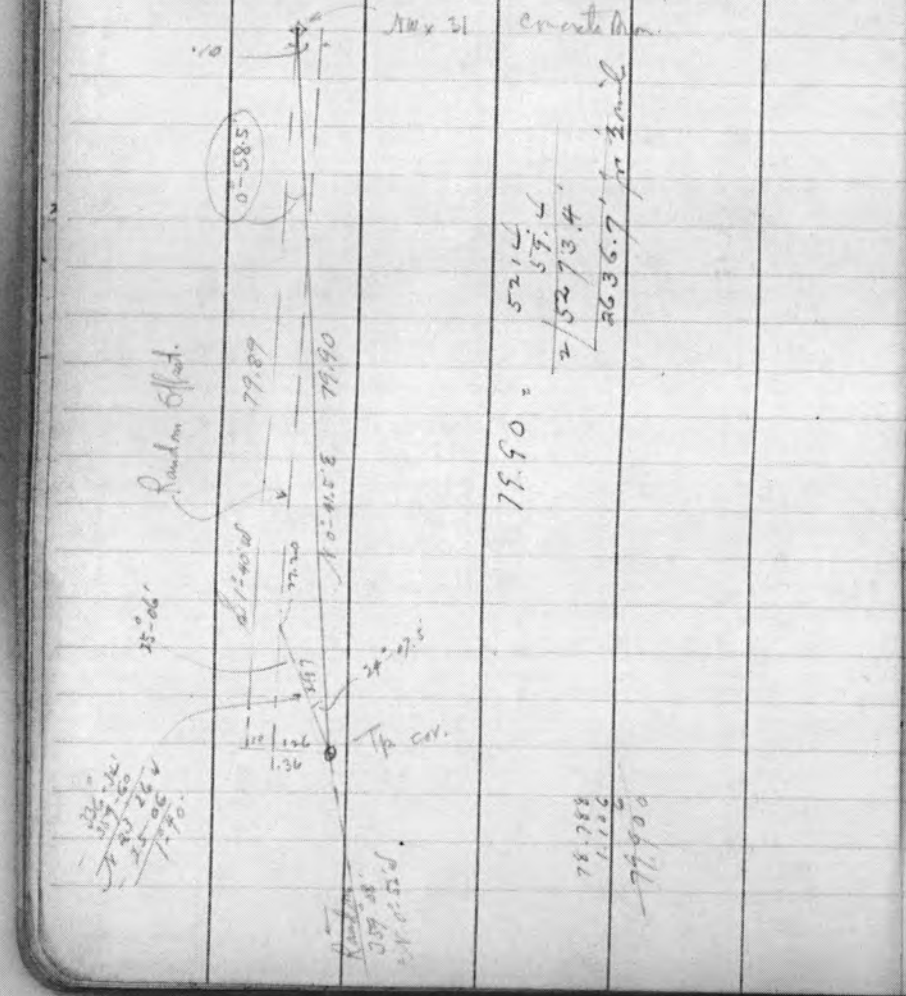
Continue S. on random initialed to Mks. E
of Orig. NW x 31 - 39 - 6

32.73 hub + tacks Swamp NE & SW.
39.945 corrected at 90° + set 1/4 ⊙.
(1/4) Dug Tam. post + scribed
True Az Spruce 3" 107°-20' S72°-40' E. .25^8
Var 1°-50' E Tam. 3" S24°-08' W 1.16^8
old posts by 204°-08' 268°-40' .21
40.00 hub on same line + turn ∠ N to E to
2 posts in ℄ winter road. Bo NW + SE.
83°-56' .37^2
Sail to find any evidence of the
stumps.

31-39-6

continued

43.303	hub + leaves swamp W + SE.
47.00	" at brow of hill
47.93	℄ shaw road SE + NW.
52.583	hub



31-39-6

continued

June 28th 1933 Fair 80° +

R H. Hall + same crew

(Dwozynski. Tomfler. Roeneck & Jergen)

55.00 Tally stake

59.917 rt. ∠ E. .92 east 4×4 pitch post

~~time to top Pine 11" 164°-37 S15°23 E 1.60 removed~~

1/9 time to B. Pine 4" S54°-06'W .476

Var 1°-10'E New Y. Pine 14" S 19° E 12.3 1.702 ✓

60.00 hub (= set P.S. .25' W)

63.50 ℄ trail E + W.

69.795 Y. Pine 11" + 6 feet West 0.25 ft. to glass thru opening.

" mark line run on S side tree.

74.00 hub in old road SW. (.25' W)

Set P .25' E of hub + continue as run.

77.20 hub & turn ∠ left (S 1/2 SE) to Tp. cor.

∠ 25°-06' ② 50°-12' 2.97 ch.

Sin .4242n × 2.97 = 1.26

+ 2.69 Cos. .90557 " " 2.69

79.89 rt ∠ E to cor. 1.26

.10

1.36

1.36 / .01702 = tang 0°-58.5' fall W.

17

31-39-6 E.
continued

June 29th 1933 Fair 90°
R.H.H. + same party plus Bottom + Range
Continue correcting + staking 4th line. Set
post in 1/4 Δ + 8 1/8.

Turn off Az. 0°-41 5' at Tp cor. & run N'ly on
line fall about 8' E of S 1/8
as Corrected.

Produce line as corrected at 48.07 (.718 E)
S'ly by B.S. on 1/4 + check Ok with 1/8

Tp. cor	39-5 | 39-6	Mark new Bearing:
	38-5 | 38-6	

True Az. Var. 0°-52' E. } W. Pine 10" N 40°-09' E .98'

April 19th 1935
Plant 3'-9" section of L.R. rail with anchor
-bar bolt holed. (6" exposed)
& set Shasta wooden post just N.
of the monument.
(± weed as exact point)

18

N. line Sec 1 - 38 - 5

June 30th 1933 Fair + warm
R.H. Hall with Duszynski, Gerger, Tonjstes
+ Redeneck.

At random pt (-20. +20.) = 40.00
on Az 268° 43.5' from Tp. cor.
Turn < W to NW to Orig. 1/4 cor.
80°-21' .94⁸

∴ at 40.159 Az < N. to 1/4 post 1.934

.02328 = Tan 1°-20'
1°-20'
+ 268°-43.5'
True Az = 270°-03.5'

V = N 89°-57' W. 40.170 ch.

Run N 89°-57' W on 1/4 bet 36 & 1 bet (from random traverse).
Random line from Orig. Tp. 38 & 39 N R 5 E.

0.0 = 1/4 post (Squirrel Hill Tower Bro 281°-51')
15.00 hub at W. end field. (.003)
(Should have made this 270°-04' ?)
17.04 hub at top of slope (.009)
Young W. Pine & Jack growth.

V

LN 1-38-5

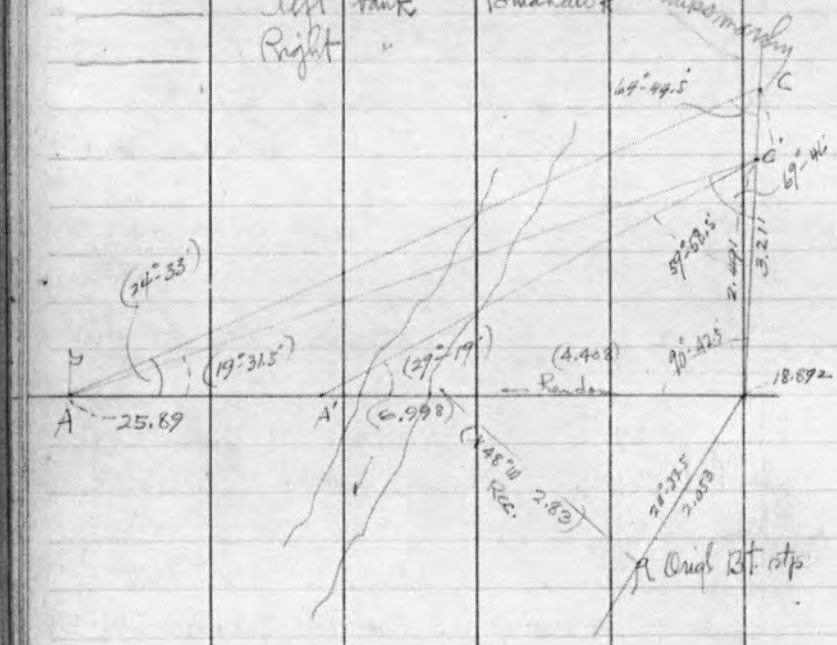
Continued

18.892 but near Top of slope to swamp p.

Orgl. Y. P. BT for MC left bank.

brs. ♀ 11°-33.5' (S 31°-33.5' W) 2.05[3].

∴ at 22.07 Orgl MC calc .14[2] N. of our random.



∴ In Δ A-B-C

$c = \frac{a \sin C}{\sin A} = \frac{3.21' \times .90439}{.41549} = (6.997)$

In Δ A'-B-C' $\frac{2.491 \times .93829}{.23422} = (6.999)$

In Δ A'-B-C' $\frac{2.491 \times .86584}{.48964} = (4.408)$

LN 1-38-5

continued

∴ at Sta. 18.892
4.408
23.300 picket W. of river

" 18.892 + 6.998 = 25.89 flag picket on side hill Rt. bank.

Calc. to a point N 48° W 2.83 from Orgl. BT. L. bank.
Our line would correct N. .00643 or 0°-22'
= .25[7] brs for S at 40.00 ?

= at 22.97 or .33 E of picket A' MC should be .148 N

= 24.92 or .97 E. of flag A
we should be .49 E of N. bearing to West MC.

= 24.99 or .90 E of flag A
we should be .07 E of N. of S. bearing To MC?

(No notes for do read
61.95 over river + at MC
Sp. Brk 10" N 81 W 199
do 10 S 83 W 203
= (.32 apart N 6° E)

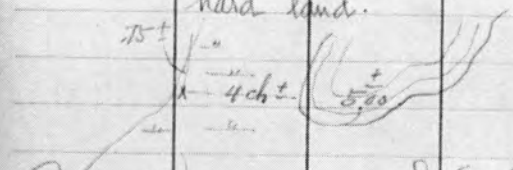
Resume on page 22

8-38-5

Cruising

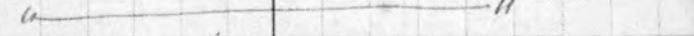
July 1st 1938. AM
Dan Jossart + Rt. Hall.

Fail to identify Orig'l cor $\frac{5}{8}\frac{4}{9}$ - but are able to locate probable loc. by shape of pond: Notes must be in error about 5.00 E & hard land.



Cruise S. 75 paces Road Erd'g (corduroy.
200 " lv. swamp
220± re-enter
345± lv. " SE
370 re-enter " SW
615 lv. swamp E&W
780 enter "
790 spot W 12 to an old line
963± fall 8 or 10" W. of Orig'l ¼ cor
Set temp pine post by stp of 30th Hem.
marks on E one. Gord boxing on W one.
Cruise N on abt 2° Grade.
¼ mile to swamp N+S. cedar N+S of line ✓
35 ch± lv " " "

Tall Fir, stub 8 or 10" W 3/4



→ Bearings for E'ly ¼ 2-38-5 ←
.07S S of sta 20.09 (page 25)

True Az. { Jack 5" S 46° W .72'
" 8" N 32°-50' W .44' ✓
Var 3°-35' E. { " 6" N 80°-10' E .68'
M. P. stp 20" S 12½° E .24'

(10)

4th Sec 1 - 88 - 5

July 3d 1933 Fair 70°
Rt. Hall with Duszynski, Tompkins, Rodewald, Geiger
{ + Leo Winkle & Louis Pogorelc
4th Sec Test #24

Continue from Sta 25.89 (.019)

① 24° 31' ② 49° 03' ③ 73° 34.5

27.60' Mnb. on stake. (.015)
30.596 " " mnt. (.016)
34.457 " (.019)

40.055 fall .037 N of 9th NW post.
from 1st post
Orig's bis. @ 2½ E 48⁵
" 72½° 665

(.021 ch)

40.057 fall 1.4' N. of old post hole

40.057
34.447 .0038
5.61 .021200
1.03
.0370

tang 0°-02'
.00053
.00005

40.057 .021200

0°-13'
random 270°-03'
269°-50

.037
.021
.016 diff in setting post

WC " N. of 9th NW

40.057
20.028
18.892
1.136 W of mnt.

✓

Decide to ignore both WCs since the distance from Orig bearings is so great and since true courses from ∘ may not bring corners where they were orig'ly placed - also as to line. The probability of placing corners where they were orig'ly is less than the probability that the party of 1860 placed them about on true line.

✓

~~N~~ ~~Sec.~~ 2 - 38 - 5 E

July 5th 1933 Overcast to fair 70°
R.H. with regular crew of 4
+ L. Pogorelc. + M. Wiltgen

(NEcor) Set iron cedar post.	Tree 4x		var 3° 30' E.	
Mw. W. P. 22°		S 16° 30' E.	.642	= 42.37
orig. obs.		S 21° E	.58 + 1.74 E	.66
Run N.east on random 44 I.		Add ½ pt.		
270°		Tree W. ±	Jack 14° S	43° 20' E
(270° - 01')				.763
0.0 Sec cor.				= 50.36'
8.41⁴ hub			(.037) ½ pt.	
			Scattering Jack	
10.44² hub			(.039) ½	4° 09' E
13	bottom of open hollow			SE
15.00 Tally stake	⅓ up W. slope			(.056)
18.195 pitch hub			(.068)	
20.096 ± ∠ .07⁵				
20. ~~Tot~~ picket.				
25 } Tally not hubbed.				
30				
3				

PM. Same crew except A. Casadonte replaces Toepfer.

35.00 tally stake
39.34 R and S turn ∠ left to protable location sight ¼ S.
10° - 04' .86⁵

40.00 hub on W. slope to roll. line crosses at N. edge shoulder.

* ∴ 40.192 rt. ∠ S.151 to possible ¼ Cor. by dist + course from 2 stps which agree no marks - stps far gone - soil has been cultivated.
Will continue this to NWx.

* Set Cedar post Oct. 26th 33.
N.B. DH Vaughan in April 1903 ran this line on 3½° E var. + at NWx fell .45 N. (dist 80.30)

∴ his var would be
80.30 | .45
.0056 = tang 0° 19'
3 30
3 49
1 03
2° 46' ∴ HH in 1933
3 30 on random
44' in 80.30 = 1.03 in mile.

30
21
30
60
63'

40.192 | 151.000
.03376
= 0° 12.9' S.

27

H-2-38-5

carried over meal.

July 6th 1933 fair 80°

R#. with Dwojnoski. Geiger (chain) + Wiltgen Roeneck. Poplack + Casadonte (ax).

39.34 hub rebt. Sun.

Time my watch 3' fast

Az ⊥ line = 90°-01'

① 8:54.8 − 3. = 8:51.8 alt 45°-15 Az 104°-24.5'

② 8:56.8 − 3 = 8:53.8 alt 45°-36' Az 104°-54'

44.322 hub + bkt. Sun. (.14½)

③ 10:12.5 Cold start accurate Centered magn. v 57°-37' Az 125°-31'

28

44.60 45. enter Swamp N + S. Spring creek runs N & S.

51.75⁸ hub + bare Swamp N & S. (52.00) (.126)

54.82 " v 2°-57' E (.12')

old house wreck bra N 9½° E 3½ or 4 ch.

60.00 Tally hub

60.287 rt ∠ 8 .11 + acct ⅛ S. v post (Pine post)

True Az. Var. 2°-52'E

W. Pine 9" S 89°-37' W 2.32⁸ Oct. 26th

W. " 9" N 8°-29' W 2.77

(bad butt)

63½ top of slope + gain plateau + pm

64.60' hub on (.101)

69.81⁵ " W end " (.091)

① Temp 90° Time 2:38 P.M. -3'

Alt. 51°-34'

Az. 245° 59.5'

calc "

② Time 2.40 P.M. -3'

Alt 51° 15'

Az 246° 34.5'

calc "

76.65 Tang to old road S E + S W. (.076)

77.145 hub + quit for nite. var. 2°-26'E

July 7th 1933. Overcast. 75°

R.H. with Duczynski. Jerges, (ch.) + Wiltgen, Casadonte, Rosenetz + Pogorelc.

Tie into Sec. NW x 2.

79.50		enter swamp.	(.07²)	
78.96'		hub + turn to	cor.	V 2°-45' E.
	(Call random 270°-06' per polar results.)			
	(267° — 22.5')			
	27 6 — 00.0			
	< 4° — 43.5'			
		.00086 = 0°-03'		
80.38²		fall 1.06⁹ N. of old post hole (only hole). agreeing reasonably close with remains of 4 cuts². The pine stub has all marks OK. SE spruce is down. boxing plain. Other 2 not so.		
	Set R over post hole + ts. on tree.			
J. P.	179 — 125 — 40 — S 54-20 E	.21		
Sp.	N 61°-30' E.	.187		
Sp.	232 — 180 — 40 — S 52 40 W	.125		
Sp.	N 51¾ W	.155		

Set 2" pointed cedar post ✓

Continued on page 105

Ref. to tie 270°-03' = 1057-57 (W)

Rm	℄	on random	W — 180° Az.
0.0		Sec. Cor.	Correct W.
1.44		℄ R.R. trd.	NW
1.78		℄ tote road	to camp 9 (.11')
2.15⁸		hub	on hard ground (.018')
3.20 +		re-enter	Swamp E + W.
499.8			2.51'
7.57²		hub in	℄ Grade .038
			Tr. 89° about 3 ch. Th. SE by
			+ S 89 W 5.00 ch.
	Cedar post for cor. + iron rod		
14.43⁴		∠ W. .07²	for 1/8 S. (not set) +
1/8/35	Birch 11	S 40 E	.39
Mag. 6.9 E	B. Ash 5	N 49 W	.26⁴ ash + cedar all swamp
r 2.5°	14.54	Rec. for 1/8	
15.00		Tally stake	on line (.075)
18.90		E. end	dry knoll. ± few acres
19.25⁵		hub	.096
20.00		re-enter	Swamp SW.
22.00		stake	on line (.11)

15.0 / 14.43 / .56 W

✓

— Resume on p. 35 —

calc.

80.382
− 40.192
= 40.19

40.095
40.192
60.287

80.382 − .151
− 40.192 − .069
= 40.19 .082
.00204 = 0°-07'

∴ Corrections are .15' - figured errors

48.322 − 40.192	= 4.13 × .00204	= .0084 − "	= .145	∅
51.758 − "	= 11.566 × "	= .0236 − "	= .12	∅
54.82 − "	= 14.628 × "	= .03 − "	= .12'	∅
60.287 − "	= 20.095 × "	= .041 − "	= .11	∅ V
64.601 − "	= 24.41 × "	= .05 − "	= .10'	S
69.815 − "	= 29.623 × "	= .06	= .07'	S
77.145 − "	= 36.953 × "	= .075 −	= .076	S
78.961	= 38.77 × "	= .079 −	= .072	∅

Cruise of Road Project in W ½
July 8th 1933 Saturday.
AM R.H. Hall with A. Knutson & Bloomquist
Dreithals post for Orig. cor 2-3-10-11
appears about right. & is about
3 rds. W of ℄ of present rd.
Th. N'ly by P.C. no vars. pacing on road
(26 paces per ch. ±)

North	140 p.	=	5.38 ch.
N 12° W	116 p.	=	4.46 "
@	28 "		1.08

Intersect ## planted area. Esw

N 51° E	80 p.	=	3.08 ch
N 10° E	50	=	1.92
N 14 E	54	=	2.08

PM. Hall + Knutson.

W. 1/8 S on 4. (not set)
S. on about 3° (runs near W. edge old Benedict Road opening

①	416 p.		= 16.00 ch.	
	To ℄ old grade	S 74 E		
		+ N 74 W		5 ch ± Th. dry
②	S 74° E on " " "	87 p.	= 3.35	
	To proposed junction			
③	S 9° W	311 p	= 11.96	
	@	235	= 9.04	
	℄ Trail SSE & NW			
④	S 7° W	47 p	= 1.81	
	@ 20 = .77	low spot	fill	
⑤	S 11° W	37	= 1.42	
	@ 25 =	junctn		
⑥	S 13° W	83	= 3.19	
⑦	S 5 W	31	= 1.19	→
⑧	S 17 W	30	1.15	
⑨	S 22 W	67	2.90	
⑩	S 26 W	23	1.00	
⑪	S 50 W	35	1.51	
⑫	S 75 W	100	4.32	
	@ 33 = drain			
⑬	S 70 W	23	1.01	

Sunday. July 9th 1933
R. H. Hall + H. M. Ginnis
6.6 miles x 2 in Truck

Find Orig. Cor. 17 | 16
20 | 21

Tam. stp. OK boxing + some marks.
Maple hard to define.
Set new scribed stake
Tall tam. ramp like trs N 57° E PC. 22 steps.
did not have tape.
(N.B. another Orig. Tam. 8" stands N — E 28.1 feet)

Pace W. ly on 2½ ± Evrgs
80 ± leave swamp (gradually) NW
145 p. = 5.58 ch to ℄ Fire road ✓
trs. ℄ 15° W PC.

See page ___ in Book 5

⑭	S 9 W	17	=	.74
⑮	S 43 W	39	to old n&s. cd.	1.69
⑯	S 25 W	149	new cut ff	6.46
⑰	S 17 W	77		3.34
⑱	S 14 W	54		2.34
⑲	S 10 W	50		2.17
⑳	S 51 W	80		
㉑	S 12 E	116	5.07 5.06	@ 88 enter planting & 8 W
㉒	South	140		

To Sec line about 3 rds E of Cor. 2-3-10-11

Sec. 2-38-5

W random - continued from p. 30

Monday, July 10th 1933 8:15
Overcast 75° truck transp.
R.H. Hall with Duszynski. Gerger.
Roeneck. Fogorele + McLeod

Continue S. (180° Az)
19.255 hub (.096) (Var. 2°-45' E)

28.50 br. swamp ENE + SW
28.715 hub (.143)
30.90 Enter small swamp E+W
33.25 leave " " "
34.29 at < W. to Orig 1/4 S (.171)
(.00499) = Tang. 0°-17'

Found 2 old posts (down) & 2 old squared trees.
Fail to find trace of trenches to fit notes.
but this is undoubtedly the old cor.

Drove new pine post (on ridge E+W) + mark
Pocket compass { N. Pine 8° S 37° W .485
0° var { W " 6° S 86° E .764
4/19/40 Substitute Co. Mon exposed + Cedar post stamped ✓
rain 10 AM

34.54 Tally stake at sec.
37.179 hub (.20)
40.305 " on Grove hill (.232) (Var. 3°-02' E)
young birch + hemlock - mostly dead.
broken - ridges E+W

Observe Sun 75° F.
Time my watch (2½' ahead of Cent. Std.)

① 2:39.5 PM alt 51°-13'
Az 245°-39.5'
calc 245°-37.5' = 2' slow

② 2:41.8 alt 50°-47.5' ✓
Az 246°-13.5'
calc 246°-15.2'
1.7' excess

∴ call random due South

45.831 hub on top hill (.288)
47.65 old road brs. E & W
Forks at line NW + SW
48.00 Tally stake. (.31)

S ⅛ on W 2 at .37 W → 53.996 page 37
Oct 27th 1933 pine post with rocks around near N. rim of gully (brs. S + W.) ✓
Var 3°-25' E. { W/ P. stp. 40" S 18°-45' E. 1.368
W " " 18" N 38°-40' W .38

LW 2 - 38 - 5

S.

July 11th. 1933 Overcast. 70°

Same crew + transportation as July 10th

53.796 at ∠ West .37 fr ℄ S.

→ See page 36 ←

49.652 hub (.326)

53.00 " (.361)

55.00 tally picket in ℄ edge (.381)
bare gully (brs. W)

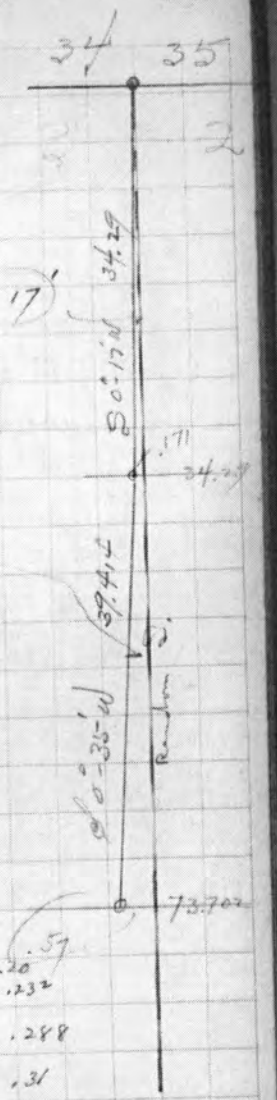
59.24 hub on ridge (.424)

62.78 hub on W shoulder SJ (.459)
road at turn. V 3°-20' ℄
" brs 172°-40'
" 62°

70.792 hub in hollow (.541)

72.462 " on knoll (.358)

73.589 hub + turn to Orig ℄ BT
86°-56'
82°
4°-56' Rec
.033 .38² = .033
73.622 Cor brs S 82 W .576
∴ 73.702 at ∠ W to corner (67 lks)



.57
.171
.399 ÷
= .01012
= Tang 0°-35'

73.702
34.29
39.412

34.29-.171
.00498
0°-17'

39.412
19.706 in ℄
- 73.702
Sta. 53.796 fr ℄ S.
- 34.29
19.706 x .01012 = .199
+ .171
.370

.57
.171
.741
.37

37.179	- 34.29 =	2.889	x .01012	+ .171	= .20
40.305	- " =	6.015	x "	+ "	= .232
45.831	- " =	11.541	x "	+ .171	= .288
48.00	- " =	13.71	x "	+ "	= .31
49.652	- " =	15.362			= .326
53.00	- " =	18.71			.361
55.00	- " =	20.71			.381
59.24	- " =	24.95			.424
62.78	- " =	28.49			.459
70.792	=	36.502			.541
72.462	=	38.172			.558

39 HW Sec 11 · 38-5

July 12th 1933. Overcast 80°
R.H. with same crew

Ang. Cor 2-3-10-11 - Set pine post.
Var. 3°-18' E. on 0° Meridian.
New Bridge on True Az.
3°-18' E. { N.P. 9" N 73° E .50*
W.P. 10" S 22°-03'W 1.14
(202°-03')

May 25 ⊕ W. Pine 7"/8" S 14°-25' E 1.02²
* has been faced + scribed on SE side
in last 7 or 8 yrs.

May 25th 1934 Duszynski · Wojciechowski + Chappelle
⊕ Plant 4' capped + marked iron Pipe (Wis. Cons. Com.) 11° Exp.
Stake in place (013t. removed for road.)
Run S 0°-35' W on Random between Secs.
10 + 11. being prolongation
of true W ½ Sec 2.
0,0 Sec. cor post.
4.61⁸ hub (.027)
Only spots are ⊕ of us

40

9.12 hub (.052) R. side wet slough E and S.
lay off base S E 121°-17' 1.00 ch.
< S to S. 59°-19' ② 118°-39
Stadia 149' ± ✓
calc. 2.288 = 151'
·2.288 Over slough to hub. Flag Brs 26°-24'
11.408 (.066) angle 25°-48.5 ② 51°-37' (25-48.5)

+1.23 to Top of ridge - hub

12.638 hub on ridge (.073)
.15. Tally pocket (.086)
15.72' hub (.09)
thence gradual slope to S.
20.095 hub (Var 3° E here on Mer.)
19.918 ctr E to Jack post .186 19.41⁸/37.82 = .51⁴

Jack post < N to E 46°-29' .257 ch.
19.861 ctr W. .114 for ⅛ cor.
P.C. var. 3° E { Jack Pine 7" N 8° E .083
" " 9" S 53° W .299
" " 6" S 36° E .87²
25.00 Tally stake (.144)
29.77 hub (.171) ✓

4W 11 38 -5
continued

22.60	℄	Rd	bns	SE+NW	
25.85	℄	" trail		NE+SW	
27.01	"	"		E+W	
32.00	Stake on line				
25.50	}	reef of rocks		NE+SW	
29.55					

4W Sec 11 - 38 - 5
(Random) continued

July 13th 1933 Overcast 70°
R. Hall with same crew i.e
Duszynski + Gerger (chain) + Pogonda.
Rosneck + Donald McLeod cutters

Continue ℄ 0°-35' W on random from NW x 11
29.77 hub (.17) (Var. 3°-33' E on Mer.)

37.70 hub on ridge (.21) land gently rolling

39.62 st. ∠ E. .20 to location of Orig 1/4 ?
I believe this was the 1/4 ?
but the evidence is hardly conclusive.
– Will correct the line straight.

39.734 st. ∠ West .22 for 1/4 S.
(25.35 net temp. post
+ on ℄ Var 3° E)

40.00 hub
41.70 " – Only large W. Pine (24) (down) bns NE
∠ N to E 31°-20' .45

PM

43.996 hub (.253)
47.00 " on hill (.27)
49.637 " valley (.285)

52.088 hub (℄ large pine hub) (.299)
55.505 " ⌐ bottom (.319)

59.601 ⌀ ∠ W .343 for ⅛ ℄. ✓

July 14th 1933 75° 80°
R# & party arrive 5
Continue random S. ℄ (S 0°-35' W) ✓
2 polar shots at (.352)
61.183 " result in course ℄ (180°-32' ± 180°-34') call it (35') ✓
66.048 hub (.38) ⌐ bottom Ind. ⅛ ℄
(66.40 enter meander) small round swamp hole (Ad ℄)

(67.70 lv do)
67.935 hub about Ind (.39) S. ℄ slough

69.732 " on (.401) hog back SW.
young W. P. Spruce
Balsams.
Var 4°-07' E base on Meridian

74.085 hub (.426)
" (Var 4°-20' E on Meridian)

Cor. set post as near as possible by orig B.T.
S 87 W. (Tam S 27½° E .15)
Iron Birch 3 S 87½ E .078 ✓

Other Tam. may be orig
N 8° W. .16

Set on post (.03 ch N. of Albono stake)

79.55³ hub & tam. N to W to post .46⁵

79°-36'
Sin .98357 = .457
Cos .1805 = .084

∴ − .084
79.469 at W to Orig. Sec. Cor. .457
.005
= tang of 19.7'
correction West.

S. 0°-35' W
+ 20
S. 0°-55' W true line

19.469
39.734
39.6
.11⁴
.43 W
+

.457 / .228 W

Stadia Map of Camp Site.
NE ¼ NE ¼ 1-38-5

July 3d 1933
Check Stadia in K & E

Meas.	Reading
100.	100.
200	202
300	303.
400	404
500	506 ±

Traverse on True Az.
Beginning at (10) ⅛ cor W 1

	Stadia	
① 129°-17' = S 50°-43' E	475	470'
To hub on old grade (Fro 94°-46')		
99°-53' = S 80°-07' E		
to NW x office bldg.		
@ ① 94°-46'		400'
hub in same old grade		
24°-50'	212'	210.
W x office		
60°-50' S. front mess tent (kitchen)		
13°-24'	153	
18°-08'	158	
S. stake. car parking space		

47

Camp in NE NE 1-38-5

Stadia traverse

R still at ①	287°-20' = N 72°-40' W				
	To intersect camp rd. with rd on ½ line.				
	337°-05'		103	angles in camp road	
	43°		98		
	69°-38'	NE tank (pyramidal)			
	83°-35'	SW " "			
②	58°-54'			261 =	258'
	Huts near new bldg.				
R at ②	294°-13'			SW x offset	
	76°-10'	NE x pyramidal camp			
	104°-13'	SW x " "			
	47°-54'			246'	244'
	fence cor.				
Section report posts	44°-47'	N. post		126	
	97°	S "		89	
	134°			100'	
	Turn in camp road				

48

Secs 10 + 15 - 38-5 E.

Cruising road location

July 15th '33

R. Hall + Henry Albom

Project 10

Commence on random E 10 at 25.00 ch. S. of NE x

Courses by Pocket compass 0° var.

Distance in steps (1400 per ½ mile average)

①	S 25° W	335 =	13.40 ch.
	@	285	11.40
	Swamp 6rd W.		
②	S 10° W	292 =	11.67
③	South	125 =	5.00
④	S 18° E	470 =	
	37 to 67 marsh. E + W		
	223 - 252 " E.		
	294 sharp ridge - must detour E.		
⑤	S 33° W	243 =	
	145 - 185 Swamp 6E + W		
	(By being 5 or 6 rods W of W wood & cross better)		
⑥	S 30° W ±	to marsh 80 =	
⑦	S 53° W	190 =	
	@ 63 over marsh.		

10 - 38 - 5
cruising

⑧	~~South~~		1032		
	S 60° E		1050		
	@ 300	open marsh 40 ft. grass			

53

℄ S½ Sec 1 - 38 - 5

July 17 ± 1933 Overcast Shine 75°

R.H. Hall with (Duszynski, Jerger) Rosaneck Pagorski + R. Lloyd

Time line

Correct random ℄ N½ (run page 1)

Rat Orig ¼ S. Vermin on 179° - 32.5' + 68 links

0° Meridian — Var. ~~7°18'~~ West. 0°33' "

My new bearings read

Jack. N 20°-30' E. .89

W Pine N 26°-25' W .987

Orig bns N 40°-50' E Rec.

Run notes - all from 0° Azimuth

Stakes counted Oct. 23rd 1933

Run South (Azimuth 180°) on random

0.0 ¼ S.

Leave bottom at post.

9.38' hub in ridge .08 E

watch time (3 7' fast)

①	9:34	Alt		
		∨	50°-09'	
		Az	114°-57.5	
calc.	this obs.		114 - 58.5 ∨	
②	9:36.5	∨	50°-32'	
		Az	115°-38'	
calc.	this obs.		115°-35.5	

54

correct East. 520' 5.± .147

17.29 ± hub on ridge open profile trees W. Camp. flag bears 353°-05'

19.95 fall .10 W. I am 8 (.17) feet down

20.009 pt ∠ E .17 for ⅛ S. cor.

(20.01) Pitch post { Jack 6" N 53° W .673 ; 6" S 14½ E .58 ; W.P. stp 40" S 41° E 1.247

Old 23rd 133 *

20.00 Tally hub in pvmt.

22.106 hub (var. 4°20' West) (.187)

25.00 tally picket (.212)

27.62 ℄ old R.R. Grade bns S 75° W ± 358 steps to ± travelled section

28.09 ± hub (.238)

358 steps ± N 75° E from off S cor

30.52 ± (.259)

34.417 ± (.29½) .29

34.428 B.S.

39.19 Hub - bron ⅛ steps S. (.332)

* Somebody's old BT at ⅛ cor S 75 E .252

Identify Orig Cor to Secs 1+12 38-5
6+7 38 6
by old post hole agreeing ± with stps of the
three Orig bs.

Tam post → var 1° 03' E.

" bs. S 82° E. .313
" " N 62° 50' E. .993
" " S 8° W. 1.01'
.611 + .40 =

Remark stps.

var 1° 13' E

40.00 Hub - Face on Orig Stub 13 T
brs S 84° 36' E .653
Rec. S 77 30 E .31
7° 06' .343

Sin .1236 × 31 = .038
Cos. .9923 .308
40.019 .00850 .00848
∴ 39.98' ~~to E to cor. .339~~
40.00 Tum Sto E (86° 44') .34
Sin .9938
Cos. .05698

Tang. 0° 29½' Course E.
∴ Course S 0° 29½' E. = 39.98' / 19.99 = 40.019 / 20.009 = .339 / .1697 (.17)

July 18th 1933 70°
R# with same party
Ride with Rents truck
Continue Sly (S 0° 29' E) on random
after setting Tam post at Orig cor.
1-6-7-12 as noted.

(Correct last 2 stations N. of cor &
Produce true line S 0° 29' E

0.0 Sec. Cor.
2.00 } along W edge of swamp.
3.00 }
3.60 Picket on ridge
4.50 enter swamp just W of narrows
8.65 bs. " NE & SW.

var. 3° 08' E on 0° Az.
8.943 hub S. of marsh just W. of narrows. .0038 (.25 on 3°)

11.671 hub on N. shoulder = .005 ch (.33')

57 — E 12-38-5

13.25 6 — hub on NW border of open plateau (var 2°-07' E) — .00 56 (.31)

20.00 — tally hub — .00846 = .56 for 8 ch.

3/1/40 — Set 1"x36" iron pipe for d.s. 5x5" Tam post alongside

0 Var. — x { Y.P. Stp 14" 569° W 409 ; Jack Pine 6" N2° E 1,539

(var 2°-07' E) .011 (.73)

25.98 8 — hub on S bor flat hill — Observ S m. time very wated 85° 3¼' fast with C Std time

① 2:27 — v 52°-16' — Az 240°-48.5' — calc. = 240°-48.5' ✓

② 2:29.5 — v 51°-55' — Az 241°-29.5' — Calc = 241°-32 — 2.5 excess

11.55

28.45 — Enter swamp. E+W. — .017 (1.12)

40.00 — Hub - find nothing. continue picket line by eye - soft bog.

(3141.6) 47.60 — picket - N. bank.

Random E 12-38-5 Continued. 58

July 19th 1933 — Rainy 70°

Pty. with Juszynski. Gerger. Rozenek McLeod + Pogorelc.

Begin on S. bank Kanteshine river allowance

- bro N 40 W 4 ch ± th. R.

Pierre W. - skaggish

" S 70 E 3.4 ± " E.

R on line - lay base nwly .60 ch.

∠ N to W 52°-15' v (2) 104°-31'

∠ at B. to E. 88°-33' v 177 04 (88 32)

77°-48'

179 60

A = 37°-12'

39°-12' A

B

85°-33' 60

= .949 = .95

∴ 47.60

.95

3207.3 = 48.55 hub on S. Bank. → .0206 (1.36')

3249.1 55.59 2 picket on N bank creek (NE

+ 1.00 over

3735.1 56.59 2 picket S " "

Cut bro N 17° E 4 ch. bisects

S 62 W 4°

59 ℄ Sec. 12 - 38 - 5

60.00

4346 65.84 R + hr. Swamp. E + W.
56 59 =
9. 25 Hub Var 2° 10' E. .028 = 1.85 = 1.60
found to be .25' too far E.
Move R — W. to line
of sight 1.

68.44 hub (.25' too far E) = .0291 = 1.92 = 1.67
Move R .25' W. to agree
better with line of pickets.

72.57 hub at N edge Jack flat .031
mostly open
- River only about 4 ch
W of line here

Observe Sun Temp. 85°
Time my watch 3' fast.
① 3:18.5 vert. 43°-52'
Az 253°-46.5
calc 253°-40. 6.5 obs

② 3:20.5 V 43°-33'
Az 254°-14' calc 254°-08' 6' obs

79.98 fall .04 W. of a post.
80.00 hub + point for sight.

1.68 E

℄ 13 - 38 - 5 60

July 20th 1938
Overcast. 75° Muggy.
Rft + party cross ride with Hunt
dinner out.

80.00 fall .03 W of true cor. as
defined by old stake hole agreeing
with rec. dist from both Orig's.
- Only W. tree was N W + not SW.

.00421 = 0°-01.5' = 2.66

Set new post + mark rocks = 36.92
Jack Pine 7" S 76°-35' W .56
" " 9" S 52°-00 E 1.69
Var 3°-16' E on 0° Meridian

Orig's - N 64°-50' E. 1.18 = 77.88
N 16°-10' W 1.01 = 66.66

Az derived from sighting to B.S over hub
72.57 as N 0°-44.7' W

Run ℄ 0°-30.5' E on random
set 13 + 18.

℄ 12-38-5 E.

(.10)

15.417 hub on random
Var 2°-15' E on Meridian

20.00 picket on line

20.118 at < W. .1305 for ⅛ d.
Set dry jack post

Oct 18-33
True Var. 2°-04' E
Var.
Jack 7" N 70°-50' W .826
" 12" N 33°-10' E .756
" 7" S 34°-10' E .775

(.162)

25.00 hub. Sand level.
Iowa. Probably jack pine growth.
Var on 0° Meridian

33.81 lock E+W .76 - fail to find
any y. P. Bt

34.962 hub (.237)

40.00 hub + tree < S to W var 1°-05' E
63°-56' to a post .565 ch.
Sin .3983 = .578
Cos .4354 .248

∴ 40.248 at < W. .508 to post found

40.705 ℄ old road NW + SE

Observe Sun at hub
25.00 temp. 90° Time my watch 3' fast.
Lat = 45°-47' N.
① 2:25 PM dec. alt 52°-18'.c
Alt = 52°-17.4'
Az reads 239°-54.5
calc = 239 48.
6.5 chy

② 2:26.8 PM.
dec alt 52°-03'.6
" = 52°-02.4'
Az reads 240°-26.5 NC.
" calc 240 18.
8.5 chy

transit must be out.

Auxiliary ref. =
Jack notched N 55°-50' E .212
" " S 53°-E .228

40.236 at < W. .261 for ¼ ø cor. (℄ road bro. ø. 34½
Oct 18-33 Set dry pine post
True Var 0°-45' E
Var
Jack 6" N 31°-30' E .97
" 7" S 72°-25' E .613
" 7" S 54°-33' W .85

63 ℄ S½ 13 - 38 - 5

July 21st/1933 Moist 70°
Rtt.) with Same Crew
Continue ℄ 0°-30.5' E on same random.

46.19 hub ℄+W for Orig P.O.B. +
Find nothing

46.962 hub + offset W 6" to pass (.302 from hub)
W. Pine 16" (Var 0°-40' E)

Continue S½ on ed. offset West.

60.00 Tally on orig. random

60.355 at ∠ W. .392 ch. for ½ ⊕ cor.

Oct. 20th Pitch post { Y. Pine 9" S. 83° E 1.288
Time Az. Jack 6" N 39°-30' E .98
Var. 1°-35' E " 6 N 60°-40' W .801 (.638 from hub W.)

60.908 hub on offset + move A
E 6" to line

66.71 . hub on line. (Var 0°-57' E)
(.437)

70.253 hub (.152)

71.167 " (.465)

64

74.116 hub (.481)

74.42 ℄ Rds W NW.

78.885 hub + ∠ Rt to Orig Cor. as marked by Vaughans post + 3 ounce

18°-14' ⊙ 36.-28' 1.67 ch

1.586 Sin .3129 = .522
Cos .9498 = 1.586

∴ 80.471 at ∠ West to cor. 13-18-19-24

.522
.00649 = Tang. 0°-22.3'

∴ Random = ℄ 0°-30.5' E.
22.3

℄ 0°-08.2 E = line bet 13 + 18

= 80.473 ch. =
= 40.236 " =
20.114 =
60.354

18°-14'
30.5'
Az 17°-43.5'

80.471
74.47
6.05 on random

Tan S 89°-53.5' E ⊙ SE x 13
= 269°-53.5'

88 53.5
180
269°-53.5'
35 22
90°-06.5'
17 43.5'
107°-50'

Comment XE part 38-5

Calculating corrected courses + distances
(True Azimuth)

from Tp cor. WE fnd.

		S.	E.
SE cor. Sec 12	is	151.549	1.296
SW " " 11	is	153.046	162.050 (W)
		1.497 ÷	163.346
	=	.00917 = Cot	S 89°-28.5' W.
		Sin "	= .99996
		$\frac{1}{2}$ 11 $\frac{1}{2}$ 11	= 163.352
HS Rec.	= 80.80 + 80.10		= 160.90
		160.9) 2.45²	mrop.
		.01525	per ch.
	80.80 ×	"	= 1.233
			80 80 11
			82.033 ?
	80.10 ×	"	= 1.222
		80.10	81.822
			163.355 ✓

SE×1 is 71.55² + .586 E.
SW×2 " 73.586 161.180 S
2.034 ÷ 161.766
= .01258 = Cot S 89°-16.7' W
calc. 161.779
HS Rec = 80.90 + 80. = 160.90
444
16.9) 1.879 mrop
× .01546
80.90
.444

∴ 81.344 notable
80.443
161.787 ✓

Observations on our prevailing
Course + dist on W 2 + 11
" " = 17'
55
52
S 26 W.
W = S 55 W
281
S 0°-40' W. Ave course.

Meas. W-2 = 34.29 + 39.41
Rec = 34.57
34.57) .25
.00724 short per ch.

40.
40) .586
.01465 short per ch.

Meas. W-11 = 79.47
Rec 80.
80) .53
.00662

∴ .00724
.01465
2).02189
.01094 W 2
.00662 - "
2).01756
.00878 hypo short.
80
.7024
80.
79.298 assumed
W-14

S 0°-40' W.

(In random course # 13 + 14)

SW× Dec 14 Hyp = 232.34 S + 162.973 W
SE× " 13 Actual = 232.022 + 1.483 E
.318 S ÷ 164.456 W
= Cot S 89°-53.5' W.

HS Rec W 81.00
80.60
161.60

.0197
80.60
1424
80.60
2)3.024
41.013
81.
1.434
82.434 = 81 ×

164.46 ±
161.6) 2.86 (.0177

Observations - continued

∴ Try Running S. 89°-53.5' W on ℄13

and @ 82.44 temp sec. cor.
2/41.22 temp 2 61.83
20.61

20.506 — 102.946
2/41.013 123.45
82.44 143.96
@ 123.453 temp 4 ⅆ.
@ 164.46 " Sec Cor. ✓

∴ Set temp stakes @

20.61			
41.22	Rec	40.50	2 spruces p. 30 " "
61.83			
82.44	Rec	81.00	2 poplars
102.95	"	88.00	swamp rd SE.
123.45	"	121.30	2 Norways p. 33
143.96			
164.46			

℄ 13 - 38 - 5 E.

ⅆ 89°-53.5' W ± on Random Line
Az 269°-53.5', (Calc to about 1/4 cor 2 mi. W.)?

July 24th 1933 Fair 80°
R.H. Hall with same crew - Duszynski & Gerger (chain) & Mc Leod, Pogorelc & Roseneck (cutting).

Re-set post found at Orig. SE cor 13.
& get ± true Az from Polaris 78.88 5
(Var on 0° Az = +15' E.) 2°-18' E.
Picket out true angle line N 0°-08' W as far N. as road. (6.10 ch. to ℄ Rd.)
* 10-11-33 Set County mon. 6" exposed with wood post W. side do.
Orig Fearnaught road.

	N 43° E	Rec.	O.K.
N 2°-13' E	S 5 E	"	O.K.
		but tilted over	
	S 14¾ W	Rec.	

* at 418.5' N of Cor. Set white post & plaque (11' N of ℄ rd. as remarked.
Drill W. from 12" N 77° E .979
Oct. 23rd 1933
Set new post & mark:

Trav Az.	Jack Pine 9"	S 68°-50' W	1.76
	" 10"	S 56°-55' E	1.51⁸

& Complete correction of random ℄ 13. ✓

"69 ₵ 13-38-5

Random finally determined = S 89°-36.8' W. ← Correction = S.

0.0 Corner.

1.86[9] hub 8"

2.12 fall .24 S. of blazed poplar

80°

① 9:54.5 AM Cent. Std
V 52°-48'
Avg. 123°-18.5'
123 08
calc 10.5' obs

② 9:57.8 V 53°-15'
Az 124°-17.5'
calc " 124-04' 19.5' obs

8.04[2] hub + enter-thick jack 2.94'

Average dia. 4"
Var 2°-45' E.

15.97[8] hub 5.84'

20.[125] [11] ft ∠ S. [11] for ⅛ S. = 7.4'

10/11/35 Drove 5½' iron shaft* (+ cedar post.)
Var 2°-15' E. { Jack 8" N 80° W 12.6'
" 6" N 39° E 40.2'

20.61 Tally True line called S 89°-17.7' W.

70'

22.71[6] hub
27.109 "

0 2:13.5
53° 02'
236°-25.5' 9.5' obs
calc 236°-14'

② 2:16
V 52°-24'
Az 237°-13'
calc 237°-35'

40.25 ft. ∠ S. .223 + set ¼ S. bet 13 + 24
Set County Monument* 6" exposed (+ cedar post.)
True Az. { Jack Pine 9" N 52°-40' E 23.2'
Var 1°-35' E. { do 9" S 53°-20' W 17.5'
Oct 11th '35

34.29 ± Cedar Falls rd. W SW. by
35.48' hub in sag (Spruces)
(V 2° E) 40.34[8] " (pace N 40 to a line + E 19 to a cor.
41 enter low spruce sag.
41.62 Tally (Should be 41.22)
42.64[5] Centre of Hunts road (NE)
72

* see page 72

Corrected to here Oct 11th 1935

July 25th 1933 70° Fair

R. Hall with same party.

Fail to find any 1/4 S.

Find some ones line N. of us + (possibly 8 or 10 yrs old (40 paces N of ✓)

Continue same random ~~S 89 - 53.5 W~~

41.22 tally comes in low spruce draw

42.72 ℄ hunter road NE squared up poplar 19 p 6

47.71' hub .299

51.406 " picket .322

52.00 .326

60.401 hub .387

61.83 picket

53.90 to 56.00 swampy ground

57.767 hub .361

58.00 to 61.60 " "

☆ 60.334 see page 72 ——

68.563 hub scattering poplar + jack .429

80° F. (Var. 3° 58' E on Meridian)

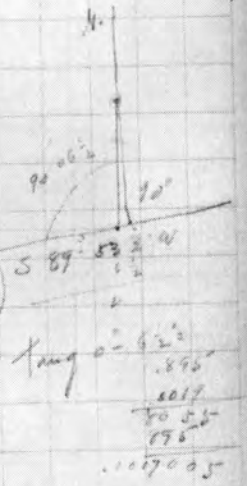
① 2:40.5 ∨ 48° 41'
Az 244° 15'

② 2:48 ∨ 47° 27'
Az 246° 14'

Obs. listed made at hub 73.168 Lat. = 45° 46.4'
73.168 hub .458 Long = 89° 49.2'
77.34 hub .484
81.00 " at Goat record
82.44 picket " hyp. " ?

82.70 Centre of road running NW + SE.

81.00 hub on range
- 80.432 P.R.
.568 Th. 4 at 90° .895



@ 40.253 at ∠ S .223 for # S. 13 ——

→ See page 70 ——

☆ @ 60.376 at ∠ S .335 for west # cor.

T 14 - 38 - 5
S ½

July 26th 1933 Fair. 75°
R.H. Hall with Druzgynski Target
Mc Leod. Pogorele & Rosenek.

Look for SE x 14 .00624 = Tang 0°-21.5'
~~80.446 at x @ .500~~ ~~to Calc~~ ~~pro-rate both ways.~~

.075 ch

81.00 Offset N .5' (6") to pass Norway at
85.147 Mc Norway. 12" .323 1
(81.26 Random falls 1.13 ℄ of only possible loc. ℄ old corner visible. Several large Aspen remain & 2 check OK for course & dist. but can find no hole. Or temp post there.

July 16th '35
80.501 at. & ℄ to orig Sec Cor .446
.00554
Tang = 0°-19.1'

See Book IV page 88

.33
.375 ℄

85.20 hub on 6" offset, ↑ brow of hill
Slope down 10°
88.25 jacket on knoll .249 .288 S.
88.90 Enter swamp at
93.75 Leave " at S

.051
95.745 hub - (still on 6" offset. .074 ℄
@ 98.058 true line intersect (∠ 1°38.2')
98.851 " .031 .015 N " " " (Var. 5°-13' E)
102.187 " .119 .111 N " " "
101.013 " .088 .077 N

.189
104.835 hub " " " .186 N

(Var. 5°-50' E on Meridian)

~~100.451 at L N .068 ch for 1/8 S. from random.~~
~~-.008 offset~~
.06
100.270 at L N .068 for 1/8 S.
100.256

97.387 Intersects random & true line ∠ 1°-30'
97.674 " offset " " " "

98.851 true
97.674 = Course
1.177

1° 30' Calc
N 88°-45' W.

$\frac{S}{4}$ Sec. 14 - 8S - 5W

($S\ 89°-53\frac{1}{2}'$ W ± on (6" N of) Random

continued

July 27th 1933 variable 75°

R.H. Hall with Same party of 5

107.57'	hub (still on offset)	.261 .264 N
	Var. 5° – 4½ E.	
110.893	hub (still on offset)	.349 .358 N
+ 1.10 (reduced)	Slope down = 24° 15' (mean)	
	Cos = .91176	
	Move R. S. 6" on to orig. random + resume.	
		.91² .19
		1.10²
(111.85 10"	Balsam on offset line	
111.995	hub on random at E edge Swamp. (N + S.	.386 .398 N
	(Var. 4°-54' E on Meridian)	

Random $\frac{1}{4}$ 14

112.00	Enter swamp.
119.00	leave "
119.51	Hub (on random line) .584 .613
120.70	Enter Swamp. again (irregular)
121.30	Picket in Swamp (at U.S. Record.)

No posts to be found near here.
Find old B.T.W. posts on W. Pine
about 130 steps S of 120.25 ±
+ N + S posts between said pine +
the random. ?

Swamp contour does not indicate that U.S. deputy ever ran $\frac{1}{4}$ 14.

120.456 at ± N .64 ch. for $\frac{1}{4}$ $\frac{14}{23}$

120.039 at ± N 59½ to orig. ¼

See III 62 →

S W¼ 14-38-5
continued

July 28th 1933 Fair 75°
Ray H. Hall with same crew ie
Dwozynski, Geiger - McLeod
Pagorelc + Rosenack.

122.28		hub in swamp.	.664 .692 N
123.25		leave - NW + SE.	
123.977		Hub on pt. of land from S	.714 N .714
125.00		Enter swamp - NE SW	
126.25		leave - N SW	
129.352		Hub W. end opening	.894 N .871
130.10		Enter swamp NW + SE.	
132.129		Hub in hard spot	.973 N .953
136.000		Picket on line quit for day - thick alder + Tamarac	1067 1084 N.

122.28
130.129
1.429

140.252 N 1.191 for ⅛ cor (June 14.'34) cable. not set

Rec° 81.60
1.60
1.36
25.6'
10.9°

Remove on page 93

N

Traverse Project (4) in 1- 12-13
38-5

July 29th '33 Hot- windy-
Ray H. Hall - 8:30 AM

All courses are by Pocket Compass & Var.
" distances " " single steps
averaging 1000 to half mile
500 " 1/4.

Beginning in ℄ Cedar Falls Road where
Hunt's road (#4) intersects ds.

a N 2° E 40 p.
b N 34 E 100.
@ 42 intersect my random ℄
Sec 13 at 42.72 ch.
W. ¼ SE cor. Sec. 13

(∴ 100 - 42 = 58 p. — Sec 13)

c N 20° E 92 (following E. edge brushing)
Sp. + Tam swamp bus & small culvert?
d N 5° W 170.
e N 26° W 30.
f N 49° W 73.
@ 55 about ℄ 2 ch. swamp
Requires 8" or 10" culvert.

g N 34° W 50 (29+21)
@ 20 lv. swamp.

h. N 6° W	215.	(along E. stake line)	
i N 4° E	400.	1, 2, 3	
	@ 11	W. Pine 11" dia brs E	8'
	@ 153	℄ old trail brs N 57° E.	
	@ 311	W. Pine 10" to on E rd.	
j N 5° E.	351.	1 2 3	
	@ 100	enter barrens.	
	@ 313	℄ old road, connecting with #3 brs. S 82 E ±	
		(See separate traverse page 83)	
k N 10° E	48.		
l N 12° W	330		
	@ 75	intersect + continue on ℄ along old rd from NE	
	@ 105	dry bridge	
m N 15° W	88.		
	@ 52.	old road brs NWly	
n N 3° E	61.		
o N 13 E	34.		
→	Resume on page 85		

Traverse of trail from ④ to ⑤
Beginning at j 313 page 81 (Hunts road)

1	S 79 E	65 paces.	
2	S 82 E	70 " to main connecting rd- bns N 40 W	
3	S 45 E	29	
4	S 57 E	50.	
5	S 64 E	114.	
6	S 67 E	140.	
7	S 70° E	55.	
8	S 79 E	47.	
(9)	S 73 E	131.	
10	S 75° E	100.	
11	S 63 E	60.	
(12)	S 57 E	90.	
(13)	S 64 E	98 to Range line	
		(105 to random at 40.70 ch. of j NE cor.	

Pace N'ly on random from 40 ch. to check my pacing. (Var about 4°

487 to 20 ch.

~~960~~ 960.5 to NE x 13

480. per 40

This is an easy pacing

Rm W. from SE x 12 on var 3° E.

286 round topped bare knoll

316 enter swamp ⑨

383 Spring creek 03 wide runs NE

730 hr swamp SW

985 ¢ road. to ④

p.	N 18° E.	280.	
		@ 57	old road NW – SE.
		@ 72	intersect my P.C. line from SE x 12 at 98½ steps.
			" "
			(85 to End.)
q	N 16 E	70	(Note p & q look straight) Compass variable.
r	N 9° W	129.	To descent along side hill.
s	N 17° W	70.	
t	N 8° W	252.	
		@ 126	Stream & marrow
u	N 35° E	600.	
v	N 39 E	30.	
w	N 57 E	340.	(to flagstaff stp)
		@ 119 – 133	Kaubeshin R.
		@ 275	turn out.
x	N to E	50.	
y	N 13 E	320.	

z N20°W	200.	set flag.			
		Then go to Quar. Cor. on Sec 1.			
		Var 1°E. Run W'ly			
		330. to ℄ road in cut. + gather stones in pile W side			
		Thence N. 18° E 91 to flag at z 200			
		∴ Plotting reverse from flag			
		S 20° E 291 etc.			
July 31st	1933	PM	R.H. Hall only		
Sky in ℄	road by PC.	pacing 1° Var.			
0.0 =	E & N	H 1-38-5			
" South	210				
	@ 80	℄ cor. and bn S89E			
b S55°W	81	to junc. new rd.			
c S4°E	1180.				
	@ 800	ridge			
	@ 1040	" (summit)			
d S42°E	278.		up grade.		
	@147 164	summit (same comes reads S47E of road N66E			
e S20°E	79.	To line of Sec 1 + 12			

278
164

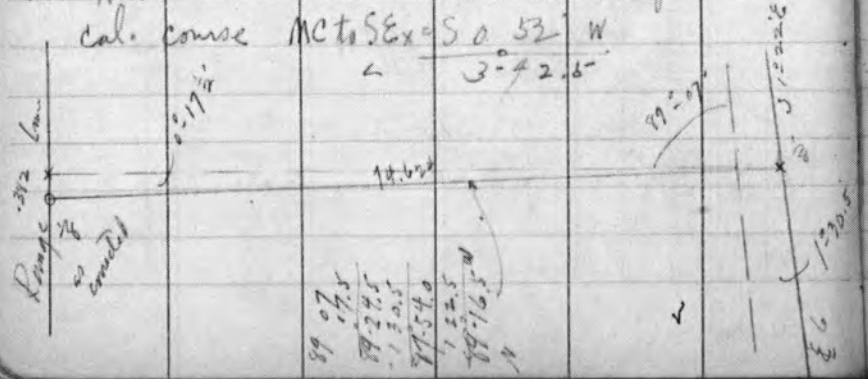
July 31st '33 Par. R.H. Hall.
Intersect corrected E&W 1/8 line on N 1/2 G
with random ℄ G
& turn ← W to N.

① 89°-07' ② 178°-13.5'
Rev. ① 89°-07.5 ② 178°-15.

∴ Random ℄ runs S 0°-08' W.
True ℄ S 1°-22.5' E.

∴ Orig'l MC on S. shore = 43.938 + 75.457 E.
" SW x is 71.552 + .586
27.614 74.871 E.
U.S. Rec = 30.95 74.50
3.174 .371

∴ Hub 21.75 lks N 2°-50.5' W from M.C.
cal. course MC to SE x = S 0 53 W
∠ 3°-42.5'



August 1st 1933 Fair. 65 75°
Rod'm H. Hall & Duszynski. Roseneck & Pogorelc
Mc Leod & Berger (chain).

Run S 0°-52' W on random from Orig'l MC
on S. shore Silver L. bet 5 & 6.
Ran N 0° Az - 1°-48' E.

0.0 MC.
.73 hub
2.45 enter swamp trs NE & SW
4.25 lv. " " "

4.68 hub
6.40 SW x of swamp. (reaches from 4.25 to 6.40)
7.647 hub
11.897 hub on Summit.
13.785 "
16.59 ℄ of road NE & SW
10.05 Rec. for 1/8

19.101 hub + observe Sun 75°
(My time) 2 days with Cent. Std time
① 2:52 P.M. V 45°-27' Az 245° 30'
② 2:53.8 45°-10' 245°- 57' V

℄ 6-38-6
continued

23.72 ℄ Road no. 3
bns SW + SE winding

24.16' Hub.
26.56[8] "
~~29.282~~ " ~~in bottom~~.
28.292 " " "

30.05 rec. dist from MC.

30.0 / 0.0 / 0.5 / 10.0 / 0.5

August 2nd/ 1933 AM only 65° Rainy
R.H. Hall with Duszynski. Jerger. 11c Leet.
Search for Orig Cor. 5-6-7-8
Find only one large W. Pine stump
anywhere near record location.
Balance are Y. Pines.

N 74° W 2.02 from rd. W.P. twigs as about
Ind SE of sta 28.29
Unable to find any evidence of a post. on the trench
Shaw is reported to have never known the
location of the corners.

93

T 14 - 38 - 5

continued from Page 77

August 3d 1933 Fair 70°
R.H. Hall with Druszynski, Pogorelc + Rosenack
Gerger + Mc Leod (chain)

Continue random # Secs. 13 + 14
S 89° 53.5' W
(132.129 Hub Var. 4° 30' E on 5° Az.)

145. Tally stake 1.33 1.34 N
146. 724 hub 1.39 1.37
154.77 ℄ creek .05 wide runs SW
157.30 leave Swamp (Island) of W.T.Y. Pine trees N
possibly ¼ acre
no sign of pine.
1.703 1.704 232.319 ft 156.233 W ft ℄
157.716 hub ℄ to camp.
(Rec= 161.60 or 5.37 to go)

N.B. — Got notes call for Sec Cor 5.60 W. of Tomahawk river but Dan Jossart says it is on ℄ side - possibly 20 rods.

94

T 14 - 38 - 5

August 4th 1933 Fair 75 80°
R.H. Hall with Gerger + Mc Leod (chain)
Pogorelc, Rosenack + Druszynski.

find old post in marsh which meas 1.78' from Orig. M. Pine B.T.

re-meas. 158.62'

@ 158.60 on random Set R + Turn - Rt
(N to N) to Sec Cor.
@ 43° 43' (2) 87° 27 (43 - 43½')
SW to E
@ 136° 15.5' (2) 272° 32 (136° 16' / 43 47½')
43 - 43.5
179° 59'
- 43° - 44' nt. 2.58 ch.

1: 158.60 = 232.32 ft
Bn. N 46° 22.5' W 2.58 = 1.781 N
tz. 313° 37.5'
313 37.5 / 269 53.5 = 43° 44.0' = 2.582

157.117 W.
1.868 W
158.985 W. - Sec 12

1785 + 1866
1785 ÷ 158.60 / 160.466 = .01113°
(0° 38.3')

Cor. 14-15-22-23

230.541 S (SW¼14) + 158.985 W
153.046 S (SW¼11) 162.050 W
77.495 N & 3.065 W

∴ W 14 calc. = tang. N 2°-16' W. .03955
cos .99922

Var 3°-45' E. at Cor.

103°-27' S 76°-33' E Angle at 1.785
179°-60'
128°-08'
76°-32'

New Post.
New Cing:
W. Pne 12" S 51°-52' E 1.99
" 3/15/34 Y " 20 N 32°-33' E 2.13+

Left bank tomahawk R. brs. West 6.40 !
Begin line N 2°-16' W.

Notes of US deputy say cor is 5.60 ch West of left bank.

Random meas. = 160.466
Rec. = 81.00 − 161.600
80.60
161.60 161.6 | 1.134 chst
.00702 per ch.

∴ .00702 × 40.5 = .284
40.500
dia. 40.216 × .01112 = .447 N

" × 81.00 = .568
− 81.000
80.432 × " = .495 N

81
40.30
121.30

" × 121.30 = .853
121.300
120.447 × " = 1.838 N

" × 161.6 = 1.134
161.600
160.466 1.784 N

Calc. for temporary true line from SE¼13 To SW¼14
→ see random (pages 69-77 + 93-95)

101.447
50.432
40.015
20.007
50.432
100.439
+.011 12
1.117 N.

= 2¾

Secs 24 & 23 38 - 5
Cimarron

Saturday,
August 5th 1933 Fair 75°
R. H. Hall - alone.
Beginning at Cedar Falls road where
Project ④ (Aunts road) intersects do.
Pocket compass courses 6° var.
Paces 1000 = ½ mile. 2000 = mile
In Sec 24 -

a	S64°W	139		
b	S76°W	215	1 2	
c	S79°W	337	1 2 3	
d	S70°W	200	1	(NW slope + fill)
	@ 59	trail SW		
	@ 170	" SE to Bear L.		
e	S54 W	160	1	
	@ 100	end of fill		
f	S39 W	80		
	@ 40	end of 2nd fill		
g	S17 W	80		
	@ 50	from ext + survey party, trail NW old grade ties S27E + NW.		
h	S9°E	175	1 about S50E	P.C.
	@ 64	trail Ely @ 136 N end slough on E		

i	S 2 W	47.		
	@ 25	hard gravel		
j	S 17 W	92.		
k	S 48 W	100.		¼ cor 23/24 should be. & 305 paces.
	0 to 65		fill	
l	S 77 W	115	1	
m	S 78 W	160	1	
n	S 54 W	77		curve change
o	S 26 W	153	1	
	@ 140	fill		
p	S 48 W	70		all on fill
q	S 69 W	241	1 2	
	@ 41		end fill	
r	S 39 W	90		
s	S 5 W	131		
t	S 18 W	100		
u	S 43 W	78.		
v	S 66 W	375	1 2 3	
	170 to 345	Farm. overp. roadway		
	180	culvert		
w	S 46 W	70		

99

x	S 31° W		300	1 2 3	
	@ 258	Trail N			
y	S 36 W		90.		
z	S 46 W		90		
	@ 53 old RR fed. S 25 W Curve L.				
x	S 44 W		233. 1 2		
	@ 100	Tangent to river			
		from 4r 50 W to S 60 W ±			
	(pace N on old random				
		135 ± to N. Pin down.			
		Seems to have old fencing.			
	S from S edge monuments.				
	123	Double car &			
	278	interest road. @ 7/8			
1	S 48° W	240		1 2	
	at 160	culvert			
2	S 88 W	80	to junction		
	falls	bus N 75 W ±	4 ch ±		

Sec. 8 - 17 - 18 38-4 100

Cedar Falls Road Traverse #3

&

August 8th 1933 Jair. Hot. dry.

R. H. Hall with Mc Leod + Ginger. chain

Pocket Compass courses (no var.)

℄ road.

Beginning on Cedar Falls road where corrected Range line intersects. (S 4 E rc)

	Course	Feet	Remarks.
(1)	S 88° E.	275	10' int
(2)	N 79° E	735	100' long. 26'
(3)	N 39° E.	366	
(4)	N 34° E	372	8'
(5)	N 78 E	728	to junction of
	roads	N 20 W	
		N 50 E	
		S 2 E	
		S 30 W ±	
(6)	N 52 E	513	to junction
		at 425 ℄ bus S 25° ±	
		Rd. bus S℄ curving E.	
(7)	N 20 E	627	
(8)	N 6½° W	356	15'
	Reg. curve Rt		

(9)	N 24° E		271		10'
		4' E of ℄	at mid. ord.		
(10)	N 64½° E		621 (tangent)		57.58 E
	@ 580	Tang.			
		drive bks	N 53 E	from sight	
(11)	N 5° E.		985'	To ℄ curve ?	
	+ 396½	= concrete mon bks & 6 E			
	@ 10.	line of pickets (S 28)			
		bks E 73'			
(12)	East.		1300 on ℄ rd.		
	@ 1260	℄ Jog E. rd.	(S 38)		
(12)	~~N 68 E~~				
	N 71 E.		124	To junc.	
		Pinkowski road			124
	@ 40' ±	picket line N 3 W. ±			E 40
(14)	N 1½° E		613	along bank road	
(15)	N 9½° W		388.5		
(16)	N 10° E		198.		
(17)	N 8½ W		238		
	@ 154	Delaglise	bks 110 E of		
(18)	N 5° E		182		

	? Delaglise's bks Cor East		(actually set by D.H.V.) 110' to ℄ road ✓
(19)	N 29° W	95.	jog at log pile
(20)	N 12° E	473.	
(21)	N 9 W	262.	
(22)	N 46 E	80	
(23)	N 29 E	224.	
(24)	N 7 E	160	
(25)	N 29 W	103	
(26)	North	194	across dry bridge
(27)	N 49 W	418	
(28)	N 24 E	151	over hill.
(29)	N 9½ W	309	
(30)	N 18 W	149	℄ RR flange here ℄
(31)	N 3 E	343	
	@ 272	℄	bridge over Kaubeshi R
(32)	N 53 E	108	
(33)	S 76 E	300	
(34)	N 79 E	120	
(35)	N 9 E	418	
	@ 180	bulge 30' E	

(36)	N26½E.		222.		
(37)	N74E		240.		

105

H 3 — 38 – 5
Random.

August 9th 1933 Overcast 70°
R. H. Hall with Gerger, Mc Leod (chain)
& Pogorelc.

Set over Ong. NEx
Az of random ℄ = 180°
" " B.S. on H 20 (random) 87° 23'
Var on 0° Az = 3° 03' E

Run West (270°) on random —

0.0	Sec Cor. in swamp.	
2.00	In swamp. N + S. ℄.	
3.04	Hub in old RR curves SE. +W NW.	
7.21	Hub in S. edge RR. same Bears NW SW. + enters marshy bottom	
20.069	ch × 3" for ⅛ S.	
1/8/35 from red r. cedar post	W.P. dip. 14" N27E .88	
V. 1°-50' E.	" " 24 S72W .56⁵	
19.835	In. swamp, trees up slope.	
1.706	1.781 × 1583	
21.541 R		

106

20.069 × 2.091 = 20.069 / 41.960 ch = 41.96 ch = 2.62 ch/hub

22.16	Hub – E. edge plateau – (Fourth) (Var. on Meridian 2° 14' E)	
32.70	old road N & W	
32.87	(Rec. 32.82) fall about 24" sd. & remains of Hem. Sun Tree	
37.82⁵	hub	
+ 40.00	=	Var 2° 14' E.

August 10th 1933 70° 80° Fair
R. H. Hall. Dwzgmski, Gerger, Mc Leod, Pogorelc
Rodenrek.

40.13⁸	fall .5' N & engl ⅛ S. by sd. post hole agreeing with remains of 2 hemlocks.	
Dirs 5' Pine Post in mark	(Pople 4"	S 38°-50'W .71⁵
(1/4S) 84 3	Notch in root " " .03 from ℄	of W.P. stp 24" N 3¼° E 1.48

* at 40.00 Observe Sun 3 times with net result that random appears to be

N 89°-51' W
N 89°-58' W 40 — 4 E = 3

40.138 − 40.069 = .069 ch = 5.3" for 1/8 S.

West (270°) from Cor. 45 Lt 3+34
on random Lt W½ 3-38-5

0.0 1/4 post.
0.4 23 & dd 2R Grace. 20 33
14.546 Hub (var. 2°-31' E)
hr. plateau NW slope to swamp
292° - 31.5' = ℄ Squirrel Tower

19.552 hub

20.029 fall .939 N to post
+ enter Swamp N+5

20.056 N. S. .108 for 8 S.

{ Cedar stp. 14" N70°W .52 Var 2°-50' E
{ Spruce 3" S27W .22 Time Az:

1/8/35 Arrow & post.

25.46' Hub on N. end ridge
Small pople & y. Pine.

28 ± hr. Swamp.
28.925

32.681 Hub

→ Resume on page 136

Sec 4 - 38 - 5 E.
NW SW ?

August 11th 1933 Fair 75°
R.H. Hall with same crew of 5
Run random West on var 2°-07' E from point on McGinnis' corner 350' ± ?

0.0
Up slope 6° = 250' 10%
300. Hub 20.
450 stake 30
734.1 Hub var 2° 48.95
791.2 stake 5° = 7%
1100. picket 133
1252.7 Hub var 2° 83.43
1500 stake 99.9
1600± ℄ edge plateau
1785.7 Hub on flat top hill 118.95
2000. picket var 1°-46' E. 133.2
2360.3 Hub ± gait for dog. 157.2
℄
2600.9 173.2
2864 end.

2906.1 Sta ⊙ 193.67'
.06664 = Tang. 3°49'

2864 marsh

2924 hub in marsh. + tree E to S to
flag at E-end neck
- tree N 60 W.

tree 2nd. wide.
84° - 43° ∠ 169° 24 (84 - 42
Sin. .99575 194.5'
Cos. .09208

2906.1
2912'
.06664
3°49' cos.
.99778
.00222
2906
2906.45
2906.1
2912.5

See page 120 for traverse beyond sta 2912'
at neck between swamps.

August 14th 1933 Fair. 75°
Rod # Hall with Geiger + Mc Leod-chain
+ Duszynski - flag.
(Staff compass — no var.)
¼ ⊙ bet. 27 + 34.
Find good post + old W. Pine Bat.
⊙ 72° E. .14
Ang. not called for in notes
¼ 44° E. .12
Sta sign 2 W. Pine.
New - W. Pine 24" N 59° W .21
Re drive post.
On side hill about 1 rod N of bottom. creek.
E on var 3° ±
0.0. ¼
1.33 to ¼ ⊙ .85 N of from ⊙ culvert 24"
5.50 drive hub about ⊙ new road clearing
5.80 old rd. crooked
7.24 present shore (Rec. 7.09
find no MC.
All old trees in bad shape.

√

Staff Compass Traverse.

N'ly from sta. 5.50
following ℄ staked ROW to
avoid brush piled in ℄.
N° var.

0	= Sta. 5.50 ch.		℄ of ℄
(1)	N 29° E.	4.00	"
(2)	N 20° E	3.68	
(3)	N 27° E	2.70	
(4)	N 19° E	2.80	
	@ 69 old rd.		brs N 8 W
(5)	N 21° E	3.36	
(6)	N 21½ E	2.46	
(7)	N 15½° E	1.99	Swing from Sides to ℄
		20.99	
(8)	N 22° E	2.55	
		3.04	
		5.59 - 14 =	5.45 ℄
			Trail NW
(9)	N 22 20/20° E.	8.09	
(10)	N 22 21¾ E	5.51½	
	@ 3.84 old road		agn NW + SE

(11)	N 6½ W	8.93	along old road
(12)	N 13 W	6.66	" " "
(13)	N 8 W	5.90	
	(Note - Actually continues N 13 W for 10.5 ch) from turn Night.		
(14)	N 18° E	2.59	
	To junction of Cedar Falls		
(15)	N 68½ W	1.87	
	from which ÷ 16 Scor. ? (fence cor. facing old blazed tree) brs N 66 W		1.69 ±
	fence cor: Have no data	y. p. 24 brs	S 31° E .65 ±
(16)	S 54½ W	1.81	Thru gate.
(17)	N 81½ W	3.70	
(18)	N 24 W	4.85	To Pinkyo.
			" mean N 77 W
			1.57

3.06 miles to Cedar Falls Jc. from Hollow Rd.

Sec. 34-38-5-

Thaw. on + along old Road. W. side Skunk L.

Aug. 15th 1933 75° Fair.

Ray H. Hall with Dwaznobi Jurgen N=Lead + Pegoda.

Sta 5.50 from ¼ Sec.

Assume Meridian 3° W of Mag.

① Az (218°) = S. 38° W. 5.11 ch.

@ 1.33 creek E.

② 215°-01' = S35°-01'W 2.64*
@ 175 rising ground 180 = W shore

③ 205°-28½' = S25°-28½W. 2.66

④ 225°-02' = S 45°-02'W. 1.59

⑤ 197°-43' = S 17°-43'W. 4.07'

⑥ 184°-11 = S 4°-11 W 3.26

⑦ 204°-06' = S24°-06'W. 1.709

⑧ 186°-15' = S 6°-15'W 4.38* @ 1.60 ? shore

⑨ 159°-06' = S20°-54'E 1.96

* Thaw One grass

⑩ 167°-10' = S 12°-50'E 2.24⁵ *

⑪ 195°-30 = S 15°-30'W 1.79⁸

⑫ 163°-13' S 16°-47'E 5.99 ± prairie rd

⑬ 150°-24' S29°-36'E 1.67⁷ between lake swamp + narrow swamps.

⑭ 177°-27' = S 2°-33'E 1.05⁷ To Sh Trail *W.

⑮ 133°-23' = S 46°-37'E 2.90⁴ @ 1.36 N+S ? line ?
@ 1.00 swamp commences on right

⑯ 116°-19' = S 63°-41'E 2.32 on neck of hard land.
⑯ end of swamp on W.
Swamp 16 p. W. to S 65 E ±

⑰ 141°-37' = S 38°-23'E 3.22⁸

⑱ 144°-21' S 35°-39'E 1.49

⑲ 114°-33' = S 65°-27'E .98⁸

⑳ 172°-31' = S 7°-29'E 1.77
Var has become 2° 35' E here.

(21)	162° 09′ (179 60)	S ° E = S 17° 51′ E	2.29
(22)	163° 51′ (179 60)	= S 16° 09′ E	4.567
	more open.		
(23)	169° 55′ (179 60)	= S 10° 05′ E	1.995

Cond.

E. end of neck (16) = 39 74/2 S. + 2.065 W

(23) = 54.18 S. + 4.262 E

Traverse - continued

August 16th 1933 Rainy.

Rft with Dusenbury - Gergen - Rowand

McLeod - Pogorelc.

(24)	164° 03′ (174 60)	= S 15° 57′ E	2.218	✓ 2.135 S .61 E
		Su .9744		
		Co .9615		
(25)	172° 39½′ (179 60)	= S 7° 21′ E	2.252	✓ 2.232 S .288 E
		Su .1279		
		Co .9918		
(26)	141° 08′ (179 60)	= S 38° 52′ E	6.20 4.633 10.833	✓ 8.432 S 6.796 E
		Su .6275		
		Co .7786		
(27)	152° 21′ (179 60)	= S 27° 39′ E	4.604	✓ 4.075 S 2.134 E
		Su .4641		
		Co .8858		
(28)	168° 31′ (179 60)	= S 11° 29′ E	4.244	✓ 4.155 S .844 E
		Su .1991		
		Co .98		
(29)	115° 07½′ (179 60)	= S 64° 53′ E	4.442	✓ 1.885 S 4.026 E
		Su .9055		
		Co .4245		

Var 2° 20′ E.

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34 + 3

(30)	160° 31′ / 179 60 = S 19° 29′ E Sin .3335 Cos .9427	5.61	5.29 S 1.871 E	✓
(31)	158° 16½′ = S 21° 44′ E Sin .3703 Cos .9289	3.278	3.047 S 1.214 E	✓
(32)	143° 02′ = S. 36° 58′ E Sin .6043 Cos .799	2.63	2.101 S 1.581 E	✓
(33)	172° 48′ = S 7° 12′ E Sin .1253 Cos .9921	1.704	1.682 S. .213 E	✓
(34)	152° 34′ = S 27° 26′ E Sin .4607 Cos .88755	2.689	1.387 S. 1.24 E	✓
(35)	160° 33′ = S 19° 27′ E Sin .333 Cos .9429	6.27	5.913 S 2.088 E 420 = 6.36	✓
(36)	177° 15½′ = S 2° 45′ E Sin .048 Cos .99885	1.577	1.575 S .076 E	✓

3 - 37 - S

118

(37)	154° 50′ / 179 01 = S 25° 10′ E Sin .4253 Cos .9051	1.276	1.158 S .544 E ✓
(38)	177° 32′ / 179 = S 2° 28′ E Sin .043 Cos .99907	3.345	3.337 S .144 E ✓
(39)	175° 11′ / 179 60 = S 4° 49′ E to road ℄ Sin .08397 Cos .99647	1.432 bs S 35 E ±	1.427 S. .12 E

∴ (16) to (39) calc. S 24° 46′ E.
may hit swamp.

Tangent Hewitt & Lynwood (37)
bs. 145° 33′ = S 34° 27′ E.

Aug. 17th fair.
R H. with Duszynski. Gerger. Pogorelc + Rosenack
Re locate route thru Govt. lots 3 + 4
in 34-38-5 E. to stay about 300'
W. of lake shore. Tentative.

1.84
9.48
4.17
3.95
3.00
2.33
21.17 To corners noted on ridge.

11.71 - 2.33
+ C
+

Sec 5-38-5

Pocket compass + chain traverse of #14
No var.
Aug. 24th 1933
R H with Duszynski. Gerger. Mc Leod. - Pogorelc
+ Rosenack.
Sta 29+12'

13	①	N 55° W	1.84 ch. over neck
	②	N 47° W	11.71
		at 2.91 a picket	
15	③	S 83° W	4.10
		at ③ 12" Norway brs	Ely .50
16	④	S 59° W	3.85
		Ridge between swamps.	× depart here
		at ④ Top extends	Dep .60
	⑤	S 43° W	8.45
	⑥	S 23° W	4.975
		at .65 enter marsh at narrows.	
		2.65 hr. "	
		at " 2 large Norways	.32 Ely
	⑦	S 5° W	4.00

5-38-J
continued

Aug. 25th 1933 fair - 75° F
R.H. + same crew of 5 men

(8) N 89° W 2.60
to follow N. margin of neck

(9) S 69° W 5.40
at 9 narrow + diminishing neck ext. W 4

(10) S 1° W 4.06
at 1.35 fall about 3' W. 16' Konwag 5 paces & 4 " clamps.
Must swing W. 4 + for ℄ gap.
10° ascent in 1.25

(11) S 46° W 29.00
along hog back + into rough terrain
@ 1.63 old R.R cut 6' deep bs N 45° W
@ 14.50 ± bog hole bs N 4 W .50
@ 17 ch ± intersect P.C. line (3 + 8) 153 paces W 3 right Lux 5
@ 21.20 } round water hole
22. }

(12) S 16° W to avoid swamp on bow arg.

This route is becoming difficult for a road.

5-38-15

August 30th with Berger - McLeod - Pogorelc
+ August 31st " " " Duszynski
+ Rosencrantz.

Stake in 12°C at sta (2) page 120
Ext. 1.49³ ch. Tang. 2.22⁷ ch.
Offset for 50 lk chd = .0527 or 3.48'.

Stake in 8°C. at (3) page 120
Ext = .16 ch. Tang = 1.52² ch.
Offset for 50 lk chd = .035 = 2.31'

After traverse beyond sta (4) as follows:
Pocket Compass corrected - no variation.

(5) S ~~59°~~ 61° W 1.96
< C. 10°

(6) West 2.09
< Transition Curve - sharp

(7) S 33° W 1.11⁵
following hog back.

(8) S 18° W " " 1.23⁵

(9) S 71° W 4.38 along N. slope-shelf

(10) N 89° W 3.44
Squirrel Hill Tower bs N 9° W

(11) S 55° W 1.76

(12) S 67 W 2.61

16.58

5-38-5
continued

(13) ¼	S 46° W	.91		18.58
(14)	S 70° W	1.24		12.62
(15)	S 42° W	.63		10.58
(16) ¼	S 22° W	1.27		41.78
(17)	S 28 W	1.26		
(18)	S 58 W	3.58		
(19) ¼	S 31 W	3.73		
	@ .88	Swamp at bottle necks		
	to 3.28			
	2.40 ch corduroy required			
(20)	S 63 W	1.44		
(21)	S 43 W	2.29		
(22)	S 12 E	3.37		
(23)	S 2 W	1.67	10.58	
(24)	S 55 W	1.81	to approx line	
	between Secs. 5 + 6 + pace S'ly to			
	Quad- Cor. 5-6-7-8		349 paces	
	(Var 3½° E ±)		15.17 ch. ±	
			= 60.7 rods ±	

For Corner to 5-6-7-8 see page 134

6-38-5

Sept 1st 1933
Overcast to fair. 75°
R.A. Hall with Dwojnoski - Gerger + McLeod
Resume traverse - Pocket Compass + chain
" 0° var.

(24) = 349 paces N } S.E cor 6
(25) S 74° W } 40.00 ch.
@ 5 - 10 - 16 - 20 - tally pickets
@ 22.45 } swamp at narrows.
25.30 }
2.85 ch "

@ 40. set picket. All good going except swamps. Plenty filling available.

N.B. – There is something wrong apparently with rec. dist on ½ 6. Dot plats out about 40 rods short of Rec length. Will know when we have continued Tp. line to NW x 5.

Jossart says he never knew the ¼ s bet. 6 + 7 to be found.

125

Secs. 1 - 2 - 3 (38-5) 126

Pocket compass + pace trav. 2 Road #2. +14
" " 0° Var. " +23.1 paces to claim E1/2.
Tally counter used.

August 19th 1933 R.H. Hall alone
Begin at E⅛ on 4 Sec 1 - 38 - 5 in E road N to S

(1)	S 2° E	203	paces.
(2)	S 56° W	184	(± Wells from same course
	@ 84 road S + E		
	179 trail SW		
(3)	S 81° W	158	
(4)	S 72° W	128	
(5)	S 77 W	151	
	(@ 136 ± Wells from bs S 38 W)		
(6)	S 32° W	180	
(7)	N 86 W	75	
(8)	N 78 W	125	(trail bs N 50 W)
(9)	S 53 W	56	
(10)	S 31 W	40	to junctn Wells lane (S. 4 E)
(11)	S 42 W	118	
(12)	S 51 W	275	
(13)	S 70 W	57	
	(To junctn old RR bs N 45 E)		
(14)	S 63 W	110	to line of Bridge (N 44 W)

" - almost exact spot pointed out by Monroe Shaw as loc. of orig ¼ S bet Secs. 1 + 2 — stump he claims is 13 t may be.

Thaw. in Sec 2 - 38 - 5

15	N 44° W	96	+ house brs N 35 W	2½ ch±
	@ 28-58	Tomahawk bridge		
16	S 60 W.	113	(+ Wittes farm brs E)	
17	West	71		
18	S 68 W	128		
19	West (on RR)	224		
	@ 18	old road brs S 60 W about 3 ch.		
		Thence S 70 W		
20	N 80 W	85		
	@ 15	marsh brs N 20° E ±		
21	N 62 W	48	+ leave marsh	
22	N 53 W	226		
23	N 62 W	63		
24	N 74 W	695		
	@ 138	enter swamp	S E + N E	
	174	culvert		
	276	"		
	313	br "	S 20 W ±	
	466	project 4"0 brs	S 11° W	
25	N 58 W	72		
	to	junction old road + crosses	S E + N W	
26	N 51 W	109		
27	N 53 W	60	- old road tang	
28	N 66 W	53		
29	N 83 W	43		
	+ enter ash + cedar swamp			

30	S 85 W	388	
	@ 38 culvert		(reads S 3½° E)
	72 over sand ridge		W 2 True South
		7.57 ch	S of N W x - (see page 30)
	178 br. alder bottom		
31	N 70 W	131	
	@ 85 enter alder + cedar swamp		
32	West	40	
33	S 82 W	82	@ 40 br. swamp S W.
34	S 51 W	132	
35	S 78 W	53	
36	N 83 W	109	
37	West	60	
38	S 80 W	52	to approx ¼ line Sec 4
	(Orig ¼ S. 4 3)		brs 173 paces N Var 3½° E)
	set picket north of road		28 rds ± S of x
39	S 73° W	107	
40	S 62 W	103	
41	S 47 W	76	
42	S 27 W	400	@ 390 should intersect
			N + S ⅛ line 150 p. N of ¼ line
	old road continues S 27 W		
43	S 13 W	181	
44	S 33 W	100	
45	S 41 W	86	
46	S 53 W	333	x Cor. 3-4-9-10 should br S. 550 p.
47	S 55 W	100	
48	S 60 W	146	
49	S 78 W	69	to junction 2 + 14 (+ brs S 78 W)

S 53 W 333
@ 30 enter swamp N + S
75 culvert N
276 br swamp
S 20 E N 30 W

See page 133

129 ℄ 34 – 38 – 5

Aug. 22nd/1933 Fair 70°
R+O Hall with Dworzynski. Geiger
Pagorek + Rosenack.

Set post + strap iron at Ongl. SE × 3 ft
by mc. dist from 4 other po
NW in has pretty good facing.
Assume var. 2°-30' E.

Ongl brs	N 67½ W	Rec + ¾ Ck. ÷	
3	S 60½ W	"	
4	N ½ E	"	
1	S 36 E	"	

New —	B. Pine	6"	N 61°-15' E	.57'
	W. "	6	N 36°-30 W	.78'

Observer Sun.
Time may watch + Assumed Cent Std.
Az noted = Assumed on v 2°-30'

①	9:38 AM	v. 44°-22'	Az	126°-26'
		calc.	→	126 23.5
②	9:39.5	v 44°-40'	Az	126°-53.5
		calc	→	126 48.
③	9:41.3	v 44°-50	"	127°-25'
		calc		127 02.

℄ 34 – 38 – 5 130

Rum Westerly = S 89°-56' W ± Az = 270°
– .275 fall 2.1' N of a post found. 9.63
0.0 our Tamarac post.
5.749 hub (⅓ from N edge)

9.63 fall 33" S. of 24" W. P. off
9.73 " 24" N. " 20 " " " "

11.597 hub (⅓ from N edge) = 765.4
271.7
1037.1

1037' set line marker on ℄ mid. rd. 10/14/35
15.935 hub at intersection 4.431 3.85 574
15.922 with ℄ new Hwy @ 4.428 ℄ 4.428
8 6 ϕ AP # in Tree.

℄ brs. 152°-39' = S 27-21 E shot right
179 40

15.850
62.00 rdo.

∴ Hang brs. S 27°-25' E.
Assumed was 27°-28'

1037
10.53.3

15.922
11.597
4.325
6.1

15.922
11.597
4.325
6.1

15.922
561
15.713
11.597
4.116
6.1

11.597
5.873
5.724
6.1

726.
39.4
765.4

*

2 + 3 - 37 - 5
34 38 - 5

#4

August 21st 1933 Fair 75°
R.H. with Duszynski - Gerger - Pogorelc - Rosenack.

Check Hunts ℄ as brushed - N Wly from ℄ Town Rd. (which connects dam with points E)

Traverse adjusted to approx true courses after connecting with random ℄ 34 (page 130)

P.O.
Town Road has N 89° 46' E straight
" " " S 70° W winding

①	N 28° 54' W	7.09 ch.	along W line of Rd. fur farm
②	N 33° 43' W	15.48	
③	N 34° 11' W	18.90	
④	N 34° 24' W	23.98	To sta 39 page 118
	(C. 8° rt.)	65.45	Hunt brushing

N.B. - My trav. thru 34 - find. courses assumed - then to be correct within 0° 3'

∴ ⑤	N 7° W	13.84	C. 6° left.
⑥	N 27° 25' W	53.25	to point 17 DE (S 27° 25' E) of #19 p. 114

Thence by Pocket compass.

⑦	N 4½° W	5.43	+ curve 4° left to neck at 19½ S 63° 41' E of sta #16 p. 114

Neck of hard lands brushed as traversed i.e. thru 18

⑧	N 63° 41' W	2.35 / 19	2.51
⑨	N 46° 37' W		2.90
⑩	N 2° 33' W		1.06
⑪	N 29° 36' W		1.68
			8.15

Th. by Pocket compass 8° var.

⑫	N 22° W	6.0 / 2.12 =	8.16 To mid pt. bet pines
⑬	N 35 W		1.30 " " " "
⑭	N 30° W		1.47
⑮	N 10° W.		7.12 to P.I. 5° C. Rt.
⑯	N 13° E		11.81
⑰	N 37° E		29.86

@ 5.50 enter bottom 12' deep ±
@ 6.50 creek 10' wide W. ←
@ 7.35 Lv. "
@ 10.13 ℄ cottage road E & W.
Chose this route to pass opening in old W. Pine grove.
@ 17 ± clump of pine - most det'ors
19. Tally picket + print for day.

See page 135

Pocket compass & face Traverse of
Road project # 14 under construction.
Continued from page 128
Beginning at junction ⊇ + 14

(50)	N 76 W	341	To front of hill
(51)	N 67 W	151	
	@ 96 ℄ bridge		
(52)	N 87 W	74	
(53)	N 72 W	85	
(54)	West	318	
(55)	N 72 W	43	
(56)	N 52 W	35	
(57)	N 4 W	189	
(58)	N 57 W	79	
(59)	N 77 W	70	
(60)	N 89 W	39	To sta 0.0

Norway 3" brs N.
Mang brs. Thence S 85 W. 2912 feet.
to sta 0.0 page 120

14+24 stgs = 61.64 ch. ±

61.64
23.1 | 1424.0
1155
269

August 30th 1933 fair 75°
R.R. Hall with George McLeod. Pegged.
Set new pine post - scribed at angle cor
To Secs 5-6-7-8 in hole where old
notted post stood. Agreeing with course
+ dist to both Brgs, Bts.
Marks still on the Tamaracs.

P.C 0° var.

New Bearings:

ϕ Pin 11"	N 80° W.	.52
ϕ " 1½"	S 64 W.	.94⁵

27-38-5

continued from page 132

Sept 5th 1933 AM only.
R.tt with Duszynski & Gergen.
Re-monte ℄ of Road #4 in Lot 2
to detour W. of Pines & lake shore.

at 14.47 ch on course (17) page 132
" N 37° E
C. 16° Left.

(18) N 5° E 2.56²
C 16° Rt.

(19) N 54° E 6.31⁶
C 6° Left.

(20) Th. N 22° E as brushed
80 steps W. of shore ±

A 3-38-5 continued

from page 107

N 89° 59' W on random

Sept 5th 1933 PM
Hall. Gergen & Duszynski
32.68¹ hub
33.90 Enter bottom SW & NE

40.11³ N & S. to orig NW cor. .216
.00538
- tang 0° 18.5'
89 59
90 17.5
179 60.
Time line = N 89° 42.5' W

Set new post in wet marsh by approx rec. dist from the 4 orig trav. - SW tam. has the Scribe marks. Nothing near for bearings.
(except pine hub N 78° 08' W 1.05 (h.))

May 18, '34 - Mark:
Pocket Compass sun: W. P. stp. 10" N 25° W 1.573
" " " 7" N 80° W 1.828

T 4 -38- 5 E

Sept 6th 1933
Fair - Seasonable.
R.H. Hall with Haszynski - Geiger - Rosenack
Continue random ↗ 3 (270°)
3.895 beyond HW x 3 + then offset
S. .216 + B.S. on Sec. Cor.

Run West (270°)
0.0 Our new post at orig. NE x 4
3.895 hub at top of slope
Reserve Arm 75° F.
① 10:18 AM Cent. Std time
obs. alt + 45°-06'
" Az + 143°-30' ✓
(calc " 143°-30')

(Call random west)

② 10:25 AM
obs. alt + 45°-36'
" Az 145°-02' ✓
(calc " 145°-04')

10.00 tally picket (correct S .01 ch)
11.30± fall 3' N of atp. (line tree?)
18.00 hub (correct S. .02 ch)
NW flat - poplo small (scattering)

20.00 tally picket

20.067 ↗ & S. .02 ± set pine post 4"x5"
for 1/8 Cor. (#10)
Sept. 7th Bearings { Jack 10" S 48°-50' W .65 ch
Jack 6" S 88°-30' E 1.31 ch

22.63 ℄ Squires Tower trail
trs. North
" S 13 E

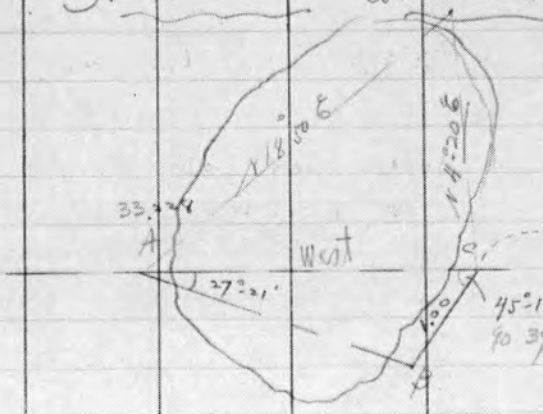
24.809 B.S.
24.877 Hub on brink of descent (.027) to swamp

25.90 Enter open marsh
" S 50° W ± North ±

31.15 hub at E edge pond (.034 S.) near S. end do
Target at N " brs " 4°-20 E.
Base line 1.00 ∠ 45°-19' = (S 44°-41' W)

33.228 Hub on W. edge pond (.037)
Same Target brs N 18°-50' E
Picket Base 1.00 ch brs N 62°-39' E
(∠ E to S 27°-21')

A 4-38-5 continued West



$h = \frac{a \sin B}{\sin A} = \frac{1.00 \times .95459}{.45942} = 2.078$ over ground.

31.15
2.078
33.228 / Hub

38.15 Iv. marsh
39.508 hub + tum ∠ left to 1/4 S post as set below

3°59	(2) 1°56	.629
Sin	.06947 ×	" = .044
Cos	.99758 "	" " .627

+ .627
40.135 fell .044 N. of 1/4 cor

.00109 = Tang 0° 03.7'
C - 89 60
∴ true line. brs. S 89°-56'-W

Set pitch post in old hole where we found old post down. The two stumps agree ok for course + almost for distance.
— badly burned

(W.Y.) A 4-38-5 continued

Sept 7th 1933 Variable. Heavy dew
RH Hall with regular crew ie.
Dwozynski. Geiger (chain) + McLeod.
Pogorek + Rosencck (cutting)

40.135
24.809
15.326 | 1.044
.00286 = Tang 0° 10' ∴ B.S. on picket 24.809

With transit over 1/4 corner.
Said BS brs N 89°-50' E
Mag. var. or Meridian = 2°-57' E.
Remains of Orig' brg { N 51° W .15½ / S 67 E .04'

New Bearings { Jack 6" S 32¾° E .09 eh / Jack 8" S 52¾ W .36 / ∴ 8 N 17¾ E .33⁶

Run S 89°-56' W on random line
0.0 Orig 1/4 S.
.45 Enter Swamp N+S
3.70 Leave "
4.889 Hub "
6.00 Enter Swamp N+S (Spruce
7.91 Hub in "
8.00 Leave "

4th W½ 4 - 38 - 5
continued

9.25 Hub (Var. 2°-25' E here) on 0° Az
13.31 "
(Later) turn ∠ right from
true random to Sec Cor.
① 0°-21' ② 5°-42'

Tang " (.0061)
×24,832
40.146 / .164 fill S.
.0040 Tang 0°-14'

14.20 Enter open marsh
" bus N½ + Wly
" 30 4ch
Thence Sly

20.00 Tally in line.
Continue by eye picked line to 40 ch.

20.07 set ∠ .08 N. for ¼ cor.

Set 20 - 25 - 30 - 35 by eye only
40.146 fall .17 S. of Orig. NW 4
Set cedar post in old hole
.50 from each of orig. pits remains.
Others cannot be found.
(Balance of day correcting 4th E½ 4)

40.146 / 3.314 / 26.83 ✓
S 89°-56' W / 179°-50' / N 89°-50' W ✓

True Course = N 89°-50' W, 40.146 ch.

Orig. NW cor. Sec. 4 - 38 - 5

Sept. 8th 1933 Fair to overcast 75° 85°
R.H. Hall with Iwaszkiewicz - Gerger - N. Lead
Rosencrock + Pogorelc.
Connect last few ch. of 4th 4 for B.S.
Set transit over new pecked cedar post
at Orig. NW cor. set 270°-10' + sight
back on true line.
Var. on 0° Az = 2°-35' E.

Orig Bmg N 75°-50' W .50
" S 55°-35' W .50
New W.P. Stp 12" S 28°-10' E .92
No other any good.

Run West (270°-00') on random 4th 5
0.0 ∠ TE cor 5
Observe Sun.
① 9:33 Cent Std Time alt obs = 39°-09'
Az reach 130°-46' ✓
(calc 130°-45')

② 9:34.5
alt 39°-20.5 Az 131°-12'
(calc. 131°-08')

③ 9:36.5 Ah alt 39°-36.5'
Az 131°-46 ✓
calc 131° 44

H E½ 5-38-5

1.60		Enter swamp N+S
		alder + dead cedar
5.24⁶		hub in swamp.
7.00		Lv. swamp
8.72³		hub (var 2°-28' here on 0°)
9.00		enter swamp N+S
10.49		fail to find line tree
		unless it be stp a rod ± N.
20.00		Tally stake
		fall .51 S of an old stake
20.518		hub
26.30		Lv. swamp
27.08		hub

→ X13 - By scale. Thus bns. 427 & 30 670 ft. from sta 11+71 on N. extremity of (14)

→ See Book 4 Page 12 for Continuation of this random ✓

January 9th 1935

6+7 38-5

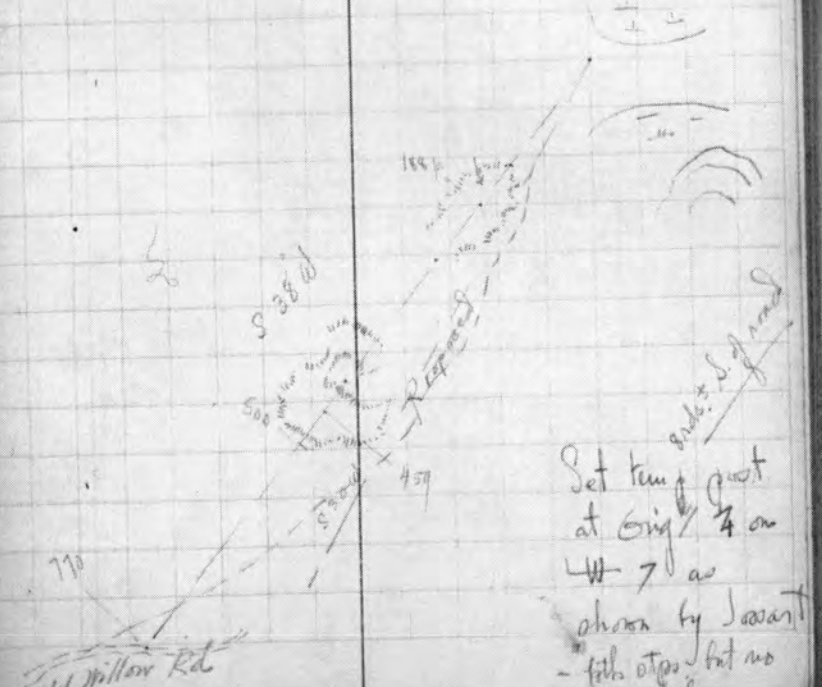
Cruising.

Sept. 9th '33

Rft. Dan Jossart + McGinnis (Morgan - transportation).

Find neck of hard land between Swamp + Manson L. to be 342 paces S. of our picket line (W. of swamp).

Decide to route #14 S&E on E side of swamp Run S 38° W (no var) from W. end neck.

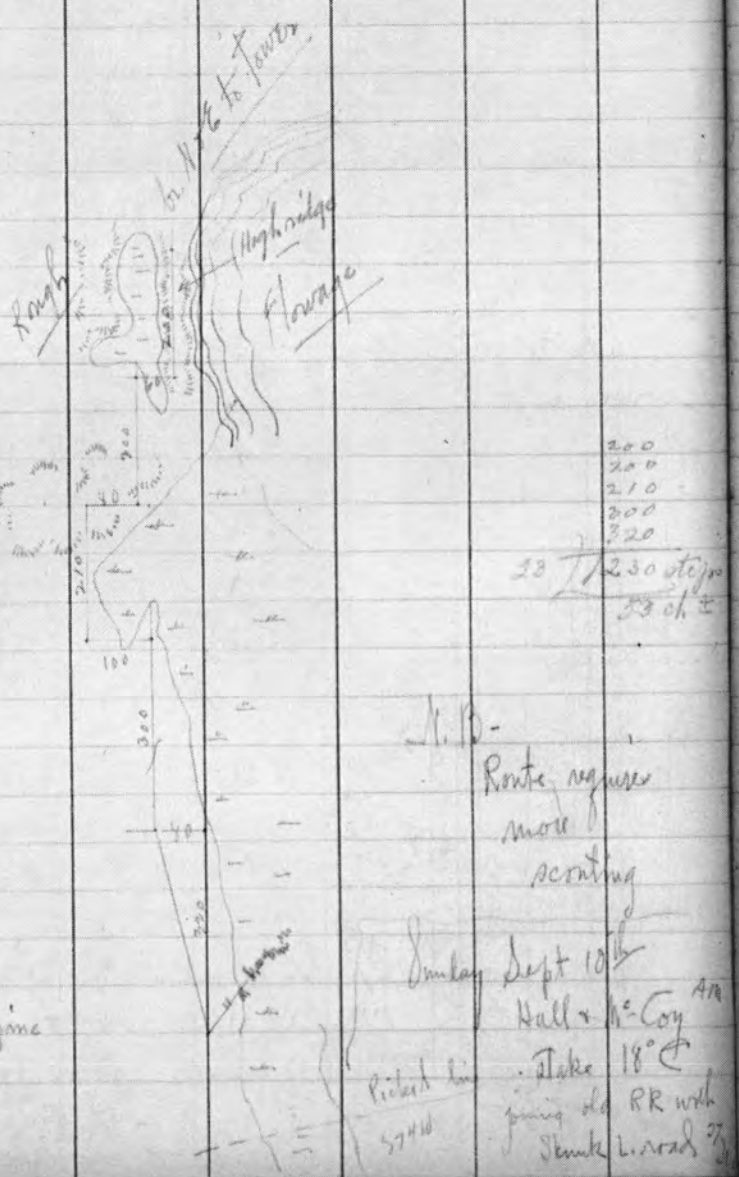


Set temp. post at Sig. 1/4 on LH 7 as shown by Jossart - fills stop but no hole

148

.5 – 38 – 5
+ 31 – 39 – 5

PM Course N. toward Squirrel Tower.



200
200
210
200
220

33 | 230 steps
33 ch ±

N.B.
Route requires more scouting

Sunday Sept 10th
Hall & McCoy AM
Take 18° C
going old RR with
Skunk L. road

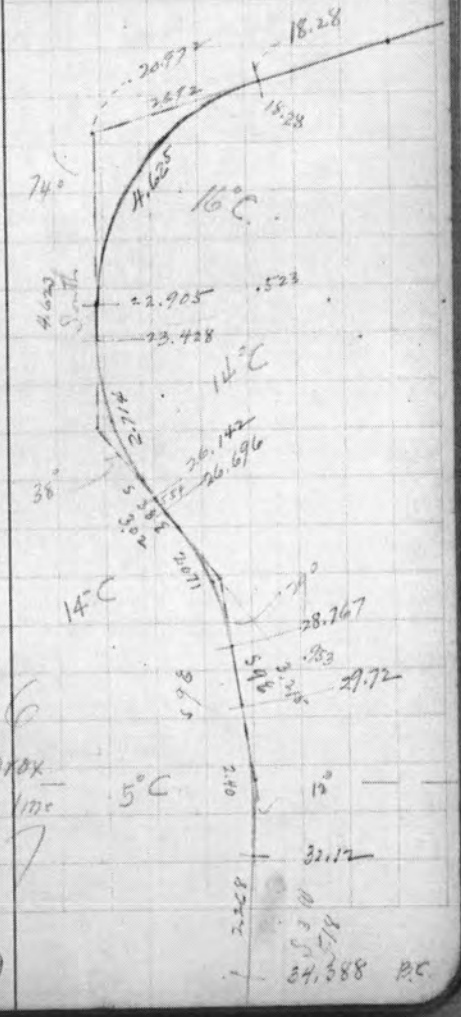
Picked up 57 W

(14) C+7 38-5 146

Picket Traverse of #14
Sept. 11th 1933 – Fair & Reasonable
Rff. & Regular crew of 5 men.

Depart Sta from our picket line (S74°W from Sta. 6 point on C)

From Sta. 6



Thence S 54 W. 3.735
N 75 W. 6.37

Resume on page 149

5-38-C (#1)

Traverse + curves on Shaw Hazelhurst Rd

Sept 12th '33 Jan.

Pty. with Gerger - Pagorek & Rosenack staking curves to fit grading.

Entire crew in AM

Dwazynski + McLeod chaining & pocket Compass traverse of road (PM)

No Var.

Beginning at ℄ new road .17 ch. N of ⅛ cor. on Wt N½ Sec 5

①	N 88° E	7.66 ch.	
②	N 75 E	10.60	@ 10.60 (Old bridge)
③	S 49 E	3.63	
④	S 25 E	3.54	
⑤	S 87 E	4.06	
⑥	N 78 E	8.21	
⑦	N 70 E	6.47	∠ 21°C. tang 96.6' ext 16.4'
⑧	S 80 E	9.08	∠ 30°C " 95.2 " 22.4
⑨	S 38 E	3.50	
⑩		56.75	

∠ 16°C " 53.5' " 4'

Sept 13th Same parties continue

⑩	S 40° E	6.85	
⑪	S 41 E	9.61	
		@ 6.80 creek - culvert	
		16.46	

⑫	S 54 E	4.65 ch.	∠ 30° C
⑬	S 88 E	4.72	∠ 30° C
⑭	S 39 E	4.69	∠ 30° C.
⑮	East	3.62	∠ 6° C.
⑯	N 75 E	4.71	To graded road ∠ 30° C
		at stat 4.00	fence cor bro S. 34 stops.
		22.39	

NB - Not entirely satisfactory - must follow present tracks to avoid too much new grading etc.

56.75
16.46
22.39
95.60

Total.

1.195 Miles

149

Sec 7-38-5

Resume picket traverse Project (14)

from page 146

Sept 14th 1933 70° Fair.

R.H. Hall with Buszynski-Gerges. McLeod Cogeol & Rosencrantz

N.

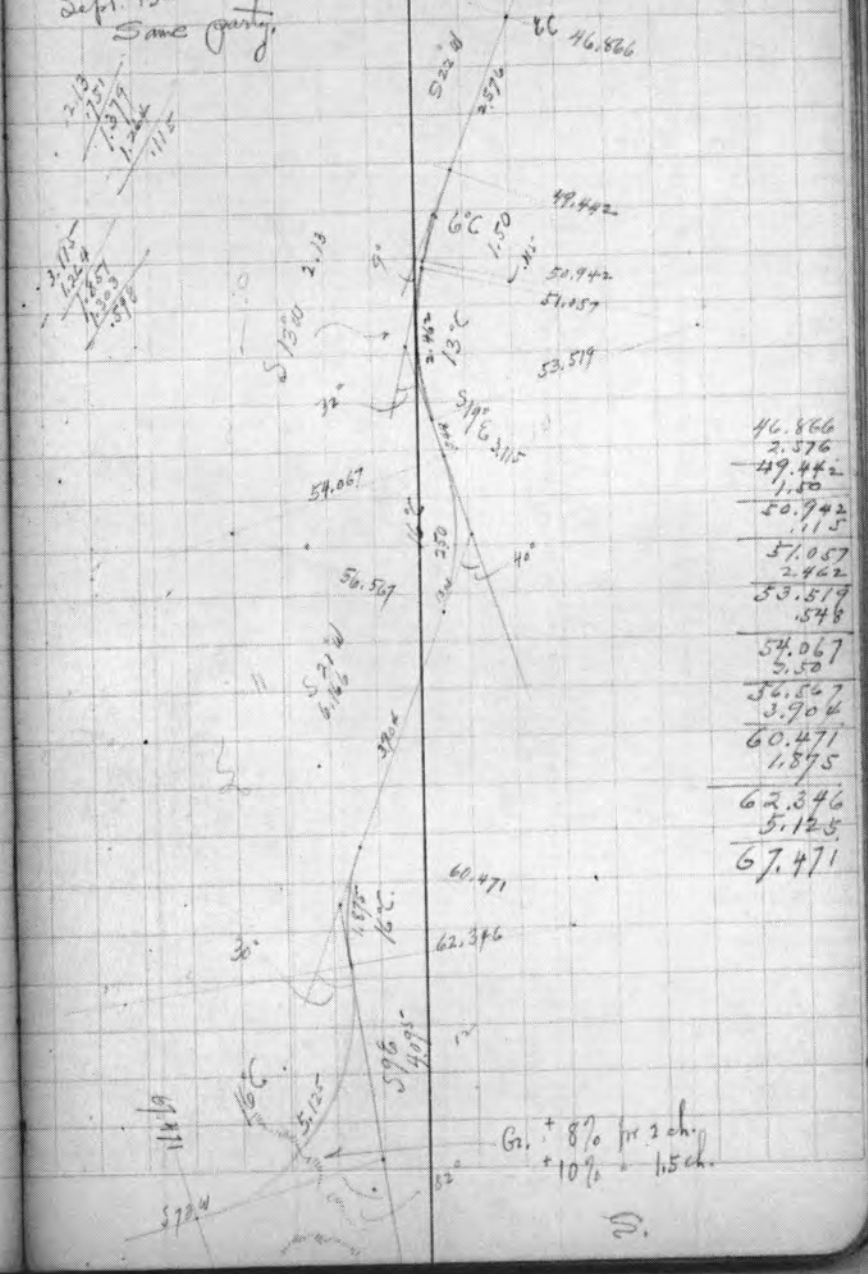
5.

150

7-38-5 continued

N.

Sept. 15th Same party.

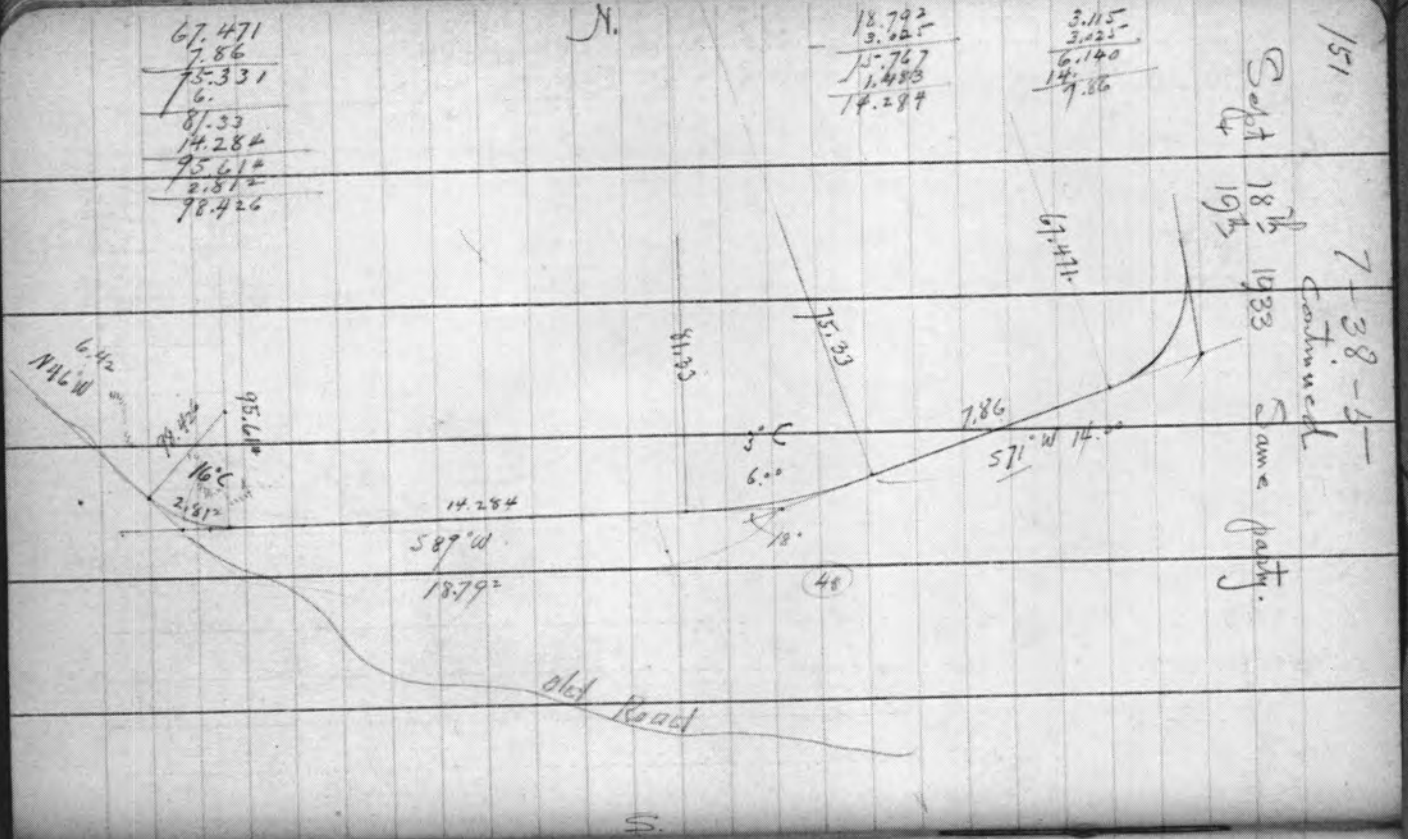


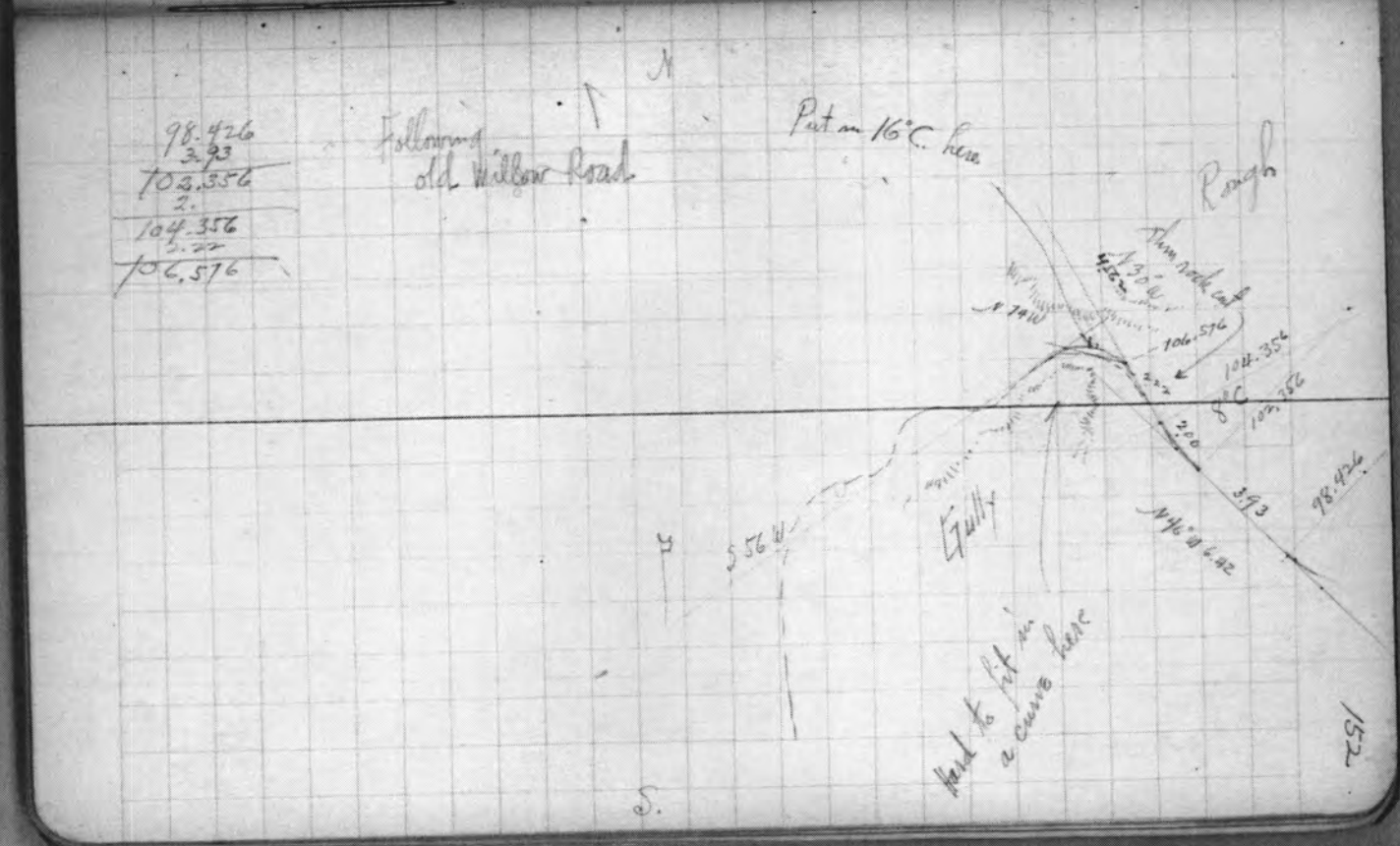
46.866
2.576
49.442
1.50
50.942
.115
51.057
2.462
53.519
.548
54.067
3.50
56.567
3.904
60.471
1.875
62.346
5.125
67.471

S.

Sept 18th 1933

7-38-1 continued same party.





7 – 38 – 5
12 – 38 – 4

P. 14 continued

Sept. 25th 1933 Overcast 60 70°
R. H. Hall - Gergen + Cagorelo
Lay in 16° C at rock cut beginning @ .854 on tang.
= sta. 104.21 (slightly overlapping.)

104.21	BC 16° C left.	gully
5.75	length " "	
109.96	E.C.	
3.00	Tang. S 58 W	
112.96	BC 6° left.	
6.50	length "	all level
119.46	E.C.	
16.45	Tang. S 19° W.	
135.91	BC 1° C right.	
3.02	length "	
138.93	E.C.	
8.87	Tang. S 2 W	
147.80	BC 10° C right	
2.20	length "	
150.00	E.C.	
.302	Tang S 44° W	
150.302	BC 12° left.	
3.29	length "	follows saddle
153.592	E.C.	on "

pot holes to. right + left. (deep)

continued Sept 26-28-29th Entire crew

153.592	E.C.	
.266	Tang S 5½° W	
153.858	BC 12° C	right
1.833	length "	
155.691	E.C.	+ leave neck slight + Gr.
2.60	Tang S 27½° W	
158.291	BC	1° C left.
1.50	length	"
159.791	E.C.	
39.422	Tang S 26° W (all level - soil light)	
199.213	BC 5° C	left.
3.20	length "	
202.413	E.C.	

4.28
.93 Tang
3.35
.75 Tang
2.60

41.74²
.75
41.03²
1.61
39.42²

+.40 = brow of hill
(falls away on W side)
+4.40 bottom 4¾° slope ±
= 8% – gr.
for 4 ch.

6.823
1.61
5.213
1.022
4.191
202.413
206.564
2.10
208.664

P. 14 ± 13-38-4

Sept. 27th '33

Rt Hall + entire party $5

Run P.C. + chain traverse of old road very crooked. Plat of same shows obvious course to cut off excess mileage.

℄ Survey, Traverse now ready - from sta 103.356 page 152

a	N 30° W	4.562 P.I.	@ .854 BC	16° left.	length 5.75
b	S 58 W	10.09 P.I.			
			@ 3.708 EC	"	
			@ 6.71 BC	6° left.	
c	S 19° W	21.34 P.I.	@ 3.38 EC	" "	6.50
			@ 19.83 BC	1°C right	3.02
d	S 22° W	11.49	@ 1.51 EC	"	
			@ 10.376 BC	10° "	
e	S 44° W	3.13	@ 1.114 EC	"	2.20
			@ 1.416 BC	12° left.	
f	S 5½° W	2.91	@ 1.714 EC	"	3.29
			@ 1.98 BC	12°C rt.	
g	S 27½° W	4.28	@ .93 EC	" " "	1.883
			3.53 BC	1°C left.	1.50
h	S 26° W	41.782			
			@ .75 EC	"	
			@ 40.172 BC	5°C left.	
i	S 10° W	6.823			
			@ 1.61 EC	" " "	3.20
			@ 5.761 BC	10°C right	2.10
j	S 31° W	3.44			
			@ 1.062 EC	" "	

Further staking will follow reconnaissance
℄ SW.

(14) Pocket Compass Traverse of old road from bottom of sand hill to E 1/4 12 151

Sta. (34) No var. (@ 30° 5C 10°C = 208.664)

			N	S	E	W	=	S	W
(35)	S 31 W	2.00		1.71		1.03		68.52	32.57
(36)	S 6 W	2.50		2.49		.26		71.01	32.83
(37)	S 3 E	2.50		2.50	.13			73.51	32.70
(38)	S 37½ E	3.80		3.02	2.31			76.53	30.29
(39)	S 51½ E	3.00		1.87	2.35			78.40	28.04
(40)	S 39 E	2.60		2.02	1.64			80.42	26.40
(41)	S 26 W	1.10		.99		.48		81.41	26.88
(42)	S 74 W	1.50		.41		1.44		81.82	28.32
(43)	S 56⅔ W	1.80		.99		1.50		82.81	29.82
(44)	S 83½ W	1.70		.19		1.69		83.00	31.51
(45)	S 54 W	2.80		1.65		2.27		84.65	33.78
(46)	S 88 W	1.70		.06		1.70		84.71	35.48
(47)	N 88 W	3.10	.11			3.10		84.60	38.58
(48)	S 53 W	1.50		.90		1.20		85.50	39.78
(49)	S 9 W	3.00		2.96		.47		88.46	40.25
(50)	S 34 W	2.50		2.07		1.40		90.53	41.65
(51)	S 53 W	2.00		1.20		1.60		91.73	43.25
(52)	S 24½ W	1.20		1.09		.50		92.82	43.75
(53)	S 49 W	1.70		1.11		1.28		93.93	45.03
(54)	S 26 W	1.20		1.08		.53		95.01	45.56
(55)	S 49 W	4.30		2.82		3.25		97.83	48.81
(56)	S 46 W	2.20		1.53		1.58		99.36	50.39
(57)	S 48 W	4.40		2.94		3.27		102.30	53.66
(58)	S 37½ W	1.60		1.27		.97			
(59)	S 50 W	2.50		1.61		1.92			
(60)	S 34¾ W	5.10		4.19		2.91			
(61)	S 45 W	3.00		2.12		2.12			
(62)	S 29½ W	1.10		.96		.54			
(63)	S 47 W	3.20		2.18		2.34			
64	S 39 W	1.40		1.09		.88			
65	S 47¾ W	1.90		1.28		1.41			
66	S 19 W	1.60		1.51		.52			
67	S 46 W	4.80		3.33		3.45		121.84	70.72

Calc - look for Sec Cor. 102 p. S 74½°10 from (67) Var 23½°E. Resume in next bk. 153

$ab = \frac{cd}{r}$ d. to ft. for rails = ch. taps

Offsets using 50' chords.

0	offset		
1	0 - 5¼"	.44	.29
2	10½"	.87	.57
3	1' - 3¾"	1.313	.86
4	1' - 9"	1.75	1.16
5	2 - 2¼"	2.188	1.44
6	2 - 7½"	2.63	1.74
7	3' - ¾"	3.06	2.02
8	3 - 6"	3.50	2.31
9	3 - 11¼"	3.94	2.60
10	4 - 4½"	4.37	2.88
11	4 - 9¾"	4.81	3.18
12	5 - 3¼"	5.27	3.48
13	5 - 8¼"	5.68¾	3.76
14	6 - 1½"	6.125	4.04
15	6 - 7"	6.58	4.34
16	7' - 0¼"	7.02'	4.63

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.)

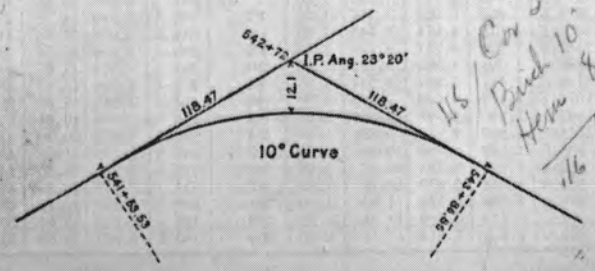

Table I. — Minutes in Decimals of a Degree.

1′	.0167	11′	.1833	21′	.3500	31′	.5167	41′	.6833	51′	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

Table II. — Inches in Decimals of a Foot.

1-16	3-32	1/8	3-16	1/4	5-16	3/8	7/16	1/2	9/16	5/8	11/16
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

Table III. — Radii, Ordinates and Deflections.

Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot
0° 10′	34377.	.036	.145	.291	0.05′	7°	819.0	1.528	6.105	12.21	2.10′
20	17189.	.073	.291	.582	0.10	20′	781.8	1.600	6.395	12.79	2.20
30	11459.	.109	.436	.873	0.15	30	764.5	1.637	6.540	13.08	2.25
40	8594.4	.145	.582	1.164	0.20	40	747.9	1.673	6.685	13.37	2.30
50	6875.5	.182	.727	1.454	0.25	8	716.8	1.746	6.976	13.95	2.40
1	5729.6	.218	.873	1.745	0.30	20	688.2	1.819	7.266	14.53	2.50
10	4911.2	.255	1.018	2.036	0.35	30	674.7	1.855	7.411	14.82	2.55
20	4297.3	.291	1.164	2.327	0.40	40	661.7	1.892	7.556	15.11	2.60
30	3819.8	.327	1.309	2.618	0.45	9	637.3	1.965	7.846	15.69	2.70
40	3437.9	.364	1.454	2.909	0.50	20	614.6	2.037	8.136	16.27	2.80
50	3125.4	.400	1.600	3.200	0.55	30	603.8	2.074	8.281	16.56	2.85
2	2864.9	.436	1.745	3.490	0.60	40	593.4	2.110	8.426	16.85	2.90
10	2644.6	.473	1.891	3.781	0.65	10	573.7	2.183	8.716	17.43	3.00
20	2455.7	.509	2.036	4.072	0.70	30	546.4	2.292	9.150	18.30	3.15
30	2292.0	.545	2.181	4.363	0.75	11	521.7	2.402	9.585	19.16	3.30
40	2148.8	.582	2.327	4.654	0.80	30	499.1	2.511	10.02	20.04	3.45
50	2022.4	.618	2.472	4.945	0.85	12	478.3	2.620	10.45	20.91	3.60
3	1910.1	.655	2.618	5.235	0.90	30	459.3	2.730	10.89	21.77	3.75
10	1809.6	.691	2.763	5.526	0.95	13	441.7	2.839	11.32	22.64	3.90
20	1719.1	.727	2.908	5.817	1.00	30	425.4	2.949	11.75	23.51	4.05
30	1637.3	.764	3.054	6.108	1.05	14	410.3	3.058	12.18	24.37	4.20
40	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.35
50	1495.0	.836	3.345	6.689	1.15	15	383.1	3.277	13.05	26.11	4.50
4	1432.7	.873	3.490	6.980	1.20	30	370.8	3.387	13.49	26.97	4.65
10	1375.4	.909	3.635	7.271	1.25	16	359.3	3.496	13.92	27.84	4.80
20	1322.5	.945	3.781	7.561	1.30	30	348.5	3.606	14.35	28.70	4.95
30	1273.6	.982	3.926	7.852	1.35	17	338.3	3.716	14.78	29.56	5.10
40	1228.1	1.018	4.071	8.143	1.40	18	319.6	3.935	15.64	31.29	5.40
50	1185.8	1.055	4.217	8.433	1.45	19	302.9	4.155	16.51	33.01	5.70
5	1146.3	1.091	4.362	8.724	1.50	20	287.9	4.374	17.37	34.73	6.00
10	1109.3	1.127	4.507	9.014	1.55	21	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	22	262.0	4.814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	23	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	24	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	25	231.0	5.476	21.64	43.28	7.50
6	955.4	1.309	5.234	10.47	1.80	26	222.3	5.697	23.50	44.99	7.80
10	929.6	1.346	5.379	10.76	1.85	27	214.2	5.918	23.35	46.69	8.10
20	905.1	1.382	5.524	11.05	1.90	28	206.7	6.139	24.19	48.38	8.40
30	881.9	1.418	5.669	11.34	1.95	29	199.7	6.360	25.04	50.07	8.70
40	859.9	1.455	5.814	11.63	2.00	30	193.2	6.583	25.88	51.76	9.00

Table IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
1°	50.00	.22	11°	551.70	26.50	21°	1061.9	97.57
10′	58.34	.30	10′	560.11	27.31	10′	1070.6	99.16
20	66.67	.39	20	568.53	28.14	20	1079.2	100.75
30	75.01	.49	30	576.95	28.97	30	1087.8	102.35
40	83.34	.61	40	585.36	29.82	40	1096.4	103.97
50	91.68	.73	50	593.79	30.68	50	1105.1	105.60
2	100.01	.87	12	602.21	31.56	22	1113.7	107.24
10	108.35	1.02	10	610.64	32.45	10	1122.4	108.90
20	116.68	1.19	20	619.07	33.35	20	1131.0	110.57
30	125.02	1.36	30	627.50	34.26	30	1139.7	112.25
40	133.36	1.55	40	635.93	35.18	40	1148.4	113.95
50	141.70	1.75	50	644.37	36.12	50	1157.0	115.66
3	150.04	1.96	13	652.81	37.07	23	1165.7	117.38
10	158.38	2.19	10	661.25	38.03	10	1174.4	119.12
20	166.72	2.43	20	669.70	39.01	20	1183.1	120.87
30	175.06	2.67	30	678.15	39.99	30	1191.8	122.63
40	183.40	2.93	40	686.60	40.99	40	1200.5	124.41
50	191.74	3.21	50	695.06	42.00	50	1209.2	126.20
4	200.08	3.49	14	703.51	43.03	24	1217.9	128.00
10	208.43	3.79	10	711.97	44.07	10	1226.6	129.82
20	216.77	4.10	20	720.44	45.12	20	1235.3	131.65
30	225.12	4.42	30	728.90	46.18	30	1244.0	133.50
40	233.47	4.76	40	737.37	47.25	40	1252.8	135.35
50	241.81	5.10	50	745.85	48.34	50	1261.5	137.23
5	250.16	5.46	15	754.32	49.44	25	1270.2	139.11
10	258.51	5.83	10	762.80	50.55	10	1279.0	141.01
20	266.86	6.21	20	771.29	51.68	20	1287.7	142.93
30	275.21	6.61	30	779.77	52.89	30	1296.5	144.85
40	283.57	7.01	40	788.26	53.97	40	1305.3	146.79
50	291.92	7.43	50	796.75	55.13	50	1314.0	148.75
6	300.28	7.86	16	805.25	56.31	26	1322.8	150.71
10	308.64	8.31	10	813.75	57.50	10	1331.6	152.69
20	316.99	8.76	20	822.25	58.70	20	1340.4	154.69
30	325.35	9.23	30	830.76	59.91	30	1349.2	156.70
40	333.71	9.71	40	839.27	61.14	40	1358.0	158.72
50	342.08	10.20	50	847.78	62.38	50	1366.8	160.76
7	350.44	10.71	17	856.30	63.63	27	1375.6	162.81
10	358.81	11.22	10	864.82	64.90	10	1384.4	164.86
20	367.17	11.75	20	873.35	66.18	20	1393.2	166.95
30	375.54	12.29	30	881.88	67.47	30	1402.0	169.04
40	383.91	12.85	40	890.41	68.77	40	1410.9	171.15
50	392.28	13.41	50	898.95	70.09	50	1419.7	173.27
8	400.66	13.99	18	907.49	71.42	28	1428.6	175.41
10	409.03	14.58	10	916.03	72.76	10	1437.4	177.55
20	417.41	15.18	20	924.58	74.12	20	1446.3	179.72
30	425.79	15.80	30	933.13	75.49	30	1455.1	181.89
40	434.17	16.43	40	941.69	76.86	40	1464.0	184.08
50	442.55	17.07	50	950.25	78.26	50	1472.9	186.29
9	450.93	17.72	19	958.81	79.67	29	1481.8	188.51
10	459.32	18.38	10	967.38	81.09	10	1490.7	190.74
20	467.71	19.06	20	975.96	82.53	20	1499.6	192.99
30	476.10	19.75	30	984.53	83.97	30	1508.5	195.25
40	484.49	20.45	40	993.12	85.43	40	1517.4	197.53
50	492.88	21.16	50	1001.7	86.90	50	1526.3	199.82
10	501.28	21.89	20	1010.3	88.39	30	1535.3	202.12
10	509.68	22.62	10	1018.9	89.89	10	1544.2	204.44
20	518.08	23.38	20	1027.5	91.40	20	1553.1	206.77
30	526.48	24.14	30	1036.1	92.92	30	1562.1	209.12
40	534.89	24.91	40	1044.7	94.46	40	1571.0	211.48
50	543.29	25.70	50	1053.3	96.01	50	1580.0	213.86

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
31°	1589.0	216.3	**41°**	2142.2	387 4	**51°**	2732.9	618.4
10′	1598.0	218.7	10′	2151.7	390.7	10′	2743.1	622.8
20	1606.9	221.1	20	2161.2	394.1	20	2753.4	627.2
30	1615.9	223.5	30	2170.8	397.4	30	2763.7	631.7
40	1624.9	226.0	40	2180.3	400.8	40	2773.9	636.2
50	1633.9	228.4	50	2189.9	404.2	50	2784.2	640.7
32	1643.0	230.9	**42**	2199.4	407.6	**52**	2794.5	645.2
10	1652.0	233.4	10	2209.0	411.1	10	2804.9	649.7
20	1661.0	235.9	20	2218.6	414.5	20	2815.2	654.3
30	1670.0	238.4	30	2228.1	418.0	30	2825.6	658.8
40	1679.1	241.0	40	2237.7	421.4	40	2835.9	663.4
50	1688.1	243.5	50	2247.3	425.0	50	2846.3	668.0
33	1697.2	246.1	**43**	2257.0	428.5	**53**	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276 2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
50	1742.6	259.1	50	2305.2	446.4	50	2908.9	696.1
34	1751.7	261.8	**44**	2314.9	450.0	**54**	2919.4	700.9
10	1760.8	264.5	10	2324.6	453.6	10	2929.9	705.7
20	1770.0	267.2	20	2334.3	457.3	20	2940.4	710.5
30	1779.1	269.9	30	2344.1	461.0	30	2951.0	715.3
40	1788.2	272.6	40	2353.8	464.6	40	2961.5	720.1
50	1797.4	275.3	50	2363.5	468.4	50	2972.1	725.0
35	1806.6	278.1	**45**	2373.3	472.1	**55**	2982.7	729.9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.4	30	3014.5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
36	1861.7	294.9	**46**	2432.1	494.8	**56**	3046.5	759.6
10	1870.9	297.7	10	2441.9	498.7	10	3057.2	764.6
20	1880.1	300.6	20	2451.8	502.5	20	3067.9	769.7
30	1889.4	303.5	30	2461.7	506.4	30	3078.7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37	1917.1	312.2	**47**	2491.3	518.2	**57**	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
20	1935.7	318.1	20	2511.2	526.1	20	3132.6	800.4
30	1945.0	321.1	30	2521.1	530.1	30	3143.4	805.6
40	1954.3	324.1	40	2531.1	534.2	40	3154.2	810.9
50	1963.6	327.1	50	2541.0	538.2	50	3165.1	816.1
38	1972.9	330.2	**48**	2551.0	542.2	**58**	3176.0	821.4
10	1982.2	333.2	10	2561.0	546.3	10	3186.9	826.7
20	1991.5	336.3	20	2571.0	550.4	20	3197.8	832.0
30	2000.9	339.3	30	2581.0	554.5	30	3208.8	837.3
40	2010.2	342.4	40	2591.0	558.6	40	3219.7	842.7
50	2019.6	345.5	50	2601.1	562.8	50	3230.7	848.1
39	2029.0	348.6	**49**	2611.2	566.9	**59**	3241.7	853.5
10	2038.4	351.8	10	2621.2	571.1	10	3252.7	858.9
20	2047.8	354.9	20	2631.3	575.3	20	3263.7	864.3
30	2057.2	358.1	30	2641.4	579.5	30	3274.8	869.8
40	2066.6	361.3	40	2651.5	583.8	40	3285.8	875.3
50	2076.0	364.5	50	2661.6	588.0	50	3296.9	880.8
40	2085.4	367.7	**50**	2671.8	592.3	**60**	3308.0	886.4
10	2094.9	371.0	10	2681.9	596.6	10	3319.1	892.0
20	2104.3	374.2	20	2692.1	600.9	20	3330.3	897.5
30	2113.8	377.5	30	2702.3	605.3	30	3341.4	903.2
40	2123.3	380.8	40	2712.5	609.6	40	3352.6	908.8
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
61°	3375.0	920.2	**71°**	4086.9	1308.2	**81°**	4893.6	1805.3
10′	3386.3	925.9	10′	4099.5	1315.6	10′	4908.0	1814.7
20	3397.5	931.6	20	4112.1	1322.9	20	4922.5	1824.1
30	3408.8	937.3	30	4124.8	1330.3	30	4937.0	1833.6
40	3420.1	943.1	40	4137.4	1337.7	40	4951.5	1843.1
50	3431.4	948.9	50	4150.1	1345.1	50	4966.1	1852.6
62	3442.7	954.8	**72**	4162.8	1352.6	**82**	4980.7	1862.2
10	3454.1	960.6	10	4175.6	1360.1	10	4995.4	1871.8
20	3465.4	966.5	20	4188.5	1367.6	20	5010.0	1881.5
30	3476.8	972.4	30	4201.2	1375.2	30	5024.8	1891.2
40	3488.3	978.3	40	4214.0	1382.8	40	5039.5	1900.9
50	3499.7	984.3	50	4226.8	1390.4	50	5054.3	1910.7
63	3511.1	990.2	**73**	4239.7	1398.0	**83**	5069.2	1920.5
10	3522.6	996.2	10	4252.6	1405.7	10	5084.0	1930.4
20	3534.1	1002.3	20	4265.6	1413.5	20	5099.0	1940.3
30	3545.6	1008.3	30	4278.5	1421.2	30	5113.9	1950.3
40	3557.2	1014.4	40	4291.5	1429.0	40	5128.9	1960.2
50	3568.7	1020.5	50	4304.6	1436.8	50	5143.9	1970.3
64	3580.3	1026.6	**74**	4317.6	1444.6	**84**	5159.0	1980.4
10	3591.9	1032.8	10	4330.7	1452.5	10	5174.1	1990.5
20	3603.5	1039.0	20	4343.8	1460.4	20	5189.3	2000.6
30	3615.1	1045.2	30	4356.9	1468.4	30	5204.4	2010.8
40	3626.8	1051.4	40	4370.1	1476.4	40	5219.7	2021.1
50	3638.5	1057.7	50	4383.3	1484.4	50	5234.9	2031.4
65	3650.2	1063.9	**75**	4396.5	1492.4	**85**	5250.3	2041.7
10	3661.9	1070.2	10	4409.8	1500.5	10	5265.6	2052.1
20	3673.7	1076.6	20	4423.1	1508.6	20	5281.0	2062.5
30	3685.4	1082.9	30	4436.4	1516.7	30	5296 4	2073.0
40	3697.2	1089.3	40	4449.7	1524.9	40	5311.9	2083.5
50	3709.0	1095.7	50	4463.1	1533.1	50	5327.4	2094.1
66	3720.9	1102.2	**76**	4476.5	1541.4	**86**	5343.0	2104.7
10	3732.7	1108.6	10	4489.9	1549.7	10	5358.6	2115.3
20	3744.6	1115.1	20	4503.4	1558.0	20	5374.2	2126.0
30	3756.5	1121.7	30	4516.9	1566.3	30	5389.9	2136.7
40	3768.5	1128.2	40	4530.4	1574.7	40	5405.6	2147.5
50	3780.4	1134.8	50	4544.0	1583.1	50	5421.4	2158.4
67	3792.4	1141.4	**77**	4557.6	1591.6	**87**	5437.2	2169.2
10	3804.4	1148.0	10	4571.2	1600.1	10	5453.1	2180.2
20	3816.4	1154.7	20	4584.8	1608.6	20	5469.0	2191.1
30	3828.4	1161.3	30	4598.5	1617.1	30	5484.9	2202.2
40	3840.5	1168.1	40	4612.2	1625.7	40	5500.9	2213.2
50	3852.6	1174.8	50	4626.0	1634.4	50	5517.0	2224.3
68	3864.7	1181.6	**78**	4639.8	1643.0	**88**	5533.1	2235.5
10	3876.8	1188.4	10	4653.6	1651.7	10	5549.2	2246.7
20	3889.0	1195.2	20	4667.4	1660.5	20	5565.4	2258.0
30	3901.2	1202.0	30	4681.3	1669.2	30	5581.6	2269.3
40	3913.4	1208.9	40	4695.2	1678.1	40	5597.8	2280.6
50	3925.6	1215.8	50	4709.2	1686.9	50	5614.2	2292.0
69	3937.9	1222.7	**79**	4723.2	1695.8	**89**	5630.5	2303.5
10	3950.2	1229.7	10	4737.2	1704.7	10	5646.9	2315.0
20	3962.5	1236.7	20	4751.2	1713.7	20	5663.4	2326.6
30	3974.8	1243.7	30	4765.3	1722.7	30	5679.9	2338.2
40	3987.2	1250.8	40	4779.4	1731.7	40	5696.4	2349.8
50	3999.5	1257.9	50	4793.6	1740.8	50	5713.0	2361.5
70	4011.9	1265.0	**80**	4807.7	1749.9	**90**	5729.7	2373.3
10	4024.4	1272.1	10	4822.0	1759.0	10	5746.3	2385.1
20	4036.8	1279.3	20	4836.2	1768.2	20	5763.1	2397.0
30	4049.3	1286.5	30	4850.5	1777.4	30	5779.9	2408.9
40	4061.8	1293.6	40	4864.8	1786.7	40	5796.7	2420.9
50	4074.4	1300.9	50	4879.2	1796.0	50	5813.6	2432.9

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
91°	5830.5	2444.9	**101°**	6950.6	3278.1	**111°**	8336.7	4386.1
10′	5847.5	2457.1	10′	6971.3	3294.1	10′	8362.7	4407.6
20	5864.6	2469.3	20	6992.0	3310.1	20	8388.9	4429.2
30	5881.7	2481.5	30	7012.7	3326.1	30	8415.1	4450.9
40	5898.8	2493.8	40	7033.6	3342.3	40	8441.5	4472.7
50	5916.0	2506.1	50	7054.5	3358.5	50	8468.0	4494.6
92	5933.2	2518.5	**102**	7075.5	3374.9	**112**	8494.6	4516.6
10	5950.5	2531.0	10	7096.6	3391.2	10	8521.3	4538.8
20	5967.9	2543.5	20	7117.8	3407.7	20	8548.1	4561.1
30	5985.3	2556.0	30	7139.0	3424.3	30	8575.0	4583.4
40	6002.7	2568.6	40	7160.3	3440.9	40	8602.1	4606.0
50	6020.2	2581.3	50	7181.7	3457.6	50	8629.3	4628.6
93	6037.8	2594.0	**103**	7203.2	3474.4	**113**	8656.6	4651.3
10	6055.4	2606.8	10	7224.7	3491.3	10	8684.0	4674.2
20	6073.1	2619.7	20	7246.3	3508.2	20	8711.5	4697.2
30	6090.8	2632.6	30	7268.0	3525.2	30	8739.2	4720.3
40	6108.6	2645.5	40	7289.8	3542.4	40	8767.0	4743.6
50	6126.4	2658.5	50	7311.7	3559.6	50	8794.9	4766.9
94	6144.3	2671.6	**104**	7333.6	3576.8	**114**	8822.9	4790.4
10	6162.6	2684.7	10	7355.6	3594.2	10	8851.0	4814.1
20	6180.2	2697.9	20	7377.8	3611.7	20	8879.3	4837.8
30	6198.3	2711.2	30	7399.9	3629.2	30	8907.7	4861.7
40	6216.4	2724.5	40	7422.2	3646.8	40	8936.3	4885.7
50	6234.6	2737.9	50	7444.6	3664.5	50	8965.0	4909.9
95	6252.8	2751.3	**105**	7467.0	3682.3	**115**	8993.8	4934.1
10	6271.1	2764.8	10	7489.6	3700.2	10	9022.7	4958.6
20	6289.4	2778.3	20	7512.2	3718.2	20	9051.7	4983.1
30	6307.9	2792.0	30	7534.9	3736.2	30	9080.9	5007.8
40	6326.3	2805.6	40	7557.7	3754.4	40	9110.3	5032.6
50	6344.8	2819.4	50	7580.5	3772.6	50	9139.8	5057.6
96	6363.4	2833.2	**106**	7603.5	3791.0	**116**	9169.4	5082.7
10	6382.1	2847.0	10	7626.6	3809.4	10	9199.1	5107.9
20	6400.8	2861.0	20	7649.7	3827.9	20	9229.0	5133.3
30	6419.5	2875.0	30	7672.9	3846.5	30	9259.0	5158.8
40	6438.4	2889.0	40	7696.3	3865.2	40	9289.2	5184.5
50	6457.3	2903.1	50	7719.7	3884.0	50	9319.5	5210.3
97	6476.2	2917.3	**107**	7743.2	3902.9	**117**	9349.9	5236.2
10	6495.2	2931.6	10	7766.8	3921.9	10	9380.5	5262.3
20	6514.3	2945.9	20	7790.5	3940.9	20	9411.3	5288.6
30	6533.4	2960.3	30	7814.3	3960.1	30	9442.2	5315.0
40	6552.6	2974.7	40	7838.1	3979.4	40	9473.2	5341.5
50	6571.9	2989.2	50	7862.1	3998.7	50	9504.4	5368.2
98	6591.2	3003.8	**108**	7886.2	4018.2	**118**	9535.7	5395.1
10	6610.6	3018.4	10	7910.4	4037.8	10	9567.2	5422.1
20	6630.1	3033.1	20	7934.6	4057.4	20	9598.9	5449.2
30	6649.6	3047.9	30	7959.0	4077.2	30	9630.7	5476.5
40	6669.2	3062.8	40	7983.5	4097.1	40	9662.6	5504.0
50	6688.8	3077.7	50	8008.0	4117.0	50	9694.7	5531.7
99	6708.6	3092.7	**109**	8032.7	4137.1	**119**	9727.0	5559.4
10	6728.4	3107.7	10	8057.4	4157.3	10	9759.4	5587.4
20	6748.2	3122.9	20	8082.3	4177.5	20	9792.0	5615.5
30	6768.1	3138.1	30	8107.3	4197.9	30	9824.8	5643.8
40	6788.1	3153.3	40	8132.3	4218.4	40	9857.7	5672.3
50	6808.2	3168.7	50	8157.5	4239.0	50	9890.8	5700.9
100	6828.3	3184.1	**110**	8182.8	4259.7	**120**	9924.0	5729.7
10	6848.5	3199.6	10	8208.2	4280.5	10	9957.5	5758.6
20	6868.8	3215.1	20	8233.7	4301.4	20	9991.0	5787.7
30	6889.2	3230.8	30	8259.3	4322.4	30	10025.0	5817.0
40	6909.6	3246.5	40	8285.0	4343.6	40	10059.0	5846.5
50	6930.1	3262.3	50	8310.8	4364.8	50	10093.0	5876.1

Table V. Corrections for use with table IV,

For Tangents Add

△ ANGLE / CURVE	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.03	.06	.09	.13	.16	.19	.22	.25	.28	.31	.34	.38	.42	.46
15°	.04	.10	.14	.19	.24	.29	.34	.39	.45	.51	.53	.58	.63	.68
20°	.06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	79	.84	.90
25°	.08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
30°	.10	.19	.29	.39	.49	.59	.69	.79	.89	.99	1.09	1.20	1.29	1.39
35°	.11	.22	.34	.47	.58	.69	.70	.81	.92	1.04	1.29	1.42	1.54	1.66
40°	.13	.26	.40	.53	.67	.80	.93	1.06	1.20	1.34	1.49	1.64	1.79	1.94
45°	.15	.30	.44	.60	.76	.91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
50°	.17	.34	.51	.68	.85	1.02	1.19	1.36	1.54	1.72	1.91	2.10	2.29	2.48
55°	.19	.38	.57	.76	.95	1.14	1.32	1.52	1.72	1.92	2.14	2.35	2.56	2.77
60°	.21	.42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2 60	2.83	3.07
65°	.23	.46	.69	.93	1.16	1.40	1.64	1.88	2.13	2.38	2 63	2.88	3.13	3.39
70°	.25	.51	.76	1.02	1.28	1.54	1.80	2.06	2.33	2.60	2.88	3.16	3.44	3.72
75°	.27	.56	.83	1.12	1.40	1.69	1.98	2.27	2.57	2.87	3.16	3.47	3.78	4.09
80°	.30	.61	.91	1.22	1.53	1.84	2.15	2.46	2.78	3.10	3.44	3.78	4.12	4.46
85°	.33	.66	1.00	1.33	1.68	2.02	2.36	2.70	3.05	3.40	3.77	4.14	4.55	4.89
90°	.36	.72	1.09	1.45	1.83	2.20	2.57	2.94	3.32	3.70	4.10	4.50	4.91	5.32
95°	.39	.79	1.19	1.55	2.00	2.40	2.80	3.20	3.61	4.02	4 49	4.98	5.38	5.83
100°	.13	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5 37	5.85	6 34

For Externals Add

ANGLE / CURVE	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.001	.003	.004	.006	.007	.008	.009	.011	.012	.014	.015	.017	.018	.020
15°	.003	.007	.010	.014	.018	.023	.027	.029	.032	.035	.039	.043	.047	.051
20°	.006	.011	.017	.022	.028	.034	038	.045	.051	.057	.063	.070	.076	.083
25°	.009	.018	.027	.036	.046	.056	.065	.074	.083	.093	.106	120	.127	.135
30°	.013	.025	.038	.051	.065	.078	.090	.103	.116	.129	.149	.170	.179	.188
35°	.018	.035	.054	.072	.086	.109	.131	.153	.175	.197	.213	.230	.247	.264
40°	.023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341
45°	.030	.060	.093	.119	153	.184	.216	.254	.289	.325	.351	.378	.411	.445
50°	.037	.075	.116	.151	.189	.227	.266	.305	.345	.384	.425	.467	.508	.550
55°	.046	.093	.142	.188	.236	.283	.332	.381	.420	.479	.530	.582	.641	.700
60°	.056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	697	.774	.851
65°	.067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.711	.845	922	1.01
70°	.080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°	.095	.182	.286	.383	.480	.578	.678	.777	.877	977	1.07	1.18	1.29	1.39
80°	.110	.220	.332	.445	.558	.671	.787	.903	1.02	1.13	1.25	1.38	1.50	1.62
85°	.128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1 62	1.76	1.91
90°	.149	.299	.450	.603	.756	.910	1.07	1.22	1.38	1.54	1.70	1.87	2.03	2.20
95°	.174	.350	.522	.706	.985	1.06	1.25	1.43	1.62	1.80	1 99	2.18	2 38	2 58
100°	.200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2 06	2.28	2.50	2.73	2.96

Table VI. Deflections for Sub Chords for Short Radius Curves.

Degree of Curve	Radius 50 / sin. def. ang.	½ sub chord / R = sin of def. angle 12.5 Ft.	15 Ft.	20 Ft.	25 Ft.	Length of arc for 100 ft.
30°	193.18	1° 51′	2° 17′	2° 58′	3° 43′	101.15
32°	181.39	1° 59′	2° 25′	3° 10′	3° 58′	101.33
34°	171.01	2° 06′	2° 33′	3° 21′	4° 12′	101.48
36°	161.80	2° 13′	2° 41′	3° 33′	4° 26′	101.66
38°	153.58	2° 20′	2° 49′	3° 44′	4° 40′	101.85
40°	146.19	2° 27′	2° 57′	3° 55′	4° 54′	102.06
42°	139.52	2° 34′	3° 05′	4° 07′	5° 08′	102.29
44°	133.47	2° 41′	3° 13′	4° 18′	5° 22′	102.53
46°	127.97	2° 48′	3° 21′	4° 29′	5° 36′	102.76
48°	122.92	2° 55′	3° 29′	4° 40′	5° 50′	103.00
50°	118.31	3° 02′	3° 38′	4° 51′	6° 04′	103.24
52°	114.06	3° 09′	3° 46′	5° 02′	6° 17′	103 54
54°	110.11	3° 16′	3° 54′	5° 13′	6° 31′	103.84
56°	106.50	3° 22′	4° 02′	5° 23′	6° 44′	104.14
58°	103.14	3° 29′	4° 10′	5° 34′	6° 57′	104.43
60°	100.00	3° 35′	4° 18′	5° 44′	7° 11′	104.72

CURVE FORMULAS.

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan. \frac{1}{2} I}{\text{Sin. D}}$

$\text{Sin. D} = \frac{50}{R}$

$\text{Sin. D} = \frac{50 \tan. \frac{1}{2} I}{T}$

$R = T \cot. \frac{1}{2} I$

$R = \frac{50}{\text{Sin. D}}$

$E = R \text{ ex. sec. } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{\frac{1}{2} I}{D}$

Tan. def. = ½ chord def.

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

Table IV. contains Tangents and Externals to a 1° curve. Tan. and Ext. to any other radius may be found, nearly enough, by dividing the Tan. or Ext. opposite the given Central Angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Ext. opposite the given Central Angle by the given External.

To find. Nat. Tan. and Nat. Ex. Sec. for any angle by Table IV.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.), and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance: Multiply the angle by .01745, and the product by the distance.

Right Angle Triangles.— Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt 10. $10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. 25. $25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875$ = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

Natural Sines

Deg.	0′	10′	20′	30′	40′	50′	Deg.	Deg.	0′	10′	20′	30′	40′	50′	Deg.
0	0000	0029	0058	0087	0116	0145	89	40	6428	6450	6472	6494	6517	6539	49
1	0175	0204	0233	0262	0291	0320	88	41	6561	6583	6604	6626	6648	6670	48
2	0349	0378	0407	0436	0465	0494	87	42	6691	6713	6734	6756	6777	6799	47
3	0523	0552	0581	0610	0640	0669	86	43	6820	6841	6862	6884	6905	6926	46
4	0698	0727	0756	0785	0814	0843	85	44	6947	6967	6988	7009	7030	7050	45
5	0872	0901	0929	0958	0987	1016	84	45	7071	7092	7112	7133	7153	7173	44
6	1045	1074	1103	1132	1161	1190	83	46	7193	7214	7234	7254	7274	7294	43
7	1219	1248	1276	1305	1334	1363	82	47	7314	7333	7353	7373	7392	7412	42
8	1392	1421	1449	1478	1507	1536	81	48	7431	7451	7470	7490	7509	7528	41
9	1564	1593	1622	1650	1679	1708	80	49	7547	7566	7585	7604	7623	7642	40
10	1736	1765	1794	1822	1851	1880	79	50	7660	7679	7698	7716	7735	7753	39
11	1908	1937	1965	1994	2022	2051	78	51	7771	7790	7808	7826	7844	7862	38
12	2079	2108	2136	2164	2193	2221	77	52	7880	7898	7916	7934	7951	7969	37
13	2250	2278	2306	2334	2363	2391	76	53	7986	8004	8021	8039	8056	8073	36
14	2419	2447	2476	2504	2532	2560	75	54	8090	8107	8124	8141	8158	8175	35
15	2588	2616	2644	2672	2700	2728	74	55	8192	8208	8225	8241	8258	8274	34
16	2756	2784	2812	2840	2868	2896	73	56	8290	8307	8323	8339	8355	8371	33
17	2924	2952	2979	3007	3035	3062	72	57	8387	8403	8418	8434	8450	8465	32
18	3090	3118	3145	3173	3201	3228	71	58	8480	8496	8511	8526	8542	8557	31
19	3256	3283	3311	3338	3365	3393	70	59	8572	8587	8601	8616	8631	8646	30
20	3420	3448	3475	3502	3529	3557	69	60	8660	8675	8689	8704	8718	8732	29
21	3584	3611	3638	3665	3692	3719	68	61	8746	8760	8774	8788	8802	8816	28
22	3746	3773	3800	3827	3854	3881	67	62	8829	8843	8857	8870	8884	8897	27
23	3907	3934	3961	3987	4014	4041	66	63	8910	8923	8936	8949	8962	8975	26
24	4067	4094	4120	4147	4173	4200	65	64	8988	9001	9013	9026	9038	9051	25
25	4226	4253	4279	4305	4331	4358	64	65	9063	9075	9088	9100	9112	9124	24
26	4384	4410	4436	4462	4488	4514	63	66	9135	9147	9159	9171	9182	9194	23
27	4540	4566	4592	4617	4643	4669	62	67	9205	9216	9228	9239	9250	9261	22
28	4695	4720	4746	4772	4797	4823	61	68	9272	9283	9293	9304	9315	9325	21
29	4848	4874	4899	4924	4950	4975	60	69	9336	9346	9356	9367	9377	9387	20
30	5000	5025	5050	5075	5100	5125	59	70	9397	9407	9417	9426	9436	9446	19
31	5150	5175	5200	5225	5250	5275	58	71	9455	9465	9474	9483	9492	9502	18
32	5299	5324	5348	5373	5398	5422	57	72	9511	9520	9528	9537	9546	9555	17
33	5446	5471	5495	5519	5544	5568	56	73	9563	9572	9580	9588	9596	9605	16
34	5592	5616	5640	5664	5688	5712	55	74	9613	9621	9628	9636	9644	9652	15
35	5736	5760	5783	5807	5831	5854	54	75	9659	9667	9674	9681	9689	9696	14
36	5878	5901	5925	5948	5972	5995	53	76	9703	9710	9717	9724	9730	9737	13
37	6018	6041	6065	6088	6111	6134	52	77	9744	9750	9757	9763	9769	9775	12
38	6157	6180	6202	6225	6248	6271	51	78	9781	9787	9793	9799	9805	9811	11
39	6293	6316	6338	6361	6383	6406	50	79	9816	9822	9827	9833	9838	9843	10
Deg.	60′	50′	40′	30′	20′	10′	Deg.	Deg.	60′	50′	40′	30′	20′	10′	Deg.

Deg.	0′	10′	20′	30′	40′	50′	Deg.
80	9848	9853	9858	9863	9868	9872	9
81	9877	9881	9886	9890	9894	9899	8
82	9903	9907	9911	9914	9918	9922	7
83	9925	9929	9932	9936	9939	9942	6
84	9945	9948	9951	9954	9957	9959	5
85	9962	9964	9967	9969	9971	9974	4
86	9976	9978	9980	9981	9983	9985	3
87	9986	9988	9989	9990	9992	9993	2
88	9994	9995	9996	9997	9997	9998	1
89	9998	9999	9999	9999	1.0000	1.0000	0
Deg.	60′	50′	40′	30′	20′	10′	Deg.

Natural Cosines

Natural Tangents

deg.	0′	10′	20′	30′	40′	50′	deg.	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	2.8239	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	6536	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	3.8667	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.	60′	50′	40′	30	20′	10′	deg.	deg.	60′	50′	40′	30′	20′	10′	deg.

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	343.770	0
deg.	60′	50′	40′	30′	20′	10′	deg.

Natural Cotangents

1°28′ E. of Meridian at 71 & 1933
10 degrees = 33 yds
1°18′

Our Bearings for SEx 25 - 39 - 5"
Jack 8° 14' 6" .473 gone
Felpole S 59½ E .455 moved
(near face)
Cement Mon in E roads.

Pacing on Shaws Hagelbuttrd. (Means. page 6)
length 74.624 ch paces = 1724
23.1 pa. ch.

pacing West from ⅛

We get
107
222
328
564
795
1026
1141
1258.5
1374.
1491.
1724.

∴ Basis for road trav.
Ch. × 23.1 = paces.
paces × .0433 = chains

This should be check on my Cedar Falls road.

Emil Geiger Test #3

Data - from my Lat + Long maps.

NE x 38-5 = 45°-49' Lat + 89°-48.1 W Long

S.E x 13-38-5 = 45°-46.4'

NW x 3 " " = 45°-49' N + 89°-51.8 "

NW x 38-5 = " + 89°-55.7'

NW x 38-4 = 45°-49' + 90°-03.2 "

Center " " = 45°-46.4 + 89°-59.5' "

Mc. S. shore Silver L.
= 45°-48.5' 89°-46.9 "

E 4 1.34-5 = 45°-48.6 89°-48.1

SW x 19-38-4 45°-45.5' N + 90°-03.2 W
90°-01.9
20 " " 90°-00.7
21 " " 89°-57.4
22 " " 89°-58.2
23 " " 89°-56.9
24 " "

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.

MADE IN GERMANY.

Location posters
T 36 R 7

1- Township 36-7
Sets 4 chs 45 Lks East of ⅛ post
bet Secs 14-23

2- Township 36-7
21 chs 51 Lks East to Sec cor
to Secs 12-13-7-18
bet Ranges 7 + 8

3- Township 36-7
4 chs 90 Lks North
To ¼ post bet Secs 11 + 12

4- Township 36-7
5 chs 54 Lks East to ¼ post
bet sec 2 + 11

5- Township 37-6
1 ch 92 Lks South to ¼ post
bet Secs 2 + 3

6- Bet townships 36 + 37 Range 7
28 chs 58 Lks North to sec cor to Secs
2-3-34-35

Location posters
T 36 R 7

7- township 36 - 7
14 Chs 95 Lks West 10 1/4 Post
bet secs 2 & 3

8-

Location Markers
T 37 R 7

1- 10 chs 44 Lks North to Sec Cor to Secs 15-16-21-22 Township 37-7 (on Horsehead Lake Rd.)

2- 20 chs 98 Lks West to Sec Cor to Secs 15-16-21-22 Township 37-7 (on Horse Head Lake Rd)

3- 18 chs 36 Lks south to ¼ post which sets in open Swamp bet Secs 31+36 Township 37 Bet Ranges 7-8

4- 4 chs 1 Lk North to sec Cor to Secs 25-30-36-31 Township 37 bet Ranges 7+8

5- Township 37 bet Ranges 7+8 1 ch 12 Lks East to Sec Cor to Secs 25-30-36-31

Location Markers
T 37 R 7

6- Township 37 R 7
2 chs 68 Lks West to ¼ post
bet secs 24 & 25

7- Township 37 R 7
15 chs 63 Lks south
to ¼ post secs 23 & 24

8- Township 37 R 7
28 chs 55 Lks South to ¼ post
bet secs 23 & 24

9- Township 37 R 7
Approx 19 chs North to Sec Cor
to secs 2-3-10-11

10- Township 37 bet Ranges 7 & 8
North 2 chs 21 Lks to Sec Cor
to Secs 1-6-12-7

11- Township 37 bet Ranges 7 & 8
7 chs 97 Lks North to Sec
Cor to secs 1-6-12-7

Location Markers
T37 R7

12- Township 37 bet Ranges 7+8
2 Chs 19 Lks East to Sec Cor
to secs 1-6-12-7

13- Township 37 bet Ranges 7+8
18 Chs 39 Lks East to Sec
Cor to Secs 1-6-12-7

14- Township 37 bet Ranges 7+8
18 Chs 38 Lks South to ¼ post
bet Secs 13-18

15- Township 37 bet Ranges 7+8
17 Chs 05 Lks North to ¼ Post
bet Secs 13+18

16- Township 37 bet Ranges 7+8
11 Chs 10 Lks South to Sec Cor
To secs 13-18-24-19

17- 10 Chs 34 Lks East to sec Cor
to Secs 13-18-19-24

Location Markers
T37 R7

18- Township 37 R7
17 chs 74 lks south to sec
Cor to secs 27-28-33-34

19- Township 37 R7
16 chs 73 lks North to ¼ post
bet secs 27-26

20- Township 37 R7
4 chs South to ¼ post
bet secs 26-27

21- Township 37 R7
88 lks South to ¼ post
bet secs 22-23

22- Township 37 R7
2 chs 94 lks East to ¼ Cor
bet Secs 14-23

23- 29 chs 26 lks North to sec Cor
To secs 26-27-34-35
T37 R7

Location Markers
T37 R7

24- 24chs 53 Lks West to
Sec Cor 26-27-34-35
T37 R7

25- 28chs 69 Lks South to Sec
Cor to secs 34-35-3-4
bet townships 36+37
Range 7

26- 19chs 79 Lks East to sec
Cor 11-12-13-14
T37 R7

27- 20chs 65 Lks South to ¼
Cor bet secs 13-14
T37 R7

28- 7chs 4 Lks North to ¼ post
bet Sec 13+14
T37 R7

29- 11chs 16 Lks North to
Sec Cor to Secs 23-24-25-26
T37 R7

Location Markers
T37 R7

30- 38 chs 30 lks West to
¼ post bet secs 14-23
T37 R7

31- 38 chs 40 lks North to ¼ post
bet secs 13-14
T37 R7

32- 29 chs West to ¼ post
bet secs 23-14
T37 R7

33- 12 chs 50 lks North to
¼ post bet secs 24-19
bet Ranges 7+8 T37

34- 36 chs 35 lks East to
sec cor to secs 13-18-19-24
T37 R7-8

35- 17 chs 25 lks south to seccor
to secs 24-19-25-30
T37 bet Ranges 7+8

Location Markers
T37 R7

36- 33 chs 92 Lks South to
Sec Cor to Secs 15-16-21-22
T37 R7

37- 36 chs East to ¼ cor
bet Secs 10+15
T37 R7

38- 7 chs 38 Lks North to ¼ cor
bet secs 9+10
T37 R7

39- 4 chs 80 Lks East to ¼ post
bet Secs 3-10
T37 R7

Location Markers
T 36 R 7

1- South 1ch 37 lks to
Sec Cor to secs 3-4-9-10
T 36 R 7

2- West 5 chs 20 lks to ¼
Cor bet secs 9-16
T 36 R 7

3- West 8 chs 92 lks to Sec
Cor to secs 8-9-16-17
T 36 R 7

4- South 10 chs 8 lks to
Sec Cor to Sec 16-17-20-21
T 36 R 7

5- 6 chs 63 lks East to Sec Cor
to Secs 16-17-20-21
T 36 R 7

6- 28 chs 10 lks East to Sec Cor
to Secs 20-21-28-29
T 36 R 7

Location Markers
T36 R7

7- At North ¼ post
bet secs 28-29
T36 R7

8- South 30 chs 29 Lks to Sec
Cor to secs 7-8-17-18
T36 R7

9- West 13 chs to Sec Cor
to Secs 16-17-20-21
T 36 R7

10- North 15 Lks to ¼ post
bet Secs 21-22
T36 R7 on Fire Lane.

11- South 19 chs 85 Lks to
Sec Cor to secs 22-23-26-27
T 36 R7

12- North 3 chs 41 Lks to
Sec Cor to Secs 27-28-33-34
T 36 R7

Location Markers
T36 R7

13- South 4 chs 45 Lks to
Sec Cor to Secs 22-23-26-27
T36 R7

14- South 1 ch 80 Lks to sec cor
to Secs 28-29-32-33
T36 R7

15- North 15 chs 60 Lks to Sec
Cor to secs 28-29-32-33
T36 R7

16- East 46 Lks to ¼ Post
in Road bet secs 29-32
T36 R7

17- 2 chs 32 Lks North to ¼ Post
bet secs 27+28
T36 R7

18- West 40 Lks to Sec Cor to
secs 25-26-35-36
T36 R6 Cor sets in Rd.

Location Markers
T 37 R 6

1- West 59 Lks to Sec Cor to
Secs 14-15-22-23
T 37 R 6

2- West 19 chs to ¼ Cor
bet Secs 9-10
T 37 R 6 (on U.S. 51)

3- 3 Chs 32 Lks West to ¼ post
bet Secs 3-34
T 37 R 6

4- 1 Ch 28 Lks West to Sec
Cor to Secs 13-18-19-24
T 37 R 6

5- West 1 Ch 38 Lks to Sec
Cor to Secs 7-13-12-18
T 37 bet Ranges 6-7

6- 1 Ch 19 Lks West to ¼ post
bet Secs 13-18
T 37 bet Ranges 6-7

Location Markers
T 37 R 6

7- 36 Lks West to sec Cor to
secs 16-17-20-21
T 37 R 6

8- 2 chs 71 Lks East to sec
Cor to secs 8-9-16-17
T 37 R 6

9- At 1/8 post bet secs 17-18
T 37 R 6

10- 3 chs 70 Lks West to Sec
Cor to secs 7-8-17-18
T 37 R 6

11- 19 chs South to 1/4 post
bet secs 7+8
T 37 R 6

12- 2 chs 65 Lks West to sec
Cor to secs 5-6-7-8
T 37 R 6

Location Markers
T 37 R 6

13- 2 chs 21 Lks North to ¼ post bet 13-18
T 37 bet Ranges 5-6

14- 17 chs 95 Lks south to ¼ post bet secs 7-12
T 37 bet Ranges 5-6

15- 10 chs 90 Lks south to ¼ post bet secs 5+6
T 37 R 6

16- 3 chs 7 Lks East to ¼ post bet secs 6-31
Bet townships 37+38 Range 6

17- 21 chs East to sec cor
To secs 4-5-32-33
bet townships 37+38 Range 6

18- 1 ch 56 Lks south to ¼ cor
bet secs 1-6
T 36 bet Ranges 6+7

Location Markers
T 37 R 6

19- 14 chs 62 Lks East to
Sec Cor 7-12-13-18
T 37 R 6

20- 6 chs 65 Lks East to
sec Cor to secs 1-2-35-36
bet townships 37 & 38
Range 6 E

21- 7 chs 19 Lks West to Sec
Cor to Secs 1-2-35-36
Bet townships 37 & 38
Range 6 E

Location posters
T 37 R 11

1- 30 chs 51 Lks South to ¼
sec Cor bet secs 25-30
T 37 bet Ranges 10+11

2- 22 Lks West to sec Cor
to secs 29-30-31-32
T 37 R 11 Sets in Rd

3- 35 Lks West to sec Cor
to secs 31-32-5-6
bet to Whships 36-37
Range 11

4- Sets at ¼ post bet Secs
31-32
T 37 R 11

5- 17 Chs East to Sec Cor
to Secs 20-21-29-28
T 37 R 11

6- 1 Ch 70 Lks West to ¼ Cor bet
Secs 20-29
T 37 R 11

Location Markers
T 37 R 11

7- South 8 Lks to ¼ Cor
bet Secs 19-20
T 37 R 11

8- 1 Ch 47 Lks East to ¼ Cor
bet Secs 17 & 20
T 37 R 11

9- 7 Chs South to Sec Cor
To Secs 8-9-16-17
T 37 R 11

10- 1 Ch 17 Lks West to ¼ Cor
bet Sec 16-21
T 37 R 11

11- 18 Chs South to ¼ Cor
bet Secs 28-29
T 37 R 11

12- 9 Chs 9 Lks East to ¼ Cor
bet Secs 33-34
bet T 36 & 37 R 11

Location Markers
T 37 R 11

13- 16 chs 74 Lks East to ¼ post bet Secs 33-28 T37 R 11

14- 8 chs 76 Lks North to Sec Cor to Secs 4-5-8-9 T37 R 11

15- 11 chs 85 Lks West to Sec Cor to Secs 4-5-8-9 T 37 R 11

16- 6 Lks East to Sec Cor to Secs 19-30-24-25 T 37 bet R's 10 + 11

17- 12 chs 90 Lks North to Sec Cor to Secs 19-30-24-25 T 37 bet R's 10+11

18- 10 chs 90 Lks South to Sec Cor to Secs 19-20-29-30 T 37 R 11

19- 1 ch 60 Lks South to ¼ Cor bet Secs 22-27 T 37 R 11

20- 2 chs 42 Lks North to Sec Cor to Secs 21-22-27-28 T 37 R 11

Location Markers
T 37 R 11

21- 20 chs South to sec Cor
to secs 3-4-9-10
T 37 R 11 (on Lake Margaret)

22- 3chs 51 Lks North to ¼ cor
bet secs 21 + 28 T 37 R 11

23- 14chs 25 Lks East to ¼ cor
bet Secs 21 + 28
T 37 R 11 (by over Head)

24- 15chs East to sec Cor
to secs 28-29-32-33 T 37 R 11

25- 6 chs 54 Lks West to ¼ Cor
bet Secs 17-20 T 37 R 11

26- 16 chs 70 Lks East to ¼ cor
bet Secs 19-30 T 37 R 11 (on R.R.)

27- 10chs 37 Lks North to ¼ cor
bet sec 4-9 T 37 R 11

Location Markers
T37 R11

28- 1ch85 Lks North to sec
Cor 3-4-9-10 T37R11 (on R.R.)

29- 33 Lks North to ¼ Cor
bet Secs 3-10 T37 R11

30 - 24chs 95 Lks North to Sec
Cor to Secs 3-4-33-34
bet T37+38 R11

31- 4chs 54 Lks south to Sec Cor
to Secs 20-21-28-29 T37R11

32- 40 Lks North to sec Cor to
Secs 22-23-26-27 T37 R11

33- 3chs 70 Lks south to Sec Cor
to Secs 22-23-26-27 T37R11

34- 36 Lks West to ¼ Cor bet
Secs 5-32 bet Ts 37+38 R11

35- 1ch 30 Lks South to Sec Cor to Secs
2-3-10-11 T37 R11

Location Markers
T 37 R 11

36- 11 chs 72 Lks south to Sec
Cor to Secs 1-2-11-12 T 37 R 11

37- 13 chs 64 Lks South to Sec Cor
to Secs 1-6-7-12 T 37 bet Rs 11 + 12

38- sets on Sec Cor to Secs
25-30-31-36 T 37 bet Rs 11 + 12

39- 6 chs 10 Lks North to Sec Cor
to Secs 19-24-25-30 T 37 bet Rs 11+12

40- 29 chs 65 Lks North to Sec
Cor to Secs 19-24-25-30
T 37 bet Rs 11+12