

6

16

6

FIELD BOOK

140-25 140-26 140-25 140-26 140-141 140-141

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T 140 N. R 25 W.

West bet. 1 - 12 - Page 3

T 140 N. R 26 W.

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140-26

140-25

140-26

140-25

140-26

140-26
26

140-25
25

T. 140 N R. 26 W

26739 Ft. Crossed hay meadow.

19780 Ft. entered N-W end of same hay meadow.

15757 Ft. Crossed hay meadow.

14786 Ft. Came to hay meadow NE-SW.

11715 Ft. Crossed old hay Road running NW-SE.

10768 Ft. Crossed fence running N-S.

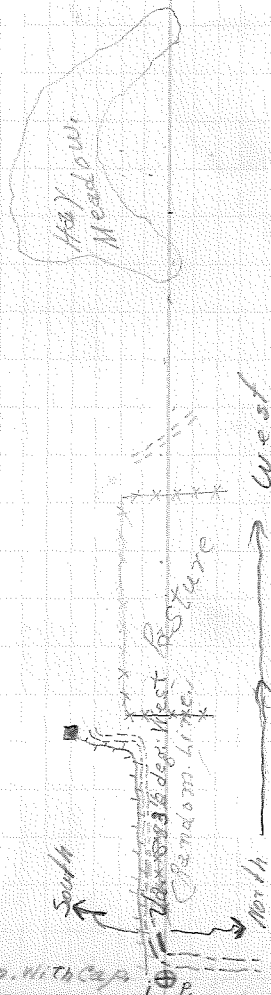
5760 Ft. Crossed fence running N-S.

5700 Ft. farm house south of line about 2700 Ft.

1710 Ft. Crossed fence running west along line.
Ft. 27 Ft. came to center of Road running W-N.
0700 Set up and ran West on Random line. Sec. 14 1/2

Date. November 9. 1937

Party:
Stronsted
Chapka
Miller
Chas. Lewis
E. Riley



Started from old ip. with caps

T. 140 N. R. 26 W.

25 Ft center of Highway No. 6.
52+70 Ft set 499 Sec. Cox. Toymans above.

Sec. 10 1/4
5 1/4

2.

~~Highway No. 6~~
~~140-25~~

Same party

34+52 Ft Crossed Ss. Swamp

30+2 Ft. Come to Ss. Swamp

34+40 Ft. Set app. 1300. No B.C. found.

2 1/2 S. 8 1/2 W. Sec. 10 1/4
140-25



4/20/25

T140 R256

36+40 ft. set APP. Weak No old B.T.S. Found.

23+20 ft. Entered ss. sup. Running N-S.

15+70 ft. Left tam. sup.

14+12 ft. Entered tam. sup. Running N-S.

0+00

set up. et APP. sec. Cor. Bet.

116 140-25
127 140-26

1/2 No old B.T.S. Found, Run west.

APP. sec. Cor. 13

140-26

140-25

140-26

140-26

140-25

page 3.

1/2 sec. Cor.

Weather - Clear - Cool.

Date Nov. 11, 1937

Party Stromsted
Chaplin
Miller
Chas. Lewis
E. Riley.

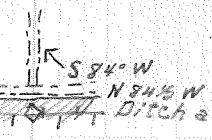
Tam. sup.

S. 80° dip. sec. W.
1/2 dip. tam. line

(Mag. B.)

53+00 Ft. Come to center of Road N-S.
52+80 Ft. Set App. Sec. Cor. 1731 Ft. to Far So. to Meet

Road running West Bears
Road running N-S Bears
Ditch along Road.
Telephone above



4.

Same party

34+40 Ft. Left ss. swp.

32+48 Ft. Entered ss. Swamp N-S.

27-27 Ft. Left ss. swp. Panni of M.S.

S 84 1/2 deg. W
(Mag. Bearing)



T. 140^N R. 26 W

26+40 Ft. Set APP $\frac{1}{4}$ Cor. Bet. 2-11. in Center of Road

23+00 Ft. Farm house to the north about 2150 ft.

22+00 Ft. Set up 2nd Run West along Road $\frac{1}{2}$ 6°

140-25 140-26 140-27 140-28
26 25

5

Weather Clear - Cool - Windy Date November 10 - 1957

Party: Stronstad - Compass
Chapka - Chain
Miller, O. - Chain
Foley, E. - Brush
Lewis, E. - Brush

58°W
Random Run 57°

Telephone West along Road
APP. Sec. Cor. 2-11

T. 140 N. R. 26 W.

53+23 Ft. hit edge of twin lake.
52+80 Ft. Set App. Sec. Cor.

50+38 Ft. middle of #6. Road Bearing N 2° W on cur
50+18 Ft. Telephone Line North and South along

46+20 Ft. Road curves of line.

45+67 Ft. Cottage on south side of road

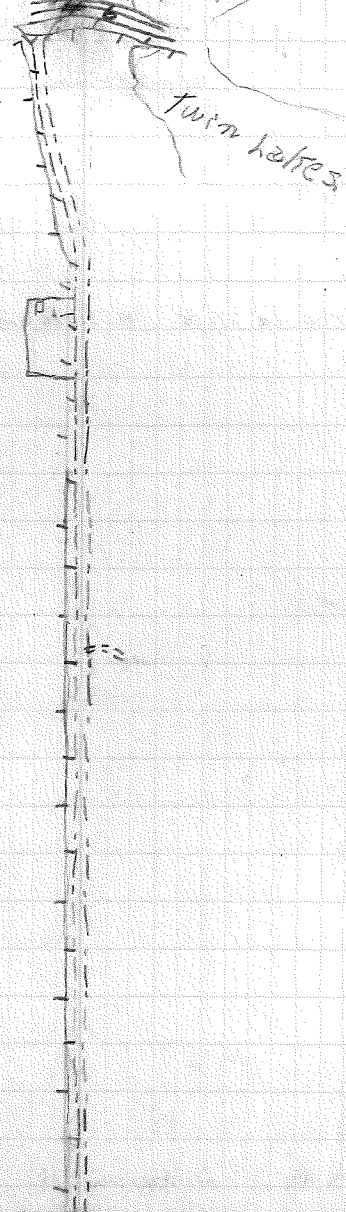
44+00 Ft. Clearing on south side of road.

38+11 Ft. side road going North

22+17 Ft. School house to the South of the line

140-20 140-25 140-26 140-141 140-142
26 25
6.
Weather Clear-Cool-Windy is the party

no.
#6.



about 150 Ft.

T140N R26W

2640 ft set APP 400 and came to same Pooled

1877 Ft. Crossed Road passable by Truck

2200 ft. Left Tam. Sup.

5453 Ft. crossed old hay Road

Setup in Tam. Sup. Run West

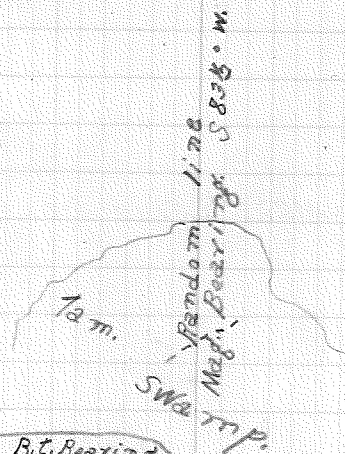
1487 Ft. found ip. Bearing N75° E Bot. two Cor.

also set up at old scribbled Cor. T140-S2 - R 2651 about

7

Weather - Cold - Windy - Attempt south Date Nov. 15, 1937

Party	Stronstad	Compass
	Chapko	Chain
	Miller	Chain
	Lewis, Chas.	Brush
	Riley, E.	Brush



found B.C. Bearing
 N62°W, 32 Ft. Bt. Tam
 Reading S 35 B.D. 11

Bt. N31°E, 5 Ft. 35
 Tam. STB


4" Squared staff. Run West

335

T140 R 26

35+65 Ft. set APP. MC. Station Rice Lake

Rice
Lake



8.

T 140 R 25

17400 Ft. Setup and run East 1/2 6/89.

appr. S.C. 1/6

Continue line east from 17400 east of

Weather - Cold - Clear - Windy Date Nov. 16, 1937

Partly	Sronstal	Compass
	Chupka	Chait
	Miller.	Chait
	Lewis.C.	Brush
	Riley.E.	Brush

N 82 1/2 E
Rough Map Map

T140 X R25 W

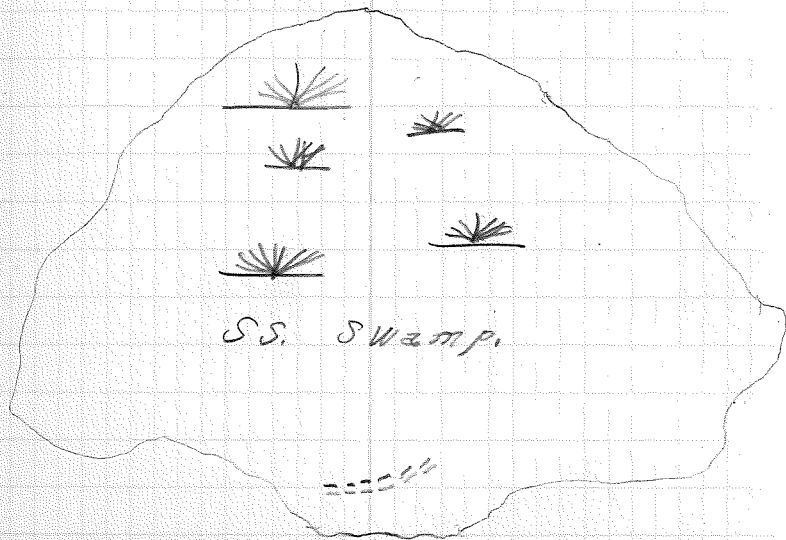
48+00 ft. left ss, swp. N-S. - Quit for day

38+13 ft. Came to old logging road NS
29+00 ft. entered ss. swp. N-S.

140-26 140-141 140-142
26 25

10.

same party



140-RR6

26+40 Ft. Sect. 4, P. 9, E. C. W. Va. Cor.
36+19 Ft. Road Run West from highway

0700 set up at int. of road run North along highway #6

140-141
26

140-142
25

12

11

===
Date Nov. 17 1937

Party - Stronstad	Compass
Chapke	Chain
Miloy	Chain
Lewis C.	Brush
Riley E.	Brush

Mag. Bearing N. 50 W.

15 14
22 23

52+80 Ft. Set App. Sec. Cor. Run West. Va. $6\frac{1}{2}$ degrees.

51+34 Ft. come to old survey line run East.

140-141
26

140-142
25

12

Same party

26+40 Ft. SET APP. E.C.W. West.

19+50 Ft. 10ft. SS SWP

18+45 Ft. came to ss. swp. N-S.

12+00 Ft. 10ft. Tem. SWP.

5+27 Ft. came to Tem. SWP. N-S.

8+00 Ft. set up and run west. at app. sec. con

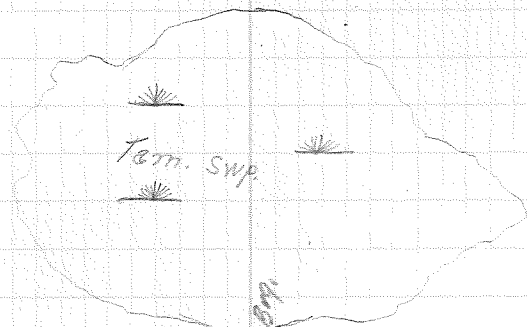
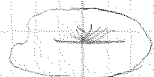
10/11
2/77

140-141
26

140-142
25

Nov. 17, 1997/13

Same party



5834.9W
Random Hops. Box

T140 R 26

140-141
26

140-141
25

14

Same party

32+57 Ft. Cement edge of Big Mander lake

26+92 Ft. measured south to 1A 37.7 Ft. mounted W. in holes at base

30+00 Ft. measured south to 1 in. horn hole 36 Ft. S. of my line

I. R.

T140 R26

17756 ft. measured So. 5 ft. to old orig. M.C. Scribed M.C. 502. - M.C. 515

13440 ft. house on S. side of 1/2 mi
13245 ft. crossed fence. N. S.

12700 ft. left. Road E-W.

0.200 Set up at 127. of road Run West along road. $\frac{15}{14}$
22/23

146-141
26

140-141
E5

15

Date Nov. 17, 1957

Party Stranstad
Chapin
Miller
Lewis,
Paley

5810 W

Random Map 899

140 1926

26740 ft. came to 410th Blazed on two sides No 307100 S.

lake shore.

17400 ft. entered Tam. Sump

14100 ft. left Spruce Sump

8475 ft. entered spruce sump
8471 ft. came to old logging Road N-S.

4177 ft. came to old logging Road N-S

1432 ft. W. to 5" squared oak post for Cor. Marked 1432

2100 Started from Road Int. S 840 W

5/4 140-26

140-141
26
140-142
25

16

Date Nov. 18, 1927

Partly Stranstad
Chaplin
Miller
Lewis
P. J. E.

Tam. Sump



Spruce Sump



Random line
Mag. Bearing S 88° W

(E side 1926 W 533
Middle 1741 N 532
Middle 1926 W 53
S side 1700 N 53)

Change in Bearing S 85° W
on cut out line.

T140 R 26

51+28 Ft. Corveth old mile stake 82 Ft. S. from middle of Road.

$\frac{33}{574}$
0100 Started from end Int. Run East and Run E. along Road

140-26
140-141
26
140-142
R5
17

Stone party

N 1/2 of E
Random May. 1891

T140 P26W.

6-22-44. Crossed foot trail.
from ft. West end of lake N-S.

1100 ft. from lake shore
low found true section 01-22-2021 Run West

40-26

190-141
26

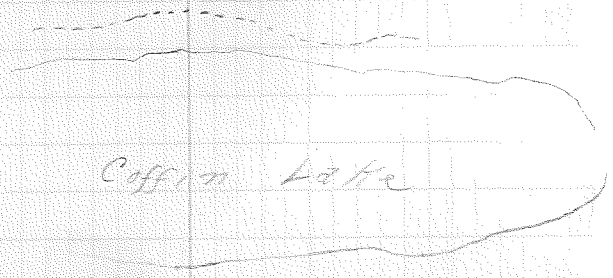
40-141
25

18

Date. Nov. 19, 1937

Party Spunsted
Chapka
Miller
Lewis.
Riley, U.

Run 80' May. Bearing



Coffin Lake

580' W on 94' cat out line

Y140 R26

52+86 ft. set app. soc. cut. on old line E.C.W.

48+82 ft. crossed foot trail N-S.

43+80 ft. came to foot trail N-W-S.E.

140-26

140-141
26

140-142
25

19

same party

F- 140-141 R²³W.
26

140-26

140-141
25

4/0
Date Nov. 29, 1937

Party Stronsted
Chupka
Miller
Pewis
Riley

583/200
Random Mag. Bearing.

2000 ft. Set up and cont. West Bet. Sec. 23
23 141-141
4 140-2526 W

2EW

T140-141 P 25

467423 ft. left SS sup.

53420 ft. found all strata. With old org. Cor along with 23 ft to the N of Myline

52170 ft. Set up ECH Sec Cor.

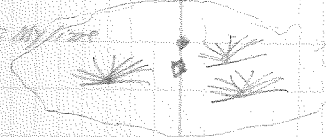
51700 ft. entered SS sup. N-S.

40-26

21

Same party

Myline Beach 200 ft. S of Myline



T 140 R 26-27 W.

26740 ft. set APP $\frac{1}{4}$ ECW cot.

11741 ft. Came to center of road E-W.

0700 ft. Set up at. truck. up Bef. Sec. $\frac{29}{36}$ in North

140-26

22

Weather Fair - Cool

Date. Dec. 2, 1937

Party:

Stronstad
Miller
Lewis
Riley
Finney

Barri of Trees found.

N 11 E 30.7 ft dist 14" JR

scribed S 31 BT

N 12 in Bears S 50 E

8.7 ft scribed S 31 BT

N 6 E W
M 1/2 N
R 1/2 W
B 1/2 S

N 13 in. Bears S 78 W

24.2 dist. scribed S 34 BT

J.R. Bears N 87 W

22.4 ft. dist. scribed S 25 BT

$\frac{1}{2}$ to 3 degrees.

T 140 R 2627 W.

53+145 ft. Came to edge of lake.
52+80 ft. Set. APP ECW sec. Cor.

50+90 ft. found old orig. M.C. old scribe in post.

45+85 ft. Came to SS sup.

32+36 ft. Came to center of Road. SW-NF.

31+77 ft. left SS sup.

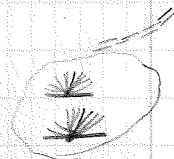
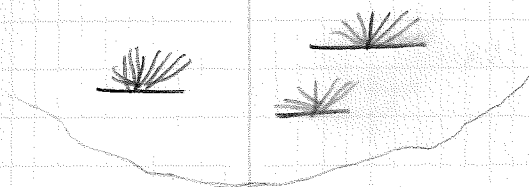
30+60 ft. entered SS sup.

140-26

23

o same party

OK • M.C.



T140 R 26 W

26700 ft. set up ECW Sec. Cor.

24700 ft. entered spruce sup.

18700 ft. left spruce sup.

15700 ft. entered spruce sup.

0700 ft. set up at spruce sup. finished 11/28

22/24

5/28

24

Date Dec. 6, 1957

Party consisted of
Chapin
Miller
Lewis
Riley

spruce sup.

Map: East of Spruce Sup. T140 R 26 W

Dec 6, 1957

ECW Sec. Cor.

T140 R 26 W

25

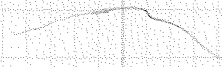
52+80 ft. Set app. E.C.W. sec. cor. Bet. ⁴⁹²⁰ 30129

Same party

50+00 ft. Entered spruce sup.



41+00 ft. left spruce sup.



37+00 ft. entered spruce sup.

Spruce
sup

35+50 ft. pine Ridge to the North



By Ridge S 26 W

30+00 ft. left spruce sup.

Spruce
sup

Dec. 7 1934

partly
Stromsted
Chapman
Lewis
Miller
Riley

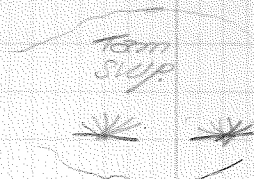
N 83 W of
Random Map 819.

8100 ft left. Tern. SWP

5700 ft entered Tern. SWP. N-S.

2150 ft left late SWP

0700 ft set up and run E. Bar 19-30 140-70



0

to appr. S.C. $\frac{19}{20}$
 $\frac{21}{29}$

50400 ft. sound line running W-76 ft N. of my line.

36780 ft Logging Road N.S.
 35760 ft. Came to Balsam SWP

31400 ft. logging camp 400 ft. S. of line

26740 ft. set HPA ECM 1/4 Cor.

1891 ft. Corro to Road E.W.
0+00 ft. set up and run No. on Range line.

28

Dec. 8, 1937

same party

N 62° 0' W
Random mag. dip.

~~10/17~~
140-26-27

Wooden Stake

52100 ft. Set. APP. ECW sec. Col.
52100 ft. Came to ss sup. N-8.

Dec. 10 1937
Some party

26440 ft. set app ECH 1/4 Cor

16450 ft. left SWP

15100 ft. entered mixed spruce hardwood swp

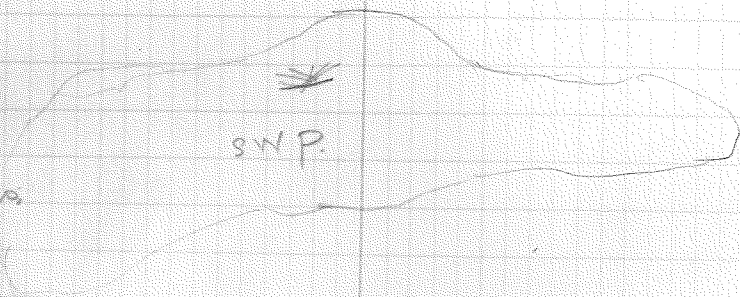
14100 ft. left spruce swp

5100 ft. entered spruce swp

0100 ft. set spruce F Bot. 1/4 Cor. At. app swp

Dec. 13, 1937.

partly same.



18310 E
Kearney Way, Kearney



SSY 1/4 SWP

31.

same party.

30+50-50 wit for day.

Dec. 14 1937

Same party

S.S. Swamp P.

8705 ft entered SS swamp.

12799 ft. Corral to true Sec. Cor 1/2 set up and continued to run

2121
50

West

5831/2
True line

Running in W. along fence.
 75 ft. Corral to true Sec. Cor.
 0700 ft. set up and running from W. Cor.

8/17 140-26

11
P
Cor

at 30400 from west.

58700 ft. toward old line 25 ft to the So. of line.
27 x 15 ft. Cement old scribed 1/4 cor. \$18 - 57

Magnifying
583 1/2 in

16700 ft left. Spruce swamp

Spruce swamp

Jan 7 - 1938

Party

Stronstad

Bushite.

Started from 1/4 Cor:

12+79 ft. East from the
Sec. Cor. 1817 Run East
Va. 630.

13+20 ft. fence N-S.

22+85 ft. " NE SW

26+13 ft. Sec. S 8 N. S 8 W. S 5

29+31 ft. sec. cor.

30+20 cont'd lake.

39+47 land

42+73 lake

48+98 ft. land

52+90 ft. Sec. Cor. 1/4

This was used
in the Atlas

16+20 ft. came to Land

25+07

24+00

23+10

22+00

21+57

20+01

19+00

18+00

14+00 ft. came to Big Thunder Lake shore.

16+10 ft. came to M.C. corner scribed with S-8 and S-17.

15+00

14+00

13+05 ft. came to 1/4 sec. corner, scribed with S-8 and S-17.

12+00 ft. crossed fence running along line

11+00

10+00

9+75 ft. crossed same fence running S.E. and East.

8+00

7+00

6+00

5+00

4+00

3+00

2+00

1+00

0+25 ft. crossed fence running North and South

0+00 ft. set up and set from iron pipe

Dec. 15, 1937
Same party

Mag. Bearing S 85° W.

between Sec. 8-17. 1/4 corner. +++++

26+0

25+00

24+00

23+00 ft. came to Cedar and Balsam swp, and

22+00

21+00

20+00

19+00

18+00

17+00

16+00

15+00

14+00

13+00

12+00

11+00

10+00

9+00

8+00

7+00

6+00

5+51 ft. left pug hole.

4+00

3+30 ft. came to pug hole.

2+00

1+00

0+00

East from S.C. 8/9 140-76

36.

Dec. 15, 1927
same party,

swp.

Spruce swamp.

Random Map, Bearing
N 103 1/2° E

pug hole

♦ I.P.

52+80 in the lake
 52+00
 51+00
 50+00
 49+00
 48+00
 47+00
 46+00
 45+00
 44+02ft. came to iron rod, iron pipe, 9ft. from iron rod, and edge of lake. Thence run across Big
 43+92ft. came to road running North and South.
 42+00
 41+00
 40+00
 39+00
 38+34ft. left spruce swp.
 37+00
 36+50ft. came to edge of spruce swp.
 35+00
 34+00
 33+00
 32+00
 31+30ft. left spruce, Balsam and Cedar swp.
 30+00
 29+00
 28+00
 27+00

140
27-24

100-27

37.

Dec. 15, 1937
same place

Big Thunder

Thunder.

=====

Mag. Sec.

swp.

swp.

100
27-28

100-27

Dec. 10, 1937
Same party.

Max. Boat
Nov 3, 1905

31+6400 came to East side of Big Thunder Lake. Then offset 4+894ft. South and found old line running West.

T140N.R26W.

52+00ft. set app. sec. cor. stake, between

51+00

50+00

49+00

48+00

47+00

46+00

45+00

44+00

43+00

42+00

41+00

40+00

39+00

38+00

37+00

36+00

35+00

34+00

33+00

32+00

31+00

30+00

29+00

28+00

27+00ft. set up and run West, between Sec.
26+00

39,

Sec. 32, on Lake Lura Dec. 17, 1937.

32
615

Party Comstock
Chupka
Miller
C. Lewis
U. Riley.

Mar. 13, 1938
5 1/2 mi. W.

615
31+00, and run across Lake Lura.

53+20ft. came to middle of road and found iron
53+12ft. came to road, passable by truck leading
52+00ft. crossed fence running Southeast.

51+00

50+00

49+30 ft. crossed fence running South, found I.P.

49+00

48+00

47+03 ft. crossed fence, which surrounds summer resort

47+00

46+00

45+00

44+00

43+00

42+00

41+24 ft. found iron pipe

41+00

40+00

39+00

38+00

37+00

36+30 ft. fence running Southeast from line

35+00

34+40 ft. offset 21 ft. North, and found iron pipe, MC.

34+00 ft. came to West end of Lake Lura.

33+00

32+00

31+00

30+00 ft. old shack about 2+50 ft. South of

29+00

28+00

27+00

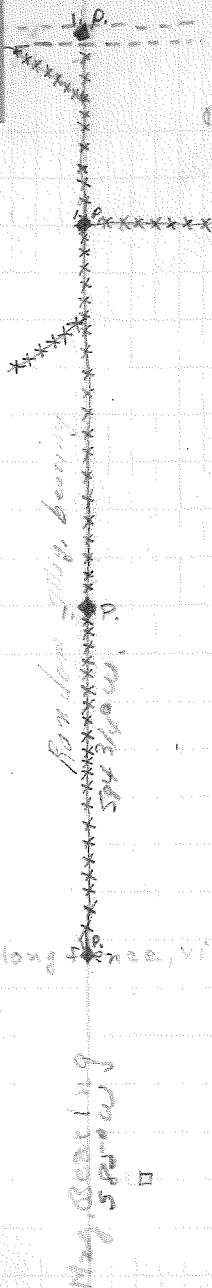
0+00 West from app. cor. $\frac{37}{675}$ 100-26

pipe
into summer resort

40.

Dec. 17, 1937

same party



corner, and run West along fence, via 5th

line

note

T 140 N. R. 27-26 W.

100-27

46

Dec. 21, 1937.

Same party.

Random Magnet Bearing
5° 30' 20" W.

5419 ft. came to iron pipe, and four inch squared post, on range line. Thence continued to run West.

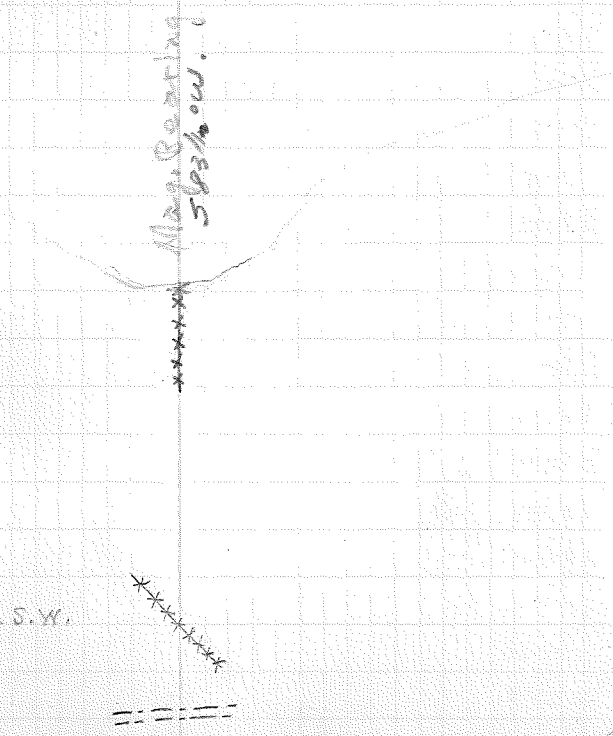
5370 ft. set up and run West, from iron pipe, and middle of road, via six and a half degrees.

2500
 2400
 2300
 2200
 2100
 2000
 1900
 1800
 1700
 1600
 1500
 1400
 1300
 1200
 1100
 1000
 900
 800
 700
 600
 500
 400
 300
 200
 100

9186 ft. came to Lake Tréptie
 8000 ft. crossed fence running North and South.
 2400
 600
 500
 400
 300
 200 ft. crossed fence running and farmer's field running N.E. and S.W.
 100
 0738 ft. found old stare, scribbled with m.c. on it
 0726 ft. came to road passable by truck, running North and South.
 0700 west bet 36/ 140-27 film corridor.

Dec. 21, 1937.
 same party.

Lake Tréptie



52 + 41 ft. found three blazed stumps, with reading
52 + 23 ft. came to old stake about 3 line. No scribble

48 + 00 ft. offset over South. 1 + 58 ft. to old

46 + 00 ft. came to road passable by truck.

44 + 68 ft. telephone wires overhead running

43 + 17 ft. came to road passable by truck, running

42 + 90 ft. came to East end of lake.

41 + 00

40 + 00 ft. house about 3 + 50 ft. South of line

39 + 00

38 + 00

37 + 00

36 + 00

35 + 00

34 + 00

33 + 00

32 + 00

31 + 00

30 + 00

29 + 00

28 + 00

27 + 00

26 + 00

43.

Dec. 21, 1937

One could not be read, [the second one was scribbled with
NEW on it] The third was 59 ft.

North of line scribbled with

NEW on it.

survey line. These continued to run West.

Running North and South

North and South

North and South

Mag. Bearing
Lake Tretipe

T/40 R. 27-26 W.

26+00
25+00

24+00

23+00

22+00

21+00

20+00

19+00

18+00

17+00

16+00

15+00

14+00

13+00

12+00

11+00

10+00

9+00

8+00

7+00

6+00

5+00

4+00

3+00

2+00

1+00

0+00 ft. set up and run south from iron-pipe, ^{1/16}/_{12/7} six degrees.

4/41

Dec. 28, 1937.

same party.

Mag. bearing
56.5

11 P.

43+00ft. set stake and quit

42+60ft. left the spruce swp.

41+00

40+74ft. came to edge of Spruce swp.

39+00

38+00

37+00

36+00

35+00

34+00

33+00

32+00

31+00

30+00

29+00

28+00

27+00

45.

Dec. 26, 1937
same party.

Spruce swp.

Mag. Bearing

T. 140 R. 27-26 W.

52+72 ft. found old line running East and

54+00

50+00

49+00

48+00

47+83 ft. left. swp. running East and

46+00

45+00

44+88 ft. came to spruce swp. and hard
43+93 ft. found 3 in. birch tree, blazed on 4 sides.
43+00 ft. Set up and run South from stake

46.

Dec. 29, 1937

thence run West, on 70
Dec 29, 1937,

West. App. to set from Sec. 10

7/12
18/13

same party.

West.

SWP.

was 4 timber
and 4 ft pine stump, approx 9 ft. from line. Bearing $S 76^{\circ} 10' 24''$
via six degrees. scribbled S-12. BT.

800
1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100

140
26-27

100

100-27

47.

Dec. 29, 1937
Same party

13+20ft. set stake and quit.

12+00

11+00

10+00

9+00

8+00ft. came to old logging road from N.W. and S.E.

7+00

6+00

5+00

4+00

3+00

2+00

1+00

0+00ft. set up and ran West from Sec. Cor.

Mag. Bearing S 85° W

W



S. 13 | 12 f. 140 R 25-26

10 | 7

~~12 | 7~~

12 | 0

Var. 7 degrees

T 140R. 2 ^P 26-25W.

25+00
25+30ft. came to road passable by truck running N. Ward S.E.

34+00

22+00

22+00

21+00

20+00

19+00

18+00

17+00

16+00

15+00

14+00

13+20ft. set up and run West between Sec.

1817
1813

Mag. Bearing S 83° W

48

Dec. 30, 1937.

same party.

T 140-R 26427. W1.

46+88 ft. offset 1+91 ft. North to Longville Grade

46+74 ft. Left ss. swp.

45+00

44+00

43+38 came to s.s. swamp between Sec.

42+00

41+00

40+00

39+00

38+00

37+00

36+00

35+00

34+00

33+00

32+00

31+00

30+00

29+00

28+00

27+00

49

Dec. 30, 1937

same party

running East and West, One mile south on the Road Corner
thence continued to run West,



Me. B. 221. 78
5830 W

T140 R 27-26W

Dec. 30, 1937
same party.

15+00 ft. quit for the day.

14+00
13+48 ft. Left the road. Set up and continued to run west from X₆ corner. came to true N₆ cor. 1. P 2." App. 3" above the ground, where the grade

turns South.
P.

- 12+00
- 11+00
- 10+00
- 9+00
- 8+00
- 7+00
- 6+00
- 5+00
- 4+00
- 3+00
- 2+00
- 1+00

0+00 ft. set up and continued to run West on Longville Grade from int. of roads at ^{11/15} 100-27

Mag. Bearing

5 P₂/N₆W

T 140 R 27-26 W.

26+00 ft. set app. $\frac{1}{4}$ sec. Cor between Sec. $\frac{14}{13}$

25+00

24+00

22+00

21+15 ft. entered floating bog running NE and S.W.

20+00

19+80

18+00

17+00

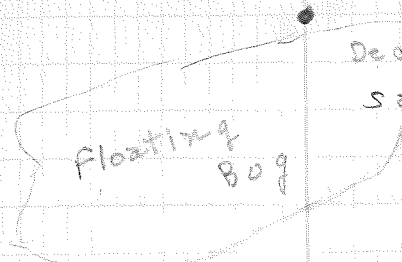
16+50

15+00 ft. set up and run West $22.6\frac{1}{2}^\circ$ between Sec. $\frac{14}{13}$ & $83\frac{1}{2}$ W.

51.

Dec. 31, 1937.

Same party.



Mag. Bearing 583° W.

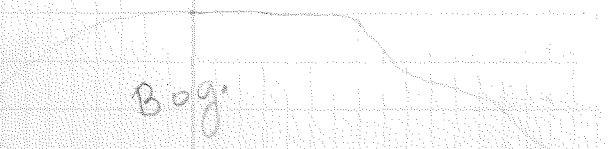
T 140 R 27 - 26 W Sec 10 11 12 13 14

53127 ft came to small swp. and found 2" i.p. with cap.
 52+00
 51+00
 50+00
 49+00
 48+00 ft. entered very heavy brush.
 47+00
 46+15 ft. left the S.W. swamp.
 45+00
 44+00
 43+00 ft. entered S.S. swamp, running N.W.
 42+90
 41+00
 40+00
 39+60
 38+00
 37+00
 36+80
 35+00
 34+00
 33+00
 32+00
 31+00
 30+76 ft. left floating bog
 29+70
 28+00
 27+00

from line West.
 1 ft. above ground, off foot South 26 ft, then run
 marked JH, standing along side of 4" squared post, burnt off
 Dec. 31, 1939. J-2
 same party.



Mag. Bearing



T 140 R 27-26 W

⁸⁴
261~~8~~ ft. offset 45 ft. North, 1/4" iron pipe, to the south-

25700

24700

23710

22700

21784 ft. left S.S. swamp

20700

19780

18700

17700

16750

15700 ft. entered S.S. swamp running N. & S.

14700

13720

12700

11700

10700

9790

8700

7700

6760

5700

4700

3730

2735 ft. left small swp.

1700

0700 ft. set up and run West, from I. P. to Sec. Cor.

100-27

53

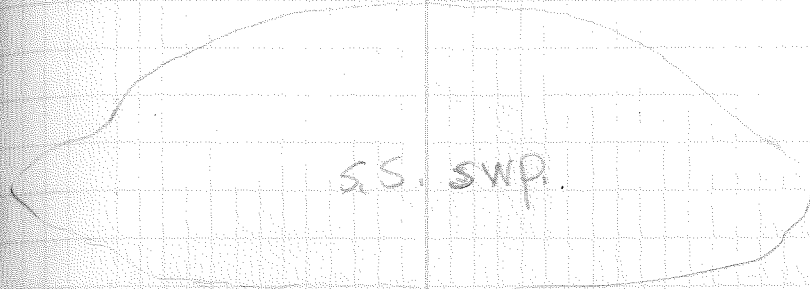
hay

hay meadow from I. P. S 83° 1/2 W.

East corner of hay meadow, then continue down east side of

1100. Dec. 31/1937.

same party.



S.S. SWP.

Magn. Bearing S 83° W

1100 corner
1 3/4" - S 83° West.

SWP.

T 140 R 27, W

53+10 ft. found l.p. corner, marked L.H.,

52+00

51+00

50+00

49+50

48+95 ft. Left s.s. swamp.

47+00

46+20

45+00

44+00

43+25 ft. entered s.s. swamp

42+05 ft. crossed drainage ditch running N.W. and S.E.

41+79 ft. entered s.s. swamp running N. + S.

40+00

39+65 ft. crossed fence running N. + S.

38+00

37+00

36+30

35+00 ft. offset over 0+26 ft. North, and continued to run West. $88\frac{1}{2}^{\circ}$ W

34+00

33+00

32+90 ft. crossed fence running N. + S., and left hay meadow

31+00

30+00

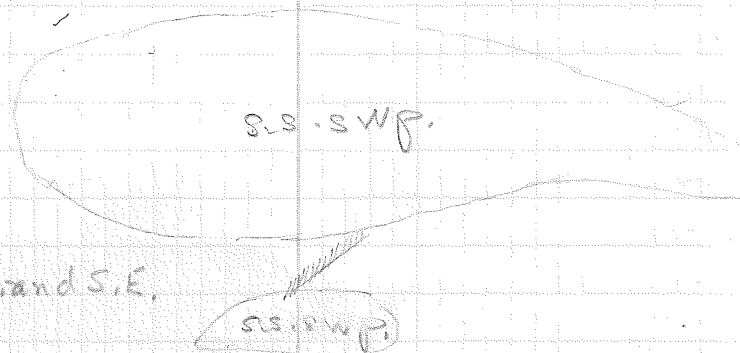
29+70

28+00

27+00

524

about 2" with cap $\frac{1}{4}$ P. Sec. $\frac{9}{10}$ 16/15



xxxxxxxxxx

Bearing

xxxxxxxxxx

Mis.

hay meadow

T140 R27W.

26400

25700

24700

23+30 ft. 1/2 ft ridge, and entered mixed swp.

22700

21400 ft. lefts wamp, and came to poplar ridge.

20700

19780

18700

17700

16750

15700

14700

13+20 ft. entered cedar and spruce swp.

12700

11700

10700

9710

8700

7700

6760

5700

4700

3730

2+38 ft. came to road passable by truck running N.E. and S.W.

1700

0700 ft. got upon road run West from LP corner.

55.

SWP

Jan. 3, 1938

comstock

Skupka

Miller

Lewis

Riley

SWP

Map, Bearing
SP 1/2 W

9/10
16/15 Va 6 1/2 58 3/4

T 140 R 27 W.

30m ft. set stake and quit for the day

29+70

25+00

27+00

56

Jan. 3, 1938.
same party.

M.B. Bearing

5 1/2

T 140 R 27

52+50 ft. set app. section in S.S. swp.
52+40 ft. came to S.S. swp. turning N. & S.

51+00

50+00

49+50

48+50

47+00

46+00

45+00 ft. left spruce and cedar swp.

44+00

43+00

42+90

41+74 ft. left S.S. swp.

40+00

39+00 ft. came to S.S. swp. turning N and S.

38+00

37+00

36+30

35+00

34+64 ft. came to old logging road running

33+00

32+00

31+00

30+00 ft. set up and run West from stake.

59

S.S. swp.

~~8/11/10~~

Jan. 4, 1938

same party.

came to very heavy brush.



High ground

S.S. swp.

High ground

N. W. and S. E.

swp.

va. $6\frac{3}{4}^{\circ}$ S $83\frac{1}{2}^{\circ}$ W.

Mag. Bearing $88^{\circ} 31' N$

26 + 50 ft. offset 53 ft. West to 1/4 cor. app.

13 + 56 ft. crossed fence E.W.
13 + 50 ft. came to telephone line overhead E.W.
13 + 20 ft. came to road passable by truck E.W.

9 + 29 ft. left lake

3 + 64 ft. came to snake lake

0 + 00 ft. started North $\frac{17}{20}$ - 139 - 26

Jan. 5, 1938.
Comstock
Miller
Lewis
Finney
Gain
Evans
Bukite
Grapes

58.



Random Hay Bed
N 65° W

Lake

0 App. Post.

52+00 ft. set app. Sec. Cor. on Lake Washburn.

38+00 ft. entered Lake Washburn.

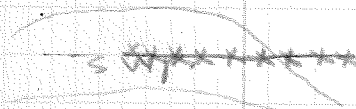
35+00 ft. leave S.S. swp.

34+00 ft. fence. E-W.

33+34 ft. entered S.S. swp. S.E. W.

30+54 ft. leave ten. swp.

29+70 ft. entered Tan. S. / P. N. E. S. W.



SWP.

53+92 ft. found true Sec. Cen post, offset to post 7 ft. N. Th. ...
53+40 ft. crossed ditch N.S.
52+80 ft. started West from app. sec. cor. 17/16

to run West, and test S.S. exp.
12 ft. S 83° W. T140 R 27

52 ft. post

←

Jan. 6, 1938. 60
Comstock head
Chupka - Thote's
Miller - head chain
Lewis - Brush
Riley - Brush.

Resurvey corner

Found 2 B.T.'s.
scribing could not be read.
14" aspen, 16 ft. North 63° W.

14" aspen, 39 ft. South 5° W.

scribing T40-R27. S-17.

Found:

Squared post 3 ft. long.

scribed T140 R 27 W. S-16

and S-17-T140 R. 27 W.

Random N. 23° W. Bearing

2400 ft. set stake

2500 ft. leave Cedar swp, entered Balsam swp.

21400 ft. started West Va. 7° Jan 7, 1938. $\frac{21}{17} \frac{9}{16}$

21500 ft. quit Sunday, Jan 6, 1938.

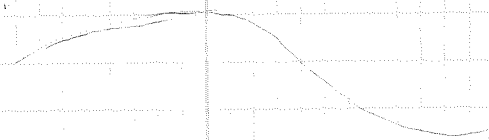
1400 ft. left Balsam swp, entered Cedar swp.

9490 ft. left S.S. swp, and entered Balsam swp.

7406 ft. entered S.S. swp.

2451 ft. came to road passable by truck N.E-S.W.

0400 ft. started and continued West, Va. 7° S 83° W.

T⁹⁹ From post. T141-27

Cedar swp.

Balsam swp.

Randomly 129. Bearing
S 83° W.

S.S. swp.

54+71 ft. Sec. Cor. found, and quit for day.

48+25 ft. leave lake

44+00 ft. 28 set 1405 ft. N. holds survey

39+32 ft. crossed fence N.S.

38+00 ft. leave S.S. swp.

37+68 ft. road passable by truck N.S., teleph. line wires overhead

33+00 ft. entered S.S. swp. N.S.

31+57 ft. road passable by truck N.W. - S.E., teleph. line wires overhead
31+00 ft. leave swp.

28+89 ft. came to S.S. swp. N.S.
27+50 ft. left + 82/22m swp.

Jan 7 1958
Comstock
Chupka
Miller
Low's
Riley

FOUND:
3 in. squared post
scribing 8/19
17/16

Random Mag. Bearing 83.0° W

line, and edge of
lake IN EVARONA

Lake,
Ingavona

xxxxxxx

S.S. swp.

swp.

swp.

T 140. R 27

2400ft. leave Pine Grove

19+81ft. crossed old logging road NE-S.W. and entered Pine Grove.

10+56ft. leave swp.

6+60ft. entered spruce and hardwood timber

0+00ft. started West swp. 2/8 70-65°, 140 27

Jan. 10, 1938. 83
Chapka - H. Chait
Woods - R. Chait
Lewis - P. Chait
Turkey - Grasse
Riley - Brusler
Kovacs - Brusler
Grapes - Brusler

Pine Grove

swp.

S. 21° W.
Random Mag. Bearing

Found One B.T.
3in. post, scribing can not be
read, bearing S 7° W, app.

5in post.
118 ft. from Sec. Cor.

52+20 ft. set app. E.R.W. sec. Cont. $\frac{12}{13} \frac{7}{18}$

42+34 ft. crossed old logging road N.E.

54

58°30'W
Branch may be

T140 - R. 27.

26+40

23+66ft. leave s.s. swp.

20+35ft. entered s.s. swp.

16+50ft. leave spruce swp.

14+00ft. entered spruce swp.

4+00ft. leave lake, entered high land

0+00ft. started West, turn S. E. 28/69 on 63° W lake

Jan. 12 1938
Chap. K. 2
Wood 6
Tucker
P. Lewis
Greene
Cain
Camp
Buck
Brud

s.s. swp

swp.

583 1/2 W
Random Mag. Beeving

lake

52+80 ft set app. K.C.W. section $\frac{23}{24} / \frac{24}{25}$
52+54 ft. hit edge of drainage ditch, run

49+50 ft. leave spruce, entered S.S. SWP.

42+50 ft. entered spruce, and leave S.S. SWP.

40+75 ft. crossed drainage ditch. N.E.

36+37 ft. crossed fence. N.E. - S.W.

19+66 ft. entered same S.S. SWP.

Continued to run West
parallel to line

E.C.V.

S.S. SWP.

SPRUCE
SWP.

S.S. SWP.

Same party
66

26+24ft. crossed road passable by truck.
26+00ft. telephone line N.S.

24+00 stream on to high land.

20+58ft. entered S.S. swp.

16+25ft. crossed old logging road NW-S.E.

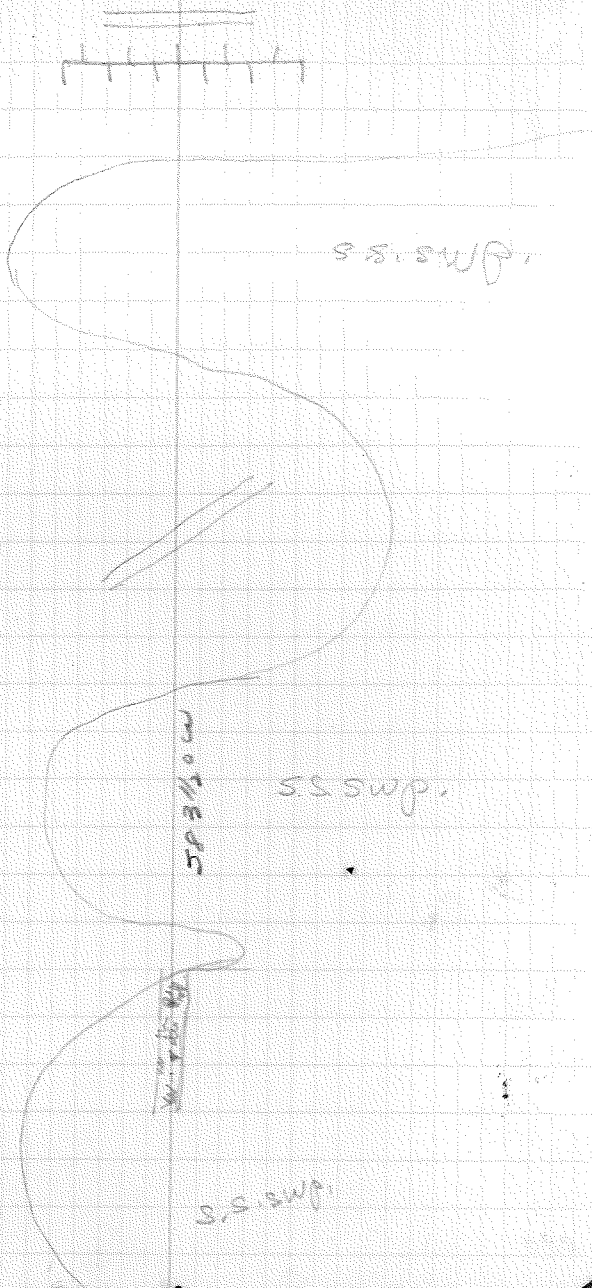
13+60ft. leave S.S. swp.

8+50ft. entered S.S. swp.
4+00ft. entered high land

4+64ft. Pine Ridge running parallel along line E.W.

0+00 Start west from app. cor. $\frac{23}{24}$
 $\frac{26}{25}$ 140-27

same party!



53+24ft. found old original sec. cov.

22/23
27/26

~~28/27~~

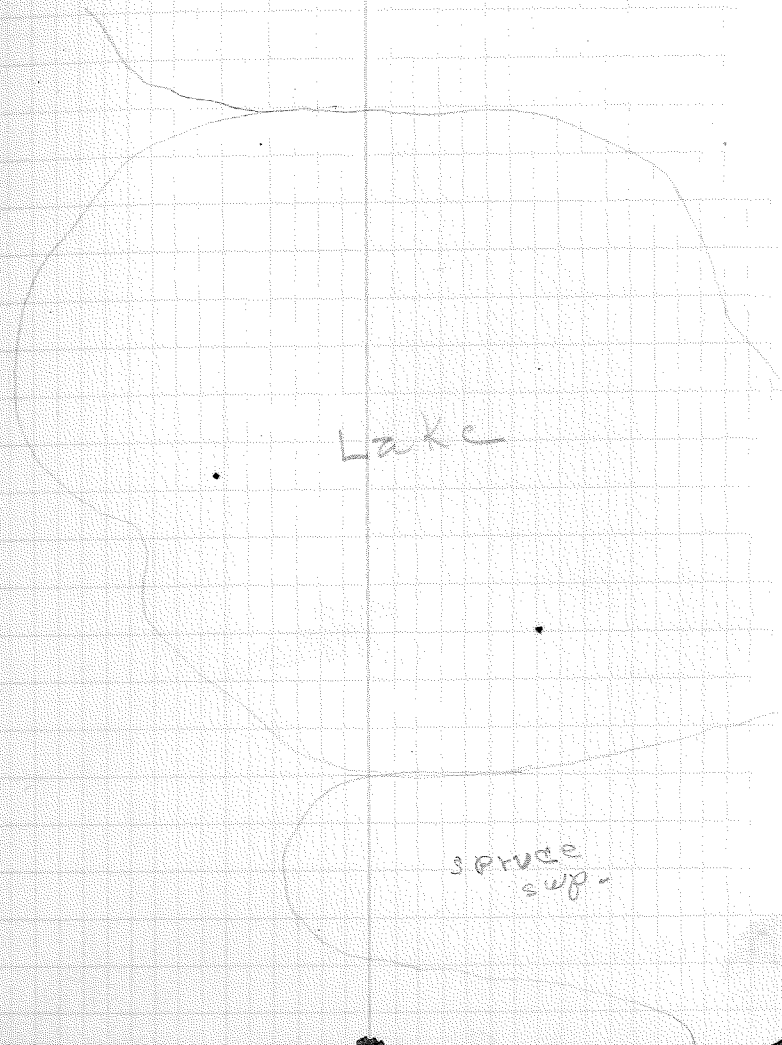
44+55ft. leave lake, entered M.G.P. swp.

33+55ft. hit edge of lake

29+55ft. entered spruce swp.

same party
68

Four inch spruce
square down 4 sides
6 ft. above ground
7/ ft. south of line



2640ft set stake in lake

23477ft entered Stearns lake again

19433ft leave Lake Stearns

2614ft edge of Lake Stearns

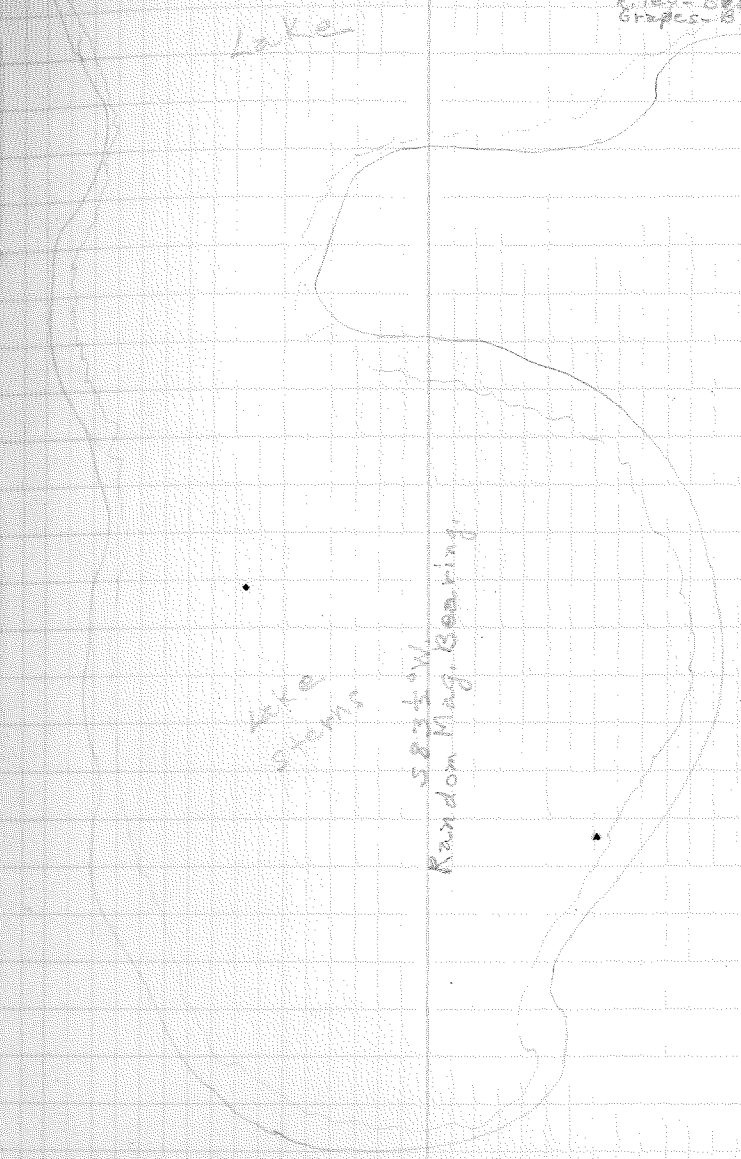
0400ft started west from S.O.

$\frac{22}{27} \frac{23}{26}$

~~27~~ 26

TI40-R27

Jan 13 1939 F
Clupka - Chain
Woods - Chain
Tucker - Compass
Lewis - Becket's
Kiley - Boulder
Graves - Brush Koh.



5240 ft set app. E.C.W. corner between Sec.

21/22
28/27
23
23 = 8, in swp.

Same part, 70

35426 ft entered M.G.R. swp.

32400 ft. leave spruce swp, entered high land

30440 ft. leave lake, entered spruce swp.

M.G.R. swp.

swp.

26+40 ft

23+10 ft entered S.S. swp.

22+49 ft crossed ^{r.f. grade} old logging road passable by track SW-NE.

9+29 ft. crossed old logging road. W-S.

7+00 ft. leave M.B.R. swp.

0+00 ft. continued West from S.R.

21/22
28/27

T140-27

same party
Jan. 13, 1930.

S.S. swp.

S 8 1/2 W
Random Mag. Bearing

swp.

52+00 ft. set App. E.C. W sec. cor.

$\frac{20}{21}$
 $\frac{29}{28}$
 $\frac{49}{50}$
30+00 ft. in swp.

49+00 ft. entered s.s. swp.

38+00 ft. leave swp, entered high land

72
same party

Found:
3 ft. Post, squared
on two sides, 1/4 in
south of line

swp

high land

swp

T 140 R 27

26+40

25

24

23+10

22

21

20+00 entered LOWLAND SWAMP.

19

18

17+00 entered HIGHLAND

16+50

15+37 fence north of section fence.

14+26 fence south

13

12

11

10

9+90

7+45 fence RULNS north

7+00 entered LOWLAND SWAMP.

6

5

4

3+30

2

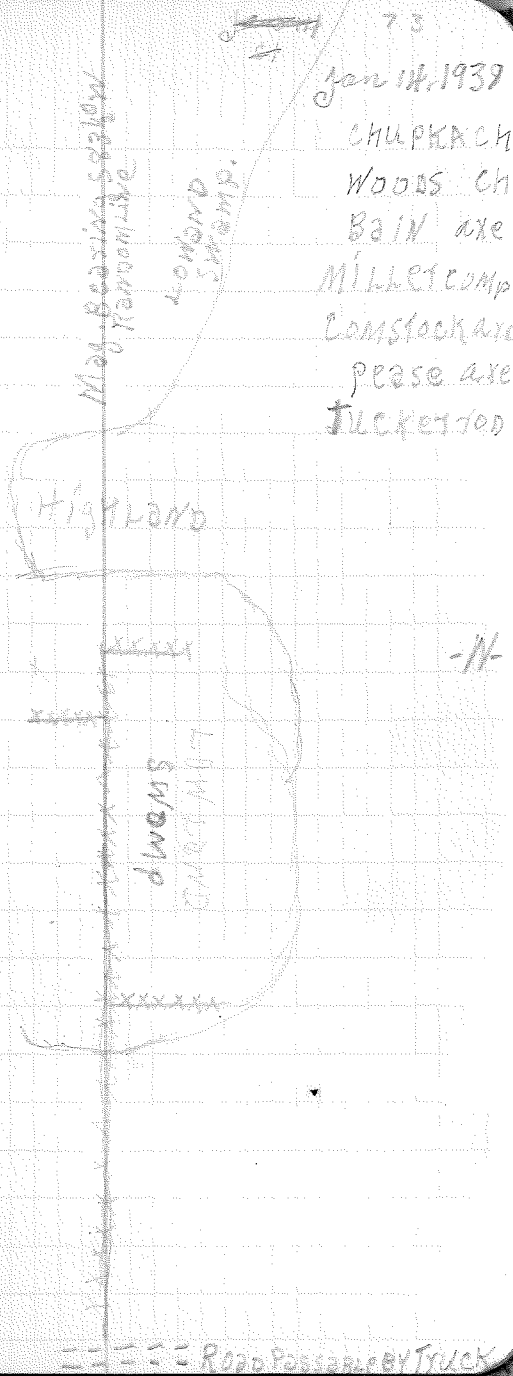
1

0+00 started west from APP. sec. 108

15/14
22 23

T 140 R 27.

S 83 1/2 W



73

Jan 14, 1939

CHURCH

WOODS CH

BAIN AXE

MILLET COMP

CANSOCK AXE

PEASE AXE

TUCKER TOB

HIGHLAND

LOWLAND SWAMP

ROAD POSSIBLY BY TRUCK

-S-

-W-

T 140 R 27

52+80 Set 3" aspen for app. sec. cot. Blazed on one

51 SIDE AND Keel ed App. sec. cot. ECW Secs. ^{16th} 2/22

50+00 ENTERED HIGH AND

49+50

48

47

46

45

44

43

42+90

41

40

39

38

37

36+30

35

34

33

32

31

30

29+70

28

27

Jan 14 1938
SOME PARTY

S 83 1/2 W

LOWLAND SWAMP

Map showing section
of RAVENHOLE

LOWLAND SWAMP

T140 R27

24+40

25

24

23+10

22

21

20

19

18

17

16+50

15+00

Crossed Old Logging Road NW-SE. Not passable

By TRUCK,

14+17

Crossed Road N-S passable by TRUCK

all grade

13

12

11

10

9+10

8

7

6

5

4

3+30

2

1

0+00

STARTED WEST FROM APP SEC. 107. ~~1645~~ T140 R27.

S 83 1/2 W

Jan 14, 1939
75
SOME PATTY

HIGHLAND

Meg. Bearing S 80 W

Randoming

HIGHLAND

T140 R27

52+50 set 3" ASPEN H' LONY FOR APP. SEC. LOT,
51 Keelad App. Sec. Lot, E.C. W. SEC.

50

49+50

48

47

46+72 LEFT LOWLAND SWAMP

45

44

43

42+70

42+70 ENTERED LOWLAND SWAMP.

41

40

39

38

37

36+50

35

34

33

32

31

30

29+70

28

27

Jan 11, 1938
S. M. PERRY

S 83 1/2 W

1716
20/21

HIGHLAND

HIGHLAND

LOWLAND
SWAMP

~~HIGHLAND~~

MORE SWAMP

RAMP LINE

HIGHLAND

26+40 Set Approx 1/4 Cor. 1
25+00 Enter Swamp Spruce & P62
24+00 enter Jack pine

14+00 enter spruce swamp
13+20 set approx. 1/6 cor. 5.

13+00

2+00 → started south from 0/17 17/16 140-27

look for:
W. pine 8° N. 82° E 30
cedar 6° S. 41° W 54 lbs

Found:

Random line
S. 63° W.

DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder stake for any width roadway, slope $1\frac{1}{2}$ to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. The number in body of table in same row and column gives distance from side stake to slope stake. If ground is not level estimate the difference in elevation between the side stake and slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point, and line of sight should cut target. If it does not make the slight adjustment necessary.

TABLE No. 9.

To find Tangent and External for curve of any other degree, divide by degree of curve and add correction found in column of corrections.

Degree of curve with a given I may be found by dividing tangent, (or external), opposite I by given tangent, (or external).

The distance from a point on the tangent to the curve is very nearly the square of the tangent length divided by twice the radius.

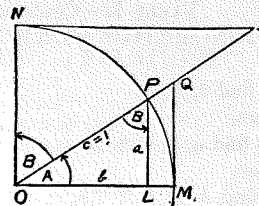


TABLE II

TRIGONOMETRIC FORMULÆ.

$$\angle A = \angle MOP \quad \angle B = \angle PON = \angle OPL$$

$$R = OB = c = 1$$

$$\sin A = \frac{a}{c} = \frac{a}{1} = a = \cos B = LP$$

$$\cos A = \frac{b}{c} = \frac{b}{1} = b = \sin B = OL$$

$$\tan A = \frac{a}{b} = \frac{MQ}{OM} = \frac{MQ}{1} = MQ = \cot B = MQ$$

$$\cot A = \frac{NT}{ON} = \frac{NT}{1} = NT = \tan B = NT$$

$$\sec A = \frac{OQ}{OM} = \frac{OQ}{1} = OQ = \csc B = OQ$$

$$\csc A = \frac{OT}{ON} = \frac{OT}{1} = OT = \sec B = OT$$

$$\text{vers } A = \frac{LM}{OP} = LM = \text{covers } B \#$$

$$\text{covers } A = \frac{OP - LP}{OP} = OP - LP = \text{vers } B$$

$$\text{exsec } A = PQ = \text{coexsec } B$$

$$\text{coexsec } A = PT = \text{exsec } B$$

$$\sin \frac{1}{2} A = \sqrt{\frac{1 - \cos A}{2}} \quad \cos \frac{1}{2} A = \sqrt{\frac{1 + \cos A}{2}}$$

$$\sin 2A = 2 \sin A \cos A \quad \cos 2A = \cos^2 A - \sin^2 A$$

$$\text{Law of Lines} \quad \frac{\sin A}{a} = \frac{\sin B}{B} = \frac{\sin C}{C}$$

$$\text{Law of Cosines} \quad c^2 = a^2 + b^2 - 2 ab \cos C$$

$$\text{Law of Tangents} \quad \frac{a+b}{a-b} = \frac{\tan \frac{1}{2} (A+B)}{\tan \frac{1}{2} (A-B)}$$

TABLE II—Continued
TRIGONOMETRIC FORMULAE (continued)

In any triangle:

Given a, b, C; to find c, B, A.

Use Law of Lines.

Given A, B, c; to find a, b, C.

Use Law of Lines.

Given a, b, c; to find A, B, C.

$$\text{Let } \frac{a+b+c}{2} = s, \sqrt{\frac{(s-a)(s-b)(s-c)}{s}} = r$$

$$\cos \frac{1}{2} A = \sqrt{\frac{s(s-a)}{bc}}$$

$$\tan \frac{1}{2} A = \frac{r}{s-a}$$

$$\tan \frac{1}{2} B = \frac{r}{s-b}$$

$$\tan \frac{1}{2} C = \frac{r}{s-c}$$

Area of a triangle:

$$\text{Area} = \frac{1}{2} ab \sin C$$

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

PRISMOIDAL FORMULA.

$$\text{Vol.} = \frac{h}{6} (B+b+4M)$$

h = altitude; b, B = bases; M = midsection

TABLE III
INCHES AND FRACTIONS OF AN INCH IN DECIMALS OF A FOOT

	0	1	2	3	4	5	6	7	8	9	10	11	
$\frac{1}{16}$	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219	$\frac{1}{8}$
$\frac{1}{8}$	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271	$\frac{3}{16}$
$\frac{3}{16}$	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323	$\frac{1}{4}$
$\frac{1}{4}$	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375	$\frac{5}{16}$
$\frac{5}{16}$	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427	$\frac{3}{8}$
$\frac{3}{8}$	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479	$\frac{7}{16}$
$\frac{7}{16}$	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531	$\frac{1}{2}$
$\frac{1}{2}$	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583	$\frac{9}{16}$
$\frac{9}{16}$	.0469	.1302	.2135	.2969	.3803	.4635	.5469	.6302	.7135	.7969	.8802	.9635	$\frac{5}{8}$
$\frac{5}{8}$	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688	$\frac{11}{16}$
$\frac{11}{16}$	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740	$\frac{3}{4}$
$\frac{3}{4}$	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792	$\frac{7}{8}$
$\frac{7}{8}$	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844	$\frac{15}{16}$
$\frac{15}{16}$	.0729	.1563	.2396	.3229	.4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896	1
1	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948	
	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	1.000	
	0	1	2	3	4	5	6	7	8	9	10	11	

TABLE IV
USEFUL RELATIONS.

Lineal feet	X.00019	= miles
Lineal yards	X.0006	= miles
Square inches	X.007	= square feet
Square feet	X.111	= square yards
Square yards	X.0002067	= acres
Acres	X4840	= square yards
Cubic inches	X.00058	= cubic feet
Cubic feet	X.03704	= cubic yards
Links	X.22	= yards
Links	X.66	= feet
Feet	X1.5	= links
360°	= 21600'	= 1296000"
Radius	= arc of 57.2957790°	
Arc of 1°	(radius = 1) = .017453292	
Arc of 1'	(radius = 1) = .000290888	
Arc of 1"	(radius = 1) = .000004848	

$$\pi = 3.141592654 \quad \sqrt{\frac{1}{\pi}} = 0.564190$$

$$\frac{\pi}{4} = 0.785398163 \quad \sqrt[3]{\frac{6}{\pi}} = 1.240700982$$

$$\frac{\pi}{6} = 0.523598776 \quad \pi^2 = 9.869604401$$

$$\sqrt{\frac{4}{\pi}} = 1.128379167 \quad \frac{1}{\pi^2} = 0.101321184$$

$$\frac{\pi}{6} = 0.523598776 \quad \sqrt{\pi} = 1.772453851$$

$$\frac{4\pi}{3} = 4.188790205 \quad \frac{1}{\pi} = 0.3183099$$

Curvature of Earth's surface = about 0.7 feet in 1 mile

Curvature in feet = 0.667 (Dist. in miles)²

Difference between arc and chord length, 0.05 feet in 11½ miles

$$\text{Probable error of a single observation} = 0.6754 \sqrt{\frac{\sum v^2}{n-1}}$$

Error in chaining of 0.01 feet in 100 feet:

Due to—

1. Length of tape error of 0.01 feet
2. Alignment. One end 1.4 feet out of line
3. Sag of tape at centre of 0.61 feet.
4. Temperature difference of 15°
5. Difference of pull of 15 lbs.

STADIA REDUCTION FORMULAE.

Horizontal Distance = R - R sin² a + C cos a

Vertical Distance = R ½ sin 2 a + C sin a

R = Reading X $\frac{\text{distance from Object glass to cross hairs}}{\text{distance between cross hairs}}$

C = distance from Object glass to cross hairs + distance from Object glass to center of instrument.

a = angle of elevation for mid Reading

TABLE VI (continued)
SINES, COSINES, TANGENTS, COTANGENTS (continued)

deg	sin 0'	tan 0'	sin 10'	tan 10'	sin 20'	tan 20'	sin 30'	tan 30'	sin 40'	tan 40'	sin 50'	tan 50'	deg
46	7193	1.0355	7214	1.0416	7234	1.0477	7254	1.0533	7274	1.0599	7294	1.0661	43
47	314	.0724	333	.0786	353	.0850	373	.0913	392	.0977	412	.1041	42
48	431	.1106	451	.1171	470	.1237	490	.1303	509	.1369	528	.1436	41
49	547	.1504	566	.1571	585	.1640	604	.1708	623	.1778	642	.1847	40
										1.2203			
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	.2647	7753	1.2276	39
51	771	.2349	790	.2423	808	.2497	826	.2572	844	.3111	862	.2723	38
52	880	.2799	898	.2876	916	.2954	934	.3032	951	.3597	969	.3190	37
53	986	.3270	8004	.3351	8021	.3452	8039	.3514	8056	.4106	8073	.3680	36
54	8090	.3764	107	.3848	124	.3934	141	.4019	158	.4641	175	.4193	35
55	192	.4281	208	.4370	225	.4460	241	.4550	258	.5204	274	.4733	34
56	290	.4826	307	.4919	323	.5013	339	.5108	355	.5798	371	.5301	33
57	387	.5399	403	.5497	418	.5597	434	.5697	450	.6426	465	.5900	32
58	480	.6003	496	.6107	511	.6212	526	.6319	542	.7090	557	.6534	31
59	572	.6643	587	.6753	601	.6864	616	.6977	631		646	.7205	30
60	660	1.7321	8675	1.7437	8689	1.7556	8704	1.7675	8718	1.7797	8732	1.7917	29
61	746	.8040	760	.8165	774	.8291	788	.8418	802	.8546	816	.8676	28
62	829	.8807	843	.8940	857	.9074	870	.9210	884	.9347	897	.9486	27
63	910	.9626	923	.9768	936	.9912	949	2.0057	962	2.0204	975	2.0353	26
64	988	2.0503	9001	2.0655	9013	2.0809	9026	.0965	9038	.1123	9051	1.2833	25
65	9063	.1445	075	.1609	088	.1775	100	.1943	112	.2113	124	.2286	24
66	135	.2460	147	.2637	159	.2817	171	.2998	182	.3183	194	.3369	23
67	205	.3559	216	.3750	228	.3945	239	.4142	250	.4342	261	.4545	22
68	272	.4751	283	.4960	293	.5172	304	.5386	315	.5605	325	.5826	21
69	336	.6051	346	.6279	356	.6511	367	.6746	377	.6985	387	.7228	20
70	397	2.7475	9407	2.7725	9417	2.7980	9426	2.8239	9436	2.8502	9446	2.8770	19
71	455	.9042	465	.9319	474	.9600	483	.9887	492	3.0178	502	3.0475	18
72	511	3.0777	520	3.1084	528	3.1397	537	3.1716	546	.2041	555	.2371	17
73	563	.2709	572	.3052	580	.3402	588	.3759	596	.4124	605	.4495	16
74	613	.4874	621	.5261	628	.5656	636	.6059	644	.6470	652	.6891	15
75	659	.7321	667	.7760	674	.8208	681	.8657	689	.9136	696	.9617	14
76	703	4.0108	710	4.0611	717	4.1126	724	4.1653	730	4.2193	737	4.2747	13
77	744	.3315	750	.3897	757	.4494	763	.5107	769	.5736	775	.6382	12
78	781	.7046	787	.7729	793	.8430	799	.9152	805	.9894	811	5.0658	11
79	816	.1446	822	5.2257	827	5.3093	833	5.3955	838	5.4845	843	.5764	10
80	9848	5.6713	9853	5.7694	9858	5.8708	9863	5.9758	9868	6.0844	9872	6.1970	9
81	877	6.3138	881	6.4348	886	6.5606	890	6.6912	894	.8269	899	.9682	8
82	903	7.1154	907	7.2687	911	7.4287	914	7.5958	918	7.7704	922	7.9530	7
83	925	8.1443	929	8.3450	932	8.5555	936	8.7769	939	9.0098	942	9.2553	6
84	945	9.5144	948	9.7882	951	10.078	954	10.385	957	10.711	959	11.059	5
85	962	11.430	964	11.826	967	12.250	969	12.706	971	13.197	974	13.727	4
86	976	14.300	978	14.924	980	15.605	981	16.350	983	17.169	985	18.075	3
87	986	19.081	988	20.206	989	21.470	990	22.903	992	24.542	993	26.432	2
88	994	28.636	995	31.242	996	34.368	997	38.189	997	42.964	998	49.104	1
89	9998	57.290	9999	68.750	9999	85.940	9999	114.58	1.000	171.88	1.000	343.77	0
90	60'	60'	50'	50'	40'	40'	30'	30'	20'	30'	10'	10'	deg.
	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	deg.

TABLE VII
RODS IN FEET AND INCHES

Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches
1	16-6	21	346-6	41	678-6	61	1006-6	81	1336-6
2	33-0	22	363-0	42	693-0	62	1023-0	82	1353-0
3	49-6	23	379-6	43	709-6	63	1039-6	83	1369-6
4	66-0	24	396-0	44	726-0	64	1056-0	84	1386-0
5	82-6	25	412-6	45	742-6	65	1072-6	85	1402-6
6	99-0	26	429-0	46	759-0	66	1089-0	86	1419-0
7	115-8	27	445-8	47	775-8	67	1105-8	87	1435-8
8	132-0	28	462-0	48	792-0	68	1122-0	88	1452-0
9	148-6	29	478-6	49	808-6	69	1138-6	89	1468-6
10	165-0	30	495-0	50	825-0	70	1155-0	90	1485-0
11	181-6	31	511-6	51	841-6	71	1171-6	91	1501-6
12	198-0	32	528-0	52	858-0	72	1188-0	92	1518-0
13	214-6	33	544-6	53	874-6	73	1204-6	93	1534-6
14	231-0	34	561-0	54	891-0	74	1221-0	94	1551-0
15	247-6	35	577-6	55	907-6	75	1237-6	95	1567-6
16	264-0	36	594-0	56	924-0	76	1254-0	96	1584-0
17	280-6	37	610-6	57	940-6	77	1270-6	97	1600-6
18	297-0	38	627-0	58	957-0	78	1287-0	98	1617-0
19	313-6	39	643-6	59	973-6	79	1303-6	99	1633-6
20	330-0	40	660-0	60	990-0	80	1320-0	100	1650-0

TABLE VIII
LINKS IN FEET AND INCHES

Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches
1	0-7.92	18	11-10.56	35	23-1.20	52	34-3.84	69	45-6.48
2	1-3.84	19	12-6.48	36	23-9.12	53	34-11.76	70	46-2.40
3	1-11.76	20	13-2.40	37	24-5.04	54	35-7.68	71	46-10.32
4	2-7.68	21	13-10.32	38	25-0.96	55	36-3.60	72	47-6.24
5	3-3.60	22	14-6.24	39	25-8.88	56	36-11.52	73	48-2.16
6	3-11.52	23	15-2.16	40	26-4.80	57	37-7.44	74	48-10.08
7	4-7.44	24	15-10.08	41	27-0.72	58	38-3.36	75	49-6.00
8	5-3.36	25	16-6.00	42	27-8.64	59	38-11.28	76	50-1.92
9	5-11.28	26	17-1.92	43	28-4.56	60	39-7.20	77	50-9.84
10	6-7.20	27	17-9.84	44	29-0.48	61	40-3.12	78	51-5.76
11	7-3.12	28	18-5.76	45	29-8.40	62	40-11.04	79	52-1.68
12	7-11.04	29	19-1.68	46	30-4.32	63	41-6.96	80	52-9.60
13	8-6.96	30	19-9.60	47	31-0.24	64	42-2.88	81	53-5.52
14	9-2.88	31	20-5.52	48	31-8.16	65	42-10.80	82	54-1.44
15	9-10.80	32	21-1.44	49	32-4.08	66	43-6.72	83	54-9.36
16	10-6.72	33	21-9.36	50	33-0.00	67	44-2.64	84	55-5.28
17	11-2.64	34	22-5.28	51	33-7.92	68	44-10.56	85	56-1.20
								86	56-9.12
								87	57-5.04
								88	58-0.96
								89	58-8.88
								90	59-4.80
								91	60-0.72
								92	60-8.64
								93	61-4.56
								94	62-0.48
								95	62-8.40
								96	63-4.32
								97	64-0.24
								98	64-8.16
								99	65-4.08
								100	66-0.00
								101	66-7.92
								102	67-3.84

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=10°	I	T	E	I=20°	I	T	E	I=30°
1°	50.00	.218	+	11°	551.70	26.500	+	21°	1061.9	97.577	+
10'	58.34	.297	5° C.	10'	560.11	27.313	5° C.	10'	1070.6	99.155	5° C.
20'	66.67	.388	T	20'	568.53	28.137	T	20'	1079.2	100.75	T
30'	75.01	.491	.03	30'	576.95	28.974	.06	30'	1087.8	102.35	.10
40'	83.34	.606	E	40'	585.36	29.824	E	40'	1096.4	103.97	E
50'	91.68	.733	.001	50'	593.79	30.686	.006	50'	1105.1	105.60	.013
2°	100.01	.873	10° C.	12°	602.21	31.561	.006	22°	1113.7	107.24	.013
10'	108.35	1.024	T	10'	610.64	32.447	T	10'	1122.4	108.90	T
20'	116.68	1.188	.06	20'	619.07	33.347	.13	20'	1131.0	110.57	.19
30'	125.02	1.364	E	30'	627.50	34.259	E	30'	1139.7	112.25	E
40'	133.36	1.552	.003	40'	635.93	35.183	.011	40'	1148.4	113.95	.025
50'	141.70	1.752	T	50'	644.37	36.120	T	50'	1157.0	115.66	T
3°	150.04	1.964	15° C.	13°	652.81	37.070	.011	23°	1165.7	117.38	.025
10'	158.38	2.138	T	10'	661.25	38.031	T	10'	1174.4	119.12	T
20'	166.72	2.425	.06	20'	669.70	39.006	.13	20'	1183.1	120.87	.19
30'	175.06	2.674	E	30'	678.15	39.993	E	30'	1191.8	122.63	E
40'	183.40	2.934	.003	40'	686.60	40.992	.011	40'	1200.5	124.41	.025
50'	191.74	3.207	T	50'	695.06	42.004	T	50'	1209.2	126.20	T
4°	200.08	3.492	15° C.	14°	703.51	43.029	.011	24°	1217.9	128.00	.025
10'	208.43	3.790	T	10'	711.97	44.066	T	10'	1226.6	129.82	T
20'	216.77	4.099	.06	20'	720.44	45.116	.13	20'	1235.3	131.65	.19
30'	225.12	4.421	E	30'	728.90	46.178	E	30'	1244.0	133.50	E
40'	233.47	4.755	.003	40'	737.37	47.253	.011	40'	1252.8	135.35	.025
50'	241.81	5.100	T	50'	745.85	48.341	T	50'	1261.5	137.23	T
5°	250.16	5.459	15° C.	15°	754.32	49.441	.011	25°	1270.2	139.11	.025
10'	258.51	5.829	T	10'	762.80	50.554	T	10'	1279.0	141.01	T
20'	266.86	6.211	.06	20'	771.29	51.679	.13	20'	1287.7	142.93	.19
30'	275.21	6.606	E	30'	779.77	52.818	E	30'	1296.5	144.85	E
40'	283.57	7.013	.003	40'	788.26	53.969	.011	40'	1305.3	146.79	.025
50'	291.92	7.432	T	50'	796.75	55.132	T	50'	1314.0	148.75	T
6°	300.28	7.863	15° C.	16°	805.25	56.309	.011	26°	1322.8	150.71	.025
10'	308.64	8.307	T	10'	813.75	57.498	T	10'	1331.6	152.69	T
20'	316.99	8.762	.06	20'	822.25	58.699	.13	20'	1340.4	154.69	.19
30'	325.35	9.230	E	30'	830.76	59.914	E	30'	1349.2	156.70	E
40'	333.71	9.710	.003	40'	839.27	61.141	.011	40'	1358.0	158.72	.025
50'	342.08	10.202	T	50'	847.78	62.381	T	50'	1366.8	160.76	T
7°	350.44	10.707	15° C.	17°	856.30	63.634	.011	27°	1375.6	162.81	.025
10'	358.81	11.224	T	10'	864.82	64.900	T	10'	1384.4	164.86	T
20'	367.17	11.753	.06	20'	873.35	66.178	.13	20'	1393.2	166.95	.19
30'	375.54	12.294	E	30'	881.88	67.470	E	30'	1402.0	169.04	E
40'	383.91	12.847	.003	40'	890.41	68.774	.011	40'	1410.9	171.15	.025
50'	392.28	13.413	T	50'	898.95	70.091	T	50'	1419.7	173.27	T
8°	400.66	13.991	15° C.	18°	907.49	71.421	.011	28°	1428.6	175.41	.025
10'	409.03	14.582	T	10'	916.03	72.764	T	10'	1437.4	177.55	T
20'	417.41	15.184	.06	20'	924.58	74.119	.13	20'	1446.3	179.72	.19
30'	425.79	15.799	E	30'	933.13	75.488	E	30'	1455.1	181.89	E
40'	434.17	16.426	.003	40'	941.69	76.869	.011	40'	1464.0	184.08	.025
50'	442.55	17.065	T	50'	950.25	78.264	T	50'	1472.9	186.29	T
9°	450.93	17.717	15° C.	19°	958.81	79.671	.011	29°	1481.8	188.51	.025
10'	459.32	18.381	T	10'	967.38	81.092	T	10'	1490.7	190.74	T
20'	467.71	19.058	.06	20'	975.96	82.525	.13	20'	1499.6	192.99	.19
30'	476.10	19.746	E	30'	984.53	83.972	E	30'	1508.5	195.25	E
40'	484.49	20.447	.003	40'	993.12	85.431	.011	40'	1517.4	197.53	.025
50'	492.88	21.161	T	50'	1001.7	86.904	T	50'	1526.3	199.82	T
10°	501.28	21.887	15° C.	20°	1010.3	88.389	.011	30°	1535.3	202.12	.025
10'	509.68	22.624	T	10'	1018.9	89.888	T	10'	1544.2	204.44	T
20'	518.08	23.375	.06	20'	1027.5	91.399	.13	20'	1553.1	206.77	.19
30'	526.48	24.138	E	30'	1036.1	92.924	E	30'	1562.1	209.12	E
40'	534.89	24.913	.003	40'	1044.7	94.462	.011	40'	1571.0	211.48	.025
50'	543.29	25.700	T	50'	1053.3	96.013	T	50'	1580.0	213.86	T

T = R tan ½ I E = R exsec ½ I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=40°	I	T	E	I=50°	I	T	E	I=60°
31°	1589.0	216.3	+	41°	2142.2	387.4	+	51°	2732.9	618.4	+
10'	1598.0	218.7	5° C.	10'	2151.7	390.7	5° C.	10'	2743.1	622.8	5° C.
20'	1606.9	221.1	T	20'	2161.2	394.1	T	20'	2753.4	627.2	T
30'	1615.9	223.5	.13	30'	2170.8	397.4	.17	30'	2763.7	631.7	.21
40'	1624.9	226.0	E	40'	2180.3	400.8	E	40'	2773.9	636.2	E
50'	1633.9	228.4	.023	50'	2189.9	404.2	.037	50'	2784.2	640.7	.050
32°	1643.0	230.9	10° C.	42°	2199.4	407.6	10° C.	52°	2794.5	645.2	10° C.
10'	1652.0	233.4	T	10'	2209.0	411.1	T	10'	2804.9	649.7	T
20'	1661.0	235.9	.06	20'	2218.6	414.5	.10	20'	2815.2	654.3	.14
30'	1670.0	238.4	E	30'	2228.1	418.0	E	30'	2825.6	658.8	E
40'	1679.1	241.0	.013	40'	2237.7	421.4	.017	40'	2835.9	663.4	.021
50'	1688.1	243.5	T	50'	2247.3	425.0	T	50'	2846.3	668.0	T
33°	1697.2	246.1	10° C.	43°	2257.0	428.5	10° C.	53°	2856.7	672.7	10° C.
10'	1706.3	248.7	T	10'	2266.6	432.0	T	10'	2867.1	677.3	T
20'	1715.3	251.3	.06	20'	2276.2	435.6	.10	20'	2877.5	682.0	.14
30'	1724.4	253.9	E	30'	2285.9	439.2	E	30'	2888.0	686.7	E
40'	1733.5	256.5	.013	40'	2295.6	442.8	.017	40'	2898.4	691.4	.021
50'	1742.6	259.1	T	50'	2305.2	446.4	T	50'	2908.9	696.1	T
34°	1751.7	261.8	15° C.	44°	2314.9	450.0	15° C.	54°	2919.4	700.9	15° C.
10'	1760.8	264.5	T	10'	2324.6	453.6	T	10'	2929.9	705.7	T
20'	1770.0	267.2	.06	20'	2334.3	457.3	.10	20'	2940.4	710.5	.14
30'	1779.1	269.9	E	30'	2344.1	461.0	E	30'	2951.0	715.3	E
40'	1788.2	272.6	.013	40'	2353.8	464.6	.017	40'	2961.5	720.1	.021
50'	1797.4	275.3	T	50'	2363.5	468.4	T	50'	2972.1	725.0	T
35°	1806.6	278.1	15° C.	45°	2373.3	472.1	15° C.	55°	2982.7	729.9	15° C.
10'	1815.7	280.8	T	10'	2383.1	475.8	T	10'	2993.3	734.8	T
20'	1824.9	283.6	.06	20'	2392.8	479.6	.10	20'	3003.9	739.7	.14
30'	1834.1	286.4	E	30'	2402.6	483.4	E	30'	3014.5	744.6	E
40'	1843.3	289.2	.013	40'	2412.4	487.2	.017	40'	3025.2	749.6	.021
50'	1852.5	292.0	T	50'	2422.3	491.0	T	50'	3035.8	754.6	T
36°	1861.7	294.9	15° C.	46°	2432.1	494.8	15° C.	56°	3046.5	759.6	15° C.
10'	1870.9	297.7	T	10'	2441.9	498.7	T	10'	3057.2	764.6	T
20'	1880.1	300.6	.06	20'	2451.8	502.5	.10	20'	3067.9	769.7	.14
30'	1889.4	303.5	E	30'	2461.7	506.4	E	30'	3078.7	774.7	E
40'	1898.6	306.4	.013	40'	2471.5	510.3	.017	40'	3089.4	779.8	.021
50'	1907.9	309.3	T	50'	2481.4	514.3	T	50'	3100.2	784.9	T
37°	1917.1	312.2	15° C.	47°	2491.3	518.2	15° C.	57°	3110.9	790.1	15° C.
10'	1926.4	315.2	T	10'	2501.2	522.2	T	10'	3121.7	795.2	T
20'	1935.7	318.1	.06	20'	2511.2	526.1	.10	20'	3132.6	800.4	.14
30'	1945.0	321.1	E	30'	2521.1	530.1	E	30'	3143.4	805.6	E
40'	1954.3	324.1	.013	40'	2531.1	534.2	.017	40'	3154.2	810.9	.021
50'	1963.6	327.1	T	50'	2541.0	538.2	T	50'	3165.1	816.1	T
38°	1972.9	330.2	15° C.	48°	2551.0	542.2	15° C.	58°	3176.0	821.4	15° C.
10'	1982.2	333.2	T	10'	2561.0	546.3	T	10'	3186.9	826.7	T
20'	1991.5	336.3	.06	20'	2571.0	550.4	.10	20'	3197.8	832.0	.14
30'	2000.9	339.3	E	30'	2581.0	554.5	E	30'	3208.8	837.3	E</

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=70°	I	T	E	I=80°	I	T	E	I=90°
61°	3375.0	920.2	+	71°	4086.9	1308.2	+	81°	4893.6	1805.3	+
10'	3386.3	925.9	5° C.	10'	4099.5	1315.6	5° C.	10'	4908.0	1814.7	5° C.
20'	3397.5	931.6	T	20'	4112.1	1322.9	T	20'	4922.5	1824.1	T
30'	3408.8	937.3	.25	30'	4124.8	1330.3	.30	30'	4937.0	1833.6	.36
40'	3420.1	943.1	E	40'	4137.4	1337.7	E	40'	4951.5	1843.1	E
50'	3431.4	948.9	.080	50'	4150.1	1345.1	.110	50'	4966.1	1852.6	.149
62°	3442.7	954.8	10° C.	72°	4162.8	1352.6	10° C.	82°	4980.7	1862.2	10° C.
10'	3454.1	960.6	T	10'	4175.6	1360.1	T	10'	4995.4	1871.8	T
20'	3465.4	966.5	.51	20'	4188.5	1367.6	.61	20'	5010.0	1881.5	.72
30'	3476.8	972.4	E	30'	4201.2	1375.2	E	30'	5024.8	1891.2	E
40'	3488.3	978.3	.159	40'	4214.0	1382.8	.220	40'	5039.5	1900.9	.299
50'	3499.7	984.3	15° C.	50'	4226.8	1390.4	15° C.	50'	5054.3	1910.7	15° C.
63°	3511.1	990.2	T	73°	4239.7	1398.0	T	83°	5069.2	1920.5	T
10'	3522.6	996.2	.76	10'	4252.6	1405.7	.86	10'	5084.0	1930.4	.96
20'	3534.1	1002.3	E	20'	4265.6	1413.5	E	20'	5099.0	1940.3	E
30'	3545.6	1008.3	.240	30'	4278.5	1421.2	.332	30'	5113.9	1950.3	.450
40'	3557.2	1014.4	T	40'	4291.5	1429.0	T	40'	5128.9	1960.2	T
50'	3568.7	1020.5	15° C.	50'	4304.6	1436.8	15° C.	50'	5143.9	1970.3	15° C.
64°	3580.3	1026.6	20° C.	74°	4317.6	1444.6	20° C.	84°	5159.0	1980.4	20° C.
10'	3591.9	1032.8	.76	10'	4330.7	1452.5	.86	10'	5174.1	1990.5	.96
20'	3603.5	1039.0	E	20'	4343.8	1460.4	E	20'	5189.3	2000.6	E
30'	3615.1	1045.2	.240	30'	4356.9	1468.4	.332	30'	5204.4	2010.8	.450
40'	3626.8	1051.4	T	40'	4370.1	1476.4	T	40'	5219.7	2021.1	T
50'	3638.5	1057.7	15° C.	50'	4383.3	1484.4	15° C.	50'	5234.9	2031.4	15° C.
65°	3650.2	1063.9	20° C.	75°	4396.5	1492.4	20° C.	85°	5250.3	2041.7	20° C.
10'	3661.9	1070.2	.76	10'	4409.8	1500.5	.86	10'	5265.6	2052.1	.96
20'	3673.7	1076.6	E	20'	4423.1	1508.6	E	20'	5281.0	2062.5	E
30'	3685.4	1082.9	.240	30'	4436.4	1516.7	.332	30'	5296.4	2073.0	.450
40'	3697.2	1089.3	T	40'	4449.7	1524.9	T	40'	5311.9	2083.5	T
50'	3709.0	1095.7	15° C.	50'	4463.1	1533.1	15° C.	50'	5327.4	2094.1	15° C.
66°	3720.9	1102.2	20° C.	76°	4476.5	1541.4	20° C.	86°	5343.0	2104.7	20° C.
10'	3732.7	1108.6	.76	10'	4489.9	1549.7	.86	10'	5358.6	2115.3	.96
20'	3744.6	1115.1	E	20'	4503.4	1558.0	E	20'	5374.2	2126.0	E
30'	3756.5	1121.7	.240	30'	4516.9	1566.3	.332	30'	5389.9	2136.7	.450
40'	3768.5	1128.2	T	40'	4530.4	1574.7	T	40'	5405.6	2147.5	T
50'	3780.4	1134.8	15° C.	50'	4544.0	1583.1	15° C.	50'	5421.4	2158.4	15° C.
67°	3792.4	1141.4	20° C.	77°	4557.6	1591.6	20° C.	87°	5437.2	2169.2	20° C.
10'	3804.4	1148.0	.76	10'	4571.2	1600.1	.86	10'	5453.1	2180.2	.96
20'	3816.4	1154.7	E	20'	4584.8	1608.6	E	20'	5469.0	2191.1	E
30'	3828.4	1161.3	.240	30'	4598.5	1617.1	.332	30'	5484.9	2202.2	.450
40'	3840.5	1168.1	T	40'	4612.2	1625.7	T	40'	5500.9	2213.2	T
50'	3852.6	1174.8	15° C.	50'	4626.0	1634.4	15° C.	50'	5517.0	2224.3	15° C.
68°	3864.7	1181.6	20° C.	78°	4639.8	1643.0	20° C.	88°	5533.1	2235.5	20° C.
10'	3876.8	1188.4	.76	10'	4653.6	1651.7	.86	10'	5549.2	2246.7	.96
20'	3889.0	1195.2	E	20'	4667.4	1660.5	E	20'	5565.4	2258.0	E
30'	3901.2	1202.0	.240	30'	4681.3	1669.2	.332	30'	5581.6	2269.3	.450
40'	3913.4	1208.9	T	40'	4695.2	1678.1	T	40'	5597.8	2280.6	T
50'	3925.6	1215.8	15° C.	50'	4709.2	1686.9	15° C.	50'	5614.2	2292.0	15° C.
69°	3937.9	1222.7	20° C.	79°	4723.2	1695.8	20° C.	89°	5630.5	2303.5	20° C.
10'	3950.2	1229.7	.76	10'	4737.2	1704.7	.86	10'	5646.9	2315.0	.96
20'	3962.5	1236.7	E	20'	4751.2	1713.7	E	20'	5663.4	2326.6	E
30'	3974.8	1243.7	.240	30'	4765.3	1722.7	.332	30'	5679.9	2338.2	.450
40'	3987.2	1250.8	T	40'	4779.4	1731.7	T	40'	5696.4	2349.8	T
50'	3999.5	1257.9	15° C.	50'	4793.6	1740.8	15° C.	50'	5713.0	2361.5	15° C.
70°	4011.9	1265.0	20° C.	80°	4807.7	1749.9	20° C.	90°	5729.7	2373.3	20° C.
10'	4024.4	1272.1	.76	10'	4822.0	1759.0	.86	10'	5746.3	2385.1	.96
20'	4036.8	1279.3	E	20'	4836.2	1768.2	E	20'	5763.1	2397.0	E
30'	4049.3	1286.5	.240	30'	4850.5	1777.4	.332	30'	5779.9	2408.9	.450
40'	4061.8	1293.6	T	40'	4864.8	1786.7	T	40'	5796.7	2420.9	T
50'	4074.4	1300.9	15° C.	50'	4879.2	1796.0	15° C.	50'	5813.6	2432.9	15° C.

T = R tan ½ I E = R exsec ½ I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=100°	I	T	E	I=110°	I	T	E	I=120°
91°	5830.5	2444.9	+	101°	6950.6	3278.1	+	111°	8336.7	4386.1	+
10'	5847.5	2457.1	5° C.	10'	6971.3	3294.1	5° C.	10'	8362.7	4407.6	5° C.
20'	5864.6	2469.3	T	20'	6992.0	3310.1	T	20'	8388.9	4429.2	T
30'	5881.7	2481.5	.43	30'	7012.7	3326.1	.51	30'	8415.1	4450.9	.62
40'	5898.8	2493.8	E	40'	7033.6	3342.3	E	40'	8441.5	4472.7	E
50'	5916.0	2506.1	.200	50'	7054.5	3358.5	.268	50'	8468.0	4494.6	.360
92°	5933.2	2518.5	10° C.	102°	7075.5	3374.9	10° C.	112°	8494.6	4516.6	10° C.
10'	5950.5	2531.0	.76	10'	7096.6	3391.2	.86	10'	8521.3	4538.8	.96
20'	5967.9	2543.5	E	20'	7117.8	3407.7	E	20'	8548.1	4561.1	E
30'	5985.3	2556.0	.43	30'	7139.0	3424.3	.51	30'	8575.0	4583.4	.62
40'	6002.7	2568.6	E	40'	7160.3	3440.9	E	40'	8602.1	4606.0	E
50'	6020.2	2581.3	.200	50'	7181.7	3457.6	.268	50'	8629.3	4628.6	.360
93°	6037.8	2594.0	10° C.	103°	7203.2	3474.4	10° C.	113°	8656.6	4651.3	10° C.
10'	6055.4	2606.8	.76	10'	7224.7	3491.3	.86	10'	8684.0	4674.2	.96
20'	6073.1	2619.7	E	20'	7246.3	3508.2	E	20'	8711.5	4697.2	E
30'	6090.8	2632.6	.43	30'	7268.0	3525.2	.51	30'	8739.2	4720.3	.62
40'	6108.6	2645.5	E	40'	7289.8	3542.4	E	40'	8767.0	4743.6	E
50'	6126.4	2658.5	.401	50'	7311.7	3559.6	.536	50'	8794.9	4766.9	.721
94°	6144.3	2671.6	15° C.	104°	7333.6	3576.8	15° C.	114°	8822.9	4790.4	15° C.
10'	6162.2	2684.7	.76	10'	7355.6	3594.2	.86	10'	8851.0	4814.1	.96
20'	6180.2	2697.9	E	20'	7377.8	3611.7	E	20'	8879.3	4837.8	E
30'	6198.3	2711.2	.43	30'	7399.9	3629.2	.51	30'	8907.7	4861.7	.62
40'	6216.4	2724.5	E	40'	7422.2	3646.8	E	40'	8936.3	4885.7	E
50'	6234.6	2737.9	.200	50'	7444.6	3664.5	.268	50'	8965.0	4909.9	.360
95°	6252.8	2751.3	10° C.	105°	7467.0	3682.3	10° C.	115°	8993.8	4934.1	10° C.
10'	6271.1	2764.8	.76	10'	7489.6	3700.2	.86	10'	9022.7	4958.6	.96
20'	6289.4	2778.3	E	20'	7512.2	3718.2	E	20'	9051.7	4983.3	E
30'	6307.9	2792.0	.43	30'	7534.9	3736.2	.51	30'	9080.9	5007.8	.62
40'	6326.3	2805.6	E	40'	7557.7	3754.4	E	40'	9110.3	5032.6	E
50'	6344.8	2819.4	.401	50'	7580.5	3772.6	.536	50'	9139.8	5057.6	.721
96°	6363.4	2833.2	15° C.	106°	7603.5	3791.0	15° C.	116°	9169.4	5082.7	15° C.
10'	6382.1	2847.0	.76	10'	7626.6	3809.4	.86	10'	9199.1	5107.9	.96
20'	6400.8	2861.0	E	20'	7649.7	3827.9	E	20'	9229.0	5133.3	E
30'	6419.5	2875.0	.43	30'	7672.9	3846.5	.51	30'	9259.0	5158.8	.62
40'	6438.4	2889.0	E	40'	7696.3	3865.2	E	40'	9289.2	5184.5	E
50'	6457.3	2903.1	.200	50'	7719.7	3884.0	.268	50'	9319.5	5210.3	.360
97°	6476.2	2917.3	10° C.	107°	7743.2	3902.9	10° C.	117°	9349.9	5236.2	10° C.
10'	6495.2	2931.6	.76	10'	7766.8	3921.9	.86	10'	9380.5	5262.3	.96
20'	6514.3	2945.9	E	20'	7790.5	3940.9	E	20'	9411.3	5288.6	E
30'	6533.4	2960.3	.43	30'	7814.3	3960.1	.51	30'	9442.2	5315.0	.62
40'	6552.6	2974.7	E	40'	7838.1	3979.4	E	40'	9473.2	5341.5	E
50'	6571.9	2989.2	.401	50'	7862.1	3998.7	.536	50'	9504.4	5368.2	.721
98°	6591.2	3003.8	15° C.	108°	7886.2	4018.2	15° C.	118°	9535.7		

TABLE X.
MIDDLE ORDINATES OF RAILS
Length of Rail (feet)

C o /	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch	C o	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch
0-20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0-40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1-0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1-20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1-40	3438	.39	.34	.29	.25	.21	.17	12	478.3	3.83	2.47	2.15	1.81	1.54	1.26
2-0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2-20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2-40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3-0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3-20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3-40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4-0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.98
4-20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.09
4-40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.5	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.53	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

TABLE XI.
SHORT RADIUS CURVES

Radius Feet	Chord Feet	Central Angle	Deflection Angle	Deflection for 1 Foot
35	10	16-26	8-13	49.3
45	10	12-46	6-23	38.3
50	15	17-16	8-38	34.5
60	15	14-22	7-11	28.8
75	15	11-30	5-45	23.0
100	20	11-30	5-45	17.3
120	20	9-34	4-47	14.3
150	20	7-39	3-49	11.5
190	25	7-32	3-46	9.15
200	25	7-10	3-35	8.6
225	25	6-25	3-12	7.7
240	25	5-58	2-59	7.2
250	25	5-44	2-52	6.9
275	25	5-12	2-36	6.2
288	50	9-58	4-59	6.0
300	50	9-32	4-46	5.7
350	50	8-12	4-06	4.9
376	50	7-40	3-50	4.6
400	50	7-10	3-35	4.3
410	50	7-00	3-30	4.2

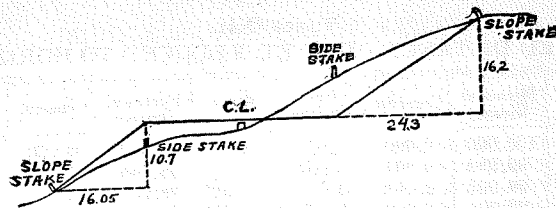
To find length of curve divide angle from P. C. to P. T. by central angle of chord, and multiply by length of chord.

TABLE XII.
INCLINED DISTANCE OF 100 FT. REDUCED TO HORIZONTAL

Slope	Horizontal Distance	Correction	Rise Per Foot	Slope	Horizontal Distance	Correction	Rise Per Foot
0°00'	100.000	0.000	0.000	8°00'	99.027	0.973	0.139
15'	99.999	0.001	0.004	15'	98.965	1.035	0.143
30'	99.996	0.004	0.009	30'	98.902	1.098	0.148
45'	99.991	0.009	0.013	45'	98.836	1.164	0.152
1 00	99.985	0.015	0.017	9 00	98.769	1.231	0.156
15	99.976	0.024	0.022	15	98.700	1.300	0.161
30	99.966	0.034	0.026	30	98.629	1.371	0.165
45	99.953	0.047	0.031	45	98.556	1.444	0.169
2 00	99.939	0.061	0.035	10 00	98.481	1.519	0.174
15	99.923	0.077	0.039	15	98.404	1.596	0.178
30	99.905	0.095	0.044	30	98.325	1.675	0.182
45	99.885	0.115	0.048	45	98.245	1.755	0.187
3 00	99.863	0.137	0.052	11 00	98.163	1.837	0.191
15	99.839	0.161	0.057	15	98.079	1.921	0.195
30	99.813	0.187	0.061	30	97.992	2.008	0.199
45	99.786	0.214	0.065	45	97.905	2.095	0.204
4 00	99.756	0.244	0.070	12 00	97.815	2.185	0.208
15	99.725	0.275	0.074	15	97.723	2.277	0.212
30	99.692	0.308	0.078	30	97.630	2.370	0.216
45	99.657	0.343	0.083	45	97.534	2.466	0.221
5 00	99.619	0.381	0.087	13 00	97.437	2.563	0.225
15	99.580	0.420	0.092	15	97.338	2.662	0.229
30	99.540	0.460	0.096	30	97.237	2.763	0.233
45	99.497	0.503	0.100	45	97.134	2.866	0.238
6 00	99.452	0.548	0.105	14 00	97.030	2.970	0.242
15	99.406	0.594	0.109	15	96.923	3.077	0.246
30	99.357	0.643	0.113	30	96.815	3.185	0.250
45	99.307	0.693	0.118	45	96.705	3.295	0.255
7 00	99.255	0.745	0.122	15 00	96.593	3.407	0.259
15	99.200	0.800	0.126	15	96.479	3.521	0.263
30	99.144	0.856	0.131	30	96.363	3.637	0.267
45	99.087	0.913	0.135	45	96.246	3.754	0.271

TABLE XIII.
MINUTES IN DECIMALS OF A DEGREE.

0 30"	.00833	10' 30"	.17500	20' 30"	.34167	30' 10"	.50833	40' 30"	.67500	50' 10"	.84167
1 00	.01667	11 00	.18333	21 00	.35000	31 00	.51667	41 00	.68333	51 00	.85000
30	.02500	30	.19167	30	.35833	30	.52500	30	.69167	30	.85833
2 00	.03333	12 00	.20000	22 00	.36667	32 00	.53333	42 00	.70000	52 00	.86667
30	.04167	30	.20833	30	.37500	30	.54167	30	.70833	30	.87500
3 00	.05000	13 00	.21667	23 00	.38333	33 00	.55000	43 00	.71667	53 00	.88333
30	.05833	30	.22500	30	.39167	30	.55833	30	.72500	30	.89167
4 00	.06667	14 00	.23333	24 00	.40000	34 00	.56667	44 00	.73333	54 00	.90000
30	.07500	30	.24167	30	.40833	30	.57500	30	.74167	30	.90833
5 00	.08333	15 00	.25000	25 00	.41667	35 00	.58333	45 00	.75000	55 00	.91667
30	.09167	30	.25833	30	.42500	30	.59167	30	.75833	30	.92500
6 00	.10000	16 00	.26667	26 00	.43333	36 00	.60000	46 00	.76667	56 00	.93333
30	.10833	30	.27500	30	.44167	30	.60833	30	.77500	30	.94167
7 00	.11667	17 00	.28333	27 00	.45000	37 00	.61667	47 00	.78333	57 00	.95000
30	.12500	30	.29167	30	.45833	30	.62500	30	.79167	30	.95833
8 00	.13333	18 00	.30000	28 00	.46667	38 00	.63333	48 00	.80000	58 00	.96667
30	.14167	30	.30833	30	.47500	30	.64167	30	.80833	30	.97500
9 00	.15000	19 00	.31667	29 00	.48333	39 00	.65000	49 00	.81667	59 00	.98333
30	.15833	30	.32500	30	.49167	30	.65833	30	.82500	30	.99167
10 00	.16667	20 00	.33333	30 00	.50000	40 00	.66667	50 00	.83333	60 00	1.00000



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

SLOPE 1 1/2 TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0 00	0 15	0 30	0 45	0 60	0 75	0 90	1 05	1 20	1 35	0
1	1 50	1 65	1 80	1 95	2 10	2 25	2 40	2 55	2 70	2 85	1
2	3 00	3 15	3 30	3 45	3 60	3 75	3 90	4 05	4 20	4 35	2
3	4 50	4 65	4 80	4 95	5 10	5 25	5 40	5 55	5 70	5 85	3
4	6 00	6 15	6 30	6 45	6 60	6 75	6 90	7 05	7 20	7 35	4
5	7 50	7 65	7 80	7 95	8 10	8 25	8 40	8 55	8 70	8 85	5
6	9 00	9 15	9 30	9 45	9 60	9 75	9 90	10 05	10 20	10 35	6
7	10 50	10 65	10 80	10 95	11 10	11 25	11 40	11 55	11 70	11 85	7
8	12 00	12 15	12 30	12 45	12 60	12 75	12 90	13 05	13 20	13 35	8
9	13 50	13 65	13 80	13 95	14 10	14 25	14 40	14 55	14 70	14 85	9
10	15 00	15 15	15 30	15 45	15 60	15 75	15 90	16 05	16 20	16 35	10
11	16 50	16 65	16 80	16 95	17 10	17 25	17 40	17 55	17 70	17 85	11
12	18 00	18 15	18 30	18 45	18 60	18 75	18 90	19 05	19 20	19 35	12
13	19 50	19 65	19 80	19 95	20 10	20 25	20 40	20 55	20 70	20 85	13
14	21 00	21 15	21 30	21 45	21 60	21 75	21 90	22 05	22 20	22 35	14
15	22 50	22 65	22 80	22 95	23 10	23 25	23 40	23 55	23 70	23 85	15
16	24 00	24 15	24 30	24 45	24 60	24 75	24 90	25 05	25 20	25 35	16
17	25 50	25 65	25 80	25 95	26 10	26 25	26 40	26 55	26 70	26 85	17
18	27 00	27 15	27 30	27 45	27 60	27 75	27 90	28 05	28 20	28 35	18
19	28 50	28 65	28 80	28 95	29 10	29 25	29 40	29 55	29 70	29 85	19
20	30 00	30 15	30 30	30 45	30 60	30 75	30 90	31 05	31 20	31 35	20
21	31 50	31 65	31 80	31 95	32 10	32 25	32 40	32 55	32 70	32 85	21
22	33 00	33 15	33 30	33 45	33 60	33 75	33 90	34 05	34 20	34 35	22
23	34 50	34 65	34 80	34 95	35 10	35 25	35 40	35 55	35 70	35 85	23
24	36 00	36 15	36 30	36 45	36 60	36 75	36 90	37 05	37 20	37 35	24
25	37 50	37 65	37 80	37 95	38 10	38 25	38 40	38 55	38 70	38 85	25
26	39 00	39 15	39 30	39 45	39 60	39 75	39 90	40 05	40 20	40 35	26
27	40 50	40 65	40 80	40 95	41 10	41 25	41 40	41 55	41 70	41 85	27
28	42 00	42 15	42 30	42 45	42 60	42 75	42 90	43 05	43 20	43 35	28
29	43 50	43 65	43 80	43 95	44 10	44 25	44 40	44 55	44 70	44 85	29
30	45 00	45 15	45 30	45 45	45 60	45 75	45 90	46 05	46 20	46 35	30
31	46 50	46 65	46 80	46 95	47 10	47 25	47 40	47 55	47 70	47 85	31
32	48 00	48 15	48 30	48 45	48 60	48 75	48 90	49 05	49 20	49 35	32
33	49 50	49 65	49 80	49 95	50 10	50 25	50 40	50 55	50 70	50 85	33
34	51 00	51 15	51 30	51 45	51 60	51 75	51 90	52 05	52 20	52 35	34
35	52 50	52 65	52 80	52 95	53 10	53 25	53 40	53 55	53 70	53 85	35
36	54 00	54 15	54 30	54 45	54 60	54 75	54 90	55 05	55 20	55 35	36
37	55 50	55 65	55 80	55 95	56 10	56 25	56 40	56 55	56 70	56 85	37
38	57 00	57 15	57 30	57 45	57 60	57 75	57 90	58 05	58 20	58 35	38
39	58 50	58 65	58 80	58 95	59 10	59 25	59 40	59 55	59 70	59 85	39
40	60 00	60 15	60 30	60 45	60 60	60 75	60 90	61 05	61 20	61 35	40
41	61 50	61 65	61 80	61 95	62 10	62 25	62 40	62 55	62 70	62 85	41
42	63 00	63 15	63 30	63 45	63 60	63 75	63 90	64 05	64 20	64 35	42
43	64 50	64 65	64 80	64 95	65 10	65 25	65 40	65 55	65 70	65 85	43
44	66 00	66 15	66 30	66 45	66 60	66 75	66 90	67 05	67 20	67 35	44
45	67 50	67 65	67 80	67 95	68 10	68 25	68 40	68 55	68 70	68 85	45
46	69 00	69 15	69 30	69 45	69 60	69 75	69 90	70 05	70 20	70 35	46
47	70 50	70 65	70 80	70 95	71 10	71 25	71 40	71 55	71 70	71 85	47
48	72 00	72 15	72 30	72 45	72 60	72 75	72 90	73 05	73 20	73 35	48
49	73 50	73 65	73 80	73 95	74 10	74 25	74 40	74 55	74 70	74 85	49
50	75 00	75 15	75 30	75 45	75 60	75 75	75 90	76 05	76 20	76 35	50

Computed by L. Leland Locke.



Standard Engineer's Field Book

Description

Size Rulings

No. 1307 7 1/4 x 4 1/2 "Level"
No. 1308 " " "Field"

Specify by Number, the Book desired

Made in U. S. A.

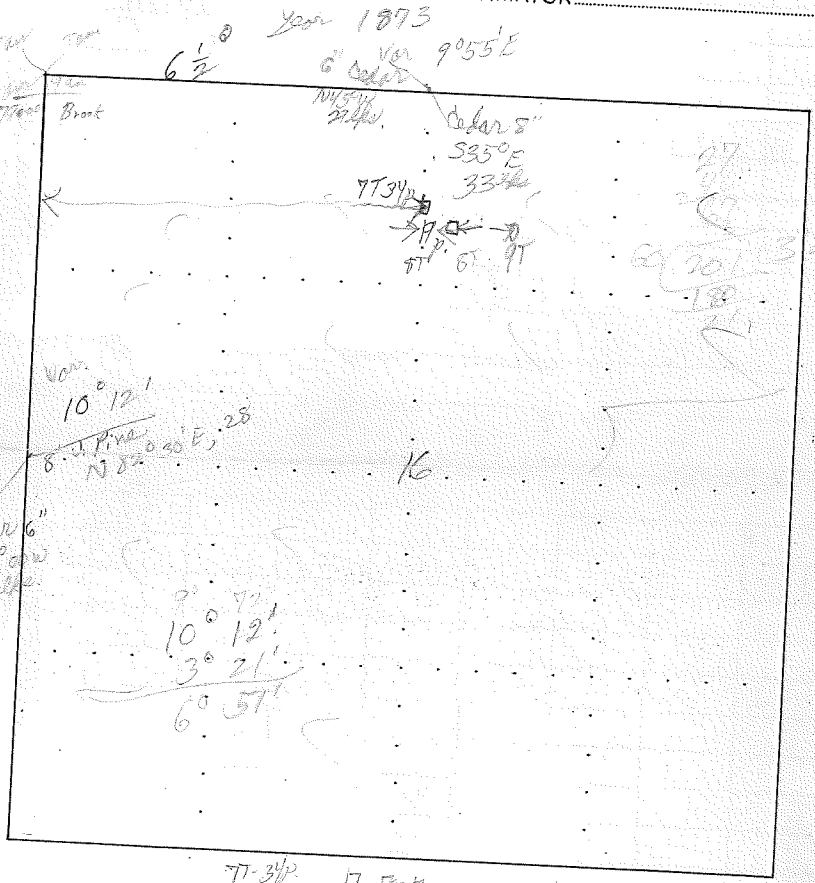
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 DIVISION OF FORESTRY
 MAP SHEET

27
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40..... SEC 16..... TWP. 140 R 27

AREA #4..... MAGNETIC DECL. 6°..... DATE June 15/40

COMPASSMAN..... ESTIMATOR.....



77-3/4 □ □ □
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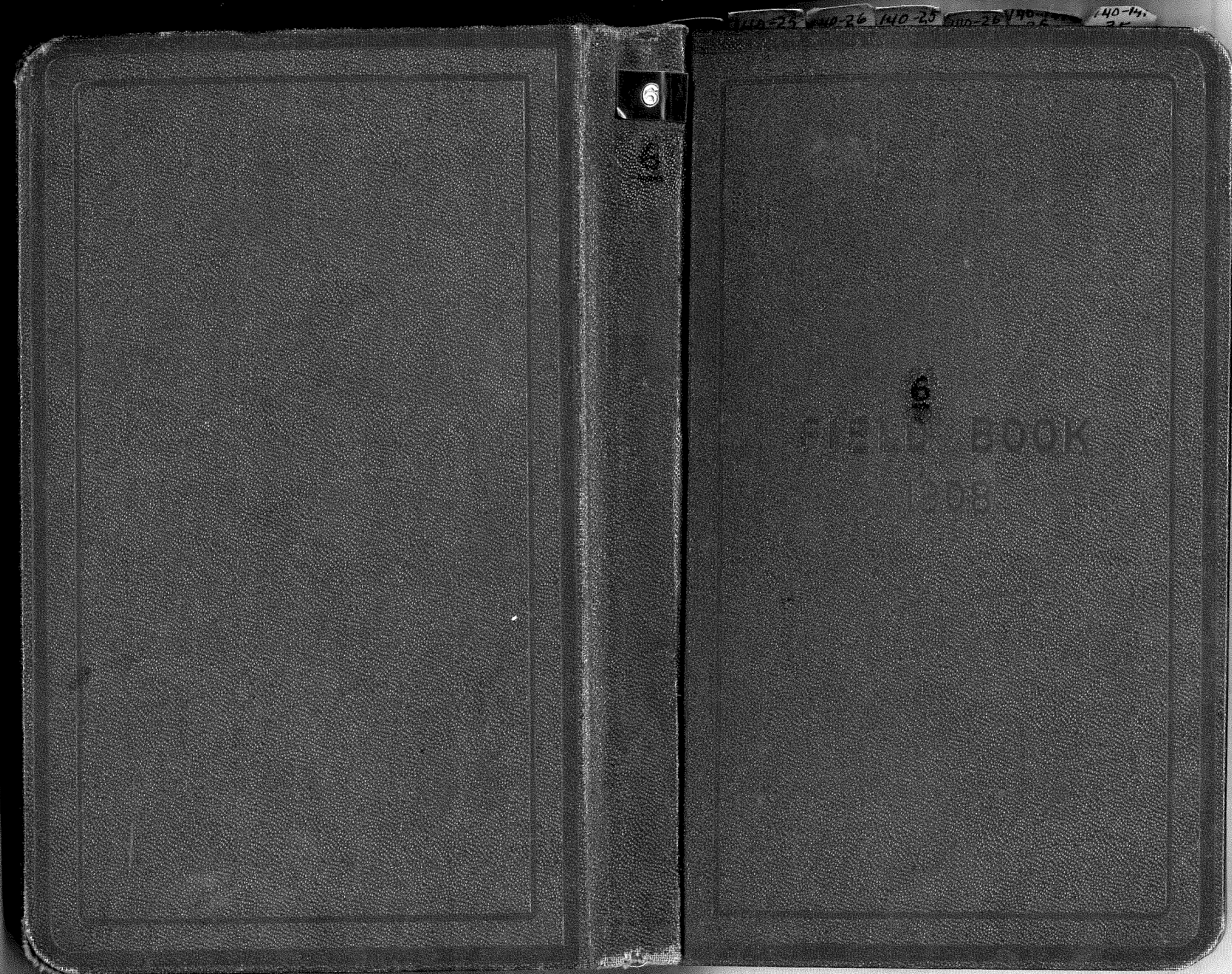
TOPOGRAPHY		SOIL		STONE	
Level A.	Sand A.	Free A.
Gentle slope A.	Sandy loam A.	Stony A.
Steep slope	..... A.	Clay loam	..... A.	Very stony	..... A.
Mountainous A.	Peat A.	Rock outcrop A.

Special use if any:

26
 5 1/2
 13
 110

35.65
 1.87
 37.52





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FIELD BOOK
1908

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