

140-20
20

140-20
20

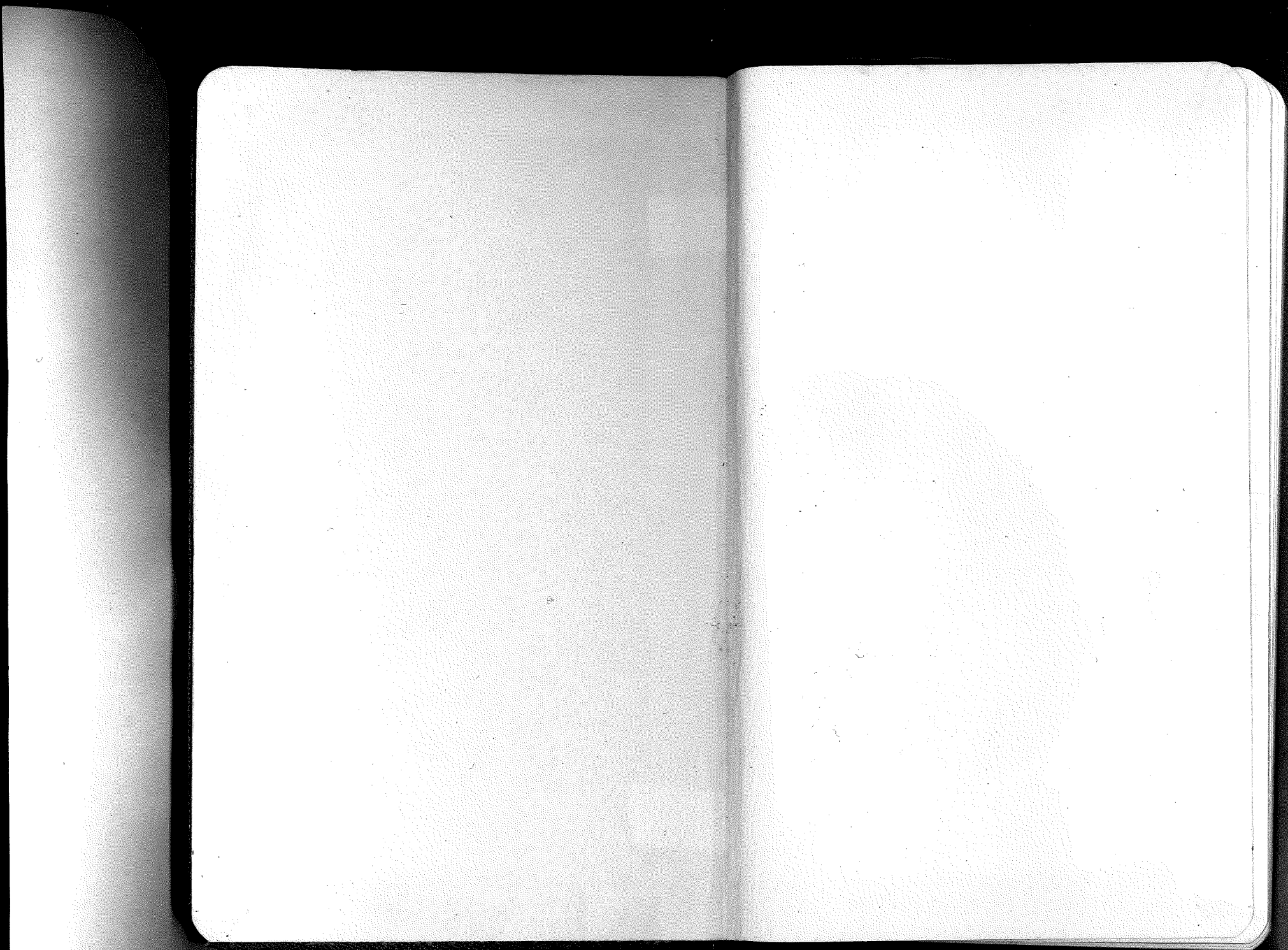
20

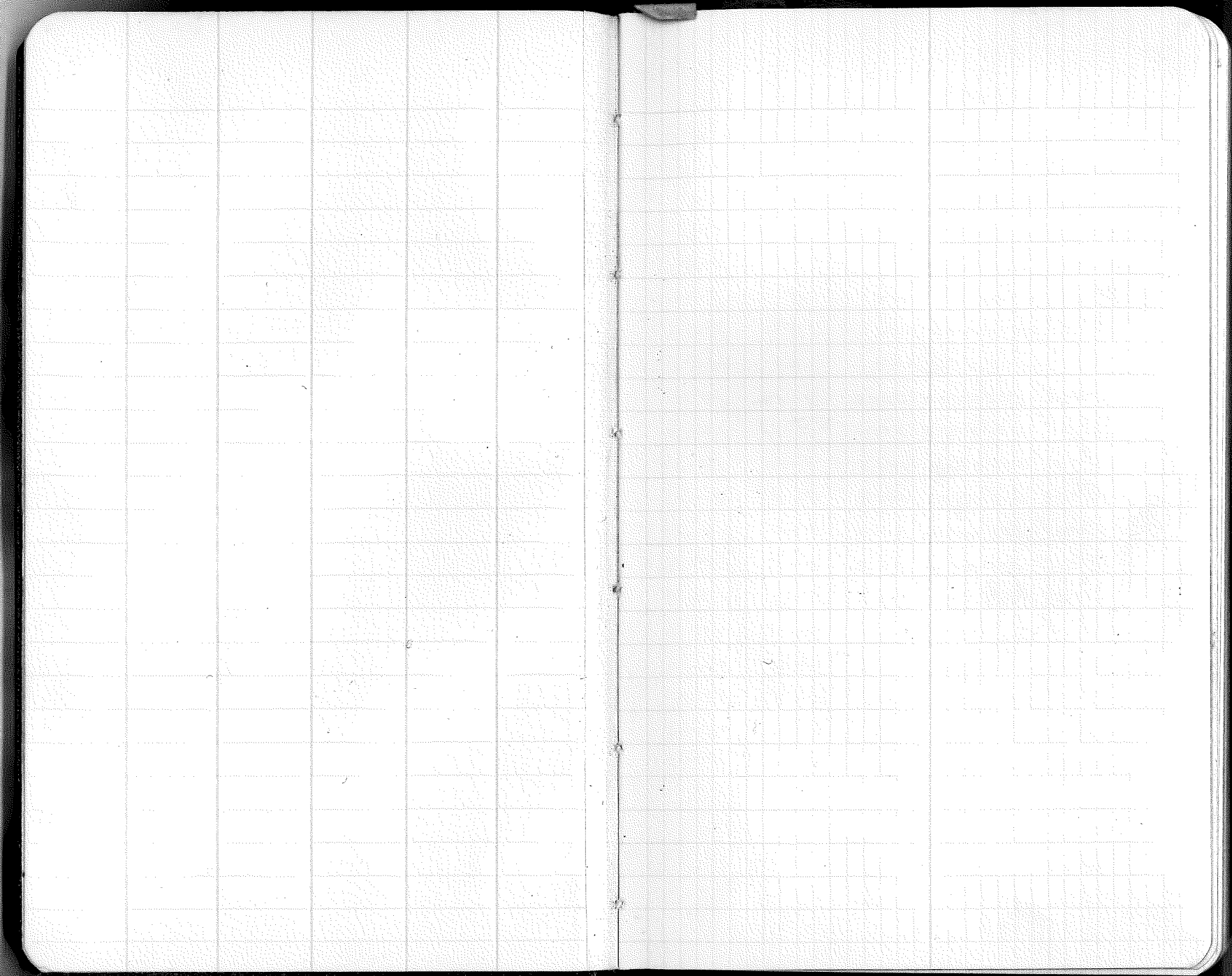
20

20

FIELD BOOK

1902



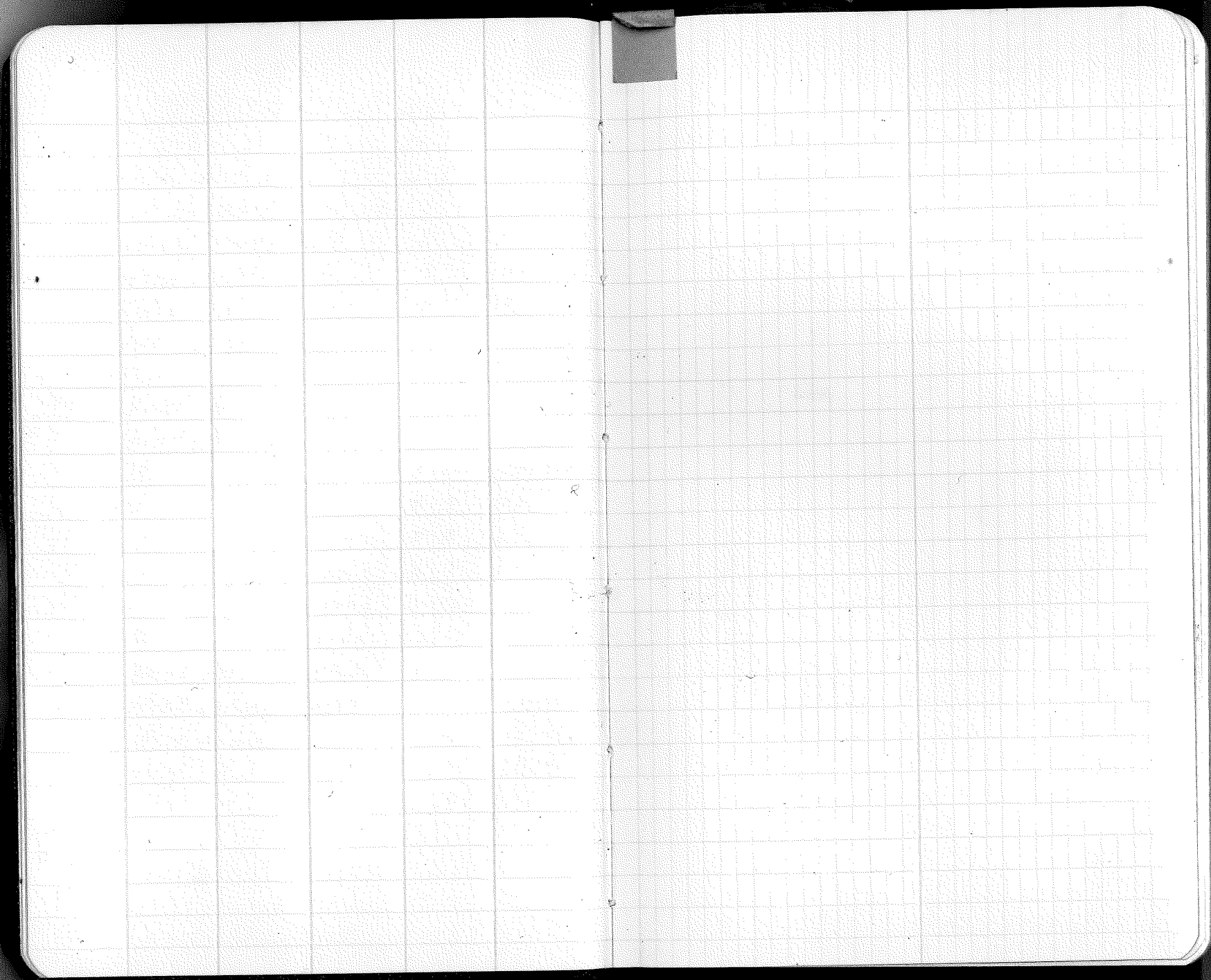


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T 140 N. R 26 W

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Data on Control Posts
in Back of bk.



find under road
in road center - is present but did

25136 Determined app. position of 1/4 cor.

25

24

23

22

21

20

19

18

17

16

15

14

13

12

11

10

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7

6

5

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2

1

0+00 Start North from App. sec. cor. 2 1/4 - 140-26

Look for:

Aspen - 4" - 5500 - 70 lbs

Birch - 10" - 517 E - 205 lbs

Aspen 6-8"
Scattered pine

Nov 9 1938

Feb. 8, 1938

H. Nilson - Compass - notes
M. Woods - Head chain
E. Comstock - Rear chain
Found: Elm - 10"

(New) N 67 1/2° W - 46.3'

scribed 4 1/2 B.T.

Wh. oak - 14"

568° E - 43.8 ft.

scribed 4 1/2 B.T.

Partially grown

over.

Big tree map

Aspen 4-6"

Road Intersection

of stake to S.C. $\frac{36}{211}$ - Closing Corner.

51+15 Intersect Standard Parallel 19 ft. west

50

49
48+99 Winter road WNW & ERS.

48

47

46+00 Enter sawrack sec. NW 1 SE

45

44

43

42

41

40

39
38+76 Woven wire fence approx. E & W.

38

37

36

35

34

33
32+46 Sheep pasture
Woven wire fence runs W & short distance E - enter

32

31

30

29+09 Fence E & W
28+42 Road to buildings runs East.
28+18 Narrow road runs NW.

27

Look for:

Tam. 4-518W-92 lks.

Tam. 4-N37E-59 lks.

Found: 2" square tam

□ stake, 2 ft. out of ground

* scribed on west side

T190N 52

on east side

R26W 51

from which

Tam stub - 4"

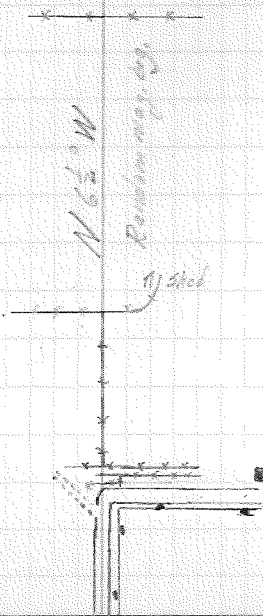
514°W - 63.6 ft.

face cut to

showing faint

evidence of scribe

marks.



26446 Appn E.C.W. 145-2" Tam. stake.

8 ft. So. of line
24425 Find 5" cedar with blaze opened up & backed face

24

23

22

21

20

19

18

17

16

15

14

13

12

11

10

9

8

7 6+55 Lve. Tam. Enter alder.

6

5

4

3

2

1

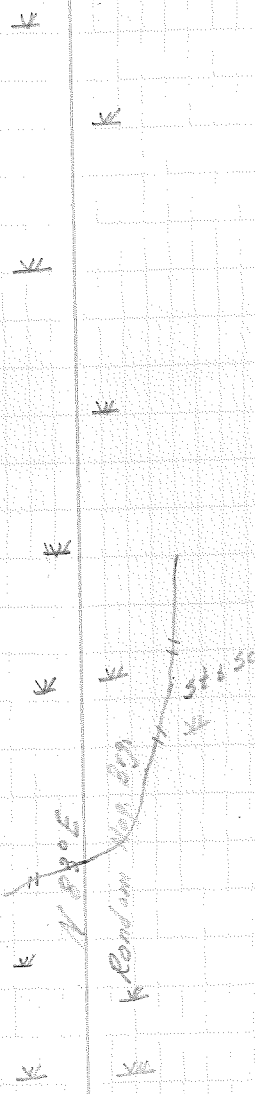
0700 Start East from S.C. $\frac{36}{211}$ 140-26

Feb. 8, 1938

3

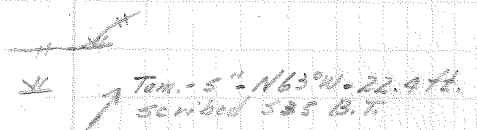
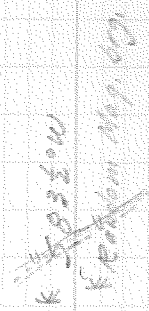
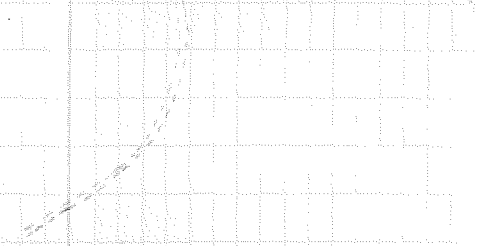
H. Wilson - Compass notes
H. Wood - dead chain
G. Comstock - bear chain

Tam. stake - 4' - S14W - 63.6°  2" Tam. stake scribed
T140N 52, R26W 51



26
 25
 24
 23
 22
 21
 20666 Narrow road SE NW
 20
 19
 18
 17
 16
 15
 14
 13
 12
 11
 10
 9
 8
 7739 ^{open} winter road NW & SE - enter high land
 7
 6
 5
 400 Loc. tam - enter Sp, ash, balsam
 3
 2
 14867 with cap 2" I.P. for standard corner S. $\frac{35}{21}$
 1
 0100 Start west from S.C. 211 $\frac{36}{21}$ - 140-26

Feb. 8, 1938 5
 H. Nilson - Compass rains
 M. Woods - Head chain
 B. Comstock - Rear chain



5 75' OLD
 TING TO
 SH. COR.
 FROM C.C.

For S.C. 312 14-26
 To line from west set app. stake
 Set stake & offset 106.4 ft. No.

52180
 52
 51
 50
 4967 Enter island
 49
 48
 47
 46
 45
 44
 43
 42
 41
 40
 39
 38
 37427 Stake at east side of lake
 37
 36740 Enter cattails
 36
 35
 34
 33100 Bottom of slope enter cedar, ash
 32
 31
 30
 29
 28728 Narrow road SW NE
 28 28124 Stake east side of road
 27

1470-23
24

1470-24

6

◇ Appr. Stake.



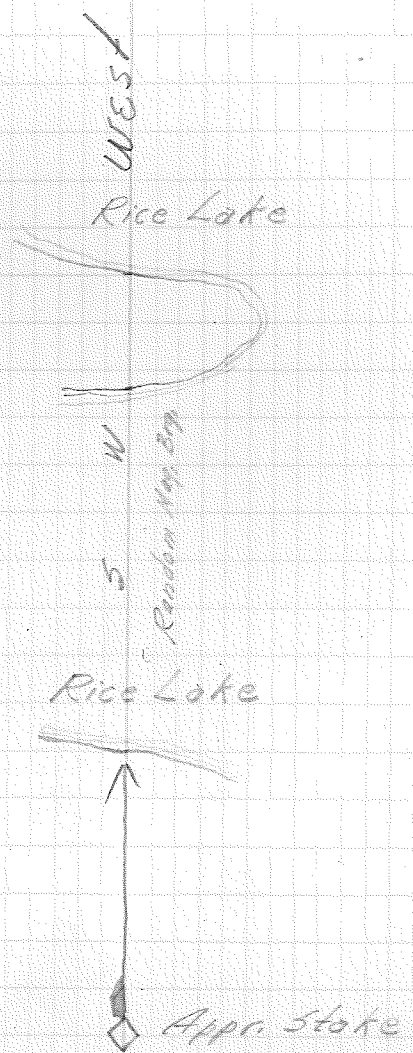
Rice Lake



26
 25
 24
 23
 22
 21
 20
 19
 18
 17
 1600 Lve point
 15
 14
 1360 Enter saltst point
 13
 12
 11
 10
 9
 8
 7
 600 Leave island
 5
 4
 3
 2
 1
 orig Start West from App SC $\frac{35}{372}$ 195-26

140-23
 20
 140-22

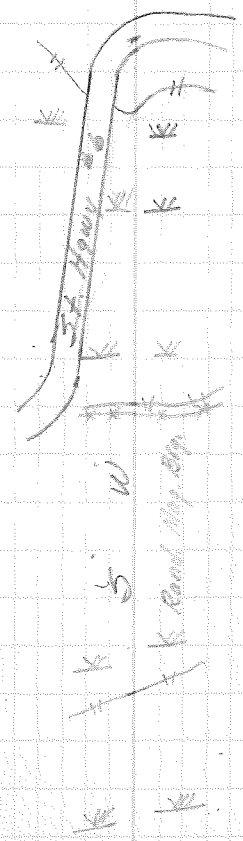
7
 Feb. 8, 1938
 H. Nilson - Compass - notes
 M. Woods - Head chain
 G. Camstak - Rear chain.



21 Apr stake
 52800 Set app. stake for SC $\frac{34}{473}$
 52
 51
 50
 49
 48
 47
 46 Center of stake they # 6 came
 45
 44 Enter aspen
 43
 42
 41
 40
 39100 Enter fir-cedar swamp
 38900 Fence SW
 38
 37
 36
 35
 34
 33100 Enter Salix
 32
 31
 30
 29
 28410 Enter sublake
 27

140-28
26 140-28

◇ App. stake for C.G.



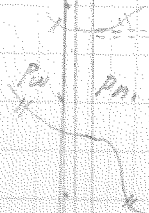
26
 25
 24
 23
 22
 21459 End of 4th oak pine clump - Small road //
 21
 20
 19409 No oak pine clump
 18
 17
 16
 15
 14
 13
 12437 Private road runs SW.
 12
 11
 10
 9
 8
 7
 6
 5 run west.
 4 offset north 91 ft. to road +
 3 appx. S.C. ^{33/34} by U.S.F.S. and
 24089 4" sq. red oak stake set to mark
 1
 0400 Start west line Apr 5. ³⁴ 11:26 - 11:26

140-25
26

140-26

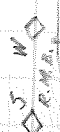
Feb 9, 1938 9

H. Nilson - Compass - not
 M. Woods - Head Chain
 G. Constock - Foot Chain



5840 W. road //

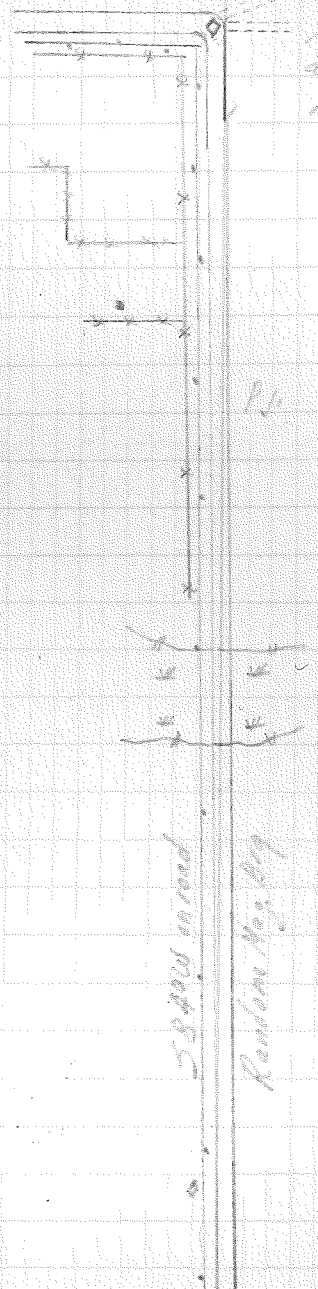
Random by dog



Appx. stake for S.C.

Appx. stake for C.C.

- center of road intersection
- 53125 Intersect 11.5 hrs, 10 ft. No. of
- 52
- 51
- 50
- 49
- 48 Interior fence runs S
- 47
- 4697 fence runs south
- 4610 Building 150 ft. south
- 45124 Gate to south
- 44
- 43
- 42
- 41100 Edge of transition zone - enter S.P.
- 40400 End of swamp - fence runs west
- 39
- 38100 Open swamp
- 37
- 36
- 35
- 34
- 33
- 32
- 31
- 30
- 29
- 28120 34 ft. S. to 11.5 - U.S.P.S.
- 27
- 26



Appr. Soc. Cor. $\frac{23}{514}$
at intersection of roads.

58000 in road
Random No. 109

26449 Continue west on 5233°W
 Offset north 10 ft. to tom. stub
 26
 25
 24
 23
 22
 21
 20
 19
 18
 17400 Enter tom rack swamp - 2"-4"
 16
 15
 14
 13160 Enter aspen-birch - 8"-10"
 13
 12
 11465 Enter aspen-birch-mixed conifers
 11
 10
 9
 8172 Enter cedar-spruce swamp
 8
 7420 Enter jack. balsam
 6
 5733 Enter Jack pine ridge
 5
 4
 3
 2
 1730 St. sec. con. $\frac{32}{51} \frac{33}{51}$ - 141-26
 1
 0400 Start west from road int. $\frac{33}{519}$ - 140-26

Found:
 Non-pine - 10" 581°E
 56 ft. blazed \circ
 Jack pine - 12" 541½°W
 61.5 ft. - blazed \circ

Found: 4" sq. stake
 3 ft. out of ground
 scribed
 West side - R26W 55
 So. side - T140N 55
 E. side - R26W 533
 N. side - T141N 532
 Road Intersection

Feb. 9, 1938 11
 H. Nilson - Compass notes
 M. Woods - Hood chain
 G. Comstock - Rear Chain

✖

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140-28
20 140-20

on ice.

52+00 Set approx Sec. Cor. $\frac{32}{675}$ stoke

- 52
- 51
- 50
- 49
- 48
- 47
- 46
- 45
- 44
- 43
- 42
- 41
- 40
- 39
- 38
- 37
- 36
- 35
- 34
- 33
- 32
- 31
- 30
- 29

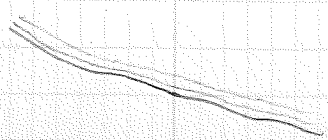
28+00 Enter Lake Laura

27+00 Beach



Lake
Laura

500±W
Random Mag. 89.



26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1

13400 Point 150 ft south

0400 Start west from appr. S.C. $\frac{32}{675}$ - 140-26

13

Lake

Point

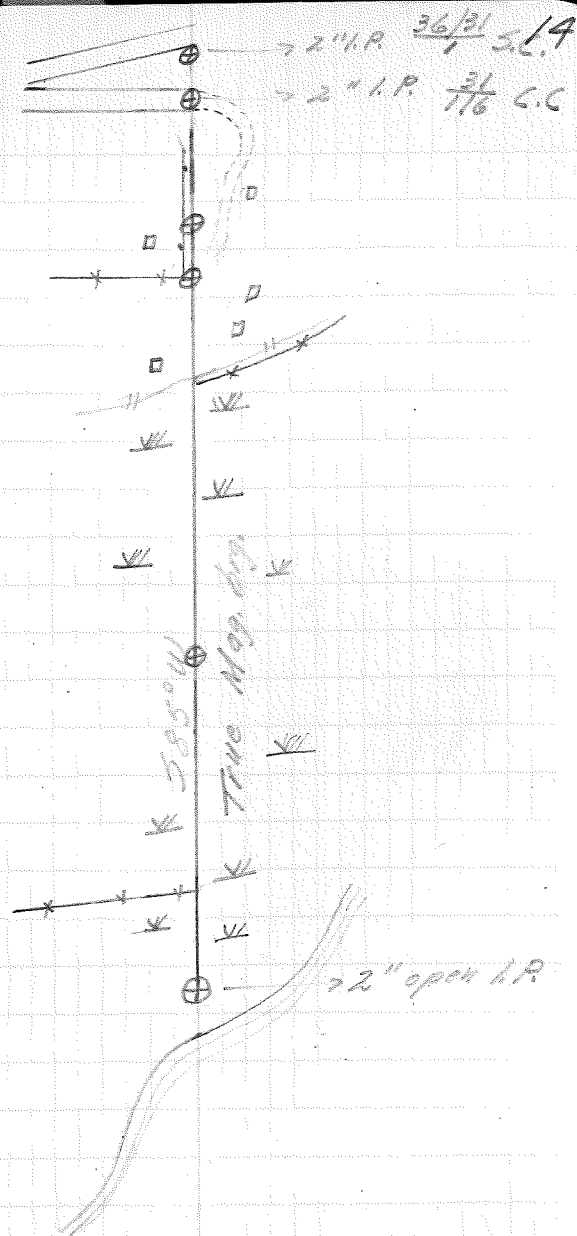
Laura

59310W

Random Map 19



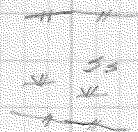
- 5424 Standard corner - 2" I.P. with cap.
with cap
- 5324 C.C. 116 - 2" I.P. open in cement block
- 52100 Enter open field
- 51
- 50 +47 1 1/2" open I.P.
- 49 +40.5 1 1/2" open I.P.
- 48
- 47 +41 Enter Jack pine
- 47 +07 Fence runs NW below bank
- 46
- 45
- 44
- 43
- 42
- 41 +30 1 1/2" open I.P.
- 40
- 39
- 38
- 37
- 36 +49 Fence runs south - 30° E - enter brush
- 35
- 34 +48 Offset No. 21 ft. to N.C. cor. of fence
- 33 +58 End of lake
- 32
- 31
- 30
- 29
- 28
- 27



146-2

1/4 cor. 1-12.
 26725² Intersect N 5 line 16 1/2 ft. S. of
 25
 24
 23100 Enter Sw. swamp
 22
 21
 20
 19
 18
 17
 16100 Leave Sw swamp
 15
 14
 13172 Enter Sw swamp
 12
 11
 10
 9
 8
 7
 6
 5
 4
 3
 2
 1
 0100 Start west from app. S.C. ¹⁶ 127 140 2675

Found: 2 "x2 1/2" tom.
 stake, 3 ft. out of
 ground scribed
 1/4 512, 1/4 51
 from which
 8" Tom. stub, bears 326°E,
 32 1/2 ft. dist. scribed
 B.T.



5000 W
 Random Map 50

□ Appr. Stake

at intersection of roads to cor ^{2/1} N15

- 191 Center of road N15, 130.7 ft. So.
- 52
- 51
- 50
- 49
- 48
- 47
- 46
- 45
- 44
- 43
- 42
- 41
- 40
- 39
- 38
- 37
- 36 157. Lve. Sal. sw.
- 35 134. Enter Sal. sw.
- 34 134. Leave Sw swamp
- 33
- 32 91. Enter Sw swamp
- 31 100. Lve. clump
- 30
- 29 100. Enter virgin N & W. P. clump
- 28
- 27 100. Leave Sw N15

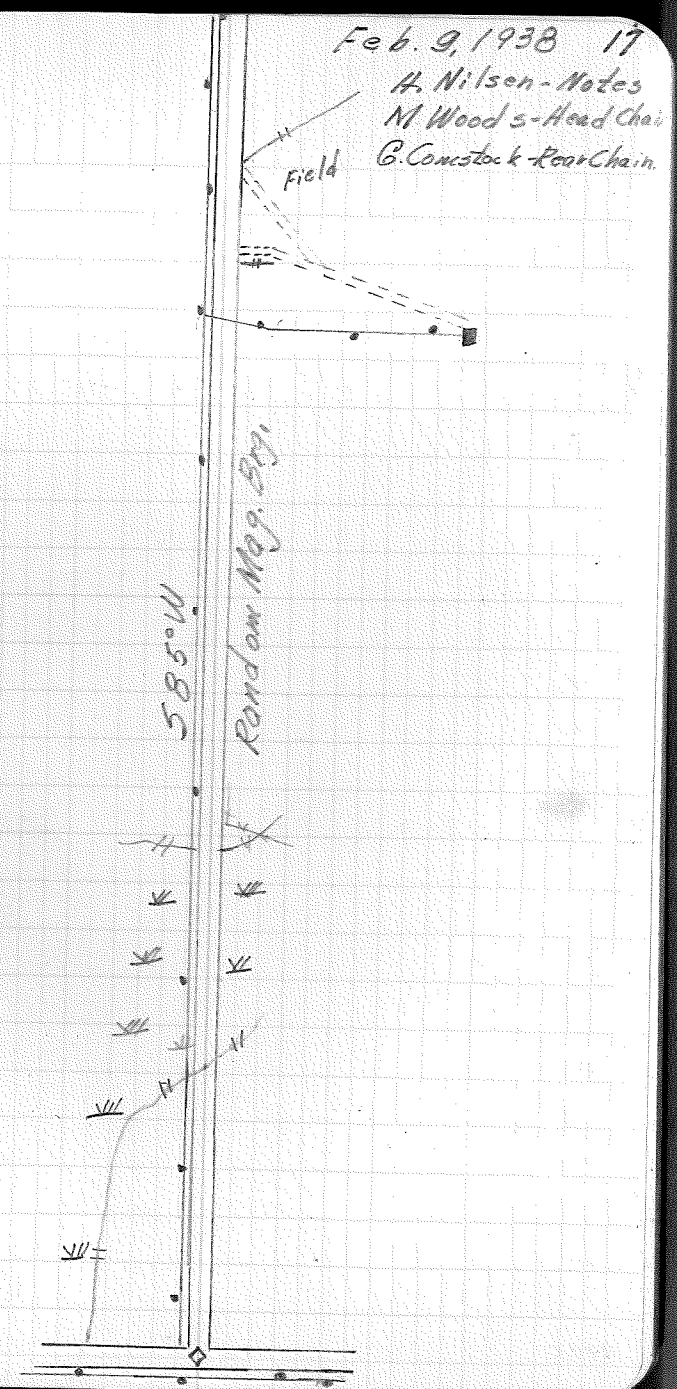
M. 3405
Rancho Map 189

~~Sal. sw~~
~~Sw~~
~~Sw~~

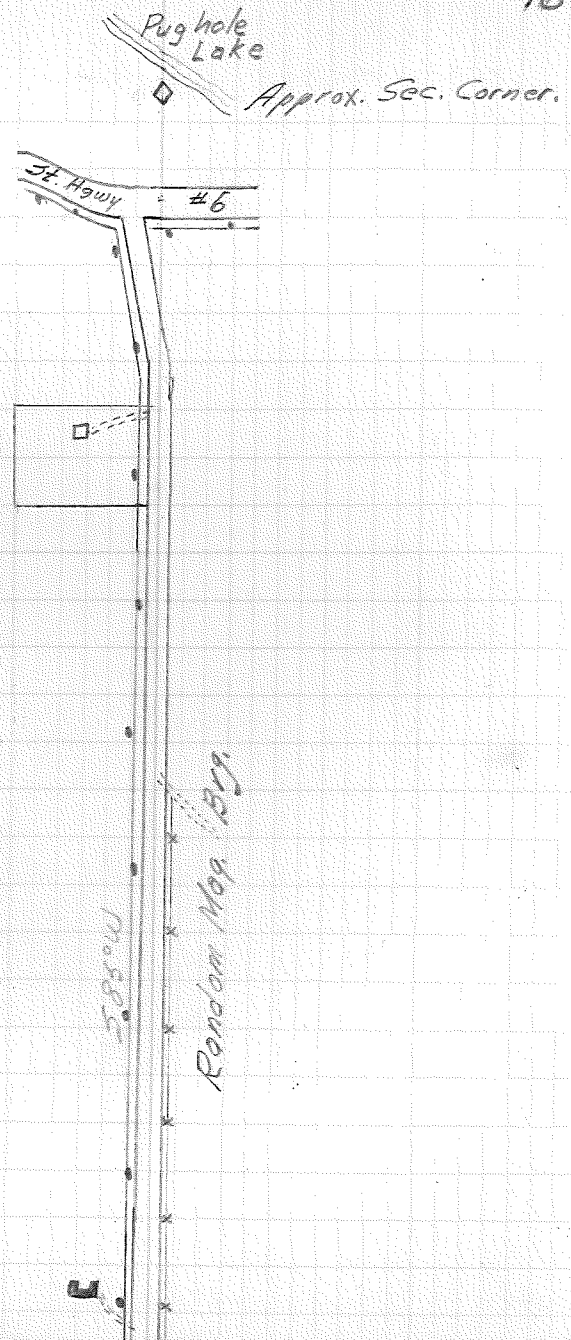
26	
25	Field NW
24	Road NE
23	
23410	Road No. to field 100 ft. No.
22	
21750	House 500 ft. No.
21	
20	
19	
18	
17	
16	
15	
14	
13	
12	
11	
10	
10213	Fence ESW & NE
10263	SW. 2115 - enter H m.
10	
9	
8	
7	
6+16	Sandy brush NW 15 ft.
5	
4	
3	
2	
1	

211
11/12-140-26

0400 Start west from intersection of roads



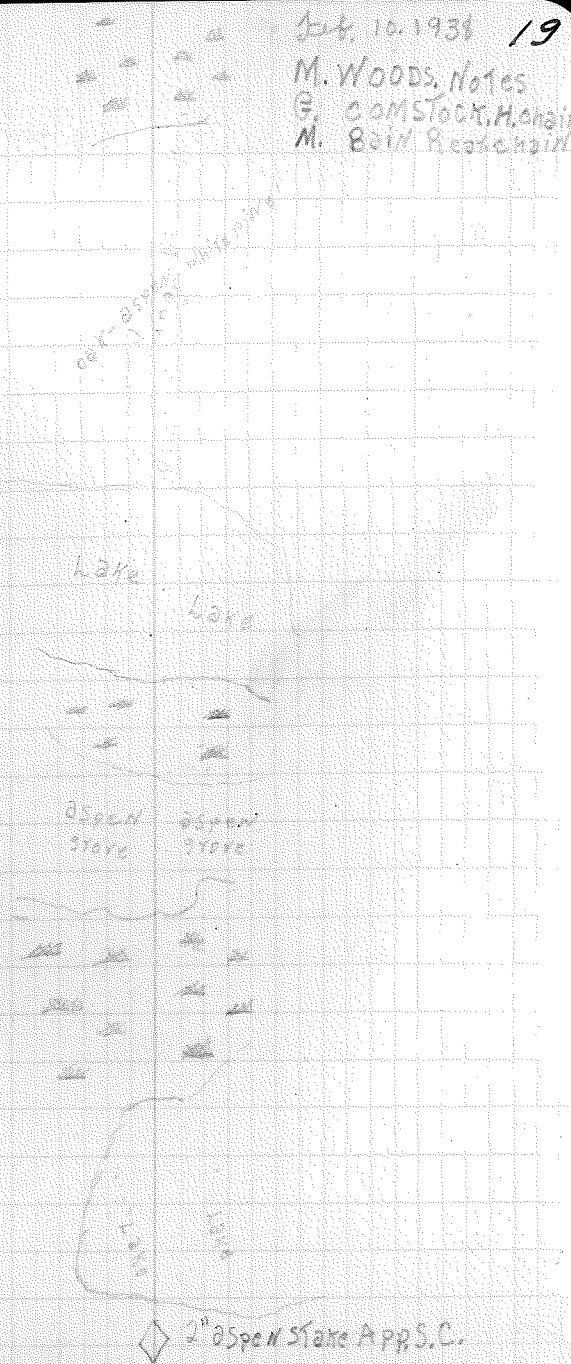
2" Aspen
 52775 Set up for Cor $\frac{3}{2}$ stake
 52
 51
 50730 Center of state hwy #6
 50
 49
 48
 47 Road angles slightly south
 46
 45750 Log cabin 150 ft. So.
 44
 44100 Edge of clearing on So. side of road
 43
 42
 41
 40
 39
 38410 Narrow road NE
 37
 36
 35
 34
 33
 32
 31
 30
 29
 28
 27115 School road ca.



26+40 entered spruce swamp
 25
 24
 23
 22
 21
 20
 19
 18+25 Left Lake entered Oak-Aspen-pine white
 17
 16
 15
 14+31 edge of Lake left cedar swamp
 13
 12+00 entered cedar swamp
 11
 10
 9+30 left cedar swamp entered aspen glade
 8
 7
 6+37
 5+14 Left Lake entered cedar swamp
 4
 3
 2
 1+00 edge of Lake
 0+00 Start west from ³¹² 1011 - 140-26

S 93° W

RANDOM MAG BEARING S 83° W



Feb, 10, 1938

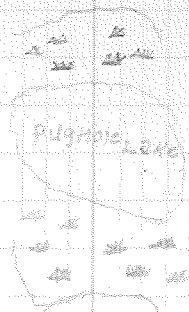
20

- 62 + 10. 21 White oak Forams SC $\frac{316}{1000}$ $\frac{413.7}{910}$
- 51
- 50
- 49
- 48
- 47
- 46
- 45
- 44
- 43
- 42
- 41
- 40
- 39 + 00 Left spruce swamp centered oak-ash
- 38
- 37 + 92 Left hand centered spruce swamp
- 36
- 35 + 29 Left spruce swamp edged phase
- 34
- 33 + 45 centered spruce swamp left oak-ash
- 32
- 31
- 30
- 29 + 00 Left spruce centered oak-ash.
- 28
- 27

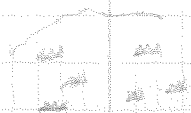
S 89° W

◇ App. Sec. 004/Sec.

Random Mag. Bearing S 83° W



oak-ash



26
 25
 24
 23+26
 22+26
 21+53
 20
 19+00
 18
 17
 16
 15
 14
 13+10
 12
 11+00
 10
 9
 8
 7
 6
 5
 4
 3
 2
 1

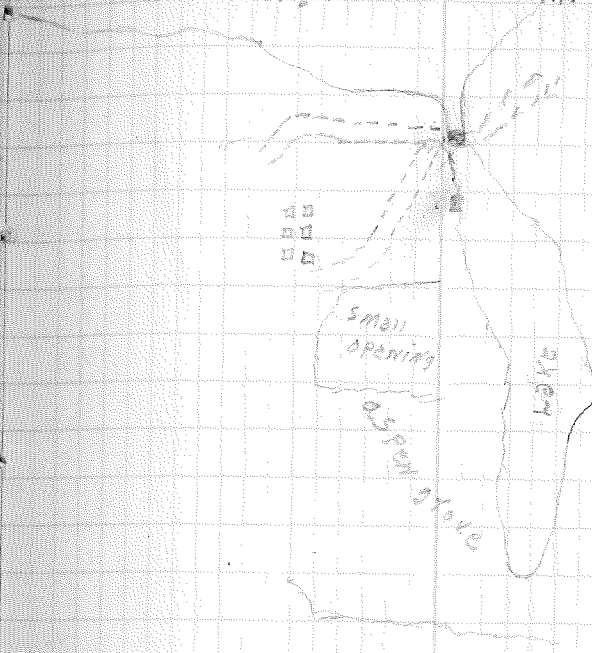
0+00 Start west from 9/3 2/10-19026

crossed Road S-NE
 Center of Box 100 ft from opening
 Road to cabins B.D. on north side
 Fall in 1st cabins app. 300 ft from wire
 Eastern side of lake by 3rd fence of wire
 entered 35 per gate

Feb 10, 1934 21

M. Woods. Notes.
 Lake G. Comstock, H. Chain
 M. Bain Bear Chain

Lake
 S 13 1/2 W



◇ 2" white oak post

52+80 Cornercamoir Lake

51

50

49

48

47

46

45

44

43

42

41

40

39

38

37

36

35

34

33

32

31

30

29

28

27

Feb. 10, 1938

22

S 83 1/2° W

Lake

Lake

Thunder Lake

Lake

Mag. bearing S 11 1/2° W

Random Lake

Lake

26

25

24

23

22 + 09 LEFT LAKE ENROUTE TO RED WILLOW SWAMP. RAN WEST

21

20

19

18

17

16

15

14

13

12

11

10

9

8

7

6

5

4

3

2

1

0100 Start West from $\frac{579}{879}$ -140-26

Feb 10, 1958.

23

M. Woods. Notes.
B. Comstock M. Orin
M. Bain. Bear Chain.

S 92° W

ON FENCE LINE

THUNDER LAKE

lake

lake

lake

Magnifying Glass

Random Line

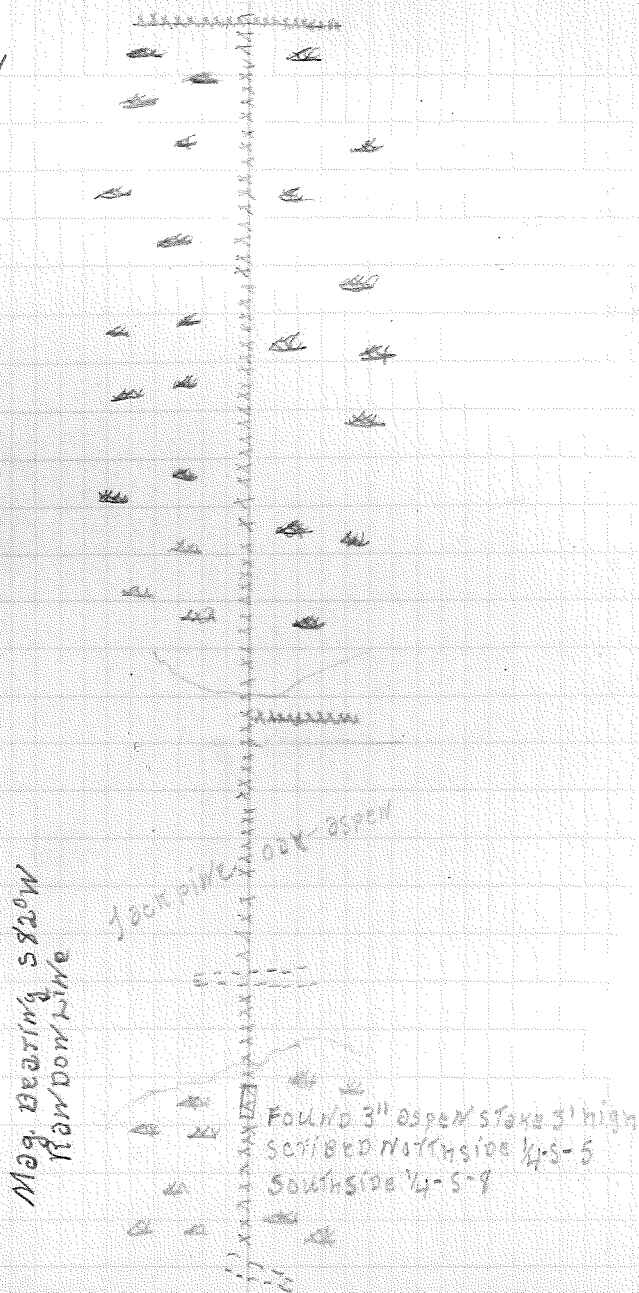
lake

Feb 10 1938

24

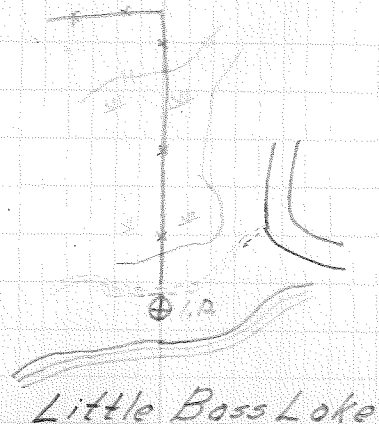
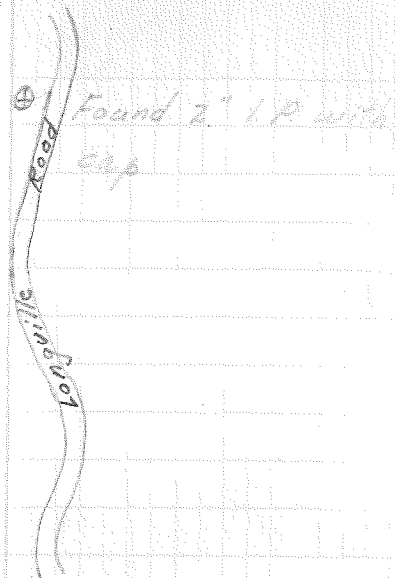
- 56+64 APP. SEC. CORNER IN CENTER OF ROAD. NORTH-SOUTH
 56+44 - Crossed Fence North-South. LEFT SPRUCE SWAMP
 52
 51
 50
 49
 48
 47
 46
 45
 44
 43
 42
 41
 40
 39+48 entered spruce swamp.
 38+69 Fence runs north
 37
 36
 35
 34
 33+39 Crossed Road North South.
 32
 31+17 Left Red Willow Swamp entered Jack pine and aspen
 30+49.6 1/4 corner 3" aspen stake.
 29
 28
 27+23 Crossed Road Ne-SW

S 82° W



52 to Sec 5, ¹¹⁶ 127 - 140-26
 51466 Intersect No 5 Line 10.6 ft. so. of cor.
 51
 50
 49
 48400 Hit south edge of road
 47
 46
 45
 44
 43
 42
 41450 Longest road is 75 ft. north
 41
 40
 39730 1 1/2" open l.p. for to cor.
 38
 37
 36
 35758 Fence runs South
 35
 34440 Edge of Ben swamp - either No. pine
 33
 32
 31
 30762 Brush pile, 20' No 5
 29773 Center of 20' No 5
 29769 M.C. 1 1/2" open l.p.
 28778 Edge of Little Bass No 5
 28
 27

26



26491 Fence Runs east-south
 26454 Center of Road in section 1/2 L.P. in center of Road

23
 24
 23
 22
 21

20446 Open Field covered aspen oak

19
 18
 17
 16
 15
 14
 13
 12
 11

10457 Open Field west of line

9
 8
 7

6458 Open field with S/W p. ENT to reg pine aspen

5
 4
 3

2470 Open field with S/W p.

1

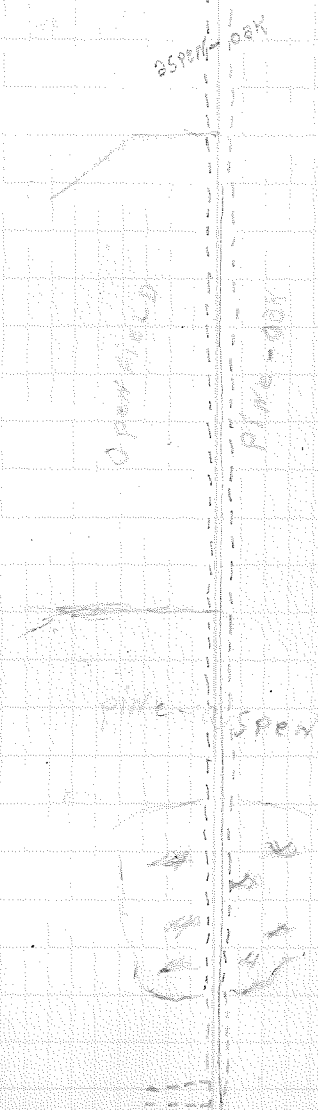
0700 Stationed south from intersection of road

211140826
 11/2

Feb 11 1938 27

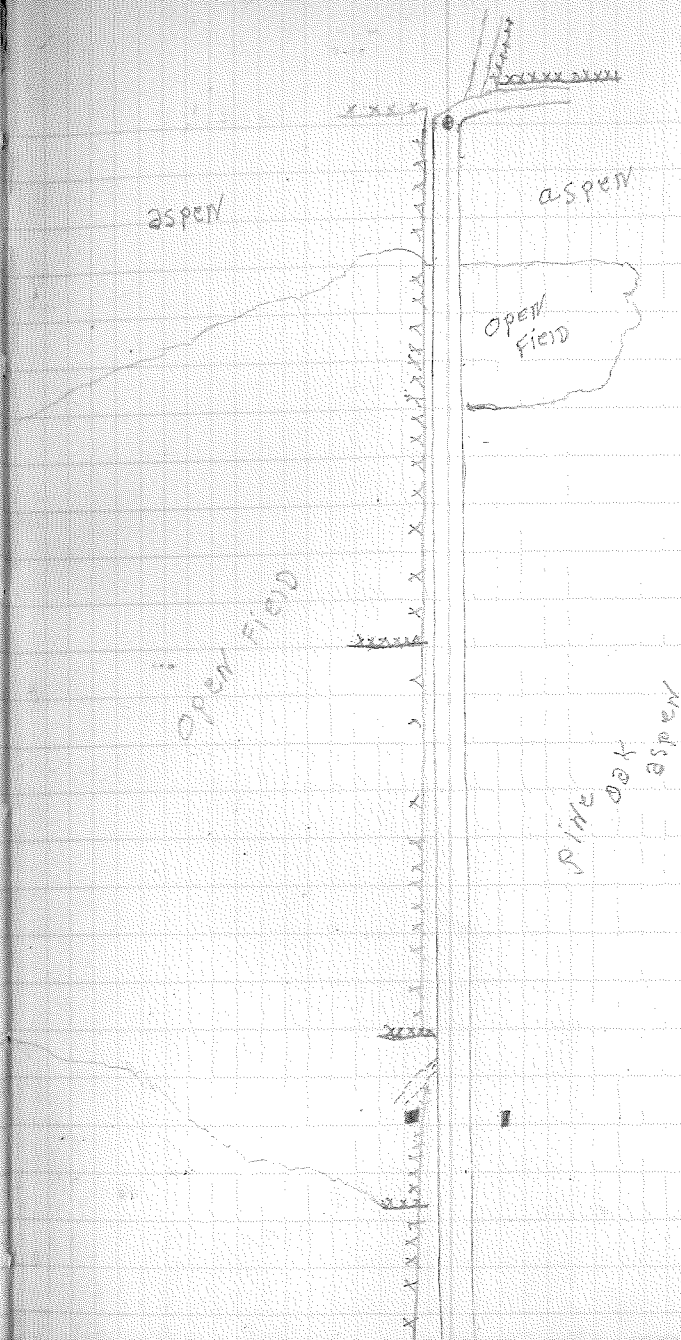
M. Woods notes
 B. Comstock H. chain
 M. B. in. Rear chain

20 White pine Beers N 42 1/2° E
 Scribed 1/2-5-12 Dist. 511 feet
 30' White pine Beers S 27° W
 Scribed 1/2-5-11-B1 Dist. 46.6



53+22 1/2 inch ip. WITH 2" Top For sec. corner. $\frac{1112}{1313}$
 52
 51
 50
 49+34 LEFT OPEN FIELDS. ENTERED ASPEN
 48
 47
 46+46 OPEN FIELD WEST OF LINE
 45
 44
 43
 42
 41+00 FENCE EAST.
 40
 39
 38
 37
 36
 35
 34
 33
 32+81 FENCE EAST.
 32+36 ROAD TO HOUSE
 31+36 HOUSE APP. 50' EAST - TRAILER HOUSE 75' WEST OF LINE
 30
 29+76 FENCE EAST OPEN FIELD
 28
 27

28



26

25

24

23

22

21

20

19

18

17

16

15

14 + 75 entered lowland swamp

13 + 56 Fence turns south app 75' south of line

12

11

10 + 07 crossed fence N-S. Fence app 60' south runs E.W.

9

8

7

6

5 + 49 Fence north-south

5 + 00 House approx. south of line

4

3

2

1 + 11 Fence N-N.E.

0 + 49 Fence runs north

0 + 13 center of road south

0 + 00 started west from S.E. corner 1112 1140. R 26.

July 11, 1938

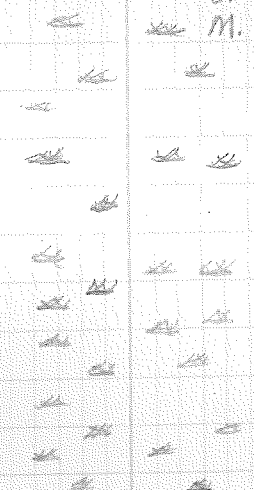
29

M. Woods. Notes

G. Comstock H. Chain

M. Bain. Reel. Chain

S 84° W.



52+91

CENTER OF HIGHWAY NO. 6 SEC. CORN. IN ROAD CENTER

52+67

2" ASPEN STAKE 31ms. FOR SEC. CORNER. $\frac{10}{15} | \frac{11}{14}$

51

50

49

48

47

46

45

44

43+00

LEFT S.S. SWAMP. ENTERED LOWLAND SWP.

42

41

40

39+22

ENTERED S.S. SWAMP

38

37

36

35

34+61

LEFT TAM. SWAMP ENTERED LOWLAND SWP.

33

32

31

30+00

ENTERED TAM. SWAMP

29

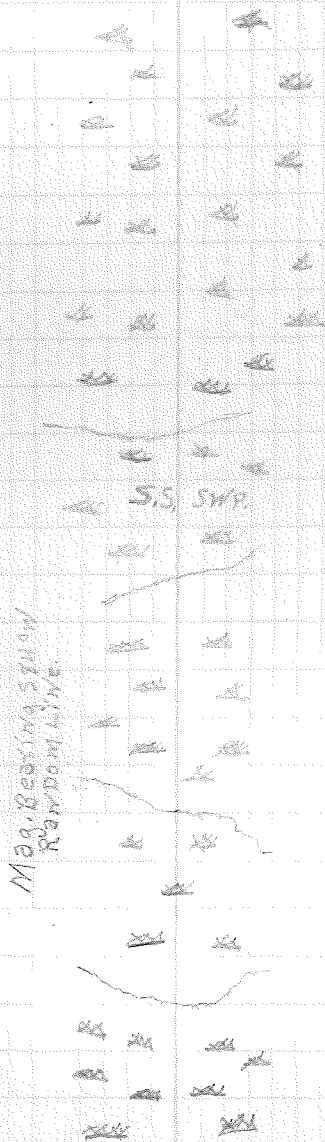
28

27

Feb. 11 1939 30

Highway No. 6

S & W



26
25
24
23
22
21
20
19
18
17
16
15
14
13+00
12
11
10
9
8
7
6
5+51
4
3
2
1

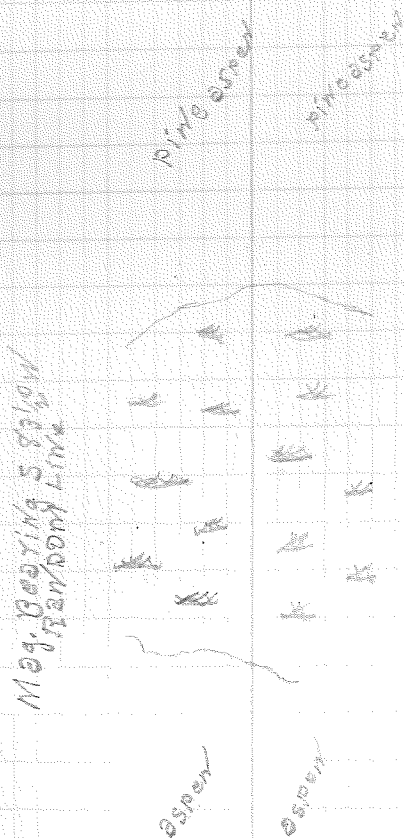
LEFT S.S. Swamp entered pine aspen

entered S.S. Swamp

0+24 APP. SEC. CORNER STAKE
0+00 STATION WEST Pt. IN APP. SEC. CORNER 219 T. 140 R. 26
0+00 OFFSET 146' NORTH TO LINE RUNNING WEST

S 83 1/2° W

Feb 11, 1938 91
M. Woods. Notes
E. COMSTOCK. H. Chain
M. Bain. Reas. chain



highway block

Feb. 11. 1938

32

52+80 COTWATER CAME IN LAKE S.C. $\frac{9}{10}$

51

50

49

48

47

46

45

44

43

42

41

40

39

38

37

36

35

34

33

32+30 EDGE OF LAKE.

31+00 FOOT OF HILL.

30+75 OFFSET 8.3' SOUTH TO 2" P. 2" HIGH

29+75 TOP OF HILL, OFFSET 37.5' SOUTH TO 2" STAKE

28

27

S 83 1/2° W

THUNDER LAKE

Mag. BEARING S 83 1/2° W
RANDOM TIME

⊕ 2" iron pipe.

Square on one side 1 1/2" high

aspen-pine

aspen-pine

26

25

24 + 00 entered Cedar Swamp

23

22

21

20

19

18

17

16

15

14

13

12 + 30

crossed Road NW-SE.

12 + 16

edge of Lake offset 70' south to

11

10

9

8

7

6

5

4

3

2

1

0 + 00

Station West of App Sc. $\frac{970}{1615}$ T. 140 R. 20

Feb 14, 1938 33

M. Woods Notes.

E. Comstock H. Choin

M. Bain Rear Choin

S 81 1/2° W

pine-aspens

pine-aspens

Magnolia

2" stake squared on 4 sides
on 50 1/2" iron rod with handle

Timber Lake

52+80 corner of field in pine hole lake

51+35 edge of pine hole lake

50

49

48

47

46

45

44

43

42

41

40

39

38

37

36

35

34

33+00 left side of swamp entrance pine aspen

32

31

30

29

28

27

S. 81 1/2° W

pine hole lake

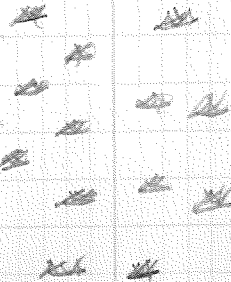
Feb 11, 1938.

39

pine aspen

pine aspen

Mag. Bearing: S 81 1/2° W
Magnetic declination



26+79. C Tossed Road N.W. Se.
 26+47 New M.C. W. aspen grazed on the sides. b' North of Line
 26+34 LEFT LAKE ENTERED PINE ASPEN
 25
 24
 23
 22
 21
 20
 19
 18
 17+17 EDGE OF LAKE
 16
 15
 14
 13+99 LEFT LAKE ENTERED ASPEN
 12
 11
 10
 9
 8
 7+15 EDGE OF LAKE.
 6+
 5+66 1 1/2" WOODEN STAKE 2' Tall.
 4
 3+72 ~~Found~~ FOUND M.C. CORNER.
 2
 1
 0+00 Started West From App. S.C. $\frac{519}{1716}$ Time: P. 26

S 82° W.

Feb 14, 1938 35
 M. Woods. Notes.
 E. Comstock. H. chain
 M. Bain. Rear chain

Thunder Lake.

ASPEN

Thunder Lake

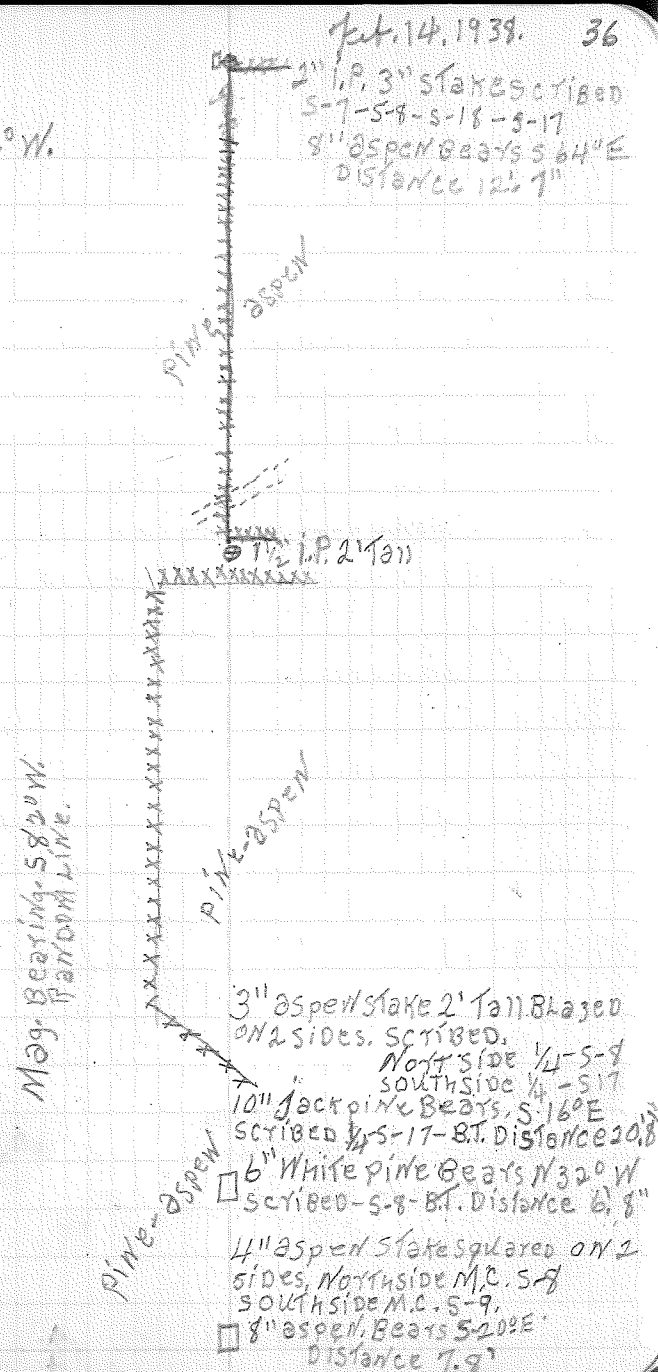
Mag. Bearing S. 82° W.
From D.M. Line

□ 1 1/2" WOODEN STAKE 2' Tall.

PINE ASPEN
 1 1/2" P. FIX 110 FT HOES 1 1/2' Tall.

- 56+45 fence turns North FOUND
- 52+80 Blazed 7" Cedar post on 2 sides Keeve App. S.C.
- 51
- 50
- 49
- 48
- 47
- 46
- 45
- 44+46 Crossed Road NW. S.E
- 43+49 Fence West-North
- 43+24 Crossed Fence North-South
- 42
- 41
- 40
- 39
- 38
- 37
- 36
- 35
- 34
- 33+71 Crossed Fence Northeast-W
- 32
- 31
- 30+39 Found 1/4 corner
- 29
- 28
- 27+33 Found original M.C. corner.

S 82° W.

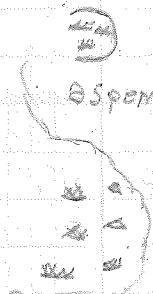


26
 25
 24
 23
 22+71 ~~LEFT SPRUCE SWAMP~~
 21+75 ~~LEFT SPRUCE SWAMP~~
 20 19+00 LEFT SPRUCE SWAMP.
 19+00 ~~LEFT SPRUCE SWAMP~~
 18+00 ENTERED SPRUCE SWAMP.
 17+54 ~~LEFT SPRUCE SWAMP~~
 16+16 LEFT SPRUCE CEDER SWAMP.
 15
 14+60 ~~LEFT LOWLAND SWAMP, ENTERED PINE ASPEN~~
 13+91 ENTERED SPRUCE CEDER SWAMP.
 12
 11+70 ~~ENTERED LOWLAND SWAMP~~
 10+37 LEFT LOWLAND SWAMP.
 9
 8+00 ENTERED LOWLAND SWAMP.
 7
 6
 5
 4
 3+72 F
 2
 1
 0+00 STARTED WEST FROM APP. SC. $\frac{216}{1317}$ T140 R26

Feb 14 1938 37
 M. Woods. Notes,
 B. COMSTOCK, H. CHAIN
 M. BAIN, REAR CHAIN

S 81 $\frac{1}{2}$ W

ASPEN
PINE



ASPEN

ASPEN-PINE



PINE-ASPEN

~~2" 10" ASPEN STAGE~~
~~SOME BIRCHES 4-30-1937~~
~~8" ASPEN REAR CHAIN~~
~~DISTANCE 1/2 MILE~~

52+20 Set 2nd Hardwood Stake

51+20 Line Runs North

50

49

48

47

46

45

44+88

43

42

41

40

39

38

37

36

35

34

33

32+44

31+15

~~30+00~~ entered Mixed Hardwood
~~29+15~~ Forest

29

28+64 crossed Road NW-SE.

27+22 FOUND 1/4 corner OFF set 46' south to Line.

Feb. 14, 1938 33

S 8 1/2° W.

Mud bearing 581/2° W
from point

Mixed Hardwood.

3" aspen stake scribed on
West side 1/2-5-8
East side 1/2-5

8" N.W. pine boots 5 1/2' E distance
12" 8" scribed 1/2-5-19-87
12" 8" pine stump bears N 1/2 W
Distance 34' scribed 5-8,

Nov. 1 1938

Setting ^{Road} ↑ Controls. $\frac{3}{2}$ 139-26

Distance from ^{NP} $\frac{3}{2}$ 139-26 east
to road 100 feet - Var. 62'
Highway #6.

Distance from $\frac{3}{4}$ $\frac{34}{3}$ 139-26 east
to Febr's road 100 feet

2. Distance to Road from ~~33~~ $\frac{33}{4}$ 139-26 West
To Febr's Road 217 feet

Distance from ~~34~~ $\frac{34}{5}$ to Febr's Road - So.
8 + 94 feet

Distance from $\frac{1}{4}$ $\frac{33}{4}$ to Febr's road
25 + 20 feet Var. $6\frac{1}{2}$ '

Distance west from $\frac{3}{4}$ to highway
no. 6, 3 + 66 Var. N 89 W 139-2

~~Distance west from~~ $\frac{1}{4}$ $\frac{34}{4}$
0 + 28.1 Var. $6\frac{1}{2}$ '

Distance ~~west from~~ $\frac{1}{4}$ $\frac{34}{4}$
0 + 28 Var. $6\frac{1}{2}$ '

Distance N $61\frac{1}{2}$ W 33 0 + 52 feet
Distance W to $\frac{33}{4}$ Var. $6\frac{1}{2}$ ' 15'

Distance N to $\frac{3}{4}$ $\frac{34}{4}$ 1 + 00 feet Var.

Var. $6\frac{1}{2}$ '

Var. $6\frac{1}{2}$ '

Var. 0°

~~Nov 2 1938~~

Nov. 2 1938

Var. $6\frac{1}{2}$ ' =

$6\frac{1}{2}$ '

Distance from $\frac{615}{49}$ To Muchon's Road

10+45 139-26-14 @ 6°

Distance ~~from~~ ^{way} from $\frac{3115}{75}$ to Lake George

Road 20+71 Va. N 6° E

Distance # ~~to~~ ^{EAST. M.W. 11/7/38} to Lake George Road

36 ft $\frac{114}{1917}$ corner $\frac{116}{1917}$

Distance north to Camp Road $\frac{1015}{2122}$

18' ~~18'~~

Distance North from $\frac{14}{21}$ $\frac{14}{21}$ to Camp Road

518 ft @ 6 1/2°

Distance South from $\frac{3384}{413}$ to Fish Run

1835' Va. @ 6°

Distance North from $\frac{313}{41}$ to Highway 6

16+75 Va. N 6° E

Setting Road controls
Set Post Fox ~~13118~~ ~~139-27~~
~~24119~~ 139-26
Distance West From ~~19120~~ 30129 To Mitchels Lake
Road 2849' - 139-26 Va. S. 73 1/2° W.
Distance East From 2530 To center
3031
of Mitchel Lake Road 18.6' Va. S 70° W.
139-26
Set Post Fox ~~13118~~ 139-27 Va. N 50° E
Set Post Fox ~~14112~~ 139-27

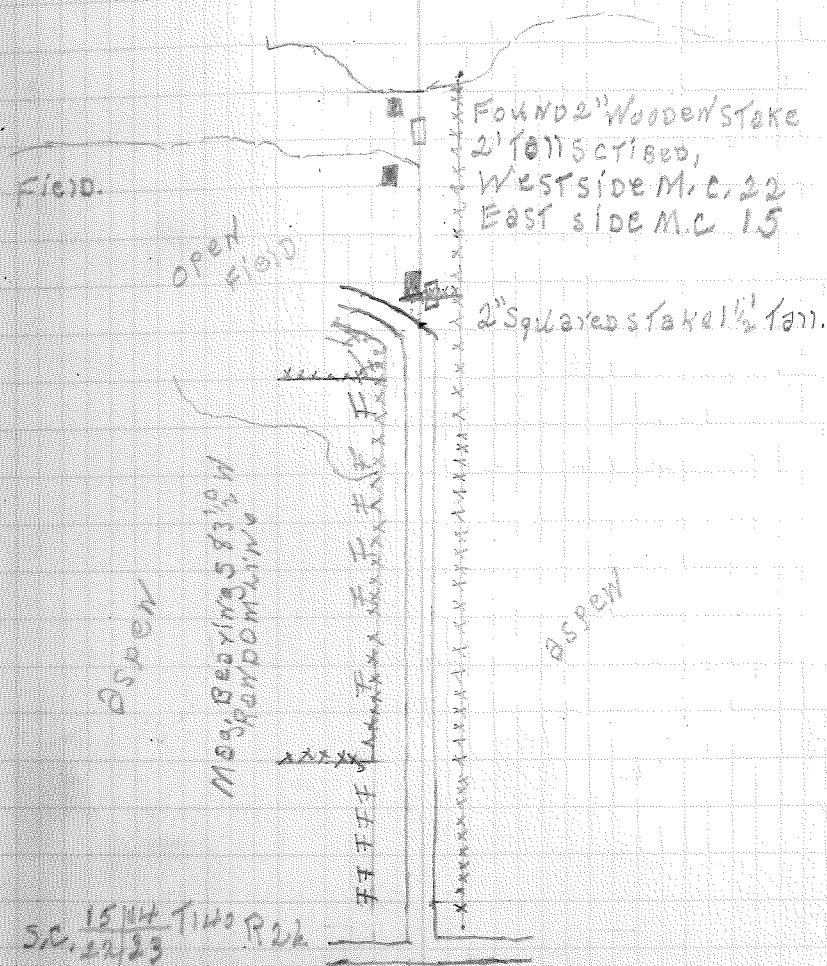
42.

NOV. 7, 1938
Woods
Schwartz
Yielding

- 26
25
24
23
22
21
20
19
17+18 EDGE OF LAKE
17+17 BUILDING 30' SOUTH OF LINE.
17+16 OFFSET 14' SOUTH TO M.C. CORNER.
16+43 House 75' SOUTH OF LINE LEFT OPEN
15
13+27 Crossed fence N-S. Building along side of wide
13+26 Road swings to south
12+16 Fence south.
11
10+15 open field south of line.
9
8
7
6
5
4+09 Fence south-west
3
2
1
0+00 Started west from S.C. in Road intersection.

S 83 1/2° W

THUNDER LAKE



July 16, 1939 #3.
M. Woods Notes.
B. Comstock H. Chait.
M. Bain, Reer, & Chait.

S.C. 15th T140 R24
22/33

54+84.5 FOUND 4" square stake from which bears.

53

52

51+22 LEFT spruce swamp entered. 25 pen.

50

49

48

47

46+63 entered spruce swamp.

45

44

43

42

41

40

39

38+82 STROSSED ROAD NE-SW.

38+12.5 FOUND M.C. CORNER.

37+89 LEFT LAKE entered ASPEN OAK.

36

35

34

33

32

31

30

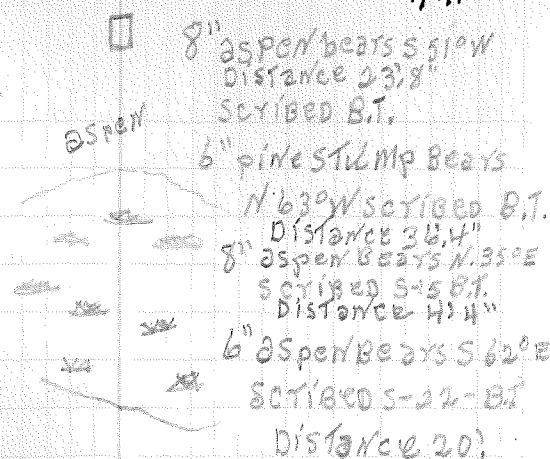
29

28

27

Feb 16, 1939. 44.

S 83 1/2° W



ASPEN-OAK

1/2" I.P. ABOUT 1" FROM 3" STAKE
5' TALL SQUARE ON 4 SIDES.

Mag. Bearing S 12 1/2° W
RANDOM LINE

THUNDER LAKE

26+89 LEFT TAM. SPRUCE SWAMP.

25

24

23

22+50 ENTERED TAM. SPRUCE SWAMP.

21

20

19

18+00 LEFT PINE GROVE ENTERED ASPEN-BIRCH.

17

16

15

14

13+20 ENTERED PINE GROVE

12

11

10

9

8

7

6

5

4

3

2

1

0+00 Started West From S.C. 1615 2122 140 R26

Feb 16, 1935 H.S.

M. Woods. Notes

G. COMSTOCK. H. O'HARA

M. BAIN. REAR CHAIR

583 1/2 W

ASPEN
BIRCH

PINE
GROVE

MAG. BEARING S 83 1/2 W
RANDOM LINE

ASPEN-OAK

4' Squared Stake

July 16, 1938 46.

52+85 App. S.C. State H¹¹ Squared on H sides

51

50

49+49 LEFT PUG HOLE LAKE ENTERED SPRUCE SWAMP

48+00 edge OF PUG HOLE LAKE

47

46

45

44

43+69 LEFT PUG HOLE LAKE ENTERED SPRUCE SWAMP
43+12 edge OF PUG HOLE.

42

41

40

39

38

37

36

35

34

33

32

31

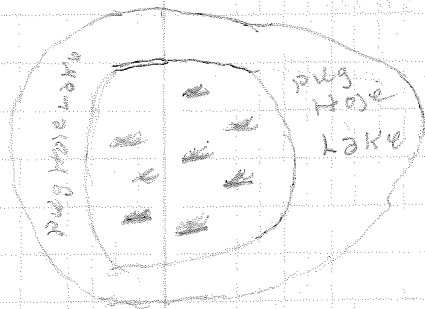
30

29

28

27

S 83 1/2° W.



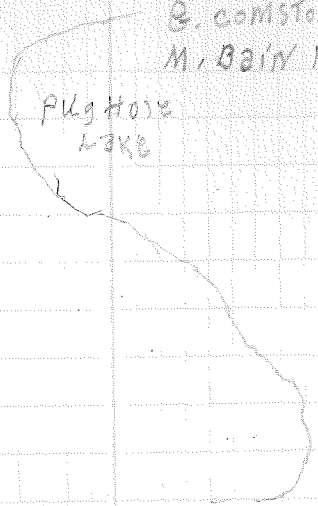
ASPEN-pine.

Mag. Bearing S 83 1/2° W.

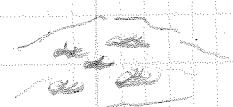
ASPEN-pine

26+40 LEFT LAKE
 25
 24
 23
 22+82 edge OF LAKE.
 21
 20
 19
 18
 17
 16+91 EAST END OF LAKE 400 North of LINE
 15
 14
 13+20 LEFT SPRUCE SWAMP
 12
 11+00 ENTERED SPRUCE SWAMP
 10
 9
 8+31 LEFT SPRUCE SWAMP ENTERED MIXED
 7
 6
 5
 4
 3+39 ENTERED SPRUCE SWAMP
 2
 1
 0+00 OFFSET 171' North TO LINE FROM EAST.

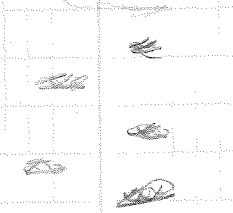
S 82° W.



Mixed H.W



Mixed H.W. SWAMP



Mag. Bearing 582° W
RANDOM LINE

Started West From App. S.C. 1716 T. 140 R. 26
2021

Oct. 16 1938. 47.
 M. Woods. Notes
 @ Comstock H. chain
 M. Bain Rear chain

Feb. 16 1938/49.

52 43.7" Found 3" square stake scribed S-19 S 19-S-17 W S-20

S 82° W

□ 10" spruce bears S 62° W
scribed S-19-B.T.

Distance 31.9

6" spruce bears N 96° W

scribed S-19-B.T.

Distance 32.4

4" spruce bears S-35° E

scribed S-20 B.T.

Distance 12.8

51

50

49

48

47

46

45

44

43

42

41

40

39

38

37

36

35

34

33

32

31

30

29

28

27

26

25

24

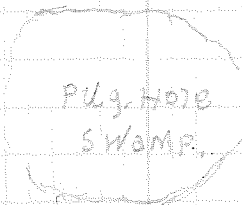
23

22

41+99 LEFT pug nose swamp entered spruce swamp

37+00 pug. nose swamp

27+63 Old trail N.E.S.W.



Mixed H.W.
Pine-Aspen

Setting Road Controls

T. 139-26

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

○ I.P.
 □ Controls
 ◇

100' Distance from I.P. @ $\frac{3}{2}$ 139-26
east to Highway #6 - $6\frac{1}{2}^{\circ}$

100' Distance from $\frac{1}{4}$ cor. $\frac{34}{3}$ 139-26
east to Fehr's ~~resort~~ road - $6\frac{1}{2}^{\circ}$

2127' Distance to $\frac{1}{4}$ cor. $\frac{33}{4}$ 139-26
R.

894' Distance from $\frac{32}{5}$ $\frac{33}{4}$ 139-26
south to Fehr's road $6\frac{1}{2}^{\circ}$

2520' Distance from $\frac{1}{4}$ cor. $\frac{33}{4}$ 139-26
south to Fehr's road $6\frac{1}{2}^{\circ}$

366' Distance from $\frac{3}{10}$ $\frac{2}{11}$ 139-26
west to Highway #6 $6\frac{1}{2}^{\circ}$

28' Distance from ~~$\frac{15}{15}$~~ 139-26 $\frac{1}{4}$ cor. 10/11
west to Highway #6

52' Distance from $\frac{15}{21}$ $\frac{14}{23}$ 139-26
N. $66\frac{1}{2}^{\circ}$ W. to Control post

Intersection of Camp road & #6.

15' Distance from $\frac{22}{27} | \frac{23}{26}$ 139-26
west to control post. $6\frac{1}{2}^\circ$

100' Distance from $\frac{28}{33} | \frac{37}{34}$ 139-26 $6\frac{1}{2}^\circ$
south to control post on road

1045' Distance from $\frac{15}{18} | \frac{15}{18}$ 139-26 $\frac{1}{4}$ $7\frac{1}{8}$
north to Muchow's road. 6°

2088' Distance from $\frac{31}{6} | \frac{32}{5}$ $\frac{140-26}{139-26}$ $100^\circ 60'$
west to Lake George road

36' Distance from $\frac{1}{4}$ $\frac{7}{18}$ 139-26
east to Lake George road.

18' Distance from $\frac{16}{21} | \frac{15}{22}$ 139-26
north to camp road

518' Distance from $\frac{1}{4}$ $\frac{16}{21}$ 139-26
north to camp road.

1835' Distance from $\frac{23}{4} | \frac{34}{13}$ 139-26
south to Fehr's road. $6\frac{1}{2}^\circ$

1675' Distance from $\frac{10}{15} | \frac{11}{17}$ 139-26 $\frac{3}{2}$ $\frac{10}{11}$
north to High. # 6.

0' set control post by corner $\frac{13}{24} | \frac{18}{19}$ 139-26
139-27

51.
corner ~~edge~~ ~~of~~ r
in road. — control east of road-high #6

2849' Distance from $\frac{19}{30} / \frac{20}{29}$ 139-26 583 1/2'

west to Mitchell Lake rd.

18.6' Distance from $\frac{25}{36} / \frac{30}{31}$ 139-26

west to control post.

Set control post for $\frac{21}{11} / \frac{12}{12}$ 139-27
 " " " " $\frac{11}{12} / \frac{12}{12}$ 139-27
 " " " " $\frac{14}{13} / \frac{13}{13}$ 139-27

28.1' Distance from $\frac{10}{15} / \frac{11}{11}$ 139-26
 west to control post

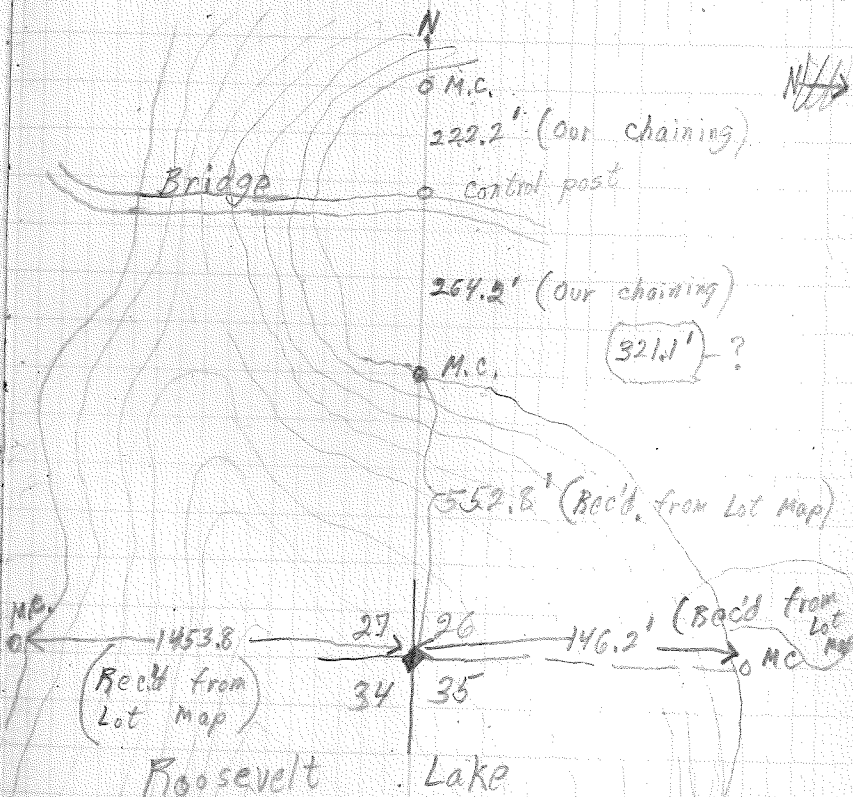
Narrow's

110' Distance control post is set
 Only a Lot Pipe south of iron pipe found
 just north of High. #6
 at "Narrow's".

391' Control post set 391' south
 of iron pipe found on
 shore of Roosevelt
 Lake - M.C. corner.

corner in center of road.

- Narrows -
 Information received on M.C. at Narrows.



Roosevelt Lake

Controls on Swatara Road.

1141.4' distance from cor. $\frac{24}{25}$ 139-26
to Swatara road.

At cor. Also set control at corner
 $\frac{24}{25}$ which is at side
of resort road to
Manning's place.

Party:

Woods, Chupka

Schultz, Anderson

Date: 12/14/38

Controls on Crooked Lake Road

T. 139-26

At cor. Bet control at cor. $\frac{26}{35} | \frac{25}{36}$
 12/14/38

At cor. Set control at cor. $\frac{25}{36}$
 12/14/38

Party:

Woods

Schwartz

Chupka

Anderson, R.

Date:

12/14/38

Controls on Cedar Spring Rd.

At cor. Set control at cor. $\frac{23}{26} | \frac{24}{25}$ 139-26

Party:

Johnson R.

Schwartz

Chupka

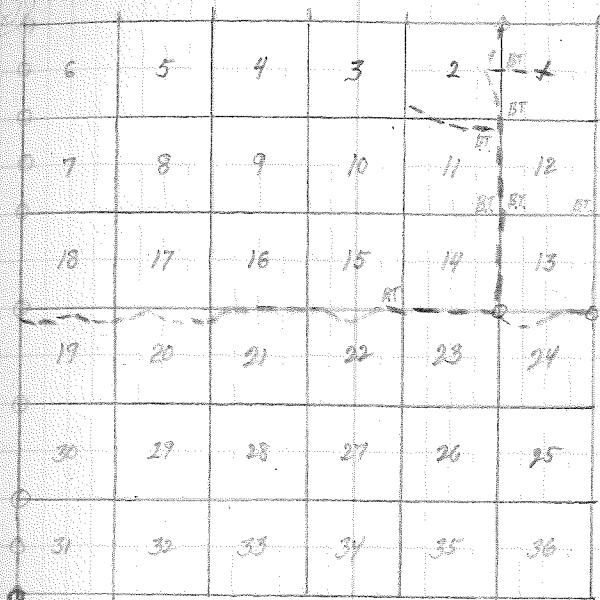
Date:

12/14/38

Co

Setting Road Controls

T. 139-27



Controls on Trelipi Road

Set control post for $\frac{2/1}{11/12}$ 139-27 Corner

Set control post for $\frac{11/12}{14/13}$ 139-27

Set control post for $\frac{14/13}{23/24}$ 139-27 Same corner described on next page.

Set control post for $\frac{23/24}{26/25}$ 139-27

Controls on The Dog Lake Spur.

Distance

At cor. set control post at $\frac{13}{21}$ 139-21 corner is on south side of road.

At cor. set control post at $\frac{14}{23}$ 139-27 " " " " " "

At cor. set control post at $\frac{15}{23}$ 139-27 " " " " " "

2300' Distance south from $\frac{18}{19}$ 139-27
to Dog Lake Spur. Set Control

Controls on the Old Grade

16.9' Distance from $\frac{1}{6}$ 139-27
south to control post on ^{Brosinger's} side road
Iron pipe in center of road.

133' Distance from $\frac{1}{6}$ 139-27
west to control on Old Grade. $6\frac{1}{2}$

129.7' Distance from $\frac{6}{7}$ 139-27
west to control on old grade $6\frac{1}{2}$

128.4' Distance from $\frac{7}{7}$ 139-27
west to control on old grade. $6\frac{1}{2}$

91' Dis. from $\frac{17}{18}$ 139-27
west to control on old grade. $6\frac{1}{2}$

100' Dis. from $\frac{18}{19}$ 139-27
west to old grade.

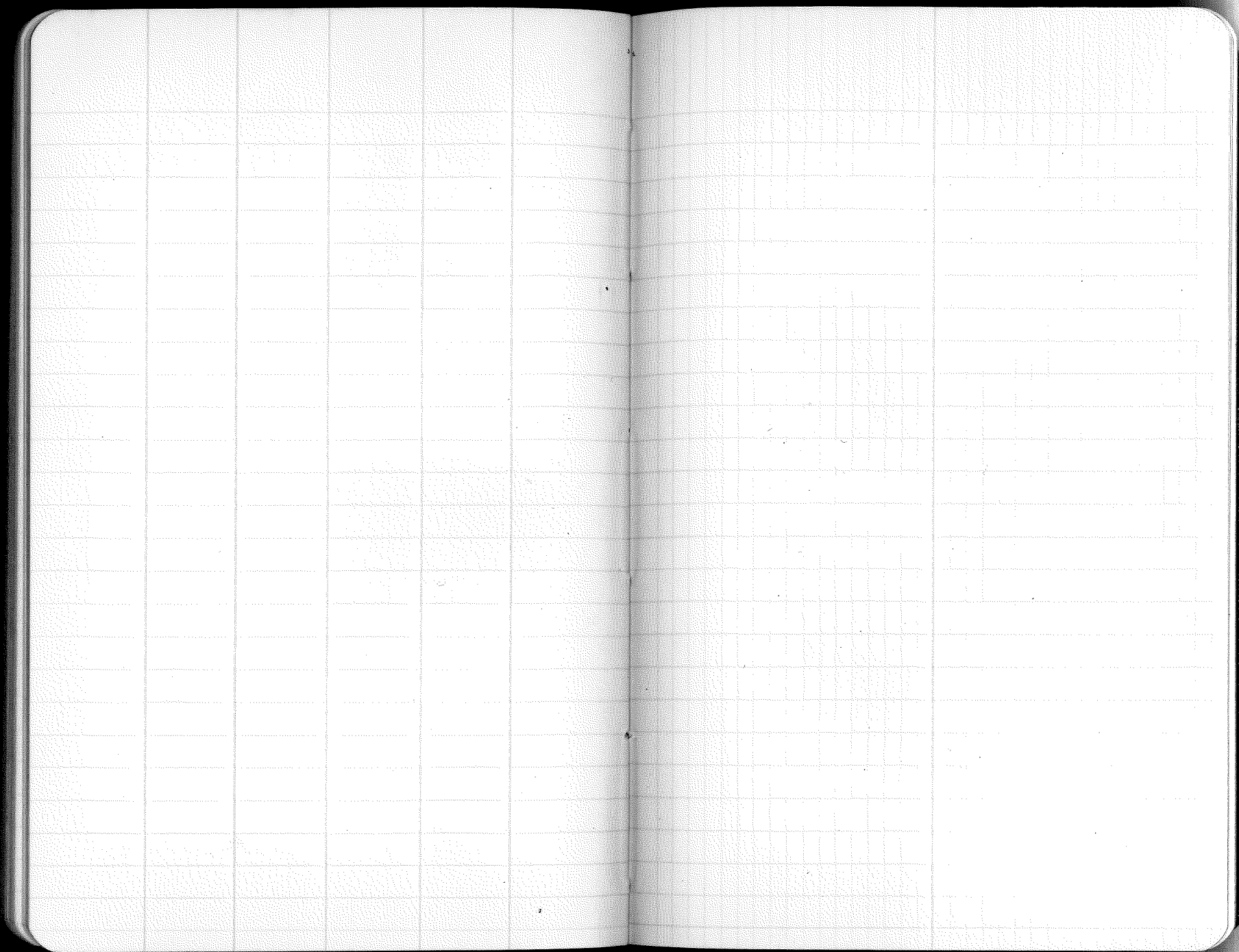
10.9' Distance from $\frac{117}{30}$ 139-27 ✓
west 10.0 m with old grade $6\frac{1}{2}$

14.8' Distance from $\frac{30}{31}$ 139-27 ✓
west to old grade. $6\frac{1}{2}$

No post

| 31 139-27

1200' Distance From | 31 139-27 ~~to~~ V
west to old grave.



T 140-27

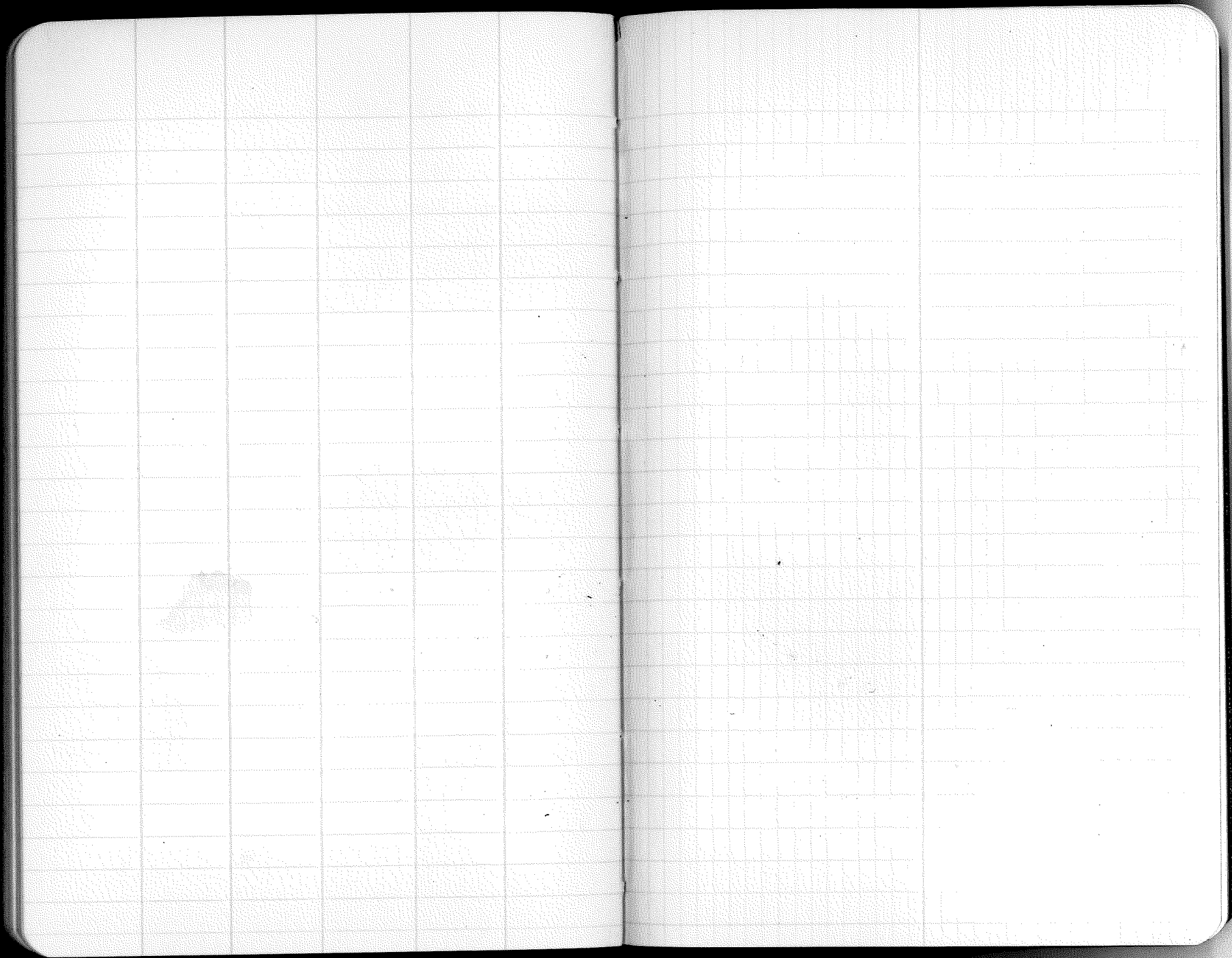
Controls on Old R.R. Grade

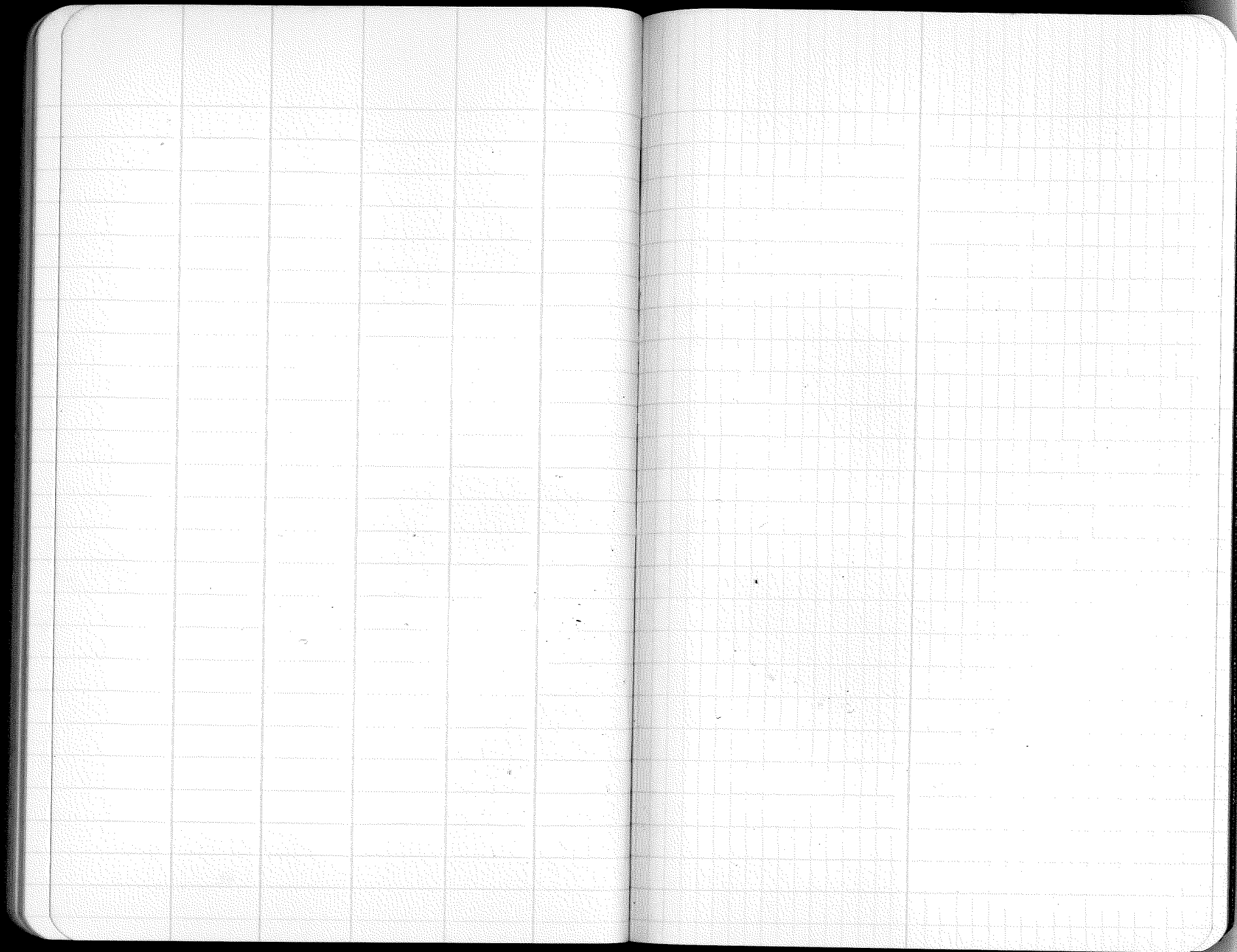
375' Distance from $\frac{30}{31}$ 140-27
south to control post on grade

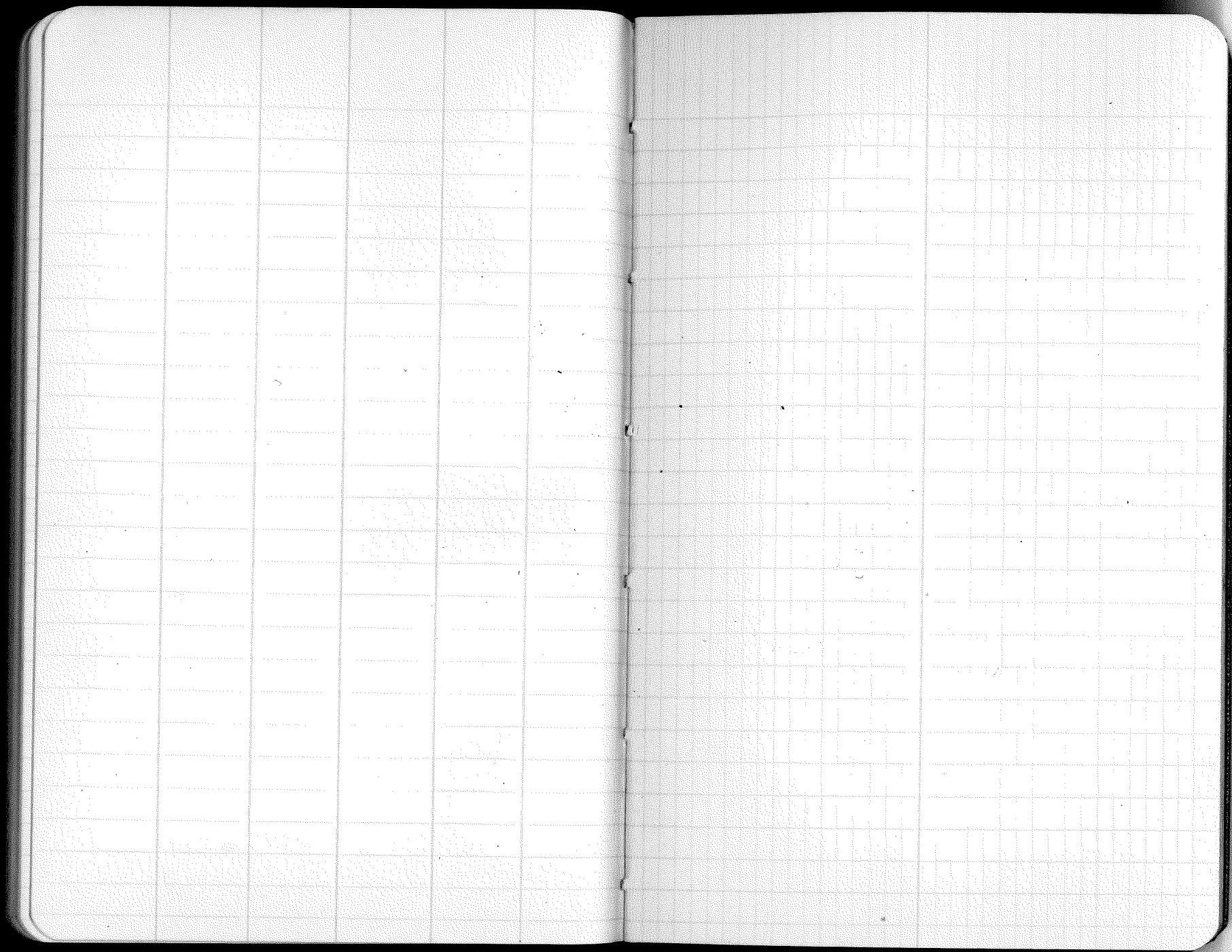
380' Distance from $\frac{30}{31}$ 140-27
east to control post on

Old grade
530' Dist from $\frac{30}{31}$ cor 140-27
north to control post on

498' Distance from $\frac{30}{31}$ 140-27
north to control post on
old grade







T. 139-25

Swatara Road

Control for $\frac{6}{12}$ 139-25 is
 1340' } south of sec. cor.

Cor. in road. } Control for $\frac{11}{13}$ 139-25 is
 edge of intersection - S.E. side.

Cor. in road. } Control for $\frac{12}{13}$ 139-25 is
 southeast side of curve in road

Party: Johnson, R.
 Woods, M.
 Chyka, J.
 Schwartz, C.

Date: Dec. 16, 1938

Found: Iron pipe ECV. Best, B.T. 6" gal.
 Old wood post

Found: Two wood post; one ^{at} N.W. cor. S.E. cor.

Found: Yellow tag on Telephone post.
 Settler said it is the corner.

Marrison Lake Trail

Cor. in { Control for $\frac{30}{31} \frac{29}{32}$ 139-25
road

Party:
Johnson, R
Woods, M
Schwartz
Chupka

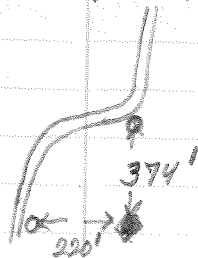
Date:
Dec. 16 '38

Found: Iron pipe & wood post in the
center of road & 2" under.

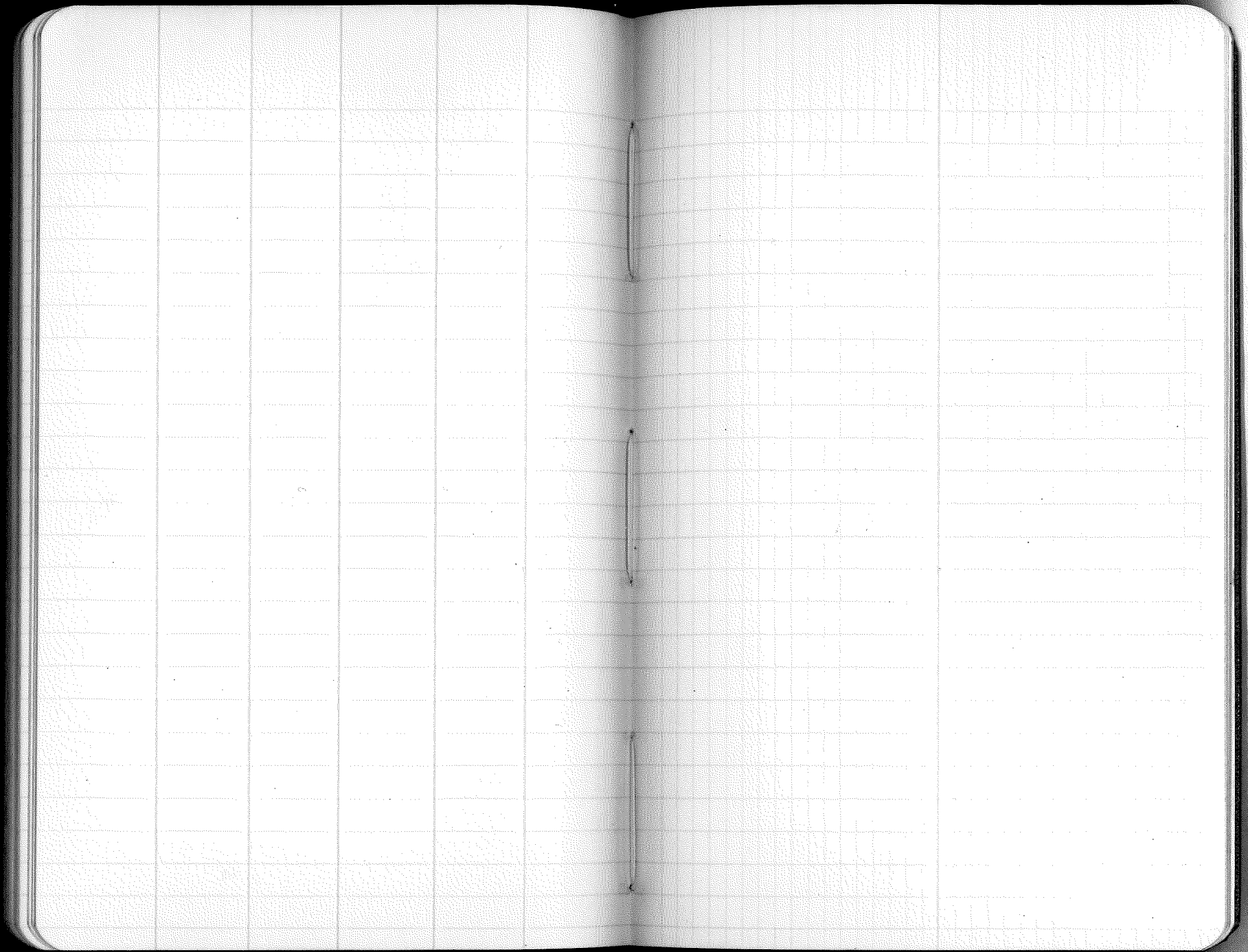
819
17116

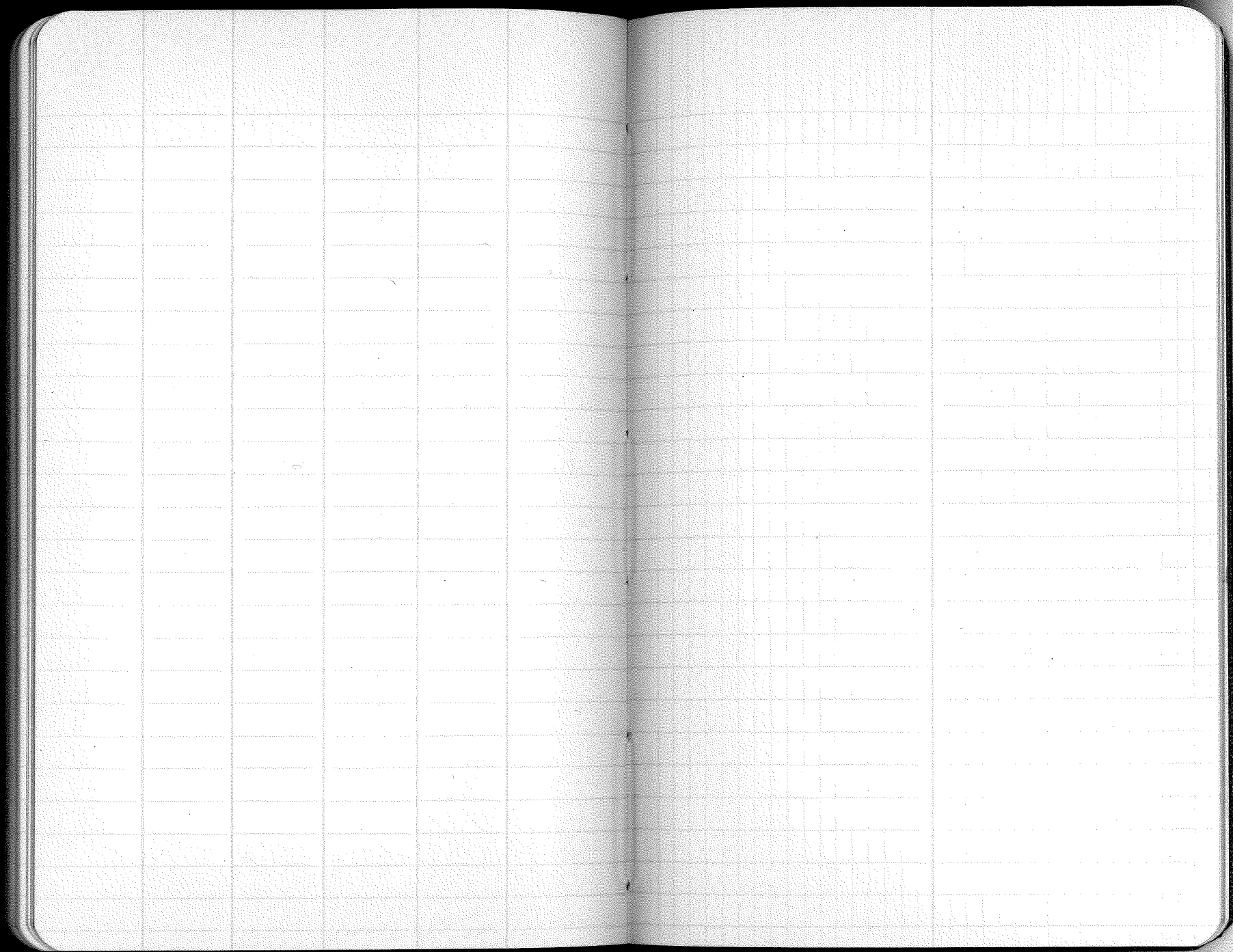
T. 140 R 27

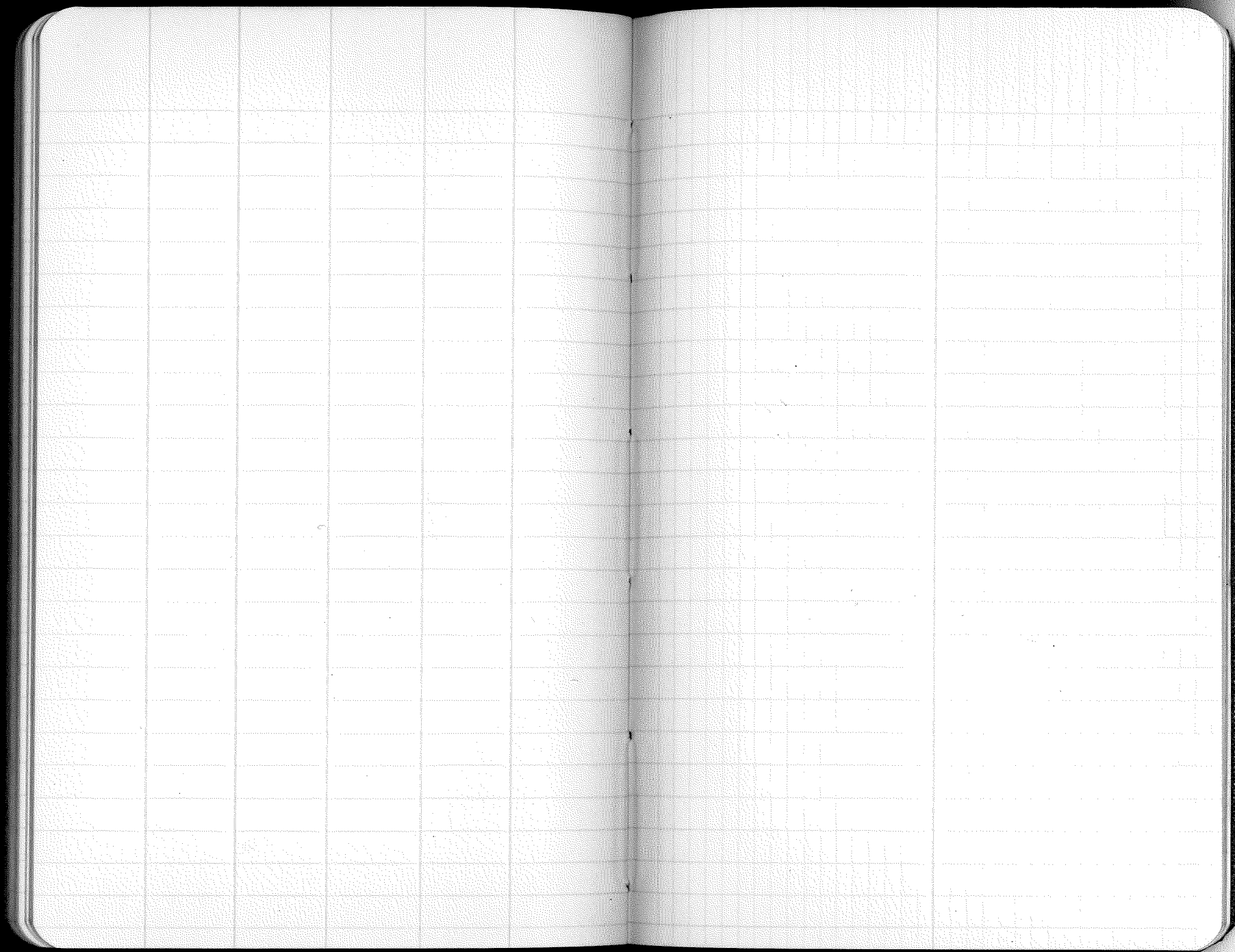
June 20, 1940

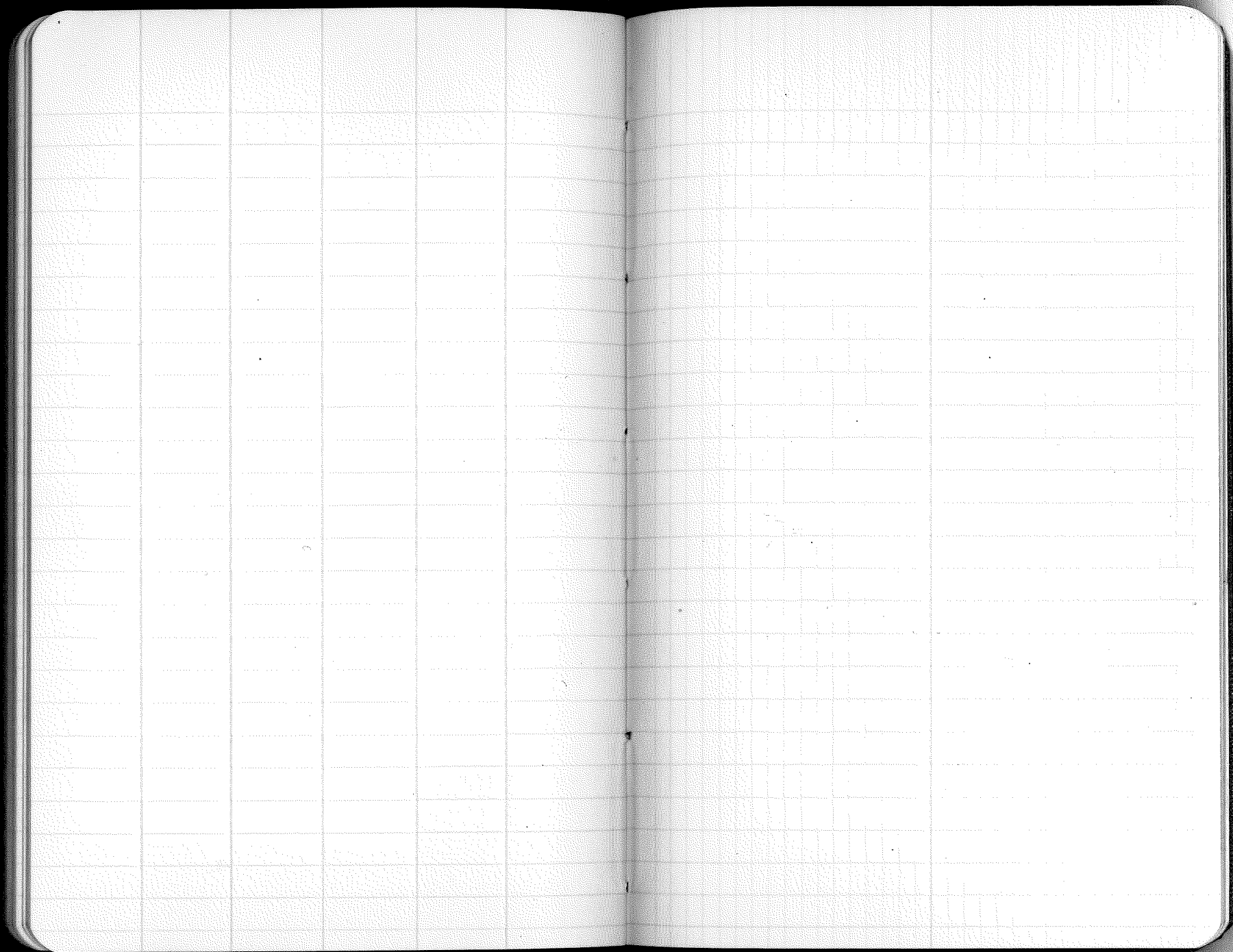


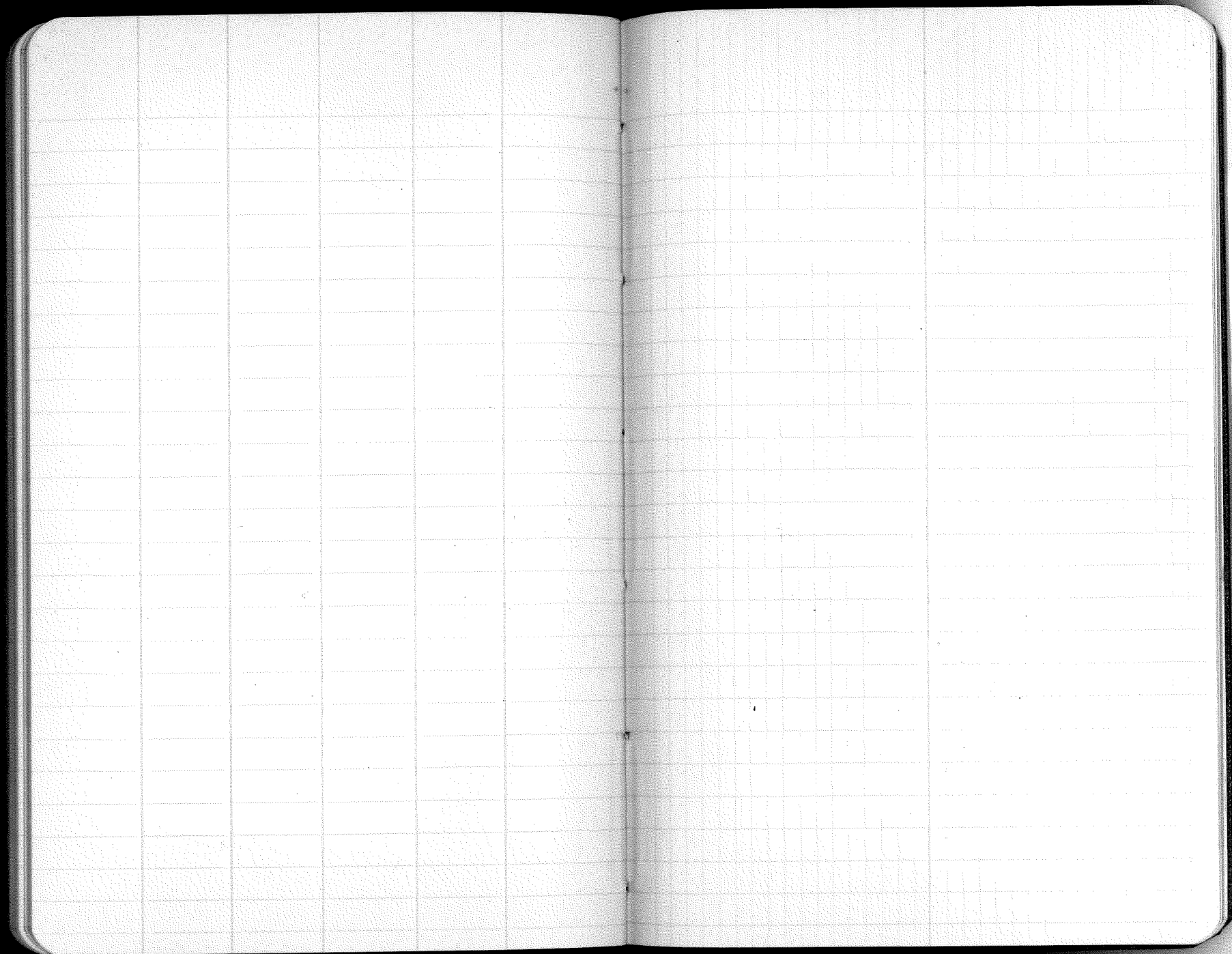
wood post
2 B.T's

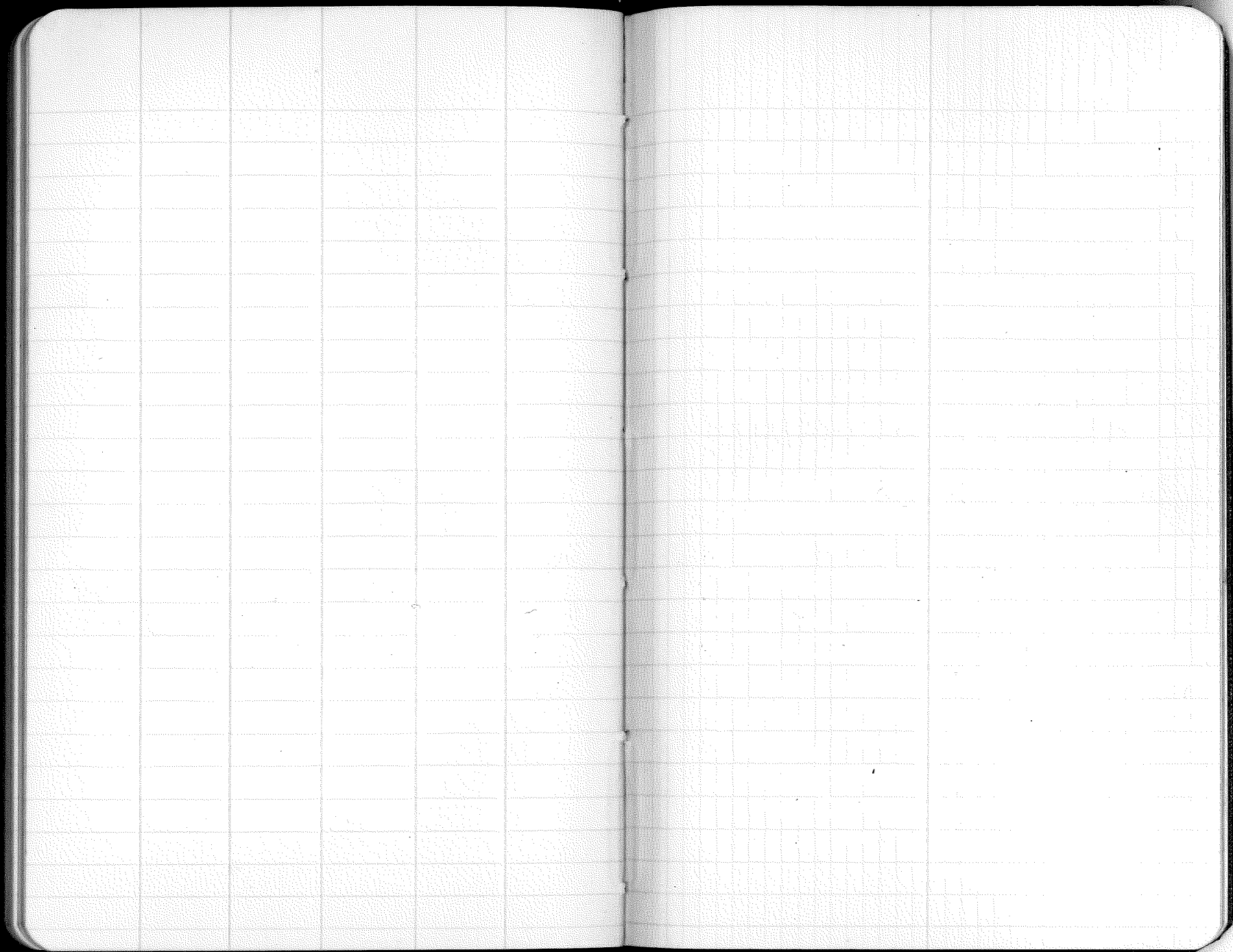












DIRECTIONS FOR USE OF TABLES

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.

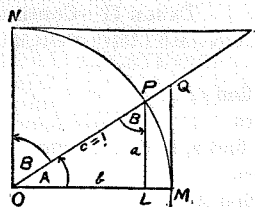


TABLE II
TRIGONOMETRIC FORMULÆ.

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

$$R = OB = c = 1$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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
$\frac{1}{8}$	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271
$\frac{3}{16}$	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323
$\frac{1}{4}$	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375
$\frac{5}{16}$	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427
$\frac{3}{8}$	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479
$\frac{7}{16}$	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531
$\frac{1}{2}$	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583
$\frac{9}{16}$	.0469	.1302	.2135	.2969	.3803	.4635	.5469	.6302	.7135	.7969	.8802	.9635
$\frac{5}{8}$	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688
$\frac{11}{16}$	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740
$\frac{3}{4}$	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792
$\frac{13}{16}$	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844
$\frac{7}{8}$	.0729	.1563	.2396	.3229	.4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896
$\frac{15}{16}$	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948
1	.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	×.00019	= miles
Lineal yards	×.0006	= miles
Square inches	×.007	= square feet
Square feet	×.111	= square yards
Square yards	×.0002067	= acres
Acres	×4840	= square yards
Cubic inches	×.00058	= cubic feet
Cubic feet	×.03704	= cubic yards
Links	×.22	= yards
Links	×.66	= feet
Feet	×1.5	= links
360°	= 21600'	= 1296000"
Radius	= arc of 57.2957790°	
Arc of 1° (radius = 1)	= .017453292	
Arc of 1' (radius = 1)	= .000290838	
Arc of 1" (radius = 1)	= .000004848	

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

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

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

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

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

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

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 11 $\frac{1}{2}$ 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 $\frac{1}{2}$ sin² a + C sin a

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

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
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	1.2203	7753	1.2276	39
51	771	.2349	790	.2423	808	.2497	826	.2572	844	.2647	862	.2723	38
52	880	.2799	898	.2876	916	.2954	934	.3032	951	.3111	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	.1283	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	848	5.6713	853	5.7694	858	5.8708	863	5.9758	868	6.0844	872	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	999	49.104	1
89	999	57.290	999	63.750	999	85.940	999	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
90	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	676-6	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	115-6	27	445-6	47	775-6	67	1105-6	87	1435-6
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	Links	Feet Inches
1	0-7.92	18	11-10.56	35	23-1.20	52	34-3.84	69	45-6.48	86	56-9.12
2	1-3.84	19	12-6.48	36	23-9.12	53	34-11.76	70	46-2.40	87	57-5.04
3	1-11.76	20	13-2.40	37	24-5.04	54	35-7.68	71	46-10.32	88	58-0.96
4	2-7.68	21	13-10.32	38	25-0.96	55	36-3.60	72	47-6.24	89	58-8.88
5	3-3.60	22	14-6.24	39	25-8.88	56	36-11.52	73	48-2.16	90	59-4.80
6	3-11.52	23	15-2.16	40	26-4.80	57	37-7.44	74	48-10.08	91	60-0.72
7	4-7.44	24	15-10.08	41	27-0.72	58	38-3.36	75	49-6.00	92	60-8.64
8	5-3.36	25	16-6.00	42	27-8.64	59	38-11.28	76	50-1.92	93	61-4.56
9	5-11.28	26	17-1.92	43	28-4.56	60	39-7.20	77	50-9.84	94	62-0.48
10	6-7.20	27	17-9.84	44	29-0.48	61	40-3.12	78	51-5.76	95	62-8.40
11	7-3.12	28	18-5.76	45	29-8.40	62	40-11.04	79	52-1.68	96	63-4.32
12	7-11.04	29	19-1.68	46	30-4.32	63	41-6.96	80	52-9.60	97	64-0.24
13	8-6.96	30	19-9.60	47	31-0.24	64	42-2.88	81	53-5.52	98	64-8.16
14	9-2.88	31	20-5.52	48	31-8.16	65	42-10.80	82	54-1.44	99	65-4.08
15	9-10.80	32	21-1.44	49	32-4.08	66	43-6.72	83	54-9.36	100	66-.000
16	10-6.72	33	21-9.36	50	33-0.00	67	44-2.64	84	55-5.28	101	66-7.92
17	11-2.64	34	22-5.28	51	33-7.92	68	44-10.56	85	56-1.20	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	1.873	10° C.	12°	602.21	31.561	10° C.	22°	1113.7	107.24	10° C.
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	15° C.	23°	1165.7	117.38	15° C.
10'	158.38	2.188	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	15° C.	24°	1217.9	128.00	15° C.
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	15° C.	25°	1270.2	139.11	15° C.
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	15° C.	26°	1322.8	150.71	15° C.
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	15° C.	27°	1375.6	162.81	15° C.
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	15° C.	28°	1428.6	175.41	15° C.
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	15° C.	29°	1481.8	188.51	15° C.
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	15° C.	30°	1535.3	202.12	15° C.
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 1/2 I

E = R exsec 1/2 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	.025	40'	2835.9	663.4	.037
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	.13	20'	2276.2	435.6	.16	20'	2877.5	682.0	.18
30'	1724.4	253.9	E	30'	2285.9	439.2	E	30'	2888.0	686.7	E
40'	1733.5	256.5	.023	40'	2295.6	442.8	.037	40'	2898.4	691.4	.050
50'	1742.6	259.1	T	50'	2305.2	446.4	T	50'	2908.9	696.1	.112
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	.025	40'	2961.5	720.1	.037
50'	1797.4	275.3	T	50'	2363.5	468.4	T	50'	2972.1	725.0	T
35°	1806.6	278.1	10° C.	45°	2373.3	472.1	10° C.	55°	2982.7	729.9	10° C.
10'	1815.7	280.8	T	10'	2383.1	475.8	T	10'	2993.3	734.8	T
20'	1824.9	283.6	.13	20'	2392.8	479.6	.16	20'	3003.9	739.7	.18
30'	1834.1	286.4	E	30'	2402.6	483.4	E	30'	3014.5	744.6	E
40'	1843.3	289.2	.023	40'	2412.4	487.2	.037	40'	3025.2	749.6	.050
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	.025	40'	3089.4	779.8	.037
50'	1907.9	309.3	T	50'	2481.4	514.3	T	50'	3100.2	784.9	T
37°	1917.1	312.2	10° C.	47°	2491.3	518.2	10° C.	57°	3110.9	790.1	10° C.
10'	1926.4	315.2	T	10'	2501.2	522.2	T	10'	3121.7	795.2	T
20'	1935.7	318.1	.13	20'	2511.2	526.1	.16	20'	3132.6	800.4	.18
30'	1945.0	321.1	E	30'	2521.1	530.1	E	30'	3143.4	805.6	E
40'	1954.3	324.1	.023	40'	2531.1	534.2	.037	40'	3154.2	810.9	.050
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
40'	2010.2	342.4	.013	40'	2591.0	558.6	.025	40'	3219.7	842.7	.037
50'	2019.6	345.5	T	50'	2601.1	562.8	T	50'	3230.7	848.1	T
39°	2029.0	348.6	1								

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	.43										
40'	3420.1	943.1	E	40'	4137.4	1337.7	E	40'	4951.5	1843.1	.36										
50'	3431.4	948.9	.080	50'	4150.1	1345.1	.110	50'	4966.1	1852.6	.200										
62°	3442.7	954.8	72°	4162.8	1352.6	.110	82°	4980.7	1862.2	.149											
10'	3454.1	960.6	10'	4175.6	1360.1	10'	4995.4	1871.8	10'	4995.4	1871.8										
20'	3465.4	966.5	20'	4188.5	1367.6	20'	5010.0	1881.5	20'	5010.0	1881.5										
30'	3476.8	972.4	30'	4201.2	1375.2	30'	5024.8	1891.2	30'	5024.8	1891.2										
40'	3488.3	978.3	40'	4214.0	1382.8	40'	5039.5	1900.9	40'	5039.5	1900.9										
50'	3499.7	984.3	50'	4226.8	1390.4	50'	5054.3	1910.7	50'	5054.3	1910.7										
63°	3511.1	990.2	10° C.	73°	4239.7	1398.0	10° C.	83°	5069.2	1920.5	10° C.										
10'	3522.6	996.2	T	10'	4252.6	1405.7	T	10'	5084.0	1930.4	T										
20'	3534.1	1002.3	.51	20'	4265.6	1413.5	.61	20'	5099.0	1940.3	.86										
30'	3545.6	1008.3	E	30'	4278.5	1421.2	E	30'	5113.9	1950.3	.72										
40'	3557.2	1014.4	.159	40'	4291.5	1429.0	.220	40'	5128.9	1960.2	.401										
50'	3568.7	1020.5	64°	4304.6	1436.8	74°	4317.6	1444.6	84°	5143.9	1970.3	.299									
10'	3580.3	1026.6	10'	4317.6	1444.6	10'	4330.7	1452.5	10'	5159.0	1980.4	10'	5174.1	1990.5							
20'	3591.9	1032.8	20'	4330.7	1452.5	20'	4343.8	1460.4	20'	5189.3	2000.6	20'	5204.4	2010.8							
30'	3603.5	1039.0	30'	4343.8	1460.4	30'	4356.9	1468.4	30'	5219.7	2021.1	30'	5234.9	2031.4							
40'	3615.1	1045.2	40'	4356.9	1468.4	40'	4370.1	1476.4	40'	5234.9	2031.4	40'	5250.3	2041.7							
50'	3626.8	1051.4	50'	4370.1	1476.4	50'	4383.3	1484.4	50'	5250.3	2041.7	50'	5265.6	2052.1							
65°	3638.5	1057.7	15° C.	75°	4396.5	1492.4	15° C.	85°	5265.6	2052.1	15° C.	95°	5289.9	2062.5	1.09						
10'	3650.2	1063.9	T	10'	4409.8	1500.5	.91	10'	5281.0	2062.5	T	10'	5296.4	2073.0	.450						
20'	3661.9	1070.2	.76	20'	4423.1	1508.6	E	20'	5296.4	2073.0	E	20'	5311.9	2083.5	.450						
30'	3673.7	1076.6	E	30'	4436.4	1516.7	.332	30'	5311.9	2083.5	.604	30'	5327.4	2094.1	30'	5343.8	2093.1				
40'	3685.4	1082.9	.240	40'	4449.7	1524.9	40'	4463.1	1533.1	40'	5343.8	2093.1	40'	5358.6	2104.7	40'	5374.2	2104.7			
50'	3697.2	1089.3	66°	4463.1	1533.1	76°	4476.5	1541.4	86°	5358.6	2115.3	96°	5382.2	2115.3	106°	5408.8	2116.0				
10'	3709.0	1095.7	10'	4476.5	1541.4	10'	4489.9	1549.7	10'	5374.2	2115.3	10'	5408.8	2116.0	10'	5419.5	2126.0				
20'	3720.9	1102.2	20'	4489.9	1549.7	20'	4503.4	1558.0	20'	5389.9	2136.7	20'	5419.5	2126.0	20'	5438.4	2136.7				
30'	3732.7	1108.6	30'	4503.4	1558.0	30'	4516.9	1566.3	30'	5405.6	2147.5	30'	5438.4	2136.7	30'	5457.3	2147.5				
40'	3744.6	1115.1	40'	4516.9	1566.3	40'	4530.4	1574.7	40'	5421.4	2158.4	40'	5457.3	2147.5	40'	5476.2	2158.4				
50'	3756.5	1121.7	50'	4530.4	1574.7	50'	4544.0	1583.1	50'	5437.2	2169.2	50'	5476.2	2158.4	50'	5495.2	2169.2				
67°	3768.5	1128.2	20° C.	77°	4557.6	1591.6	20° C.	87°	5437.2	2169.2	20° C.	97°	5495.2	2169.2	107°	5517.0	2224.3				
10'	3780.4	1134.8	T	10'	4571.2	1600.1	T	10'	5453.1	2180.2	T	10'	5517.0	2224.3	10'	5533.4	2224.3				
20'	3792.4	1141.4	E	20'	4584.8	1608.6	.445	20'	5469.0	2191.1	E	20'	5533.4	2224.3	20'	5549.2	2246.7				
30'	3804.4	1148.0	.321	30'	4598.5	1617.1	30'	5484.9	2202.2	.603	30'	5549.2	2246.7	30'	5565.4	2268.0					
40'	3816.4	1154.7	40'	4612.2	1625.7	40'	4626.0	1634.4	40'	5500.9	2213.2	40'	5565.4	2268.0	40'	5581.6	2289.3				
50'	3828.4	1161.3	50'	4626.0	1634.4	50'	4639.8	1643.0	50'	5517.0	2224.3	50'	5581.6	2289.3	50'	5597.8	2310.6				
68°	3840.5	1168.1	68°	4639.8	1643.0	78°	4653.6	1651.7	88°	5533.1	2235.5	98°	5610.6	2303.8	108°	5638.0	2318.0				
10'	3852.6	1174.8	10'	4653.6	1651.7	10'	4667.4	1660.5	10'	5549.2	2246.7	10'	5638.0	2318.0	10'	5654.2	2339.3				
20'	3864.7	1181.6	20'	4667.4	1660.5	20'	4681.3	1669.2	20'	5565.4	2268.0	20'	5654.2	2339.3	20'	5670.4	2360.6				
30'	3876.8	1188.4	30'	4681.3	1669.2	30'	4695.2	1678.1	30'	5581.6	2289.3	30'	5670.4	2360.6	30'	5686.6	2381.9				
40'	3888.9	1195.2	40'	4695.2	1678.1	40'	4709.2	1686.9	40'	5597.8	2310.6	40'	5686.6	2381.9	40'	5702.8	2403.2				
50'	3901.2	1202.0	50'	4709.2	1686.9	50'	4723.2	1695.8	50'	5614.2	2292.0	50'	5702.8	2403.2	50'	5719.0	2424.5				
69°	3913.4	1208.9	1.28	79°	4723.2	1695.8	.558	89°	5630.5	2303.5	99°	5728.4	2317.7	109°	5748.4	2332.9	119°	5774.4	2353.3		
10'	3925.6	1215.8	E	10'	4737.3	1704.7	10'	4751.2	1713.7	10'	5646.9	2315.0	10'	5748.4	2332.9	10'	5790.6	2374.7			
20'	3937.5	1222.7	.403	20'	4751.2	1713.7	20'	4765.3	1722.7	20'	5663.4	2326.6	20'	5768.1	2343.8	20'	5806.8	2396.0			
30'	3949.5	1229.7	30'	4765.3	1722.7	30'	4779.4	1731.7	30'	5679.9	2338.2	30'	5768.1	2343.8	30'	5823.0	2417.3				
40'	3961.5	1236.7	40'	4779.4	1731.7	40'	4793.6	1740.8	40'	5696.4	2349.8	40'	5784.3	2354.7	40'	5839.2	2438.6				
50'	3973.5	1243.7	50'	4793.6	1740.8	50'	4807.7	1749.9	50'	5713.0	2361.5	50'	5784.3	2354.7	50'	5855.4	2459.9				
70°	3985.5	1250.8	30° C.	80°	4807.7	1749.9	30° C.	90°	5729.7	2373.3	30° C.	100°	5812.8	2425.9	110°	5882.3	2488.5	120°	5924.0	2529.7	
10'	3997.5	1257.9	T	10'	4822.0	1759.0	T	10'	5746.3	2385.1	T	10'	5828.3	2437.1	10'	5882.3	2488.5	10'	5936.0	2551.0	
20'	4009.5	1265.0	.154	20'	4836.2	1768.2	1.84	20'	5762.5	2396.9	E	20'	5844.5	2448.3	20'	5898.5	2509.7	20'	5947.7	2572.3	
30'	4021.5	1272.1	E	30'	4850.5	1777.4	E	30'	5779.9	2408.9	.220	30'	5860.7	2459.5	30'	5910.0	2531.0	30'	5959.4	2593.6	
40'	4033.5	1279.3	.485	40'	4864.8	1786.7	40'	4879.2	1796.0	40'	5796.7	2420.9	40'	5876.9	2470.7	40'	5921.5	2552.3	40'	5971.1	2614.9
50'	4045.5	1286.5	50'	4879.2	1796.0	50'	4893.6	1805.3	50'	5813.6	2432.9	50'	5893.1	2481.9	50'	5934.0	2573.6	50'	5981.8	2636.2	

T = R tan 1/2 I E = R exsec 1/2 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	72°	7075.5	3374.9	112°	8494.6	4516.6	122°	8521.3	4538.8
10'	5950.5	2531.0	10'	7096.6	3391.2	10'	8521.3	4538.8	10'	8548.1	4561.1
20'	5967.9	2543.5	20'	7117.8	3407.7	20'	8548.1	4561.1	20'	8575.0	4583.4
30'	5985.3	2556.0	30'	7139.0	3424.3	30'	8575.0	4583.4	30'	8602.1	4606.0
40'	6002.7	2568.6	40'	7160.3	3440.9	40'	8602.1	4606.0	40'	8629.3	4628.6
50'	6020.2	2581.3	50'	7181.7	3457.6	50'	8629.3	4628.6	50'	8656.6	4651.3
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	T	10'	7224.7	3491.3	T	10'	8684.0	4674.2	T
20'	6073.1	2619.7	.86	20'	7246.3	3508.2	.103	20'	8711.5	4697.2	1.25
30'	6090.8	2632.6	E	30'	7268.0	3525.2	E	30'	8739.2	4720.3	E
40'	6108.6	2645.5	.401	40'	7289.8	3542.4	.536	40'	8767.0	4743.6	.721
50'	6126.4	2658.5	94°	7311.7	3559.6	114°	8794.9	4766.9	124°	8822.9	4790.4
10'	6144.3	2671.6	10'	7333.6	3576.8	10'	8822.9	4790.4	10'	8851.0	4814.1
20'	6162.2	2684.7	20'	7355.6	3594.2	20'	8851.0	4814.1	20'	8879.3	4837.8
30'	6180.2	2697.9	30'	7377.8	3611.7	30'	8879.3	4837.8	30'	8907.7	4861.7
40'	6198.3	2711.2	40'	7399.9	3629.2	40'	8907.7	4861.7	40'	8936.2	4885.7
50'	6216.4	2724.5	50'	7422.2	3646.8	50'	8936.2	4885.7	50'	8965.0	4909.9
95°	6234.6	2737.9	15° C.	105°	7444.6	3664.5	15° C				

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	4.58	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

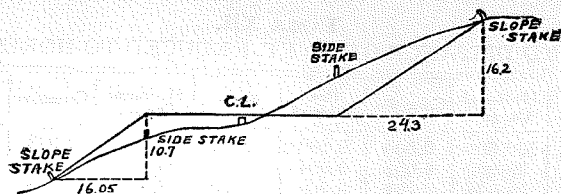
To find length of curve divide angle from P. C. to P. T. by central angle of chord, and multiply by length of chord.

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

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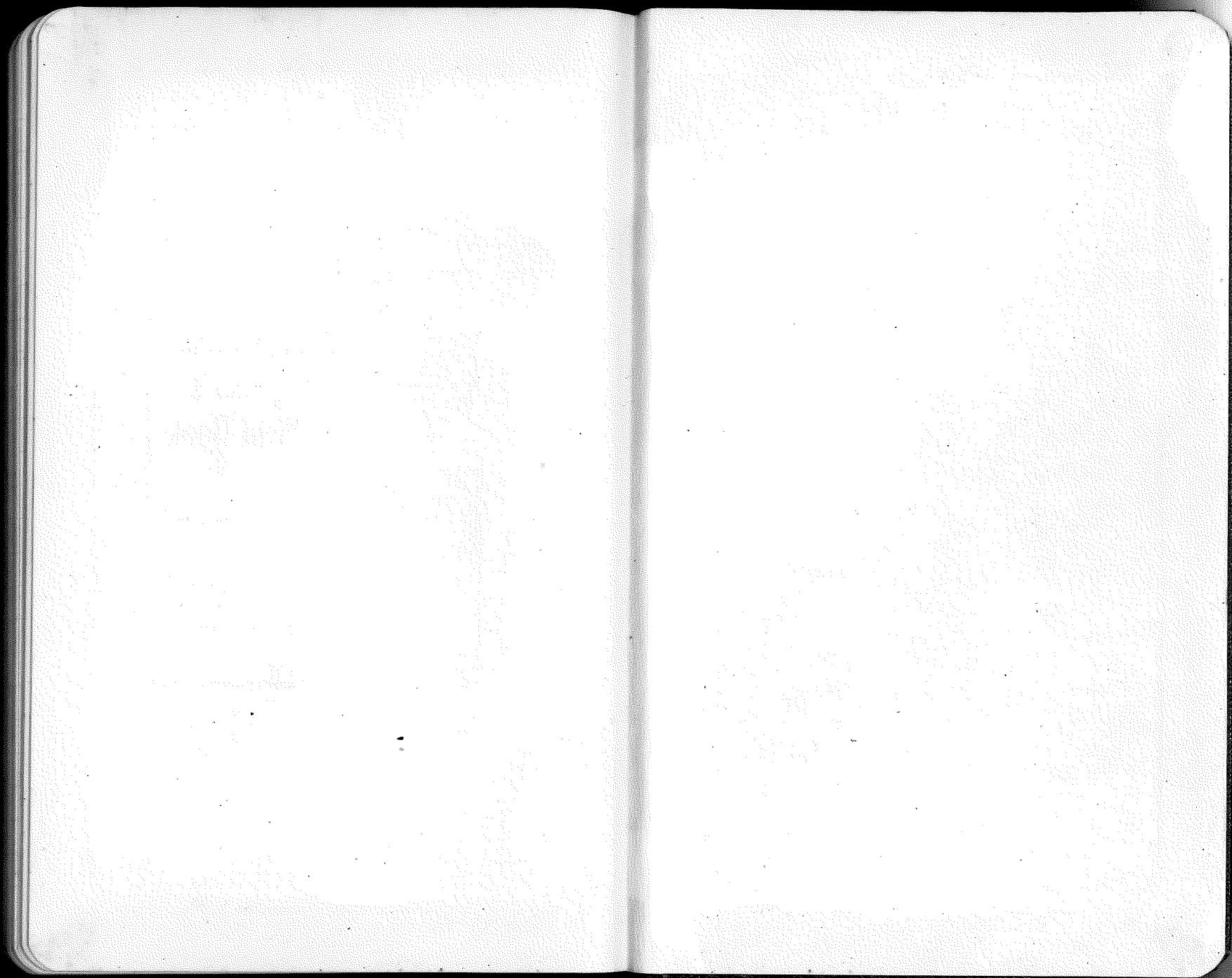
Description

Size Rulings

No. 1307 7 1/4 x 4 1/8 "Level"
No. 1308 " " "Field"

Specify by Number, the Book desired

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FIELD BOOK

140-20
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