

COUNTY DITCH N°13

9

9

FIELD BOOK

361

10

10

Co ditch # 13 whole book

of Kott's Railroad Curve Labels see end of book.

5
 120
 13
 360
 2374
 120
 2375
 28500
 1375
 120
 2750
 1375
 16500
 1650
 120
 1245
 658
 3120
 A 30
 158.05

17960
 9906
 58054 W
 9723
 17900
 17819
 58024 W
 9726
 53328 W
 2790
 56108 W
 1724
 9907 W

120
 10
 12.00

Property of

J. F. Pomasel

Pine River

Minn

INDEX

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DAILY NOTES

J. Pomasel & W. Starkweather Hire Auto from H. Andrews to take us to Geo Snell in TWP 140 R27. where we get Geo Snell to go on the preliminary survey of Co Ditch No 13. We run levels and take stadia as well as sketch and get general course of proposed ditch. We also look up Mr Northby who will assist us in getting general lay of the land benefited.

July 25 1917. J. Pomasel & Starkweather, Geo Snell and Mr Northby finish levels on Main Ditch. Very hot and too soft for levels being brushy. Pomasel run levels by turning intervals, same process used on plain table work.

July 26. J. Pomasel, Starky and Geo Snell run levels and take course of Lat No 1. Very hot day. Geo Snell attends school meeting in the afternoon. Vern Hardy gets us from Geo Snell place and brings us to Pine River charges \$10.00

July 29 1917 J. Pomasel in office on map. The whole day W. Starkweather figures section for ditch No 1 in the PM. PM. Helps Pomasel on map.

July 28 Finish map and estimate very hot day.

Jan 14 1918 Pomasel and Starky go to Co Ditch No 13 for final survey

Jan 16 go to LR. Barris to make survey
 " 17 on traverse
 " 18 on traverse
 " 19 " "
 " 20 " "
 " 21 " "
 " 22 " "
 " 23 " "
 " 24 " "

Jan 25 traverse
 Jan 26 " "
 " 27 finish at Noon
 PM. Work to Longville
 For Monday AM stage
 For work in office
 see office book on work done

see pages 47 for Daily Notes

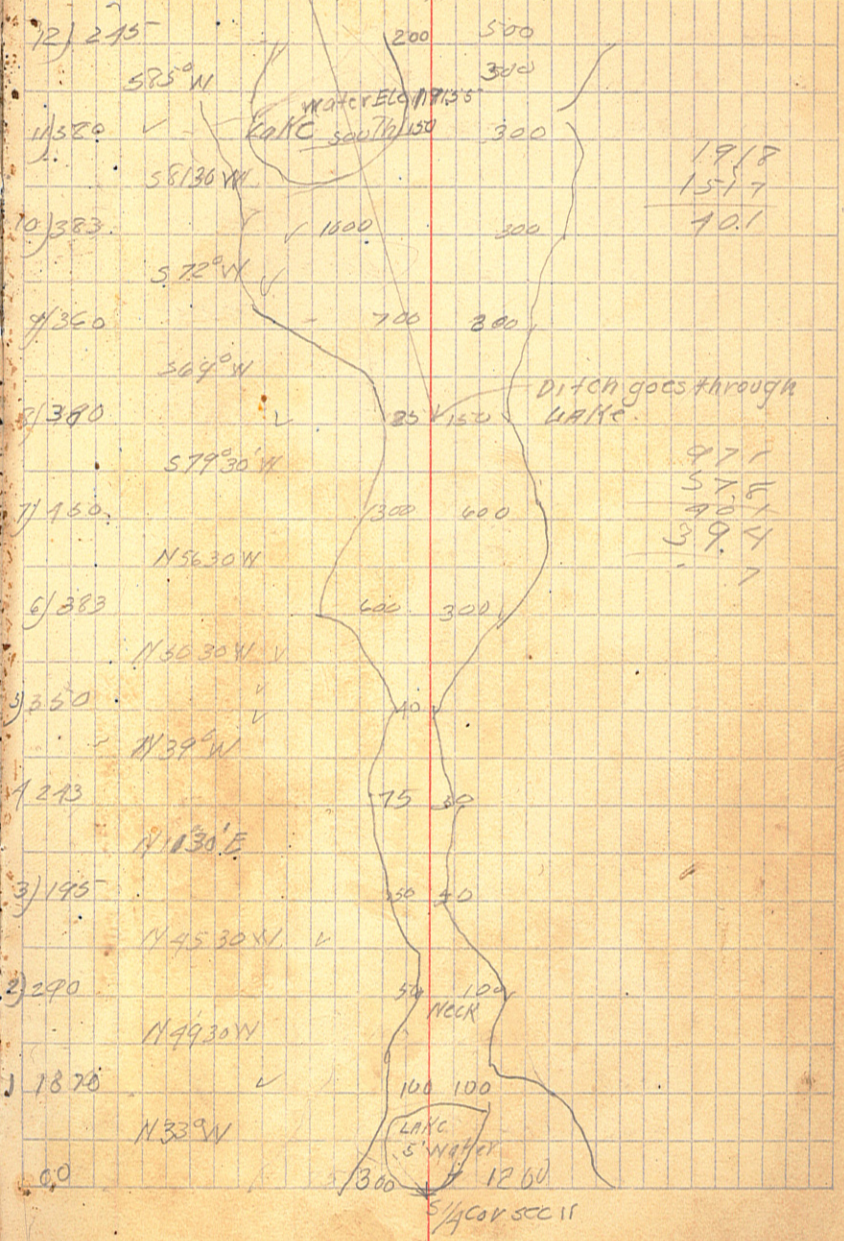
| Cash Expense | | Livery From H. Andrews | |
|--|--|---|---------|
| July 26 1917. J. Pomasel supper at Restaurant .35 | | July 24 1917. Pine River to Geo Snell and Inquadomeni | |
| Claim made out Aug 2 1917 | | Lake \$8.00 charges | X X X X |
| Jan 15 1918 Stage from RR to Longville 2.00 | | July 26 1917 Vern Hardy brings us from Geo Snell in TWP 140 R27 to Pine River charges 10.00 | |
| Jan 16 Dinner Panora .35 | | Claim made out Aug 2 1917 | |
| From supper Jan 15 to dinner inclusive Jan 16 Congville 1.35 | | Cash expense for Starky Jan 15 1918 Dinner at Panora .35 | |
| Jan 16 1918 Livery from Longville to Mr Barris Geo Ford driver. \$4.50 | | Jan 15 Stage from PR to Tolongville 3.00 | |
| From supper Jan 27 to breakfast inclusive Jan 28 | | From supper Jan 15 to dinner Jan 16, # inclusive at Long 1.35 | |
| at Longville 1.00 | | Tongville supper Jan 27 to breakfast inclusive Jan 28 \$11.00 | |
| Jan 28 Stage Longville to Pine River 1.50 | | Jan 28 Stage from Longville to Pine 1.50 | |
| Jan 28 Dinner at Panora .35 | | Jan 28 Dinner Panora .35 | |
| Claim made out Feb 2 1918 \$11.05 | | Claim made out Feb 1 1918 6.55 | |
| Feb 14 1918 Livery PR to Longville 1.50 | | Feb 14 1918 Livery from Pine R to Longville 1.50 | |
| Feb 14 Dinner Panora .35 | | Feb 14 Dinner in Panora .35 | |
| " 14 Livery Longville to Inquadomeni 50 | | " 14 Stage Longville to Inquadomeni 50 | |
| Feb 28 Livery from RR to Pine 5.00 | | Feb 14 1918 Livery from Pine R to Longville 1.50 | |
| " 28 Dinner Remur .35 | | Feb 14 Dinner in Panora .35 | |
| " 28 RR fare Remur to Congville 1.25 | | " 14 Stage Longville to Inquadomeni 50 | |
| " 28 Supper Remur to Congville .40 | | Feb 14 1918 Livery from Pine R to Longville 1.50 | |
| " 28 Dinner Remur to Congville 1.36 | | " 24 Stage Longville to PR 1.50 | |
| " 28 Hotel 5.00 | | | |
| Claim made out Mar 1 1918 \$112.1 | | Claim made out Mar 1 1918 53.8 | |

| Sta | B.S. | H.I. | F.S. | ELEV | |
|--------------------|------|----------------------|-------|--------|-----------|
| 1 Assumed | 560 | 20560 | | 20000 | SNIP ELEV |
| 2 10 | 435 | 20455 ¹⁰⁵ | 4.40 | 20020 | 1000 |
| 4 | 422 | 20242 ²¹³ | 6.35 | 19820 | |
| 6 | 333 | 19915 ³²⁷ | 6.40 | 1958.2 | |
| 8 | 330 | 19705 ²¹⁰ | 5.40 | 1937.5 | |
| 10 | 445 | 19645 ⁶⁰ | 5.05 | 1920.0 | |
| 12 | 435 | 19610 ³⁰ | 4.70 | 191.75 | |
| 14 | 495 | 19710 ²² | 3.95 | 1921.5 | |
| 16 | 112 | 19732 ⁴⁰ | 3.90 | 193.20 | |
| 18 | 485 | 19832 ¹⁰⁰ | 8.85 | 188.47 | |
| 20 | 356 | 18828 ⁵⁰⁴ | 8.60 | 184.72 | |
| 22 | 110 | 18573 ²⁵⁰ | 6.65 | 181.63 | |
| 24 | 853 | 17901 ⁶⁷² | 10.25 | 175.48 | |
| 26 | 137 | 17898 ⁰³ | 4.40 | 174.61 | |
| 28 | 383 | 17810 ⁵⁰ | 4.41 | 174.57 | |
| 30 | 312 | 17707 ¹³³ | 4.75 | 173.65 | |
| 32 | 398 | 17515 ¹⁹² | 5.90 | 171.17 | |
| 34 | 441 | 17516 | 4.40 | 170.75 | |
| 36 using intervals | 420 | 17466 | 4.70 | 170.46 | |
| 38 | 427 | 17263 | 6.30 | 168.36 | |
| 40 | 405 | 17224 | 4.44 | 168.19 | |
| 42 | 450 | 17266 | 4.08 | 168.16 | |
| 44 | 420 | 17199 ¹⁰³ | 4.87 | 167.79 | |
| 46 | 463 | 17202 | 4.60 | 167.39 | |
| 48 | +154 | 16764 | 5.90 | 166.12 | |

LEVELS NOT VERY ACCURATE
200 ft for each setup

July 24 1917 Preliminary 4.5 3
1920
91.55

TRANSIT NOTES



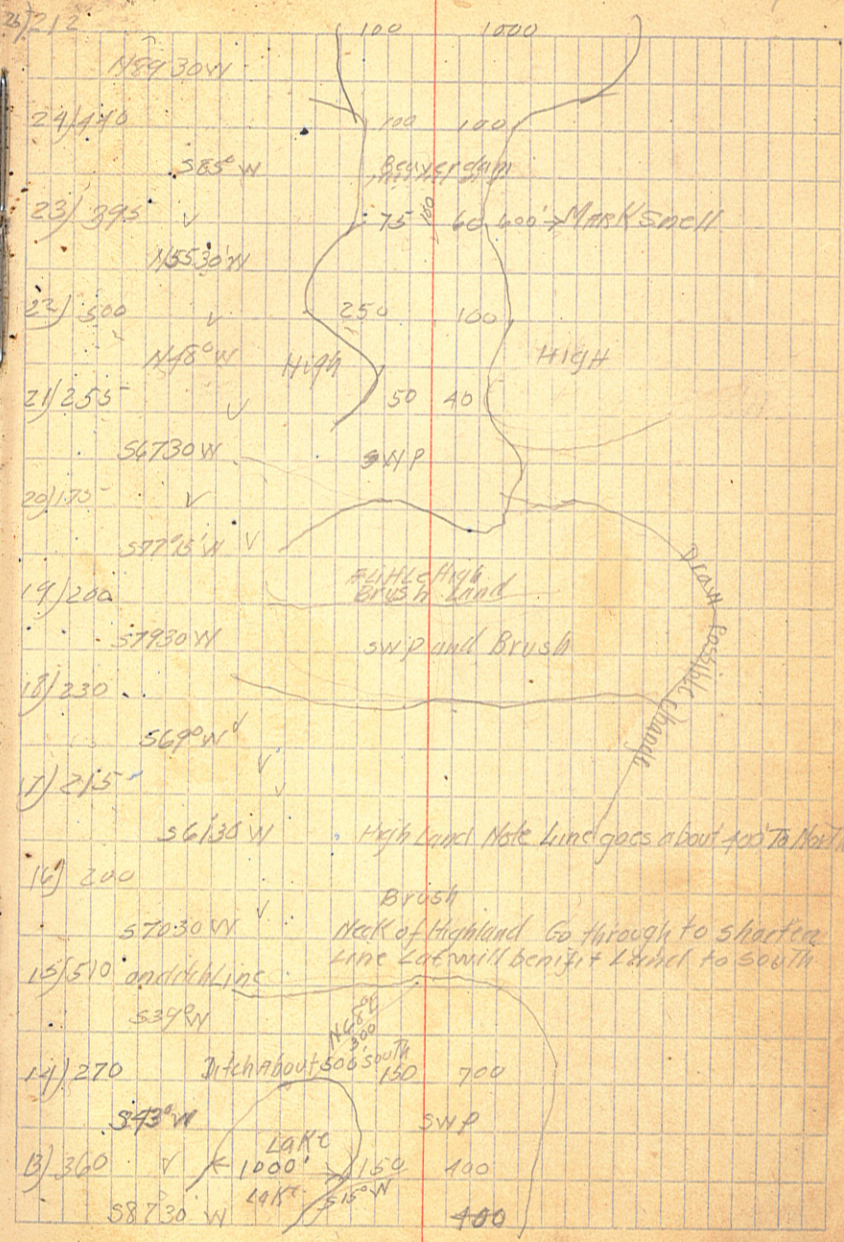
1918
1517
10.1
971
575
401
39.4
7

| Sta. | B.S. | H.I. | F.S. | Elev. |
|------|------|------------------------|-------|--------|
| 50 | | 167.66 | | |
| 50 | | | 7.70 | 158.96 |
| 50 | 2.64 | 170.17 ^{2.51} | .03 | 167.63 |
| 52 | 4.54 | 163.14 ^{0.03} | 11.57 | 158.60 |
| 54 | 3.00 | 160.84 ^{2.30} | 5.30 | 157.54 |
| | | | 9.10 | 151.74 |
| 56 | | | 5.70 | 155.14 |

Water Elev of Otto Brook

Elev. of Bot Tom of Brook

July 21 1917



July 25 1917

165
22
-30

5

37/173

Brush

563°W

36/200

586°W

Brush

35/170

563°30'W

34/110

Brush

552°30'W ✓

33/210

Brush

575°30'W

Brush

32/170

Brush

526°30'W

31/300

20W to E/W 101 sec 15

Not Lat 576° approximately 1300

525°W

30/160

529°W

29/170

3000

152 class

550°30'W

280/330

1000

1 1/4 miles

541°W ✓

stand class

27/300

600

2000

578°W

26/295

300

1000

561°30'W

16

July 25-176

Brush. Follow Otto Brook.

49 393'

N 89° W

48 310'

Brush

S 52° 30' W

190 to Beginning of lat Noe Pans N 40° E for approx distance
of

42 225'

Brush

S 83° W

46 454'

Brush

S 81° W

45 230'

Brush

S 43° W

44 386'

Note. Firm P. 42 to 45 Straight Line

2

S 51° 30' W

43 250'

SWP Lowland N into sec 4

N 77° 30' W

42 234'

Brush

S 82° 30' W

41 198'

S 83° W

Brush

40 153'

and swampy

S 71° 30' W

39 195'

Brush

S 64° 30' W

swamp

38 190'

S 73° 30' W V

Brush

(Note) Length of Main Ditch is 18,887. FT

Inguaciona LANE About 1/2 mile N 70° W. to outlet of Brook

56 425' Brush - Cross Brook. Dead water
N 47° 15' E

55 310' Brush. Brook 15' Left
N 67° 30' W

54 240' Brush. Brook 15' Left
N 57° 30' W

53 130' Brush. Brook 15' Left
N 80 W

52 340' Brush. Brook to Left
N 71° 30' W

51 265' Brush. Brook to Left
N 54° 30' W

50 320' Brush - Otto Brook to left
N 61 W

Fly Levels LIAT No 4

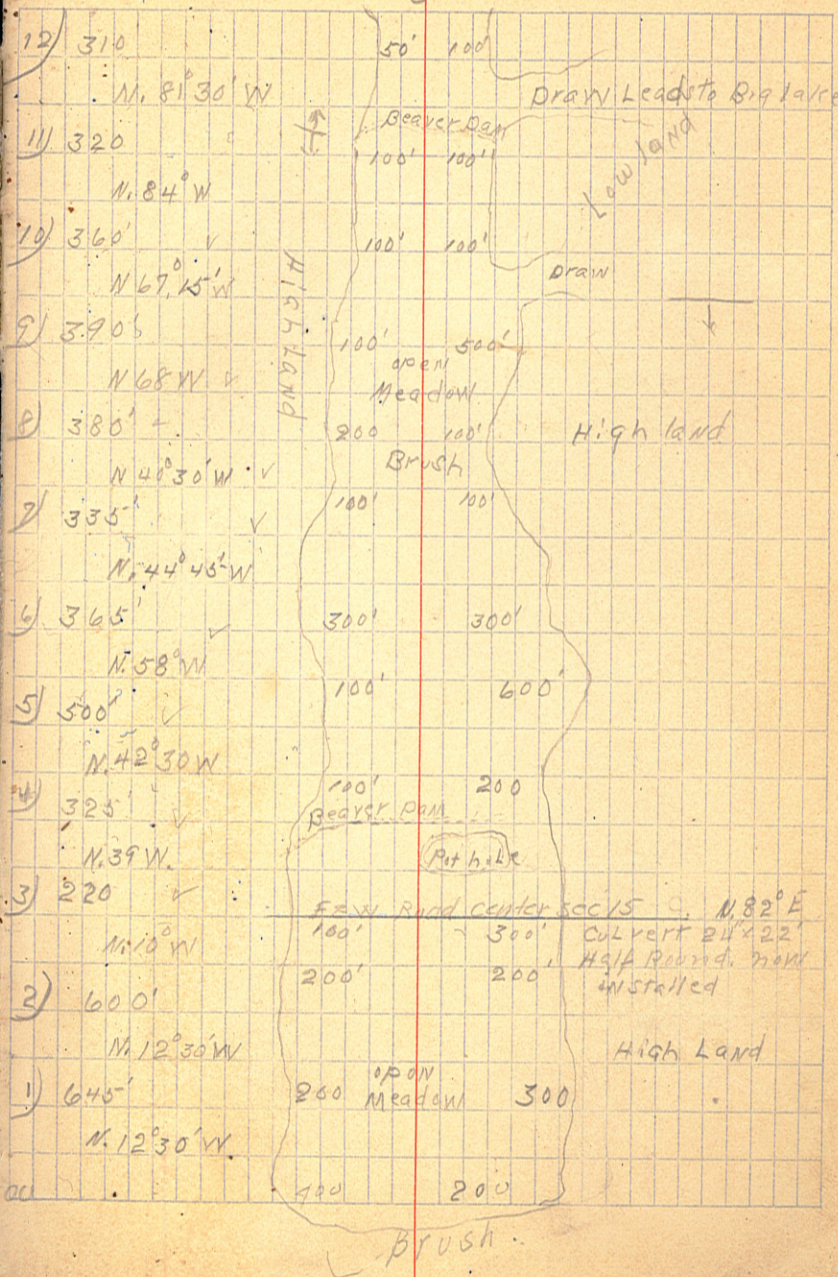
| Sta | BS | HI | FS | ELCV |
|------------------------|------|--------|------|-------------------|
| Assumed ELEV of Meadow | | | | 200.00 |
| 00 | 2.47 | 202.47 | | 200.00 |
| 2 | 5.65 | 202.97 | 5.15 | 197.32 |
| 4 | 3.30 | 199.10 | 7.17 | 195.80 |
| 6 | 3.07 | 197.12 | 5.05 | 194.05 |
| 8 | 3.83 | 191.90 | 9.05 | 188.07 |
| 10 | 4.15 | 189.23 | 6.82 | 185.08 |
| 12 | 4.12 | 187.12 | 5.43 | 183.80 |
| 14 | 2.69 | 185.76 | 4.86 | 183.07 |
| | | 3.18 | 6.80 | 179.00 Cr. Bottom |
| 16 | 2.52 | 182.58 | 5.70 | 180.06 |
| 18 | 3.40 | 177.15 | 8.83 | 173.75 |
| 20 | 4.02 | 175.12 | 6.06 | 171.10 |
| 22 | | | 7.95 | 170.17 |

Note For section to East
1/4 cor of Sec 15 starting at Point No 3
running East along Road to 1/4 cor

670
N82°E
375
N81°45'E
Point 3

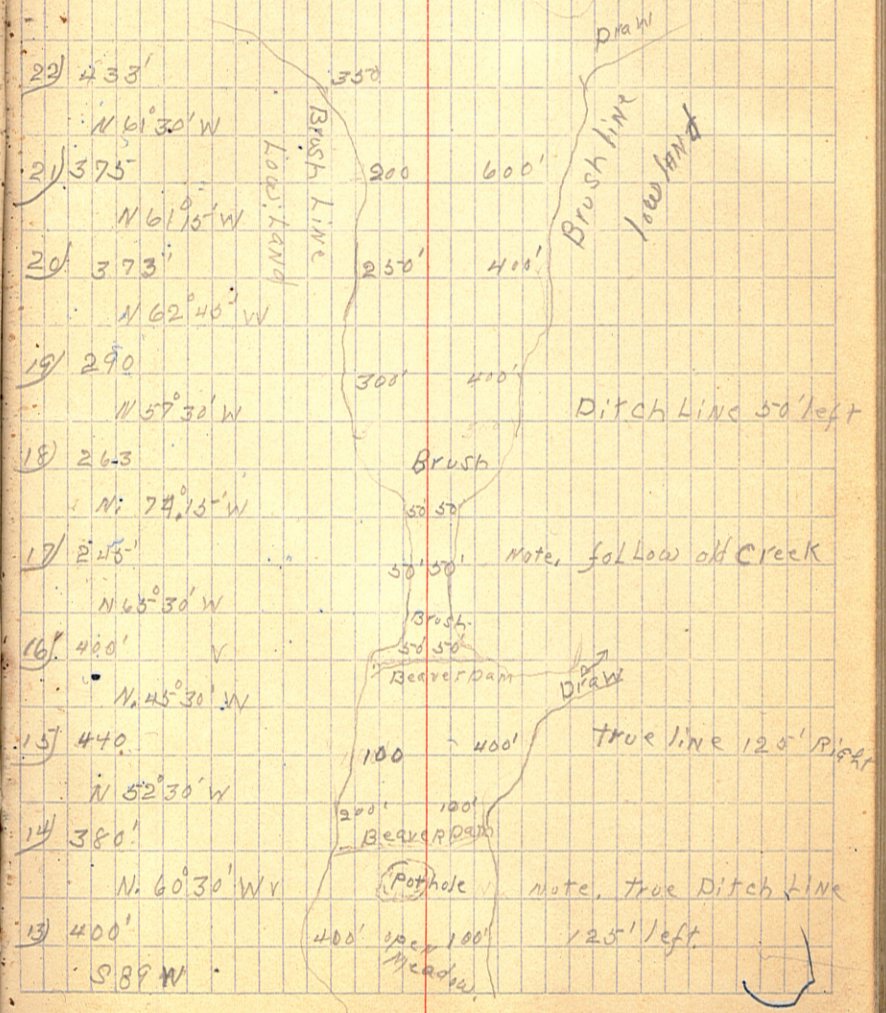
LIAT No 1 of Co Ditch No 13
July 26 1917 Preliminary Notes

8



8,349 = length of lateral No. 1

Note, point 22 of Lot. No. 1 = point 31 on Main Ditch



Variation 8°00'

| Sta. | Dist. | Mag. Bear. | True B. |
|------|-----------|------------|---|
| 12) | 461 | 322°E | 314°E |
| 11) | 338 | 317°E | 309°E |
| 10) | 220 | 325°30'E | 319°30'E |
| 9) | 280 | 552°30'E | 544°30'E ✓ 560°30'W |
| 8) | 40 701 | N35°30'E | N43°30'E ✓ Note Traverse No 5 7000 ft. from |
| 7) | 467 | N12°30'W | N4°30'W ✓ |
| 6) | 196 ✓ | N10°30'W | N2°30'W ✓ all sec line |
| 5) | 135 ✓ | N34°30'W | N26°30'W ✓ sect. on W |
| 4) | 315 ✓ | N10°15'W | N22°15'W ✓ |
| 3) | 248 ✓ | N37°30'W | N29°30'W ✓ |
| 2) | 181 ✓ | N78°E | N86°E ✓ geo. sect. |
| 1) | 500 | N10°00'W | N2°W ✓ |

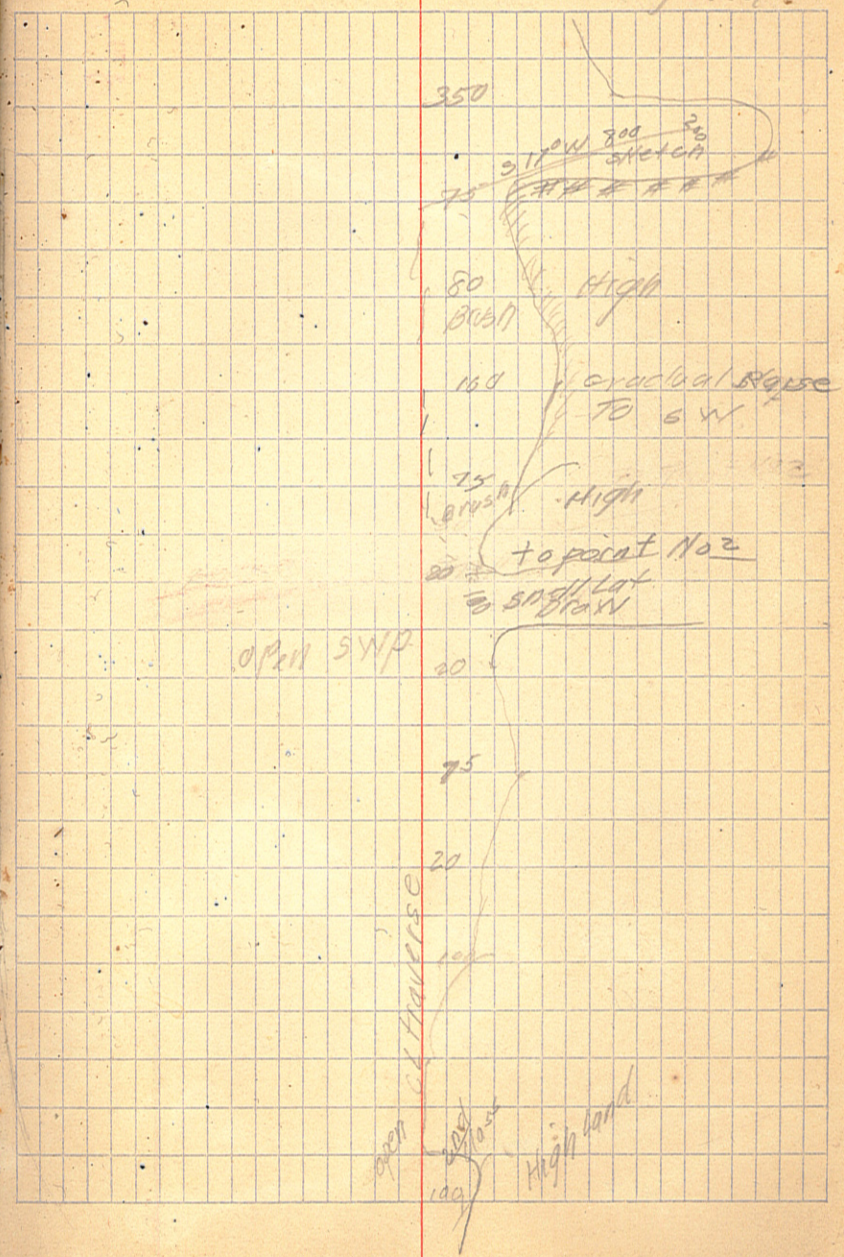
00 = S. N. Cor. sec. 10 T. 40. 27

Traverse No Jan 17 1915



| sta | Dist | Mag B. | True Bearing |
|-----|------|----------|--------------|
| 21) | 360 | N33°45'E | N41°45'E |
| 23) | 287 | S59°E | S51°E |
| 22) | 160 | S16°45'E | S8°45'E |
| 21) | 104 | S79°45'E | S71°45'E |
| 20) | 326 | S27°E | S19°E |
| 19) | 297 | S21°W | S32°W |
| 18) | 181 | S16°45'E | S8°45'E |
| 17) | 256 | N42°W | N34°W |
| 16) | 199 | N62°W | N54°W |
| 15) | 251 | S5°30'E | S2°30'W |
| 14) | 464 | S32°45'E | S30°45'E |
| 13) | 156 | S23°15'W | S31°15'W |

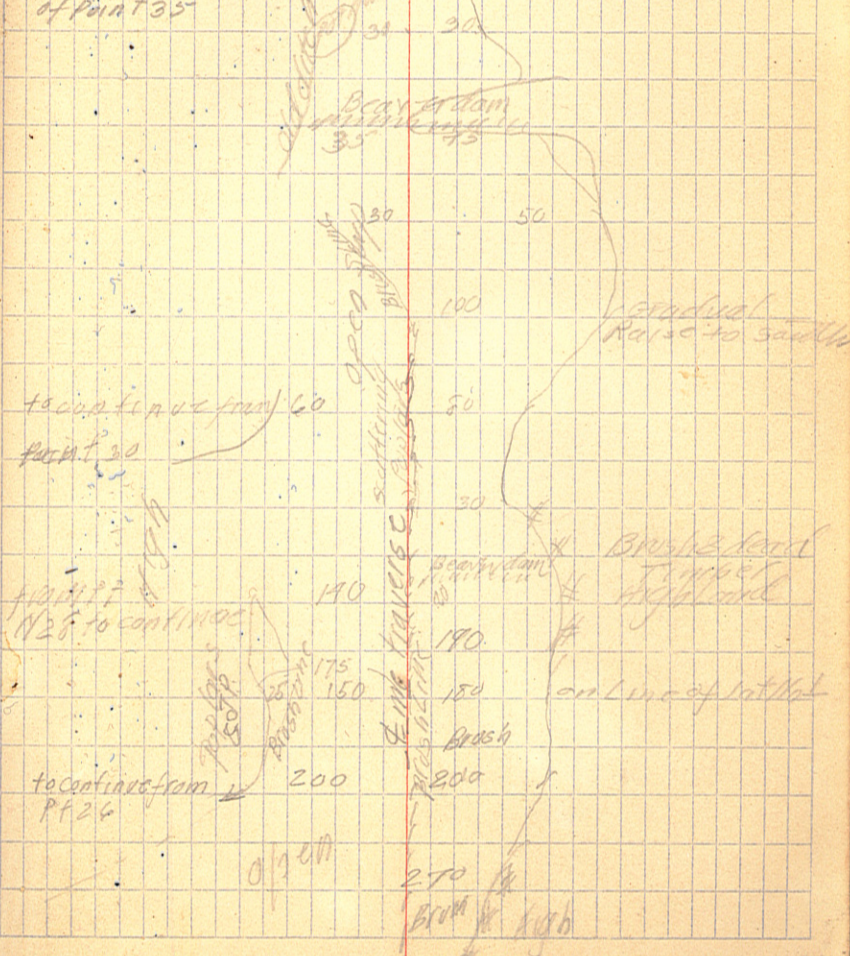
Traverse No 1 Jan 17 1951
ser y cold.



| Sta | Dist | Mag Bearing | True Bearing |
|-----|------|-------------|--------------|
| 34 | 571 | S 1° 30' W | S 9° 30' W |
| 35 | 66 | S 23° E | S 15° E |
| 37 | 107 | S 22° 30' E | S 14° 30' E |
| 33) | 610 | S 10° 15' E | S 10° 15' E |
| 32) | 267 | S 11° 30' E | S 11° 30' E |
| 31) | 361 | S 42° 30' E | S 34° 30' E |
| 30) | 254 | S 14° 30' E | S 66° 30' E |
| 29) | 191 | S 51° 15' E | S 43° 15' E |
| 28) | 325 | S 68° E | S 60° E |
| 27) | 261 | N 74° E | N 82° E |
| 29) | 337 | S 64° 45' E | S 56° 15' E |
| 25 | 405 | N 56° 45' E | N 64° 45' E |

Jan 17/18 very cold & windy 12
 Traverso No 1

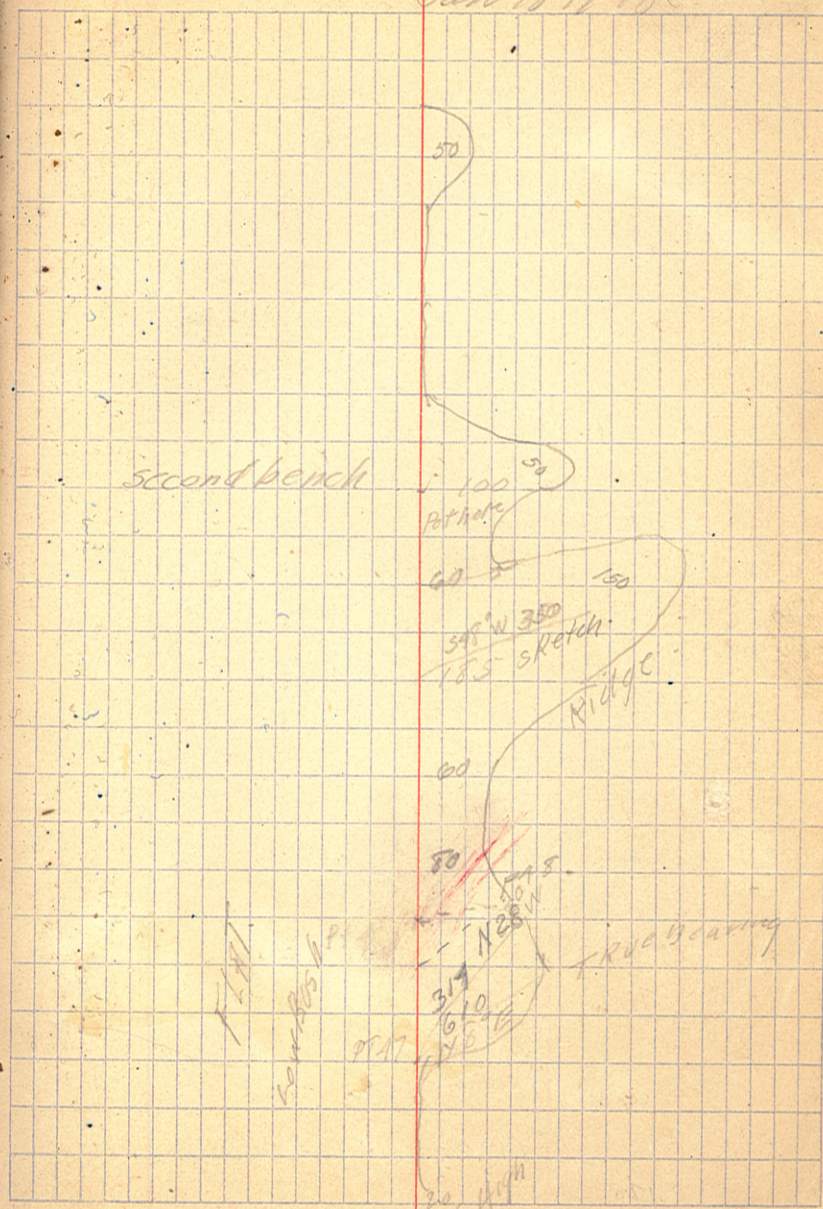
Mag: ~~N 83° E 1120'~~ ~~E 25 W Road Section Sec 15 19027~~
 True: ~~S 89° E 1120'~~ ~~N 89° W~~
 Convert 15 97' East of Point 35



| Sta | Dist | Mag Bearing | True Bearing |
|-----|------|-------------|--------------|
| 57 | 261 | N 89° 30' E | 382° 30' E |
| 54) | 194 | N 39° E | N 47° E |
| 53) | 250 | S 63° 30' E | S 55° 30' E |
| 52) | 225 | S 15° 15' E | 37° 15' E |
| 53 | 194 | S 21° 30' E | S 13° 30' E |
| 52 | 229 | S 12° 30' E | S 21° 30' E |
| 51 | 331 | S 8° 30' W | S 16° 30' W |
| 50 | 285 | S 15° E | S 7° E |
| 49 | 176 | S 6° E | S 2° N |
| 18) | 308 | N 85° 15' W | N 77° 15' W |
| 17 | 620 | N 14° 30' E | N 22° 36' E |
| 14 | 199 | N 46° 30' W | N 35° 30' W |

Traverses No 1
Jan 15 1915

14



| Sta | Dist | Mag Bearing | True Bearing | |
|-----|------|-------------|--------------|------------------|
| 69 | 390 | N18°45'E | N26°45'E | 3ct on |
| 68 | 950 | N28°W | N20°W | |
| 67 | 405 | N48°45'E | N56°45'E | Start from Pt 38 |
| 66 | 560 | N31°15'E | N39°15'E | Tic to Point |
| 65 | 301 | N47°W | N39°W | |
| 64 | 209 | N38°W | N30°W | |
| 63 | 190 | N52°W | N24°W | |
| 62 | 194 | N25°45'E | N33°15'E | |
| 61 | 195 | S77°30'E | S69°30'E | |
| 60 | 188 | N59°30'E | N67°30'E | |
| 59 | 346 | N60°E | N68°E | |
| 58 | 170 | N70°15'E | N15°15'E | |

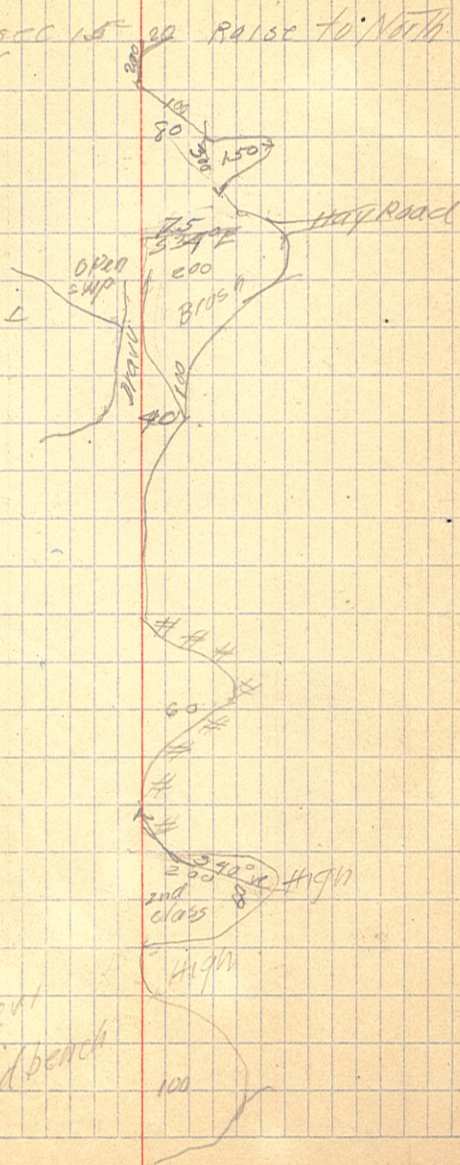
Traverse No 1 ²⁷⁵ ³⁸⁰ 15
 JAN 18 1918 Cold

Ferry line acc 15th on road
 Raise to North

38 traverse No 2
 Hay Road

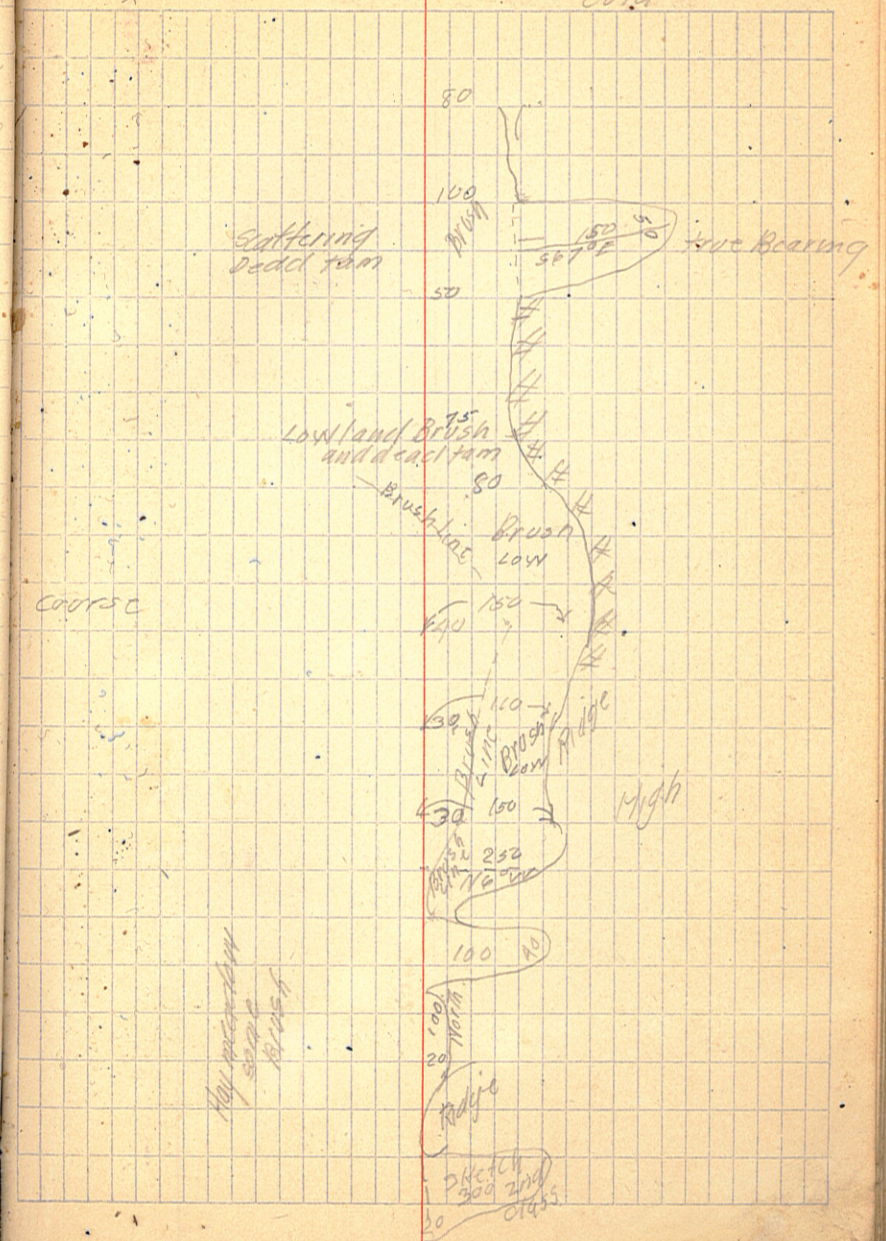
Note from Pt 38
 To flag stand
 class 3
 all on second bench

Brush Low
 Lanch
 second bench



| Sta | Dist | Mag. Bearing | Truck B | Notes |
|---|------|--------------|----------|--------|
| 80 | 480 | N30°30'E | N38°30'E | |
| 79 | 184 | N5°E | N13°E | ✓ |
| 78 | 360 | N54°30'E | N62°30'E | |
| 77 | 448 | N12°30'E | N20°30'E | |
| 76 | 373 | N23°45'W | N15°45'W | |
| tie point to Traverse C No 1 213 FT 53°43'0"E N.W. side | | | | |
| 75 | 536 | N37°30'W | N29°30'W | course |
| 74 | 374 | N70°30'W | N62°30'W | |
| 73 | 287 | S33°30'W | S71°30'W | |
| 72 | 465 | N36°W | N28°W | |
| 71 | 354 | N159°5'W | N70°5'W | |
| 70 | 485 | N31°W | N43°W | Lucan |

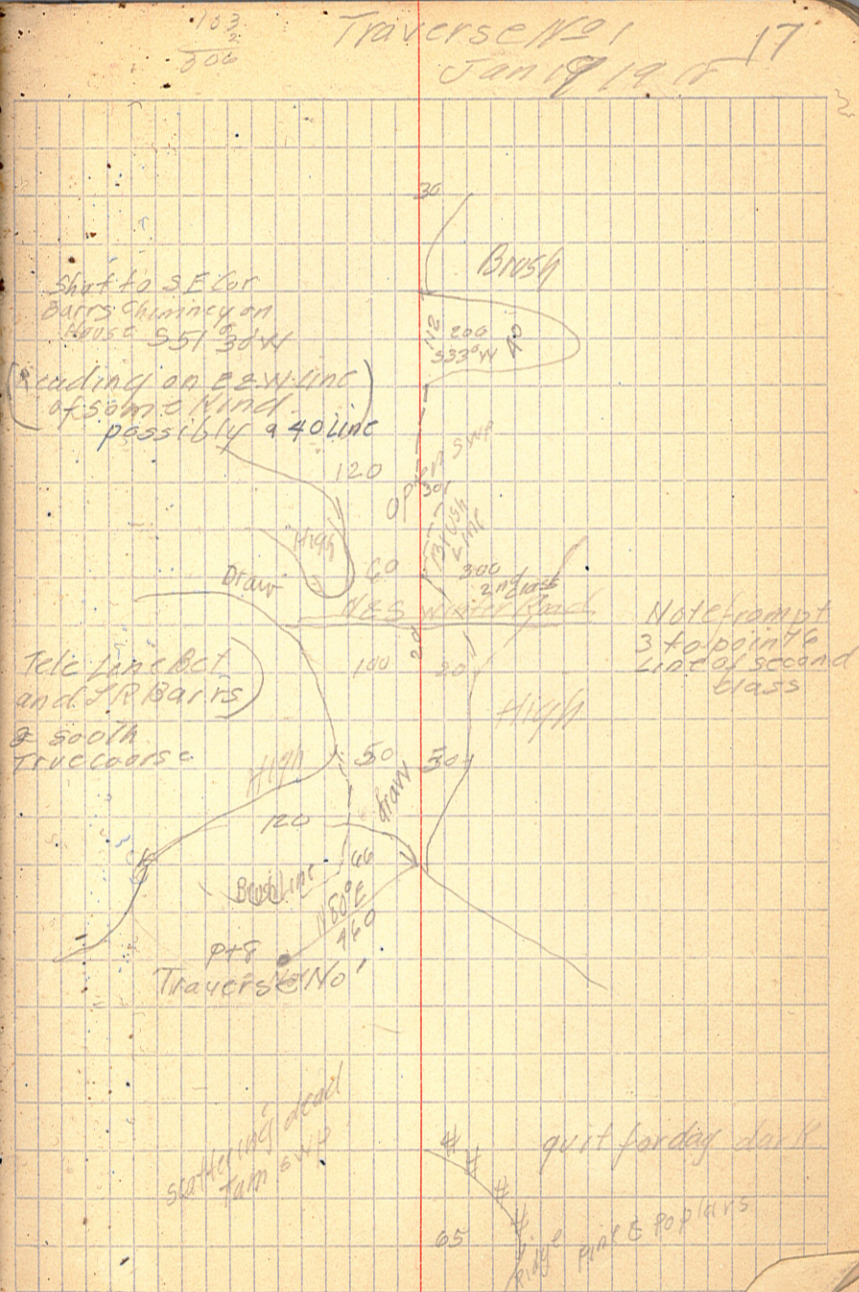
10.1
1924
Traverse No 1
Jan 15 1915
cold
16



| Sta | Dist | Mag Bearing | True Bearing |
|-----|------|-------------|---------------------------------------|
| 8 | 3 | 532°E | 524°E |
| | 397 | | |
| 7 | | 545°E | 537°E |
| | 112 | | |
| 6 | | 500°15'E | 57°45' W 7 Note |
| | 600 | | |
| 5 | | 364°15'E | 356°15'E |
| | 378 | | |
| 4 | | 557°05'E | 549°30'E |
| | 455 | | |
| 3 | | 571°30'E | 563°30'E |
| | 183 | | (Note Course of M Snell's DUG N |
| 2 | | N80°15'E | N88°15'E |
| | 225 | | |
| 1 | | N72°E | N70°E |
| | 460 | | |

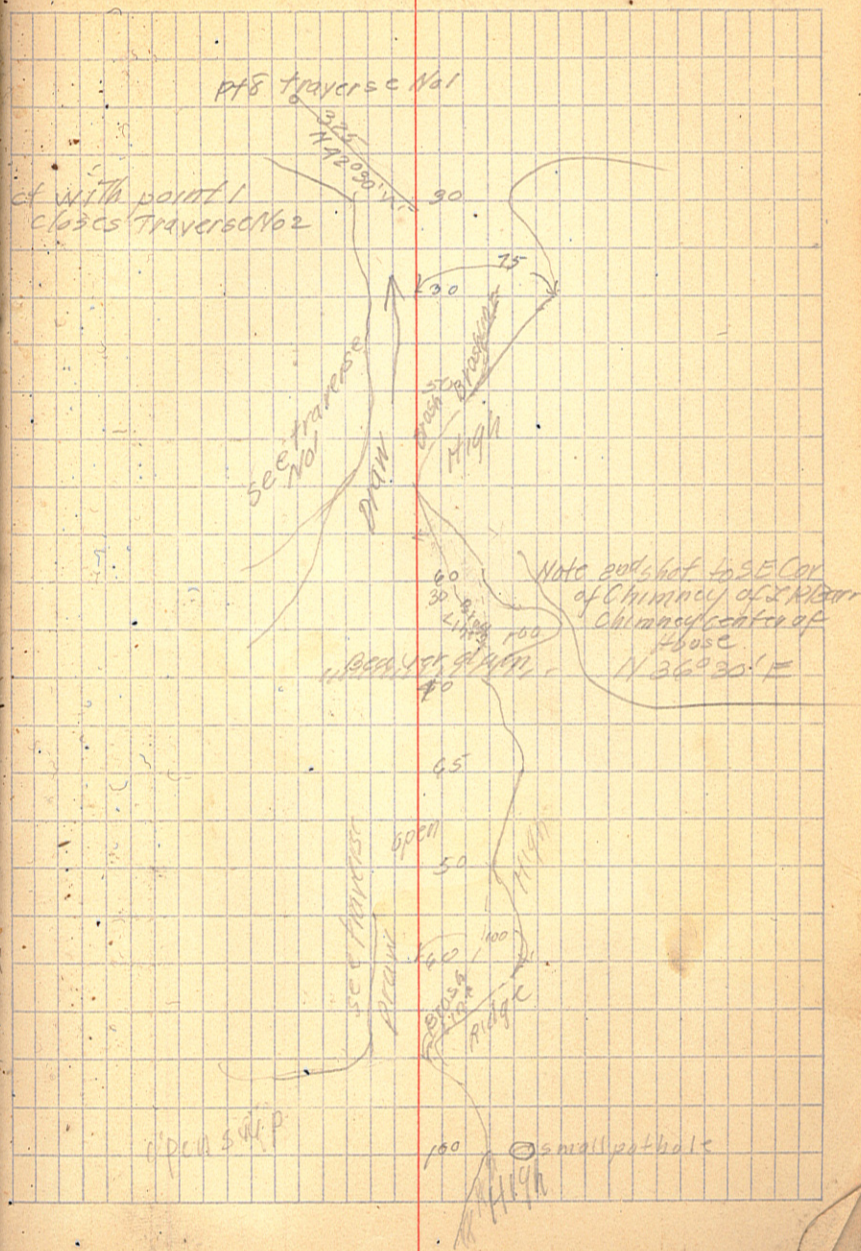
00 = points of traverse No 1 Jan 19 1915
Traverse No 2

| | | | | | |
|--------------------------------------|-----|-----------|-------------------------|---|---|
| X | X | X | X | X | X |
| Continued on page 21 of traverse 1-A | | | | | |
| 52 | | N 21-47 | 15 continuation of No 1 | | |
| | | N 77°E | N 87°E | | |
| | 277 | | | | |
| 51 | | N 65°30'E | N 73°30'E | | |
| | 306 | | | | |



| Sta | Dist | Mag Bearing | Troc Bearing | |
|-----|------|------------------------------|--------------|---------------------|
| | 325 | N 52° 30' W | N 42° 30' W | tie to pt 8 T. No 1 |
| | | tie to point 8 traverse No 1 | | |
| 14 | 543 | N 16° 30' W | N 8° 30' W | Note connect |
| 18 | 657 | N 25° 30' W | N 17° 30' W | |
| 17 | 425 | N 32° 30' W | N 24° 30' W | |
| 16 | 266 | N 12° 30' E | N 10° 30' E | |
| 15 | 448 | N 19° 15' W | N 11° 15' W | ✓ |
| 14 | 434 | N 46° 30' W | N 57° 30' W | |
| 13 | 447 | S 72° W | S 80° W | P. |
| 12 | 310 | S 30° 15' W | S 38° 15' W | |
| 11 | 330 | S 23° E | S 15° E | |
| 10 | 268 | S 1° 30' W | S 9° 30' W | |
| 9 | 349 | S 3° 30' E | S 4° 30' W | |

Traverse No 2 Jan 1948



| Sta | Dist | Mag Bearing | Troc Bearing |
|-----|------|-------------|--------------|
|-----|------|-------------|--------------|

Tie top of traverse No 2

9 N56°30'W N76°30'W

93

8 346°W 357°W

217

7 332°45'E 324°45'E

257

6 346°30'E 338°30'E

354

5 N80°E N88°E

377

4 321°30'E 316°30'E

590

3 N76°E N89°E

620

2 N129°45'E N20°45'E

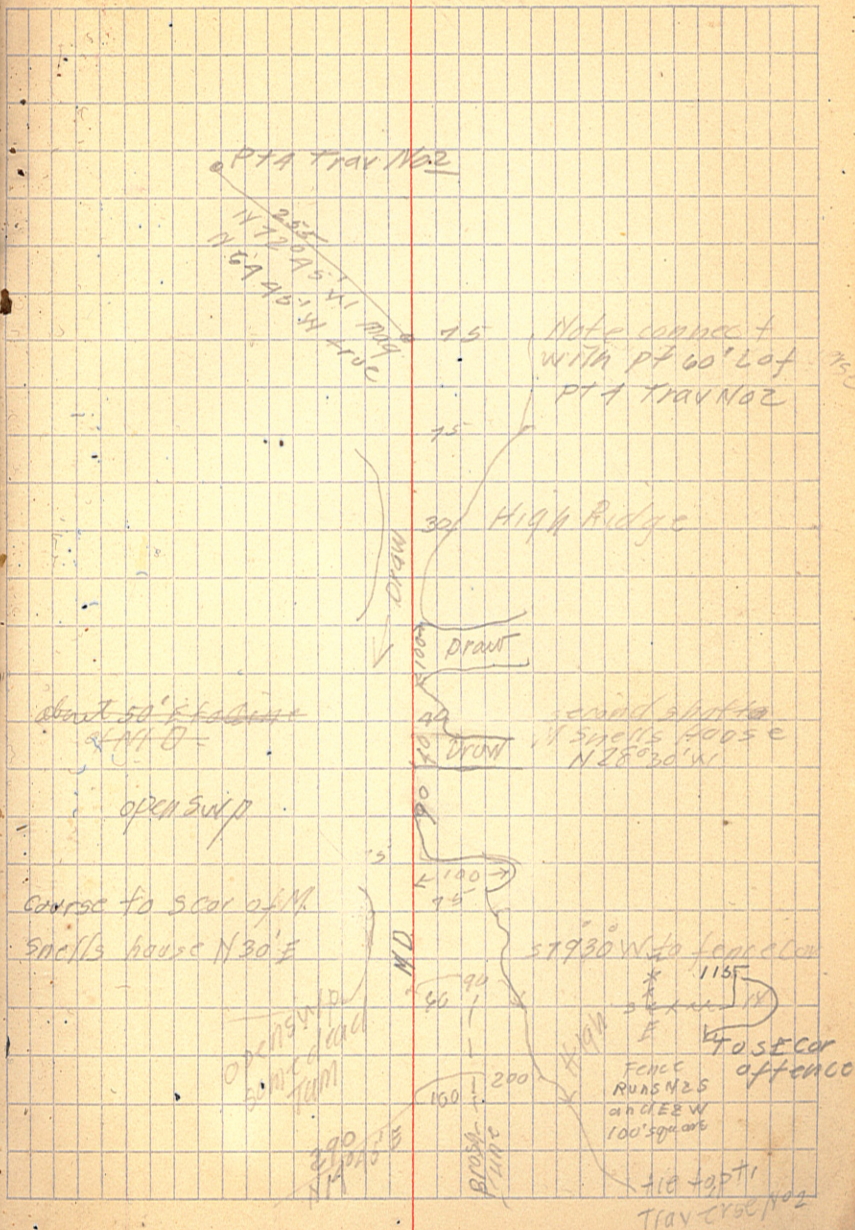
420

1 N6°45'E N14°45'E

290

00 = traverse No 1 point 5

Traverse No 3. 19
Jan 1918



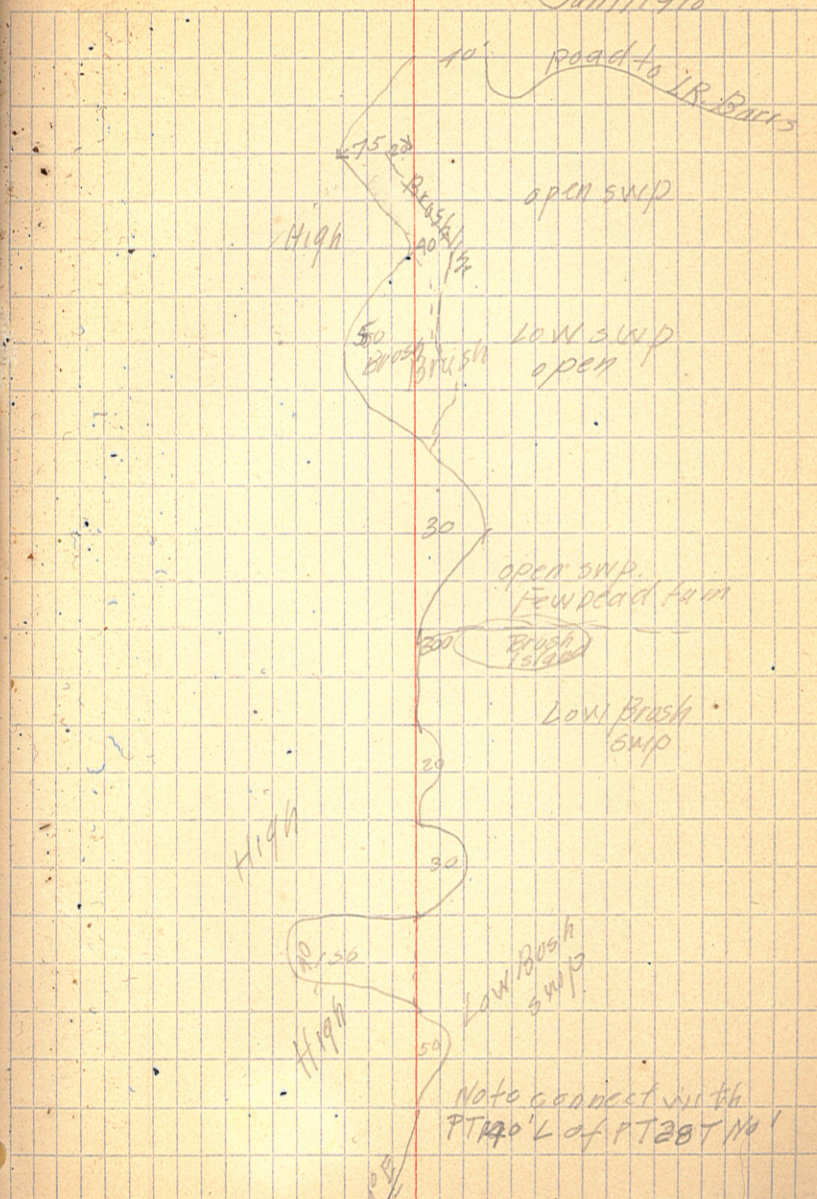
| Sta | Dist | Mag Bearing | True Bearing |
|-----|------|-------------|--------------|
| 12 | 290 | S1°W | S9°W |
| 11 | 395 | S5°W | S58°W |
| 10 | 397 | N87°45'W | N79°45'W |
| 9 | 267 | S12°E | S9°E |
| 8 | 193 | S86°15'W | N185°15'W ? |
| 7 | 346 | N37°30'W | N59°30'W |
| 4 | 495 | N25°E | N33°E |
| 5 | 293 | N19°E | N27°E |
| 1 | 140 | N66°45'E | N4°45'E |
| 3 | 159 | N34°30'E | N42°30'E |
| 2 | 250 | N19°45'W | N11°45'W |
| 1 | 295 | N6°E | N14°E |

00 = PT No 28 Traverse No 1

247
199
New Traverse No 4

20

Jan 1918



N14°E
295
PT28T No 1

| sta | Dist | Mag Bearing | True Bearing |
|-----|------|-------------|--------------|
| 7 | 347 | N67°30'E | N75°30'E |
| 6 | 510 | N23°E | N31°E |
| 5 | 180 | N23°30'W | N15°30'W |
| 4 | 415 | N79°W | N71°W |
| 3 | 310 | N89°30'W | N81°30'W |
| 2 | 535 | N32°30'E | N48°30'E |
| 1 | 295 | N48°45'E | N56°45'E |

00 of traverse No 1-A = pt 82 of traverse No 1
 Traverse No 1
 continued from page 17, A traverse No 1A

Tree top 26 Tra-191 52915E 521°15E

203

End

Note close traverse with pt 200 to P426 traverse

13 F 500°30'E 57°30'W

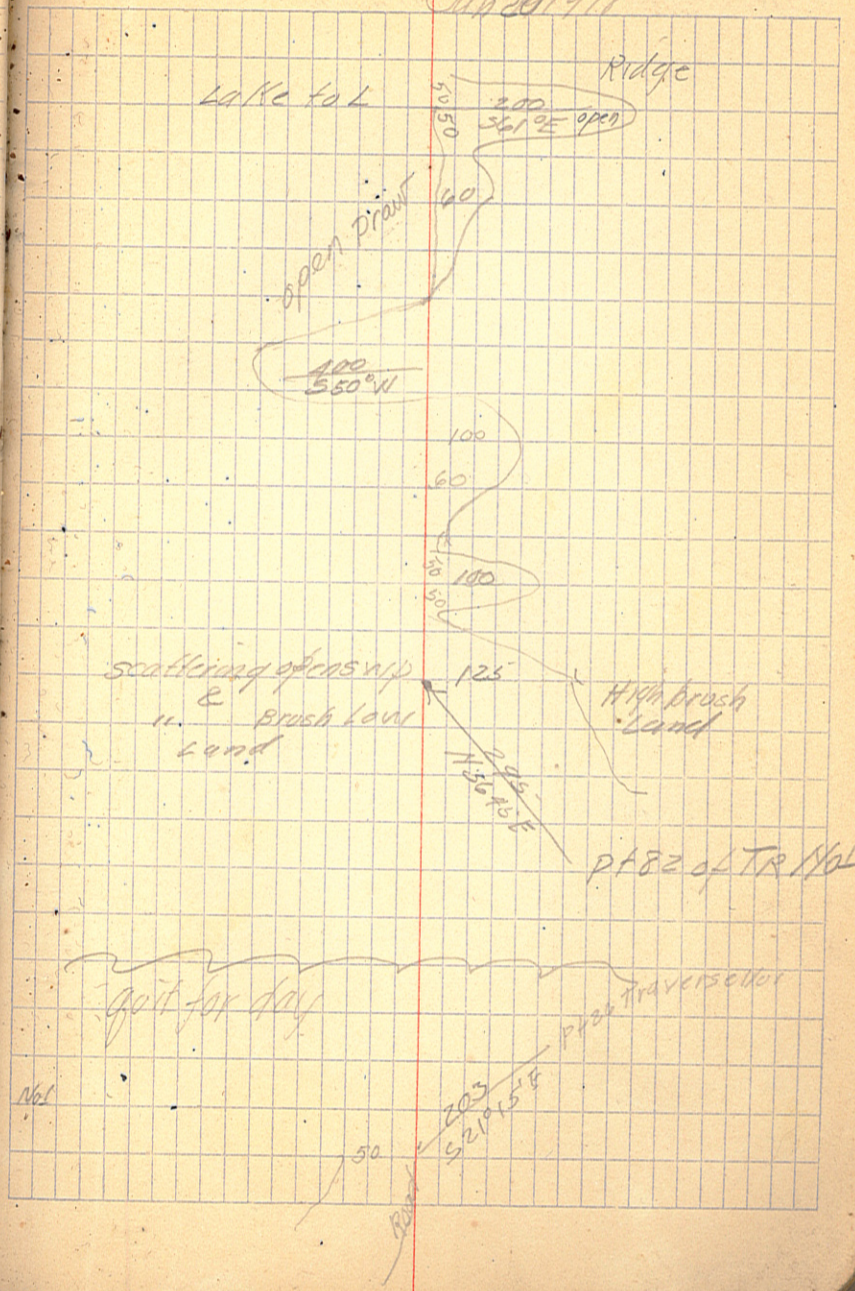
490

247
531

235
510

21

Jan 20/1915

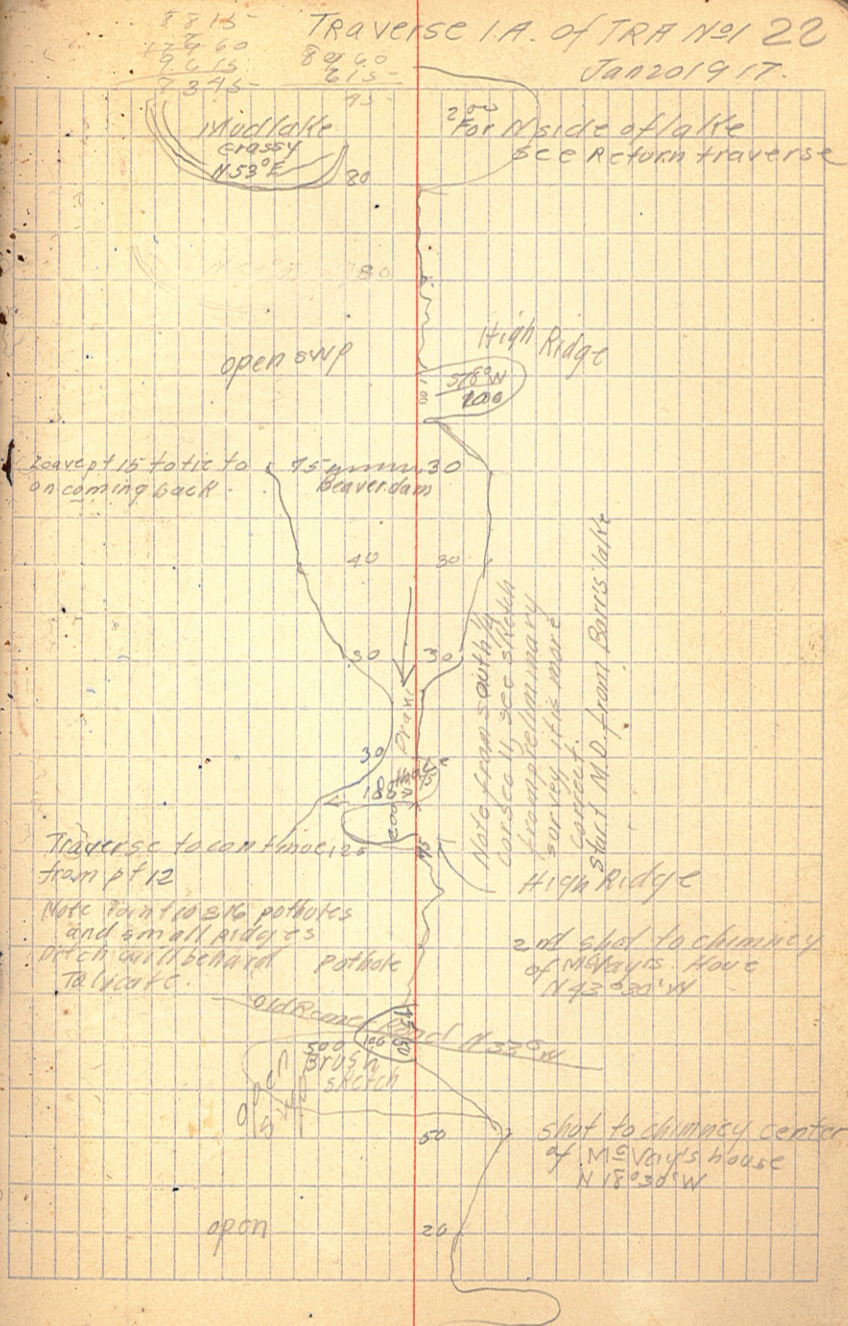


Go it for day

pt 82 of TR No 1

166

| Sta | Dist | Mag Bearing | TRUE Bearing |
|-------|------|-------------|----------------------|
| 19 48 | 388 | S1°30'W | S9°30'W |
| 18 47 | 510 | S56°E | S48°E |
| 17 46 | 448 | S13°30'E | S5°30'E |
| 16 45 | 300 | S42°30'E | S34°30'E |
| 15 44 | 250 | S00°30'W | S8°30'W S7°30'E ? |
| 14 | 435 | S41°45'E | S33°45'E |
| 13 | 540 | S41°30'E | S33°30'E |
| 12 | 440 | N88°15'E | S83°15'E ? |
| 11 | 244 | N42°30'E | N50°30'E |
| 10 | 560 | N25°E | N33°E |
| 9 | 454 | N05°E | N28°15'E |
| 8 | 384 | N28°15'E | N36°15'E |

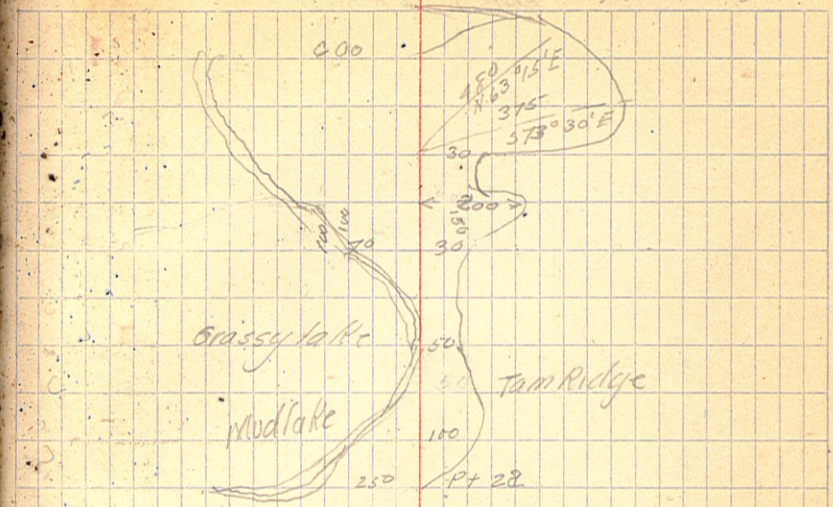


| STA | DIST | MAG Bearing | TRUC Bearing |
|--|------|-------------|--------------|
| 25-25 | 710 | N20°10'E | N28°10'E |
| 25-24 | 550 | N121°E | N129°E |
| 24-23 | 330 | N35°30'E | N43°30'E |
| 23-22 | 625 | N50°W | N42°W |
| 4 | X | 58°E | South |
| 3 | 452 | S71°E | S66°E |
| 2 | 200 | N73°30'E | N81°30'E |
| 1 | 248 | S53°E | S45°E |
| Note from pt 21, to Road is far to locate | | | |
| 22-21 | 480 | S78°45'E | S88°15'E |
| 21-20 | 780 | S61°30'E | S53°20'E |
| 20-19 | 620 | S21°15'E | S13°15'E |

continued

581.30
5
513

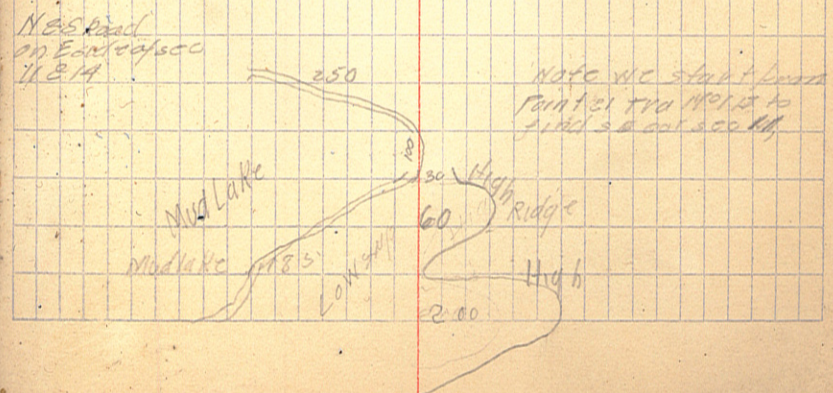
Traverse 1A of TR. No 1 23
Jan 20 19 28 2445
5315



N. South Road side
Scott and 14

Tide Line
N.S. → 0 25

Not pt 3. is at sta
77 of some survey.
Stationing to south
No sand found
Too much snow



Note road
on East of sec
11 & 14

Note we start from
Point 21 and go to
find sand on sec 14

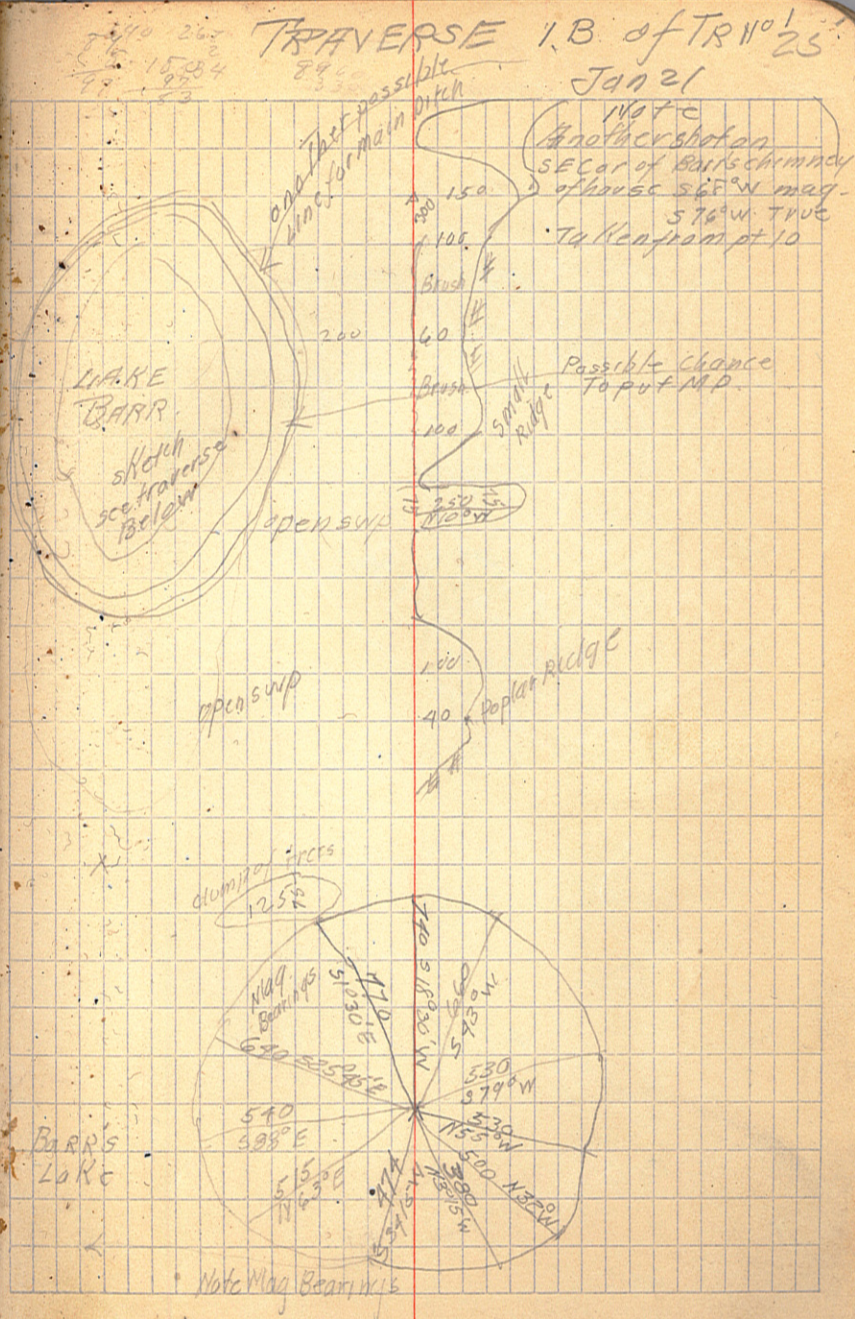
| Sta | Dist | Mag Bearing | True Bearing |
|-----|------|-------------|--------------|
| 10 | | 586°45'W | 549°45'W |
| | 820 | | |
| 9 | | 521°E | 513°E |
| | 480 | | |
| 8 | | 523°15'E | 515°15'E |
| | 650 | | |
| 7 | | 516°15'W | 524°15'W |
| | 525 | | |
| 6 | | 533°W | 543°W |
| | 370 | | |
| 5 | | 585°30'W | 586°30'W ? |
| | 405 | | |
| 4 | | 589°W | 583°W ? |
| | 390 | | |

TRaverse B No 1 continued from pt 3 page 27

X X X

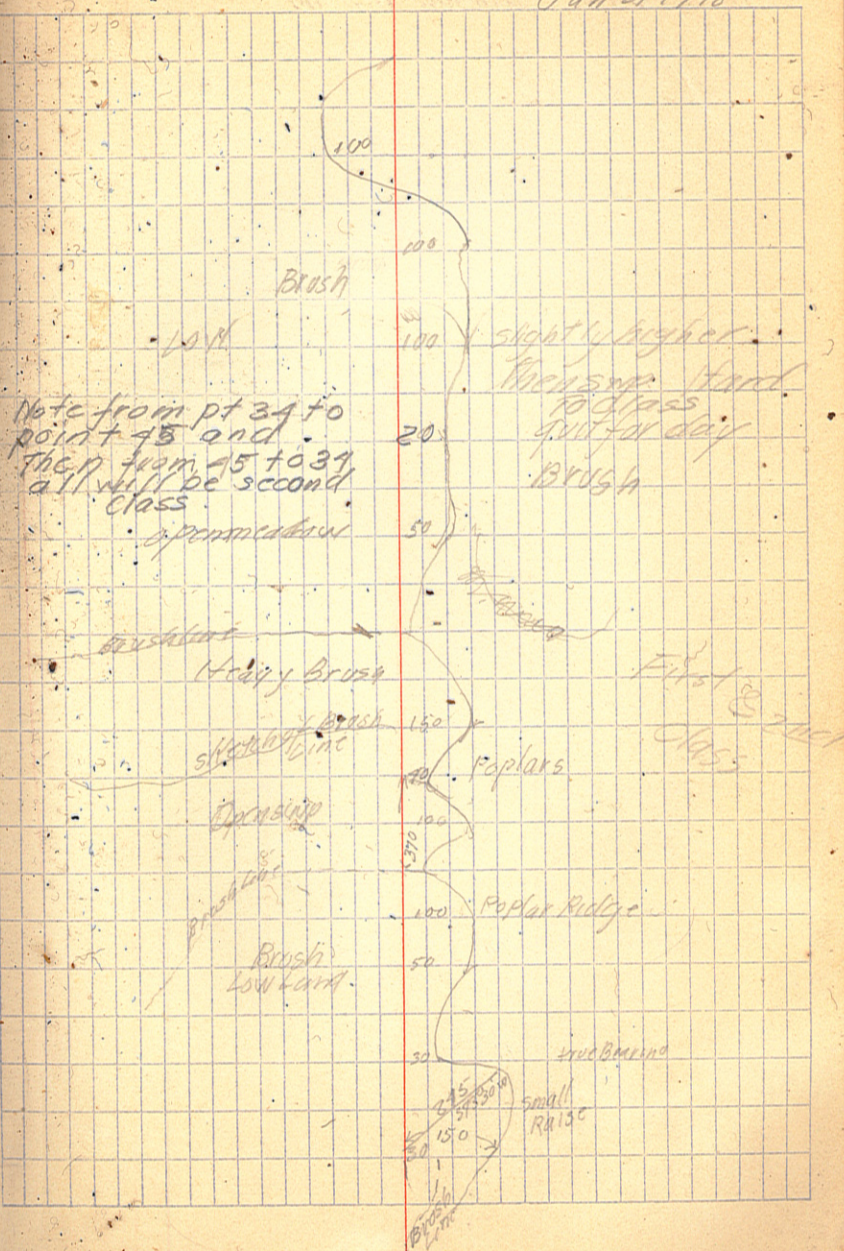
529°30'E 521°30'E Edged like

217



| Sta | Dist | Mag Bearing | TTRIC Bearing | |
|-----|------|-------------|---------------|------------------|
| 46 | 120 | N7°30'E | N13°30'E | |
| 45 | 467 | S79°15'E | S66°15'E? | |
| 44 | 230 | N59°E | N67°E | |
| 43 | 430 | N3°E | N11°00'E | |
| 42 | 280 | N48°15'E | N48°15'E | |
| 41 | 360 | N69°E | N72°E | |
| 40 | 200 | N19°E | N27°E | |
| 39 | 905 | N52°30'W | N44°30'W | |
| 38 | 348 | S77°W | S85°W | |
| 37 | 257 | S19°30'W | S27°30'W | |
| 36 | 580 | S41°15'W | S49°15'W | slut across neck |
| 35 | 274 | S30°15'E | S22°45'E | |

Traverse No 1 B. of Tra- No 1 28
Jan 21 1915



| sta | Dist | Mag Bearing | TRUE Bearing | |
|---------------------------------------|------|-------------|--------------|-------------|
| 2 | | N81°5'E | N89°45'E | in Road |
| | 445 | | | |
| | | N60°E | N66°E | set in Road |
| | 419 | | | |
| Note shots taken to locate Road E & W | | | | |
| 57 | | N149°30'E | N122°30'E | |
| | 275 | | | |
| 53 | | N42°15'E | N50°5'E | |
| | 360 | | | |
| 52 | | N78°E | N78°E | |
| | 310 | | | |
| 51 | | N11°W | N13°W | |
| | 162 | | | |
| 50 | | N27°30'W | N49°30'W | |
| | 245 | | | |
| 49 | | N42°W | N34°W | |
| | 295 | | | |
| 48 | | N13°E | N21°E | |
| | 484 | | | |
| 47 | | N43°W | N40°W | |
| | 335 | | | |

Traverse B^{No} 1 of T^{No} 29

Jan 22, 1918

very cold

No Cor found
 (see page)
 41 for location of NW cor sec 10, which was found to locate NW corner of start of road

25
 419
 75
 150

Continued on page 30

Hard to classify

Low brush land

slight raise
 1822 class
 small poplars

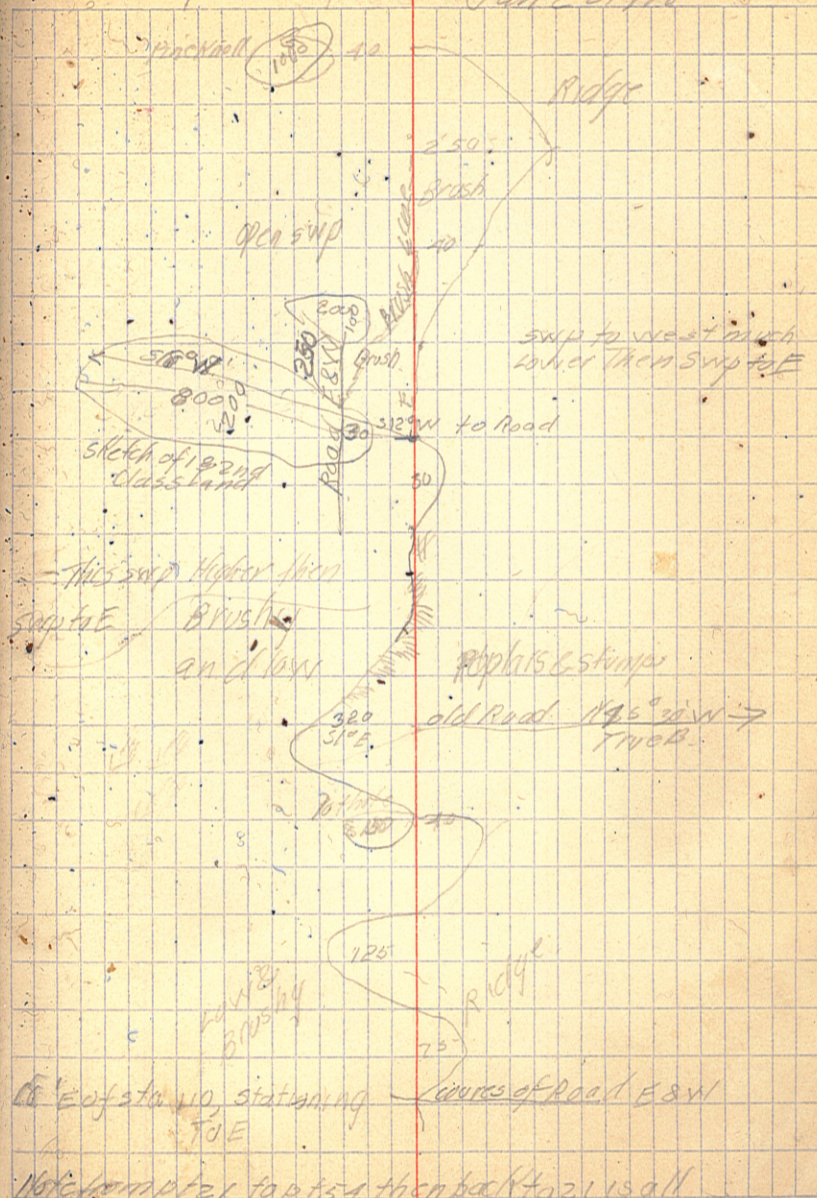
poplars and potatoes
 low & high bank
 to classify

EW Highway

| Sta | Dist | Mag. Bearing | TRUE Bearing |
|-----|------|--------------|--------------|
| 66 | | N12°15'W | N4°15'W |
| | 185 | | |
| 65 | | N15°E | N13°E |
| | 650 | | |
| 64 | | N49°W | N71°W |
| | 211 | | |
| 63 | | N74°15'W | N62°15'W |
| | 200 | | |
| 62 | | S74°45'W | S82°45'W |
| | 566 | | |
| 61 | | S37°W | S45°W |
| | 159 | | |
| 60 | | S70°30'W | S78°30'W |
| | 332 | | |
| 59 | | S80°W | S88°W |
| | 220 | | |
| 58 | | N61°30'W | N13°30'W |
| | 181 | | |
| 57 | | N26°15'E | N34°15'E |
| | 320 | | |
| 56 | | N44°30'W | N36°30'W |
| | 320 | | |
| 55 | | N69°30'W | N61°30'W |
| | 310 | | |
| | 500 | | |

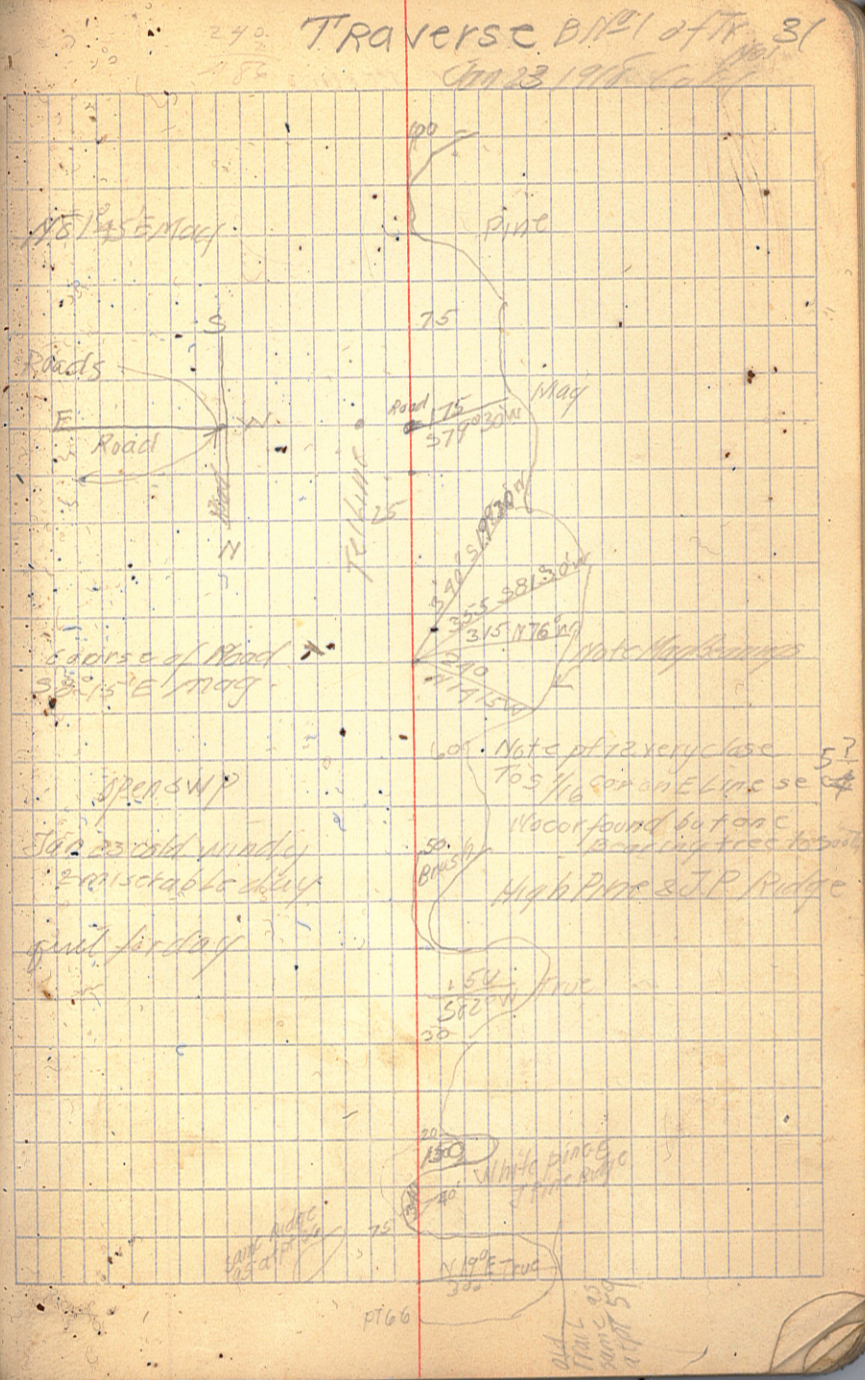
continue of from pt 84 page 29

Traverse No 18 of Tra No 1 30
Jan 22 1915

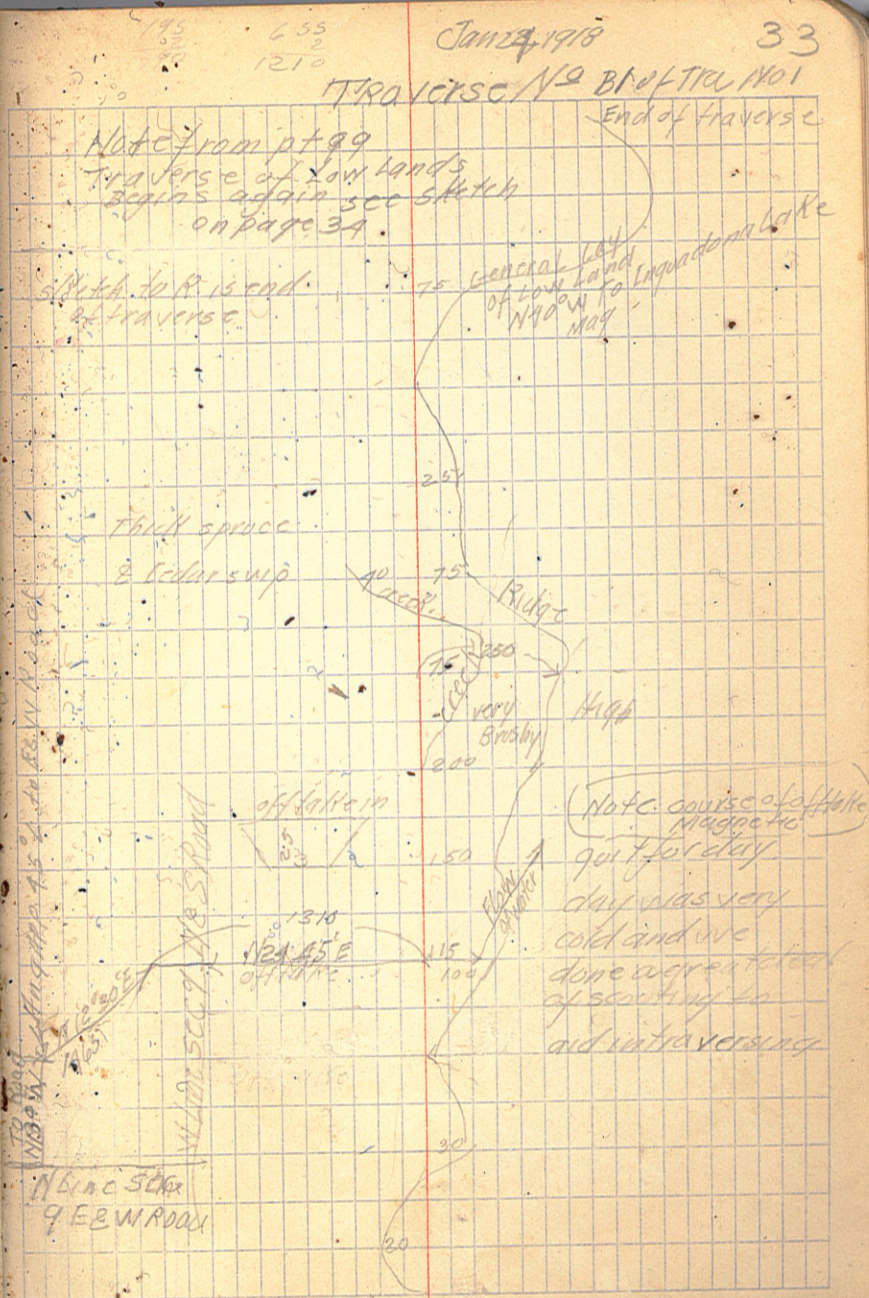


Note from pt 1 to pt 54 then back to 21 is all 1st & 2nd class, this area is hard to classify
For closure of traverse from pt 54 to the east see page 43

| Sta | Dist | Mag Bearing | True Bearing | |
|-----|------|-------------|-------------------------|-------------------|
| 78 | | S20°00'E | S12°E | |
| | 310 | | | |
| 77 | | S20°E | S12°E set on E & W Road | |
| | 285 | | | |
| 76 | | N62°E | N70°E | |
| | 310 | | | shot to Pt of |
| 75 | | S31°E | S23°E set in Road | |
| | 100 | | | 180° S9° Mag |
| 74 | | S19°30'W | S27°30'W | |
| 74 | 370 | S11°30'W | | |
| | 370 | | | |
| 73 | | S13°E | S5°E | set on N & S Road |
| | 145 | | | E Line sec 13 |
| 72 | | S49°45'W | S57°45'W | |
| | 186 | | | |
| 71 | | S00°15'E | S7°45'W? | |
| | 330 | | | |
| 70 | | S4°30'E | S8°30'W | |
| | 187 | | | |
| 69 | | S21°W | S29°W | |
| | 200 | | | |
| 68 | | N50°15'W | N42°15'W | |
| | 650 | | | |
| 67 | | S81°30'W | S89°30'W | |
| | 270 | | | |



| Sta | Dist | Mag. Bearing | True Bearing | |
|-----|------|-----------------------------|--------------|---|
| 97 | | 577°W | S 85°W | In Road |
| 52 | 180 | Note shots to Inquadon Lake | | |
| 96 | 350 | 563°W | S 71°W | In Road |
| 95 | 214 | 548°W | S 56°W | Road's R. |
| 94 | 290 | 537°W | S 45°W | In Road |
| 93 | 390 | 546°W | S 53°W | In Road |
| 92 | 150 | 56°E | S 2°W | Point on winter Road |
| 91 | 277 | 516°30'W | S 24°30'W | Exit of off track empties into small deck |
| 90 | 115 | 524°30'W | S 32°30'W | In angle of off track |
| 89 | 205 | 58°30'E | S 00°30'E | |
| 88 | 220 | 51°W | S 9°W | |
| 87 | 460 | 51°E | S 7°W? | |
| 86 | 570 | 530°30'E | S 22°30'E | |

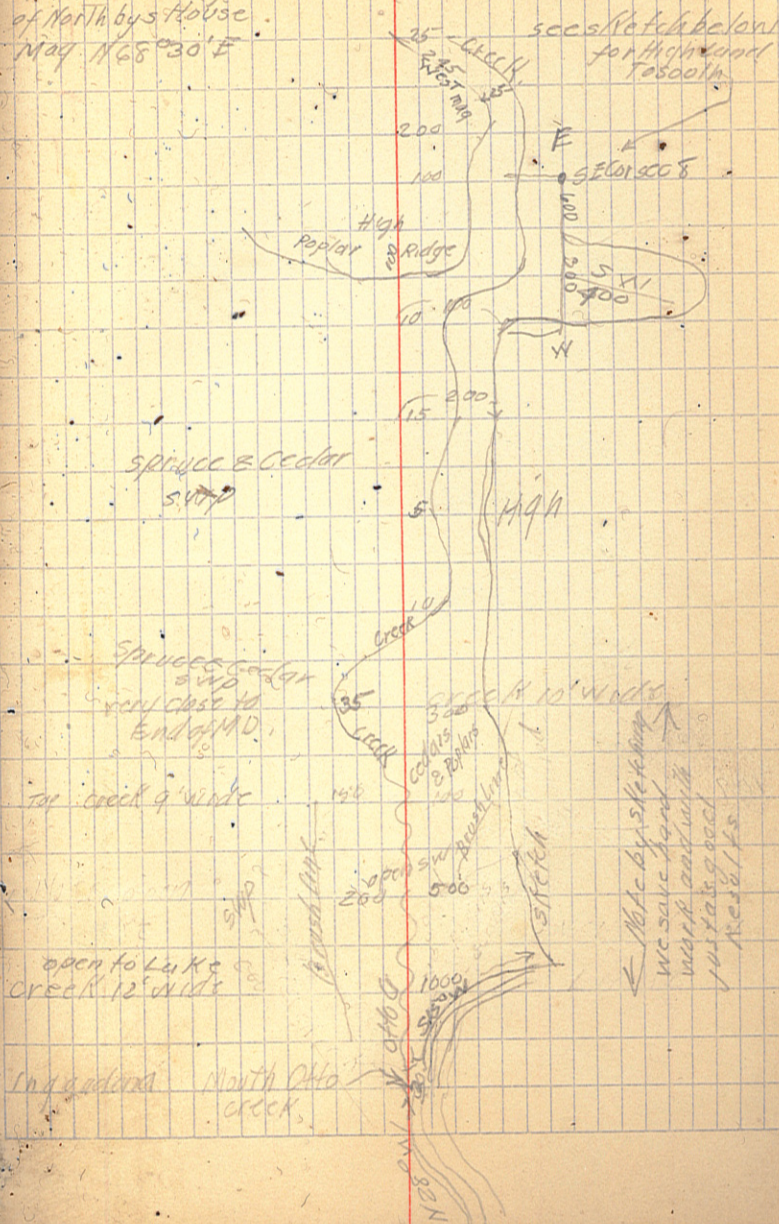


| Sta | Dist | Mag B. | True B. | |
|-----|------|----------|----------|---------------------------------|
| 107 | 280 | S47°E | S39°E | |
| 106 | 248 | S56°E | S48°E | in Road |
| 105 | 328 | S81°30'E | S73°30'E | Road to R |
| 104 | 197 | S54°30'E | S46°30'E | in Road |
| 103 | 335 | S69°E | S61°E | in Road |
| 103 | 116 | N67°36'E | N65°45'E | in Road |
| 102 | 205 | N29°30'E | N37°30'E | on Road |
| 102 | 315 | N45°18'E | N53°15'E | |
| 101 | 517 | N83°30'E | S88°30'E | creek |
| 100 | 374 | S24°5'E | S16°45'E | Creek |
| 99 | 360 | S24°E | S16°E | at top of |
| 98 | 760 | S89°W | N. 83° W | edge of Lake also E. of Road |

Traverse No 81
Jul 24 1918

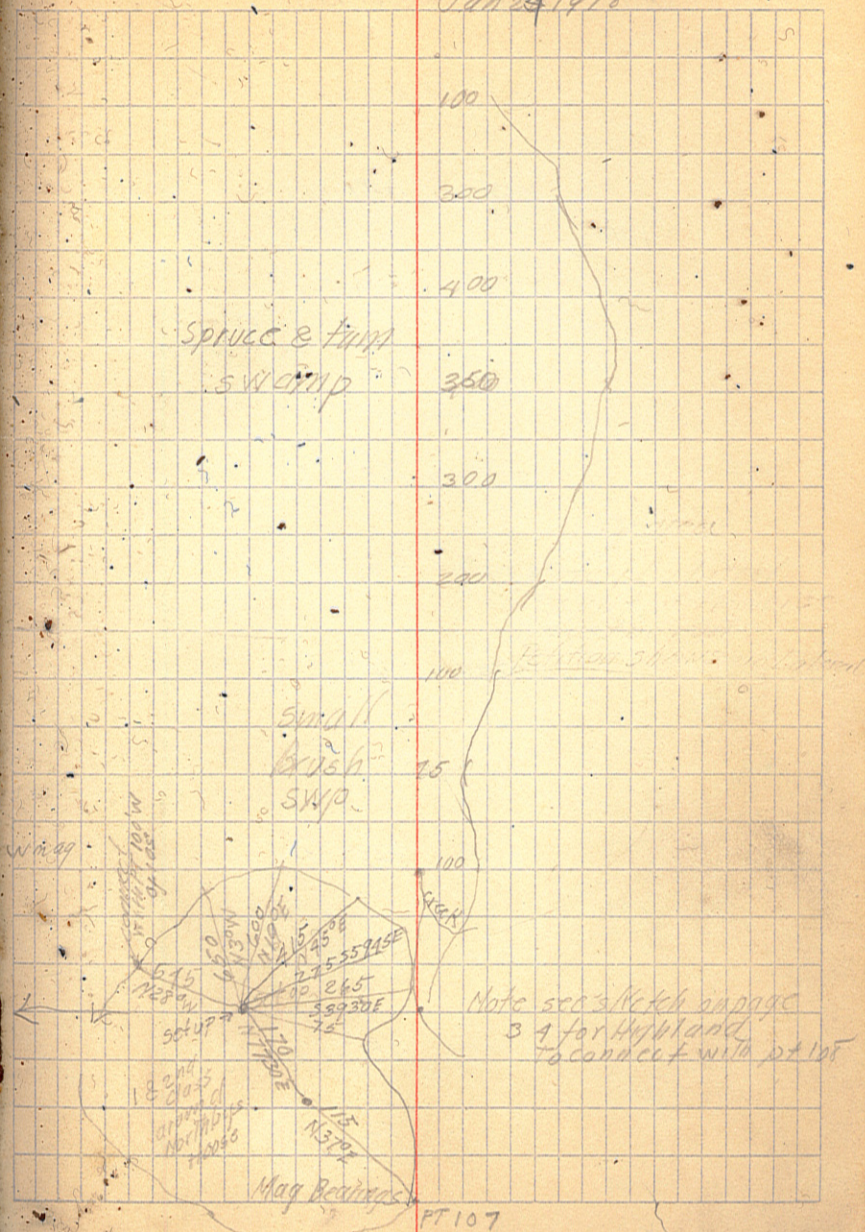
39

Shot for chimney center
of North bys House
Mag N68°30'E



| Sta | Dist | Mag Bearing | True Bearing | |
|-----|------|-------------|--------------|--|
| 117 | | S 65° 30' W | S 73° 30' W | in Road |
| | 384 | | | |
| 116 | | S 41° 30' W | S 49° 30' W | in Road |
| | 280 | | | |
| 115 | | S 8° 15' W | S 16° 15' W | in old Logroad |
| | 235 | | | |
| 114 | | S 81° 30' E | S 23° 30' E | |
| | 110 | | | |
| 113 | | S 18° E | S 10° E | |
| | 252 | | | |
| 112 | | S 13° 45' E | S 5° 45' E | |
| | 145 | | | |
| 111 | | S 35° 30' E | S 27° 30' E | |
| | 228 | | | |
| 110 | | S 17° 30' E | S 9° 30' E | SNOWY |
| | 200 | | | |
| 109 | | S 45° E | S 37° E | end of chimney of N.A. P.S. Hoop N.B. set in creek |
| | 360 | | | |
| 108 | | S 9° 30' E | S 1° 30' E | to 500 corners 8, 9, 16, 17 |
| | 305 | | | |
| | 115 | | | |

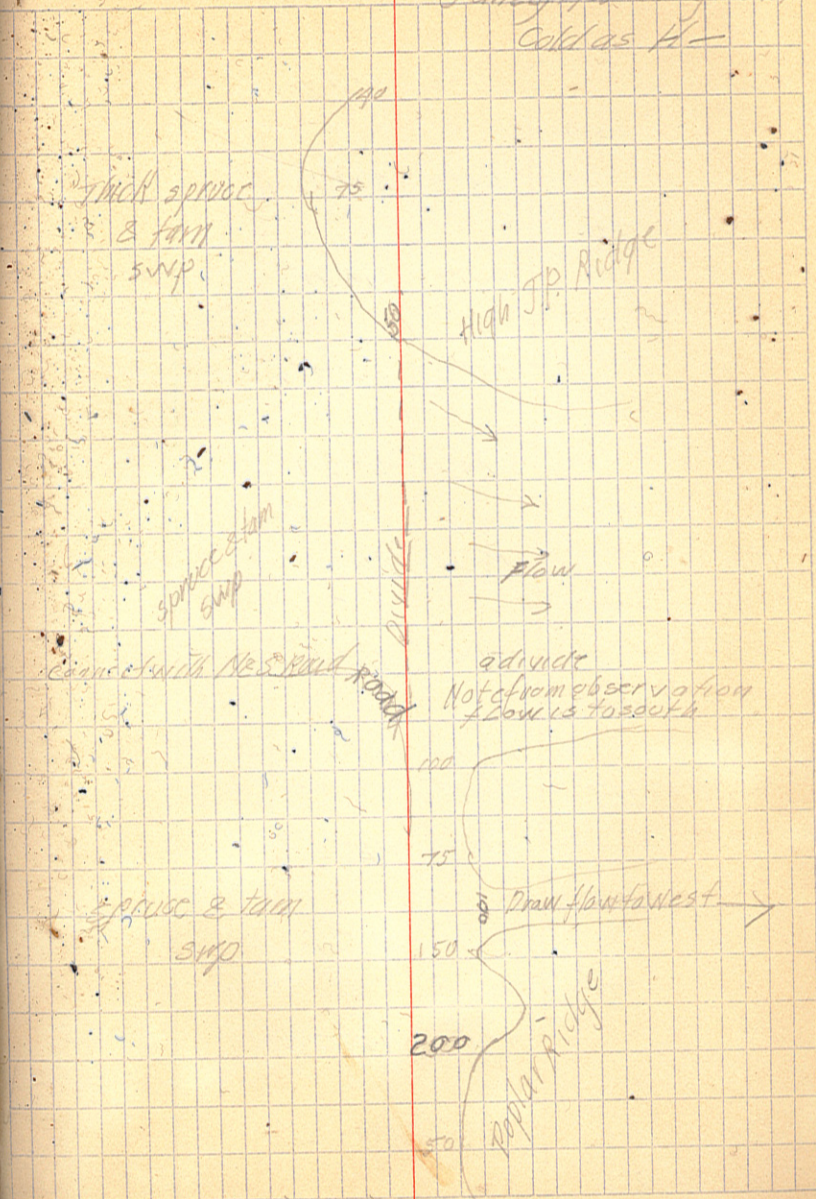
Traverse No. B1 35
Jan 24 1918



| Sta | Dist | Mag B | True B | |
|-----|------|----------|----------|------------------------|
| 129 | | N15°30'E | N23°30'E | |
| | 234 | | | |
| 128 | | N43°30'E | N51°30'E | |
| | 170 | | | |
| 127 | | S82°30'E | S74°30'E | |
| | 270 | | | |
| 126 | | S43°30'W | S51°30'W | P. 325°30'E in Road |
| | 124 | | | |
| 125 | | S68°30'E | S60°30'E | in Road |
| | 149 | | | |
| 124 | | S79°E | S71°E | in Road |
| | 190 | | | |
| 123 | | S71°E | S63°E | in Road |
| | 244 | | | |
| 122 | | S9°30'E | S1°30'E | |
| | 367 | | | |
| 121 | | S34°W | S42°W | in Road |
| | 420 | | | |
| 120 | | S10°W | S18°W | in Road |
| | 264 | | | |
| 119 | | S73°15'W | S51°15'W | in Road |
| | 358 | | | |
| 118 | | S71°15'W | S79°15'W | in Road |
| | 139 | | | |

Traverse No BL 36

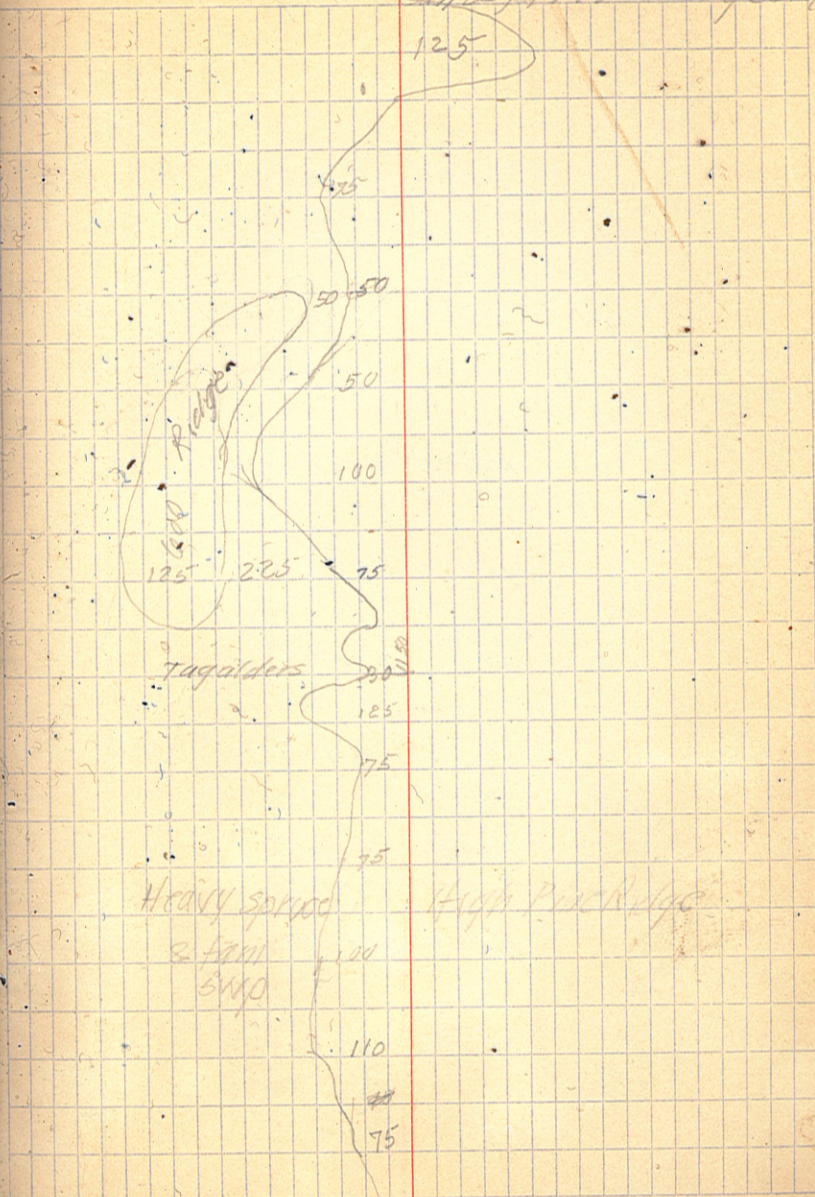
Jan 25, 1916 very cold
Cold as H-



| Sta | DIST | Mag Bearing | True Bearing |
|-----|------|-------------|--------------|
| 141 | | S68°30'W | S68°30'W |
| | 190 | | |
| 140 | | S9°15'W | S12°15'W |
| | 240 | | |
| 139 | | N87°E | N87°E |
| | 173 | | |
| 138 | | N59°30'E | N67°30'E |
| | 106 | | |
| 137 | | N69°E | N77°E |
| | 115 | | |
| 136 | | N86°45'E | S85°45'E |
| | 295 | | |
| 135 | | S78°30'E | S70°30'E |
| | 225 | | |
| 134 | | N17°15'W | N9°15'W |
| | 265 | | |
| 133 | | N15°30'E | N23°30'E |
| | 168 | | |
| 132 | | N10°15'W | N2°15'W |
| | 175 | | |
| 131 | | N24°30'W | N26°30'W |
| | 327 | | |
| 130 | | N22°E | N30°E |
| | 220 | | |

Traverse No BI 37

Jan 25, 1918 very cold



| sta | DIST | MAG Bearing | TRUE Bearing |
|-----|------|-----------------------|-----------------------|
| 153 | 175 | N31 ³⁰ E | N39 ³⁰ E |
| 152 | 255 | N32 ⁰ E | N40 ⁰ E |
| 151 | 350 | N8 ⁰ E | N16 ⁰ E |
| 150 | 290 | S81 ⁰ E | S73 ⁰ E |
| 149 | 120 | N69 ⁰ E | N77 ⁰ E |
| 148 | 305 | N52 ⁰ E | N60 ⁰ E |
| 147 | 210 | N31 ⁰ 30'E | N39 ³⁰ E |
| 146 | 330 | N24 ⁰ E | N32 ⁰ E |
| 145 | 210 | N82 ⁰ 30'E | S89 ³⁰ E |
| 144 | 215 | S25 ⁰ 15'E | S17 ⁰ 15'E |
| 143 | 220 | S14 ⁰ 30'N | S22 ⁰ 30'W |
| 142 | 110 | S29 ⁰ E | S21 ⁰ E |

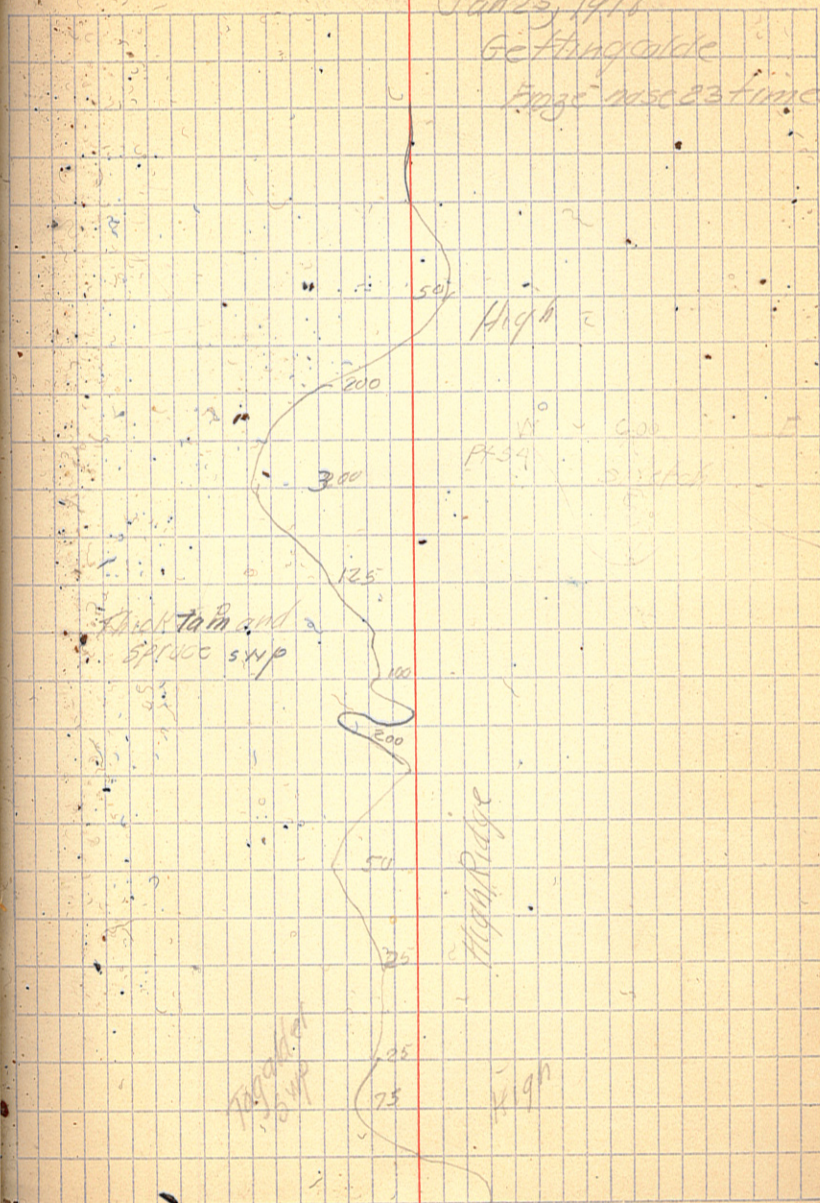
17 1/2
350

Traverse No. B1 38

Jan 25, 1918

Getting colder

Finger nose 23 times



| Sta | Dist | Mag Bearing | True Bearing |
|-----|------|-------------|--------------|
| 170 | | N79°30'E | N87°30'E |
| | 313 | | |
| 169 | | S31°E | S23°E |
| | 187 | | |
| 168 | | S72°W | S64°E |
| | 110 | | |
| 167 | | N3°30'W | N4°30'E |
| | 300 | | |
| 166 | | N9°E | N17°E |
| | 230 | | |
| 165 | | N39°30'E | N47°30'E |
| | 174 | | |
| 164 | | N20°E | N28°E |
| | 377 | | |
| 163 | | N9°30'W | N1°30'W |
| | 235 | | |
| 162 | | N71°45'E | N84°43'E |
| | 245 | | |
| 161 | | N3°E | N11°E |
| | 125 | | |
| 160 | | N47°30'E | N55°30'E |
| | 167 | | |
| 159 | | N34°30'E | N42°30'E |
| | 255 | | |

Traverse No B1 40

Jan 26 1915

Caddis the dieters

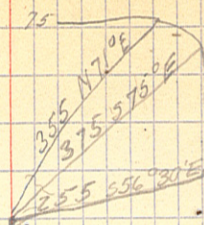


| Sta | dist | Mag. Bearing | True Bearing | |
|---------------------------------------|------|--------------|--------------|---|
| 8 | 447 | N43°30'E | N51°30'E | |
| 7 | 123 | N73°15'E | N81°15'E | |
| 6 | 395 | N4°30'E | N12°30'E | |
| 5 | 500 | N4°30'W | N3°30'E | |
| 4 | 565 | N16°15'W | N8°15'W | |
| 3 | 207 | N3°W | N5°E | Set in Road N. Line 10 |
| 2 | 700 | N17°45'W | N9°45'W | |
| 1 | 470 | N19°30'E | N27°30'E | |
| N 1/4 Cor = 00 traverse No 5 | | | | |
| Start from N 1/4 cor West Line sec 10 | | | | |
| X | X | X | X | X |
| | 485 | S9°45'E | S1°45'E | to S.W. cor sec 10 |
| 170 | 185 | S49°30'E | S41°30'E | set 15' south of pt N 1/2 cor Traverse No 1 |

Traverse No 5 71

Jan 26, 1918

From pt 18 to 14
Brush Dam



High

Open SWP

N 1/4 Cor
Sec 10

147
S82°15'W
Mag

open
Meadow

High

120 connect with point 20
of Traverse No 1

N 1/4 Cor
Sec 10
Pt 1 page 22

170
N19°30'E
Mag

147-27

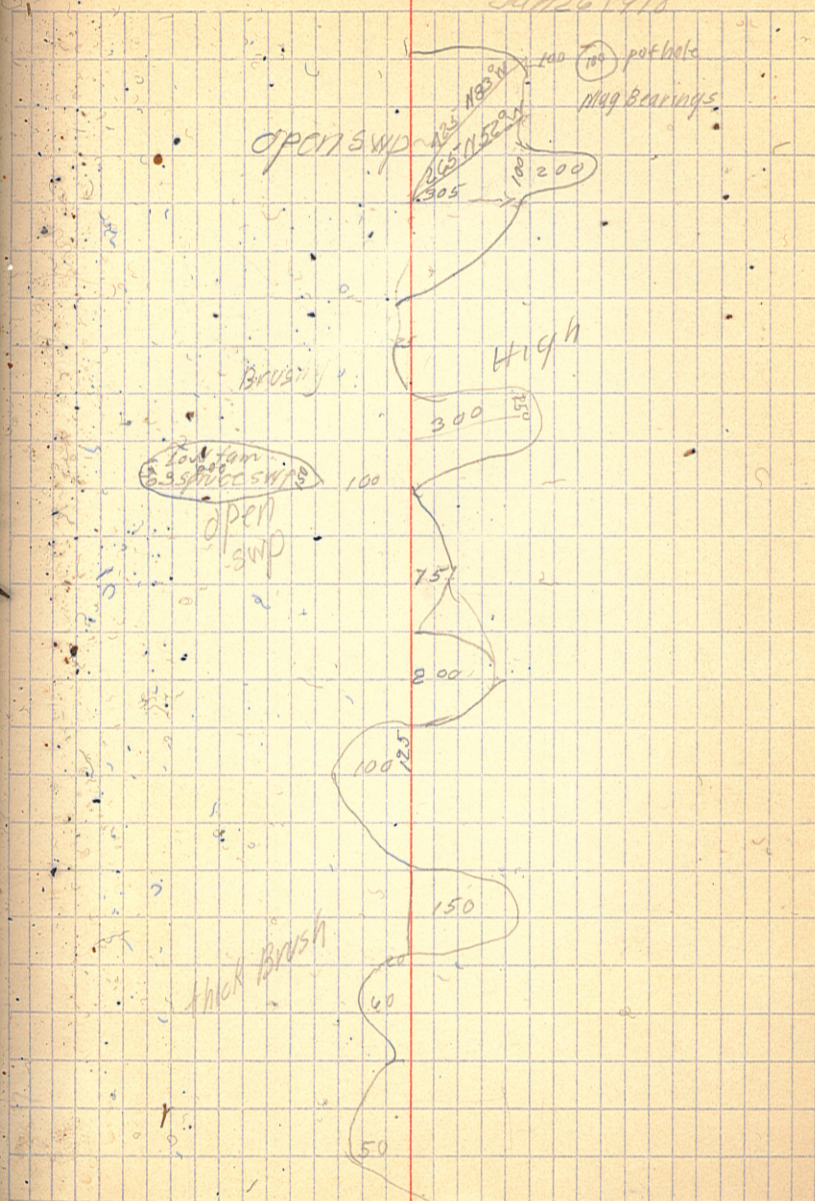
Note cor set pt 170 and
point 101 of traverse
No 1

| Sta | Dist | Mag B | True B |
|-----|------|-------------|-------------|
| 20 | 570 | S 62° 30' W | S 70° 30' W |
| 19 | 508 | S 29° 30' W | S 32° 30' W |
| 18 | 550 | S 5° 30' E | S 2° 30' W |
| 17 | 390 | S 60° 45' W | S 68° 45' W |
| 16 | 420 | N 87° W | N 69° W |
| 15 | 450 | N 66° W | N 58° W |
| 14 | 610 | N 17° W | N 9° W |
| 13 | 335 | N 5° 45' E | N 13° 45' E |
| 12 | 130 | N 68° 30' E | N 76° 30' E |
| 11 | 217 | S 68° 45' E | S 60° 45' E |
| 10 | 125 | S 89° 15' E | S 81° 15' E |
| 9 | 235 | S 70° 15' E | S 62° 15' E |

Traverse No 5

2017261918

42



75

5th Dist. Mag Bearing True B.
 600' Line Sec 10 E

pt 54

Sketch

416 cor

| | | | |
|----|-----|---------------------|-----------------------------------|
| 30 | 275 | S53°45' E S45°45' E | |
| 29 | 352 | S59°30' E S51°30' E | |
| 28 | 630 | S29°15' W S32°15' W | |
| 27 | 440 | S58°15' W S58°15' W | |
| 26 | 330 | S5°15' W S13°15' W | |
| 25 | 150 | S38°15' E S30°15' E | Set in F 2 W Road N 1/2 Sec 10 |
| 24 | 200 | S21°15' E S13°15' E | |
| 23 | 630 | S41°15' E S33°15' E | |
| 22 | 230 | S28°15' E S28°15' E | |
| 21 | 445 | S34° E S26° E | |

176
332

Traverse No

43

Date Jan 27/1917

Note from pt 54 B 181

to pt 300' south of west
 of pt 26 of trav N 3

(For Ex) from 23 B 181 around
 top 64 thence to pt 300' SW
 of 26 N 3 thence to pt 22.
 is 12 and cross
 connect this with B 181
 Traverse

Note from pt 20

of trav B N 1 to pt 3

to pt 23 thence

around to pt 8

and 100 ft to pt 20

is second class

open hay
 meadow

tie to N 1
 cor sec 10

400' north

50'

121' W

2050'

25'

400' S 120° W
 260' S 75° W

50'

125'

50'

50'

50'

50'

50'

50'

50'

50'

50'

50'

50'

50'

50'

50'

416 cor sec 10
 Mag Bearing

Mag Bearings

open swamp

Daily notes Co Ditch No 13

Feb 14, 1918, Pomasel & Stark weather
Leave Pine River for L.R. Bair's to
make final survey of Co Ditch No 13.
We make trip in one day.

Feb 15, 1918. Pomasel and Stark weather
Look for sec corners and set line stakes.
To did in running line of Co. Ditch No 13.

Feb 16, 1917. J. Pomasel & W. Stark weather
With the help of Wayne McVay, run
6500' of Lat No 2 and then brushed
1700' of sec line.

Feb 17. same crew run out Lat No 2.

Feb 18. Pomasel & Starky, set line
stake sand brush Main Ditch.
Wayne McVay stays home to saw
wood.

Feb 19. Full crew work on M.D. and brush
very cold day.

Feb 20, 1918 32 Below too cold to run
transit so we cut line and
chain bill of M.D. and Lat.

Feb 21, Pomasel & Starky locate
Lat No 3 & 4 and brush same.
W McVay did not work.

Feb 22. We read angles and
extend Lat No 4 North to Road
N line sec 9.

Feb 23. run Levels. the day is fine

Feb 24, 1918 Pomasel & Starky do not
work (Sun). Starky leaves
for P.P. acct Prippe

Feb 25. AM. Did not work too cold
and a blizzard. PM. Pomasel
& McVay finish transit line and
run 3200' Levels on lat No 1

44

Feb 26, 1918 Pomasel & W McVay run Levels
on lat Nos 4 & 3 & 2. Fine day occasionally
we had snow flurries

Feb 27, 1917. W McVay Rods for the day.
and Pomasel works all day
at odds & ends

Feb 28 Pomasel leaves work and goes
to Pine River

Mar 1, Starky works in office in notes
Pomasel does not work.

Mar 2. Pomasel & Starky in office on profile

Mar 4. 1' Starky works 3/4 day. "

Mar 5 - Pomasel works on profile
Starky is @ Walker for 2 1/2 hours

" 6 Pomasel and Starky in office on profile

" 7 " " " " " " " "

" 8 " " " " " " " "

" 9 Pomasel on Map.

" 11 " & Starky in office on profile
making out sheets

" 12. On Profile

Reserved for
notes

45-

- 22
- 21
- 20
- 19
- 18
- 17
- 16
- +32
- 15
- +68
- 14
- 13
- 12
- 11
- 10
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1
- 00

Truc Bearing

Beaverdam

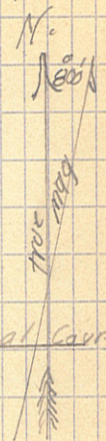
$\Delta 2634' L N 38 41' W$ Pot hole

SPike P.O.F. on E & W Line Center of 60' Road
 on $20' \times 20'$ G.P. now in.

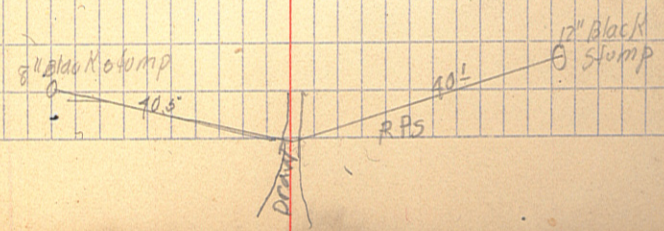
SPike $\Delta 1072' N 40 07' W$ 800' var.
 From Mag North

J.F. Ponsell Transit Feb 16, 1945 46
 W. Star Weather Rod
 W. M. Gray Freeman

L.M.T. No. 1 Co. D, 1st Inf. No. 13
 L & R.



+2813' General Course of Road



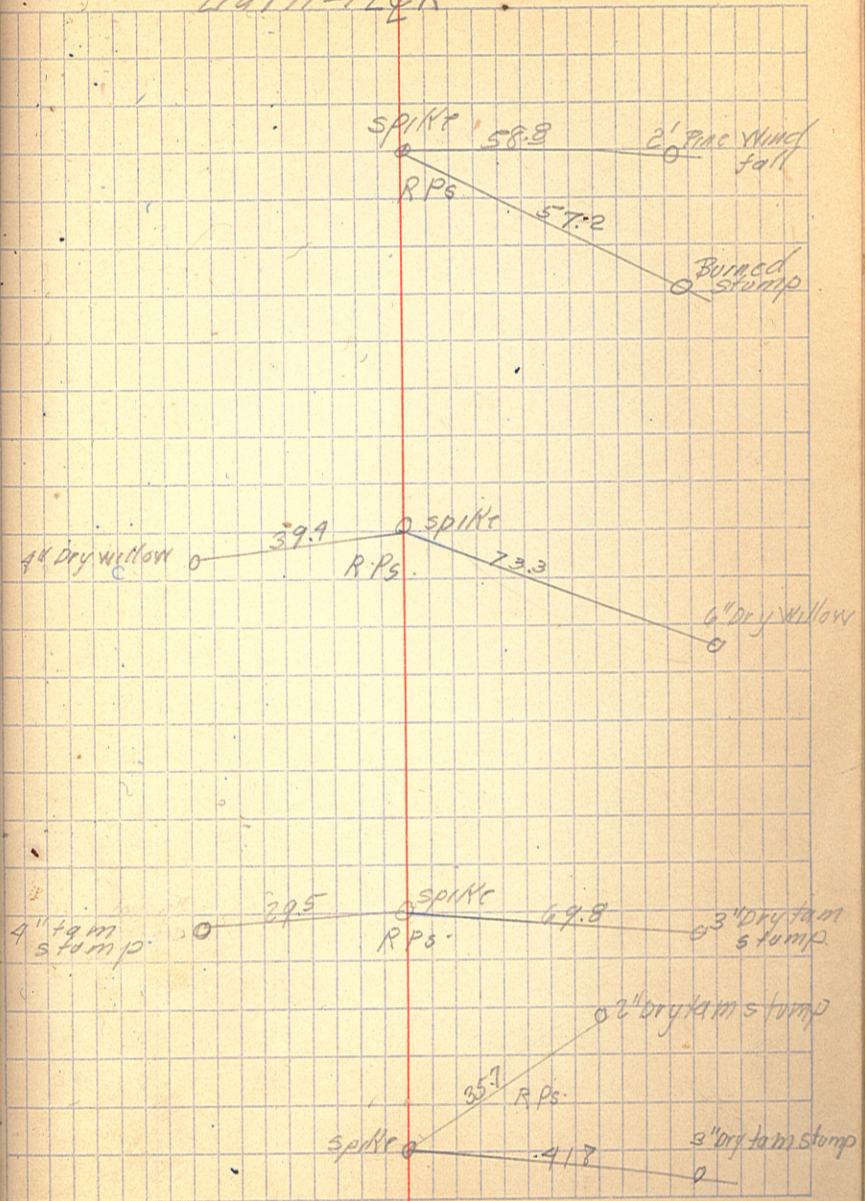
44
 43
 42
 4954 $\Delta 32^{\circ} 02' L$ $\Delta 87^{\circ} 31' W$
 41
 40
 39
 38
 37
 36
 35
 +112 $\Delta 18^{\circ} 37' L$ $N 53^{\circ} 16' W$
 34
 33
 32
 31
 30
 29
 28
 +38.5 $\Delta 27^{\circ} 41' R$ $N 34^{\circ} 32' W$
 27
 26
 25
 24
 +27.3 $\Delta 31^{\circ} 42' L$ $N 62^{\circ} 13' W$
 23

N 2001
 3/12
 62/13

Feb 16, 1918.

47

Lat N 0110 R



Lot No 1 Co Ditch No 13

67

+372 $\Delta 20^{\circ} 24' L$ $558^{\circ} 39' W$

66

65 Pot. SPIAT

64

63

62

61

60

59

58

57

56

55

+465 $\Delta 46^{\circ} 26' R$ $438^{\circ} 45' W$

54

53

52

51

50

49

48

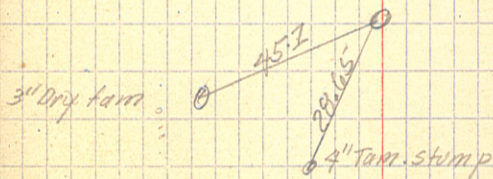
47

46

45

L R Feb 16, 1915 48

Leave lat & run section west line Sec 10 See page 55



+429 End Lat No 1

86

85

84

83

82

81

80

79

78

77

76

75

74

73

+82

72

71

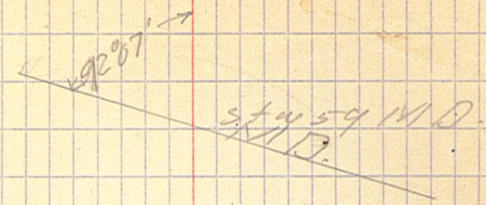
70

69

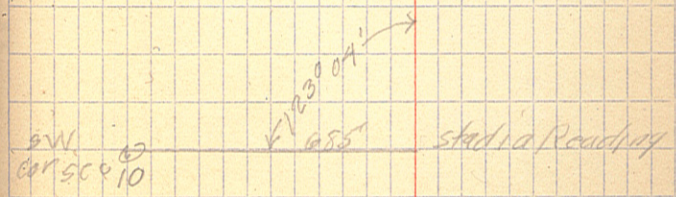
68

558°39'W

Lat No 1. 49
 cold & Windy



Lat No 1



Lat No 2 of Co Ditch No 13

+125 A 7°17' R

21

20

19

18

+01.6 @ Pot. Spike

17

16

15

14

13

12

11

10

9

8

7

6

5

4

+77' A 90°13' R

3

2

1

00 77°25' R

Flag 20' L on sec line
su ppos ed. N 1/4 cor West
side sec 10

20' E of W 1/4 cor sec 10

Center of E & W. Winter Road

00 = 43 + 41⁹ Main Ditch

Pennscl
Stark
MEVdy

Feb 17, 1918

57

41 poplar

39.95

20

3 poplar

35.9

LEAVE LINE 20' E of sec
LINE, acct. High
ground

dry
tam log

44.7

P.P.S.

57.9

dry tam log

sec line W side sec 10 - 140-87

20

cor 1/4

Ditch

20

00 = Sta

of Main Ditch

Lgt No 2 of Co Ditch
No 13.

44 A5639'R
43
42
41
40
39
38
37
36
35
34
33
32
31

#267

+1094 ΔR° 10'L

30
29
28
27
26
25
24
23
22

Center of E&W Road.

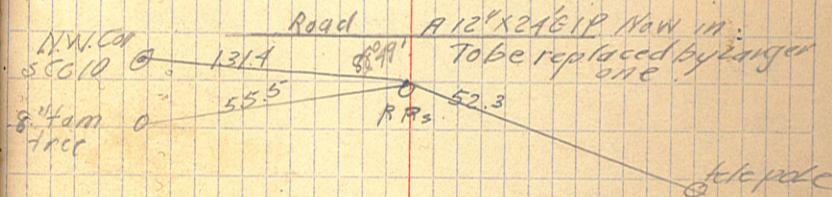
same crew

Feb 18, 1915

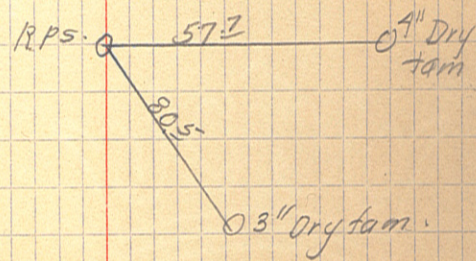
52

Quit for Day Part.

For reference tangent produced.
a 8" poplar.



62. End of Line
 61
 60
 59
 58
 57
 56. POT. SPIKE End of Lat
 55
 54
 53
 52
 51
 50
 49
 48
 47
 46
 45



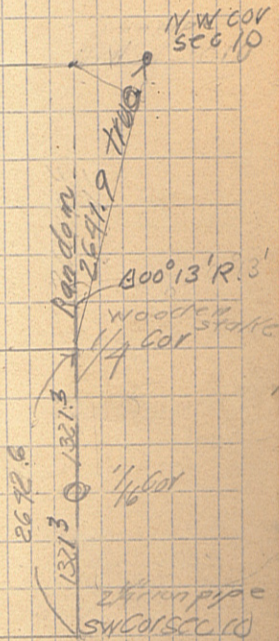
22.1
21.3

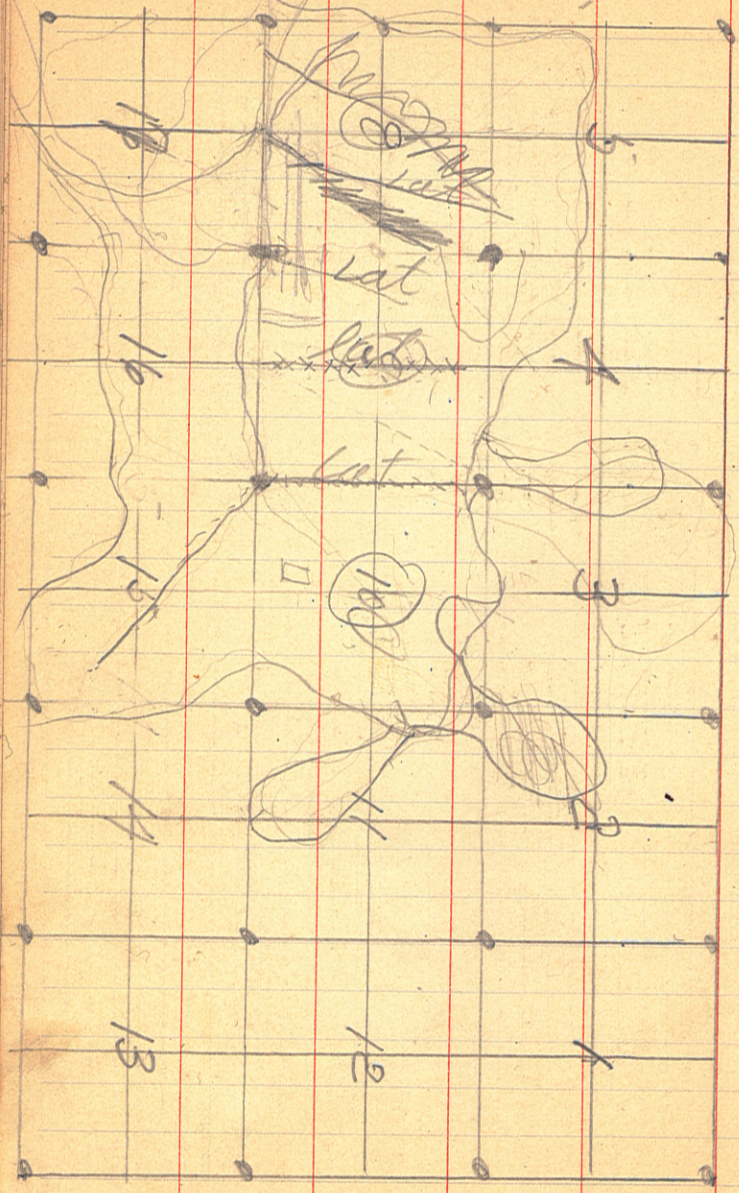
56

N



Center
9





171687
75' 50" whole

TWP 140 R 27 W.

KEITH'S RAILROAD CURVE TABLES.

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HOW TO USE KEITH'S TABLES.

EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle
of Intersection or I. P. = $23^{\circ} 20'$ to the R. at Station
542+73.

Ext. in Tab. IV opposite $23^{\circ} 20' = 120.87$
 $120.87 + 12 = 10.07$. Say a 10° Curve.

Tan. in Tab. IV opp. $23^{\circ} 20' = 1183.1$
 $1183.1 + 10 = 118.31$.

Tab. V. correction for A. $23^{\circ} 20'$ for a 10° Cur. = 0.16
 $118.31 + 0.16 = 118.47 = \text{corrected Tangent}$.

(If corrected Ext. is required find in same way)
Ang. $23^{\circ} 20' = 23.33^{\circ} + 10 = 2.3333 = \text{L. C.}$

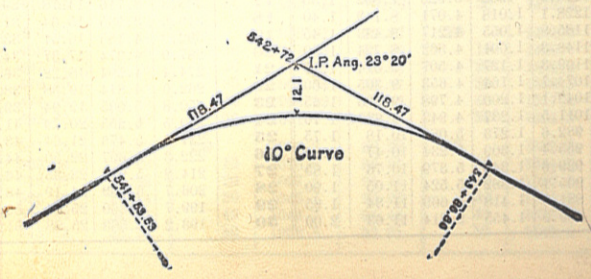
| | | |
|--|--------------|-----------|
| $2^{\circ} 19\frac{1}{2}' = \text{def. for sta. } 542$ | I. P. = sta. | 542+73 |
| $4^{\circ} 49\frac{1}{2}' = \text{" " " } +50$ | Tan. = | 118.47 |
| $7^{\circ} 19\frac{1}{2}' = \text{" " " } 543$ | B. C. = sta. | 541+53.53 |
| $9^{\circ} 49\frac{1}{2}' = \text{" " " } +50$ | L. C. = | 2.33.33 |
| $11^{\circ} 40' = \text{" " " } 543+$ | E. C. = sta. | 543+86.86 |
| | | |

$100 - 53.53 = 46.47 \times 3' (\text{def. for 1 ft. of } 10^{\circ} \text{ Cur.}) = 139.41' =$
 $2^{\circ} 19\frac{1}{2}' = \text{def. for sta. } 542.$

Def. for 50 ft. = $2^{\circ} 30'$ for a 10° Curve.

Def. for 36.86 ft. = $1^{\circ} 50\frac{1}{2}'$ for a 10° Curve

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



Natural Tangents

| sec. | 0' | 10' | 20' | 30' | 40' | 50' | less. | 0' | 10' | 20' | 30' | 40' | 50' | less. |
|------|------|------|------|------|------|------|-------|--------|--------|--------|--------|--------|--------|-------|
| 0 | 0000 | 0029 | 0058 | 0087 | 0116 | 0145 | 89140 | 8391 | 8441 | 8491 | 8541 | 8591 | 8642 | 49 |
| 1 | 0175 | 0204 | 0233 | 0262 | 0291 | 0320 | 8841 | 8693 | 8744 | 8795 | 8847 | 8899 | 8952 | 48 |
| 2 | 0349 | 0378 | 0407 | 0437 | 0466 | 0495 | 8742 | 9004 | 9057 | 9110 | 9163 | 9217 | 9271 | 47 |
| 3 | 0524 | 0553 | 0582 | 0612 | 0641 | 0670 | 8643 | 9325 | 9380 | 9435 | 9490 | 9545 | 9601 | 46 |
| 4 | 0699 | 0729 | 0758 | 0787 | 0816 | 0846 | 8544 | 9657 | 9713 | 9770 | 9827 | 9884 | 9942 | 45 |
| 5 | 0875 | 0904 | 0934 | 0963 | 0992 | 1022 | 8445 | 1.0000 | 1.0058 | 1.0117 | 1.0176 | 1.0235 | 1.0295 | 44 |
| 6 | 1051 | 1080 | 1110 | 1139 | 1169 | 1198 | 8346 | 1.0355 | 1.0416 | 1.0477 | 1.0538 | 1.0599 | 1.0661 | 43 |
| 7 | 1228 | 1257 | 1287 | 1317 | 1346 | 1376 | 8247 | 1.0724 | 1.0786 | 1.0850 | 1.0913 | 1.0977 | 1.1041 | 42 |
| 8 | 1405 | 1435 | 1465 | 1495 | 1524 | 1554 | 8148 | 1.1106 | 1.1171 | 1.1237 | 1.1303 | 1.1369 | 1.1436 | 41 |
| 9 | 1584 | 1614 | 1644 | 1673 | 1703 | 1733 | 8049 | 1.1504 | 1.1571 | 1.1640 | 1.1708 | 1.1778 | 1.1847 | 40 |
| 10 | 1763 | 1793 | 1823 | 1853 | 1883 | 1914 | 7950 | 1.1918 | 1.1988 | 1.2059 | 1.2131 | 1.2203 | 1.2276 | 39 |
| 11 | 1944 | 1974 | 2004 | 2035 | 2065 | 2095 | 7851 | 1.2349 | 1.2423 | 1.2497 | 1.2572 | 1.2647 | 1.2723 | 38 |
| 12 | 2126 | 2156 | 2186 | 2217 | 2247 | 2278 | 7752 | 1.2799 | 1.2876 | 1.2954 | 1.3032 | 1.3111 | 1.3190 | 37 |
| 13 | 2309 | 2339 | 2370 | 2401 | 2432 | 2462 | 7653 | 1.3270 | 1.3351 | 1.3452 | 1.3514 | 1.3597 | 1.3680 | 36 |
| 14 | 2493 | 2524 | 2555 | 2586 | 2617 | 2648 | 7554 | 1.3764 | 1.3848 | 1.3934 | 1.4019 | 1.4106 | 1.4193 | 35 |
| 15 | 2679 | 2711 | 2742 | 2773 | 2805 | 2836 | 7455 | 1.4281 | 1.4370 | 1.4460 | 1.4550 | 1.4641 | 1.4733 | 34 |
| 16 | 2867 | 2899 | 2931 | 2962 | 2994 | 3026 | 7356 | 1.4826 | 1.4919 | 1.5013 | 1.5108 | 1.5204 | 1.5301 | 33 |
| 17 | 3057 | 3089 | 3121 | 3153 | 3185 | 3217 | 7257 | 1.5399 | 1.5497 | 1.5597 | 1.5697 | 1.5798 | 1.5900 | 32 |
| 18 | 3249 | 3281 | 3314 | 3346 | 3378 | 3411 | 7158 | 1.6003 | 1.6107 | 1.6212 | 1.6319 | 1.6426 | 1.6534 | 31 |
| 19 | 3443 | 3476 | 3508 | 3541 | 3574 | 3607 | 7059 | 1.6643 | 1.6753 | 1.6864 | 1.6977 | 1.7090 | 1.7205 | 30 |
| 20 | 3640 | 3673 | 3706 | 3739 | 3772 | 3805 | 6960 | 1.7321 | 1.7437 | 1.7556 | 1.7675 | 1.7797 | 1.7917 | 29 |
| 21 | 3839 | 3872 | 3906 | 3939 | 3973 | 4006 | 6861 | 1.8040 | 1.8165 | 1.8291 | 1.8418 | 1.8546 | 1.8676 | 28 |
| 22 | 4040 | 4074 | 4108 | 4142 | 4176 | 4210 | 6762 | 1.8807 | 1.8940 | 1.9074 | 1.9210 | 1.9347 | 1.9486 | 27 |
| 23 | 4245 | 4279 | 4314 | 4348 | 4383 | 4417 | 6663 | 1.9626 | 1.9768 | 1.9912 | 2.0057 | 2.0204 | 2.0353 | 26 |
| 24 | 4452 | 4487 | 4522 | 4557 | 4592 | 4628 | 6564 | 2.0503 | 2.0655 | 2.0809 | 2.0965 | 2.1123 | 2.1283 | 25 |
| 25 | 4663 | 4699 | 4734 | 4770 | 4806 | 4841 | 6465 | 2.1445 | 2.1609 | 2.1775 | 2.1943 | 2.2113 | 2.2286 | 24 |
| 26 | 4877 | 4913 | 4950 | 4986 | 5022 | 5059 | 6366 | 2.2460 | 2.2637 | 2.2817 | 2.2998 | 2.3183 | 2.3369 | 23 |
| 27 | 5095 | 5132 | 5169 | 5206 | 5243 | 5280 | 6267 | 2.3559 | 2.3750 | 2.3945 | 2.4142 | 2.4342 | 2.4545 | 22 |
| 28 | 5317 | 5354 | 5392 | 5430 | 5467 | 5505 | 6168 | 2.4751 | 2.4960 | 2.5172 | 2.5386 | 2.5605 | 2.5826 | 21 |
| 29 | 5543 | 5581 | 5619 | 5658 | 5696 | 5735 | 6069 | 2.6051 | 2.6279 | 2.6511 | 2.6746 | 2.6985 | 2.7228 | 20 |
| 30 | 5774 | 5812 | 5851 | 5890 | 5930 | 5969 | 5970 | 2.7475 | 2.7725 | 2.7980 | 2.8239 | 2.8502 | 2.8770 | 19 |
| 31 | 6009 | 6048 | 6088 | 6128 | 6168 | 6208 | 5871 | 2.9042 | 2.9319 | 2.9600 | 2.9887 | 3.0178 | 3.0475 | 18 |
| 32 | 6249 | 6289 | 6330 | 6371 | 6412 | 6453 | 5772 | 3.0777 | 3.1084 | 3.1397 | 3.1716 | 3.2041 | 3.2371 | 17 |
| 33 | 6494 | 6536 | 6577 | 6619 | 6661 | 6703 | 5673 | 3.2709 | 3.3052 | 3.3402 | 3.3759 | 3.4124 | 3.4495 | 16 |
| 34 | 6745 | 6787 | 6830 | 6873 | 6916 | 6959 | 5574 | 3.4874 | 3.5261 | 3.5656 | 3.6059 | 3.6470 | 3.6891 | 15 |
| 35 | 7002 | 7046 | 7089 | 7133 | 7177 | 7221 | 5475 | 3.7321 | 3.7760 | 3.8208 | 3.8657 | 3.9136 | 3.9617 | 14 |
| 36 | 7265 | 7310 | 7355 | 7400 | 7445 | 7490 | 5376 | 4.0108 | 4.0611 | 4.1126 | 4.1653 | 4.2193 | 4.2747 | 13 |
| 37 | 7536 | 7581 | 7627 | 7673 | 7720 | 7766 | 5277 | 4.3315 | 4.3897 | 4.4494 | 4.5107 | 4.5736 | 4.6382 | 12 |
| 38 | 7813 | 7860 | 7907 | 7954 | 8002 | 8050 | 5178 | 4.7046 | 4.7729 | 4.8430 | 4.9152 | 4.9894 | 5.0658 | 11 |
| 39 | 8098 | 8146 | 8195 | 8243 | 8292 | 8342 | 5079 | 5.1446 | 5.2257 | 5.3093 | 5.3955 | 5.4845 | 5.5764 | 10 |

| sec. | 60' | 50' | 40' | 30' | 20' | 10' | less. | 60' | 50' | 40' | 30' | 20' | 10' | less. |
|------|--------|--------|--------|--------|--------|--------|-------|--------|--------|--------|---------|---------|---------|-------|
| 80 | 5.6713 | 5.7694 | 5.8708 | 5.9758 | 6.0844 | 6.1970 | 9 | 6.3138 | 6.4348 | 6.5606 | 6.6912 | 6.8269 | 6.9682 | 8 |
| 81 | 7.1154 | 7.2687 | 7.4287 | 7.5958 | 7.7704 | 7.9530 | 7 | 8.1443 | 8.3450 | 8.5555 | 8.7769 | 9.0098 | 9.2533 | 6 |
| 82 | 9.5144 | 9.7882 | 10.078 | 10.385 | 10.711 | 11.059 | 5 | 11.430 | 11.826 | 12.250 | 12.706 | 13.197 | 13.727 | 4 |
| 83 | 14.300 | 14.924 | 15.605 | 16.350 | 17.169 | 18.075 | 3 | 19.081 | 20.206 | 21.470 | 22.903 | 24.542 | 26.432 | 2 |
| 84 | 28.636 | 31.242 | 34.368 | 38.189 | 42.964 | 49.104 | 1 | 57.290 | 68.750 | 85.940 | 114.588 | 171.885 | 343.770 | 0 |

Natural Cotangents

Handwritten calculations and notes on the right page:

2640 / 10.0000 = 0.2640

6213

6173

2791

2932

85.12

84.72

78.24

88.94

5.72

276

138

2640 / 10.0000 = 0.2640

7920

20800

16480

23200

5280

138

42240

15840

5280

728640 / 43560 = 16.73

293040

