

CO. DITCH No 2

CASS Co., MINN.

MINNAPOLIS
FRANKLIN STATION
968

1C

40

COUNTY DITCH, No 2
CASS Co., MINNESOTA.

A. W. Moulster, Drainage Engr.
John W. Curo, Co. Surv.
F. N. Molyneux, Engr. in charge of field work.

Book 1

TWP. 133 & 134 , Rg 32 WEST.

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County ditch No 2, Cass Co., Minn.

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Co. Ditch No 2, Cass Co., Minnesota

EXPENSE ACCOUNT of F.M. Molyneux

July 7	R.R. fair Walker to Backus & return	.98
" 8	" " " " Motley	1.82
" 8	Dinner at "	.50
" 8	Auto Motley to Ditch	2.00
" 9	Tacks 5¢, Red cloth 40¢ Fresh	1.30
" 10	4 Balls lath, 1.00, July 20, 2 Balls lath 50¢, July 17, 2 Balls lath 1.00	2.50
" 31	Sounding rod - 10' long	.70
" 31	Supper at Motley - City Hotel	.50
" 31	Telephone call to A.W. Moulster	.26
" 31	Auto, Motley to Camp	2.00
Aug 4	Auto to Motley	2.00
" 4	Hotel Motley S	.50
" 4	Hotel Motley (S.L.B.) @ 50¢	1.00
" 5	R.R. Motley to Brainard + Ret. 51¢	1.02
" 5	Dinner Motley	.50
" 8	Hotel Motley S	.50
" 8	Hotel Motley (S.L.B.) @ 50¢	1.00
" 9	R.R. Motley to Brainard	.51
" 9	Dinner - Brainard	.50
" 9	R.R. Brainard to Walker 21.36	1.31
" 10	" " Walker to Pine River	.67
" 21	" " Pine River to Walker	.67
		<u>22.74</u> ✓

34
57

Expense Account of G.E. Coons

July 27	R.R. Walker to Motley	1.82
" 27	Hotel at Motley, D.S. @ 50¢	1.00
" 28	" " " " B. L	.50
" 28	" " " " B.	.50
" 27	Telephone to M.B. Jones	.20
" 31	Hotel Motley - supper	.50
Aug 4	" " " " S. + L.	1.00
" 5	" " " " B.	.50
" 5	" " " " Brainard D.	.50
" 5	R.R. Motley to Walker	1.82
" 10	" " Walker to Pine River	.67
" 14	" " Pine River to Walker	.67
" 16	" " Walker to Pine River	.67
" 21	" " Pine River to Walker	.67
		<u>14.02</u>

Expense Account of C.D. Conzett.

Aug 5	R.R. Pine River to Motley	1.15
" 5	Hotel Motley D.	.50
" 5	Auto to Ditch	2.00
	Board at Lemises. 3da @ 1.00	3.00
" 8	Auto to Motley	2.00
" 9	Hotel Motley S.L.B.	1.50
" 9	" " Brainard	.50
" 9	R.R. Motley to Pine River	1.15
		<u>11.80</u> ✓

Wednesday, July 7, 1915

F. N. Molyneux takes the 9-26 train from Walker to Bacus, R.R. fare 49¢, thence to camp at portage lake for his surveying out, returning with it to Bacus and then to Walker, R.R. fare 49¢. Balance of day spent in getting things together, examining records in the Co. Auditor's office, and copying Hatfield notes of Twp. 133, Rq. 32. Fine day.

Thursday July 8, 1915

F. N. Molyneux leaves Walker on the 9-26 train for Motley, R.R. fare \$1.78. Reaches Motley about 1 P.M. has dinner at the City Hotel, \$0.50. Gets auto and drives out to location of Co. Ditch #2 and interviews W. H. Lewis, one of the petitioners. Pays \$2.00 for the auto livery. Gets boarding place with George Lewis, Sec. 26, Twp. 134, Rq. 32.

Friday July 9, 1915

Rained till 9 o'clock A.M. As soon as the rain quit, accompanied by Mr. W. H. Lewis, and with his team, we went out to make a reconnaissance of the proposed

F. N. Molyneux

ditch, we drove to near the corner of sections 10, 11, 15, & 16 - 134-32, here we left the rig which was drove to the N. E. 1/4 Sec. 10. On leaving the rig we made a thorough search for the corner and bearing trees of sections 10, 11, 15 & 16. The U.S. Gov. notes call for
 Tann 12" N. 22 E. 37 (P) THESE TIES NE SEC. 39
 " 8" N. 43 W. 24 ← PROBABLY @ NE SEC. 15
 " 7" S. 35 W. 18 ALK 3/14/07
 Spruce 10" S. 5° E 12 This corner falls in

a burned out tamarac swamp and no trace of corner or B.T.s could be found. We then walked north along the course of the proposed main ditch to its upper end. It now being nearly noon and having sent word to Mr. Daniel H. Lewis, one of the petitioners who is backing on the N. W. 1/4 Sec. 10, that we would be there for dinner, we quit for same. After a splendid meal we took the team and drove to the 1/4 corner of Secs. 10 & 11. The U.S. Gov. notes call for the following bearing trees:

B.P. 5" N. 87 W. 44

B.P. 4" S 84 E 10 Unable to locate either bearing tree, but was shown by

F. N. Molyneux

Co. Ditch No 2.

W.H. Lewis and Danie/Lewis an iron well driven in the ground, for the corner, also irons driven in the ground to mark the position of the B.T.'s. These irons do not check for distance. From here we drove to near the north end of lateral No 1 where we quit the rig and followed down through the swamps of sections 2+11 along the proposed course of lateral #1 to where it will empty into the main ditch. We now proceed to examine proposed main ditch to the south, at the corner of Secs. 14, 15, 22+23 we find a corner stake, which is held by the settlers as the corner to said Secs. No trace of Gov. corner stake or B.T.'s. From here follow in a S.W. direction across Sec. 22, between little ³/₄ big island to the ¹/₄ corner between sections 22+27 at which point a stone and point of old Gov. stake marks the corner. The B.T. is entirely gone having burned up some years ago.

At this point we quit for the day

Fair weather after 9 A.M. Entire trip afoot through deep grass and water. Team brought out tools & Molyneux and red cloth

SATURDAY, JULY 10, 1915

Left boarding place at 7 A.M. and met Mr. W.H. Lewis, and were soon joined by Frank Frank Petroske, we then looked over balance of proposed ditch south to the Crow Wing River and two other passable outlets for ditch before noon. At 11-30 Mr. Lewis leaves for home. Mr. Petroske to get his dinner.

Noon. My lunch with me

After dinner Frank Petroske returns accompanied by John Heldman, one of the petitioners. Mr. Heldman agrees to any change of alignment of the ditch on his land which will facilitate the handling of the water or cheapening of the ditch. Petroske and myself put in the afternoon locating the best ditch courses for the different routes adjacent to the river.

Route No 1. is along the general course of the stream, as per petition, which describes it as: "thence in a southwesterly direction following brook through section number thirty-four - 134 - Rg 32 and sections number three & four & nine of Twp 133, Rg. 32

J.M. Molyneux

Co Ditch No 2.

and terminating in the Crow Wing River. This course makes long detour to the west, and either outlet A. or B. which I shall survey and make estimates on, emptying into the Crow Wing River, further down stream and to the east, seem to offer a more direct and cheaper route.

Outlet No A. would leave the small brook a point in Sec. 3 - 133-32 where its swings to the north and west, before entering Sec. 4. From this bend of the creek, outlet No A. would for some 400' go through a sand ridge, requiring an 8 or 10' cut thence into a swamp adjacent the Crow Wing River, reaching the river through the outlet of the swamp, and at a point some 500' down stream from the mouth of the brook.

Outlet No B. will leave the brook at a point about $\frac{3}{4}$ of a mile south of the Trip line and run in a southerly direction following the natural flowage of water from the brook, when the brook overflows as it is now done, to the river at a point just below the rapids and 100' east of a ford. This appears from my reconnaissance

J. M. Molyneux

to be the most practicable way.
This has been a hard day of wading in the water and mud.
No rain, fine overhead.
Sent to town for a brush hook and little axe, and 5 bundles of lath for stakes, to day.

Sunday July 11, 1915

Fine day. Went out with Geo. H. Lewis to look over another outlet of swamp to river, and to look up some Sec. corners.

J. M. Molyneux

Monday July 12, 1915

Fine morning, Breakfast at 6 A.M.

Albert S. Lewis drives myself and George H. Lewis to Frank Petroskie, where we met the balance of crew

F. N. Molyneux, instrument.

Frank Petroskie head chain

Jack " rear "

Arthur Farber, flag.

George H. Lewis, axe.

We then proceeded to where the brook, described in the ditch petition, empties in the Crow Wing River, at the mouth of the brook and on its bank and on the left or north bank of the Crow Wing River we drove a stake for the initial point of the survey of County Ditch No 2.

From this point, with the magnet variation of turned of on the variation plat

I established the first course of the preliminary survey N. 38° 00' W.

From the initial point I run a meander up the Crow Wing River for a distance of 1000' to establish its general course at the mouth of said proposed ditch with the following results

F. N. Molyneux

Meander Line up Crow Wing River.

From mouth of proposed Co Ditch No 2

0+00 = initial point of survey = Mouth of Brook
Ang of 71° 45' to L. from 1st course of ditch survey or
S. 70° 15' W.

- 1 8' Left to cut bank C.W. River
- 2 31' " " " " " "
- 2+26 Δ 27° 10' L, S. 42° 30' W,
- 3 25' " " " " " "
- 4 13' " " " " " "
- 5 5' " " " " " "
- 6 14' " " " " " "
- 7 40' " " " " " "
- 7+59.6 Δ
- 8 51' " " " " " "
- 8+37.5 Δ 37° R, S. 79° 30' W.
- 9 67' " " " " " "
- 10 Top of high bank 52' " " " " " "

On our way up this line we look for M.C. #26 on left bank of Crow Wing River between Secs 9 & 10 Twp 133, Rg 32 where the U.S. notes call for the following B.T's.

Oak, 15 N. 73/4 W. 140, We were unable to find the tree. We now return

F. N. Molyneux

to the initial point of this survey and run a meander line down the left bank of the Crow Wing River with the following results.

0+00 = Initial point of survey, Mouth of brook
 Ang. of $113^{\circ} 35'$ R. from 1st course
 to ditch survey or
 N. $75^{\circ} 45'$ E.

0+02 Enter brook

0+20 Leave " "

1 On edge of river

2 11' R. to " " "

2+33.2 Δ $29^{\circ} 06'$ R., S. $75^{\circ} 00'$ E

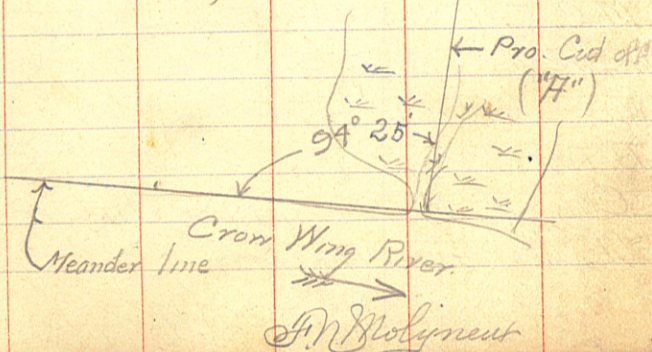
3 7 R. to edge of river

4 " " " "

4+20 enter outlet of swamp

4+28 leave " " "

4+30.1 Δ Proposed cutoff ("H") of ditch
 over ridge from bend of brook
 in Sec 3, to River



5 22' R. to edge of river

5+25 leave swamp

6 51' R. to edge of river

6+32.4 Δ $6^{\circ} 15'$ R., S. $69^{\circ} 30'$ E

7 88' " " " " "

8 93' " " " " "

9 91' " " " " "

10 74' " " " " "

11 44' " " " " "

12 47' " " " " "

12+38.3 Δ 11' " " " " "

Continued on page 23

Noon - All have dinner on line

Mosquitoes mighty thick & pestiferous

We now return to the initial point of
 this survey and run the preliminary line
 up the brook and as follows

0+00 Δ N. $38^{\circ} W$. On R. bank of brook & left
 bank of of Crow Wing River
 at mouth of brook.

River high but falling

Brook 3' of water 6' wide
 rapidly falling

1+75.1 Δ $18^{\circ} 50'$ L., N. $57^{\circ} W$.

1+88 enter creek

2 center of " , 8' wide

S.M. Molyneux

18

Co. Ditch No 2

2+60

leave creek

6+34

enter "

6+54

leave "

6+71.6 Δ 45° 33' R N. 11° 35' W " 4' R.

7+33

enter "

7+51

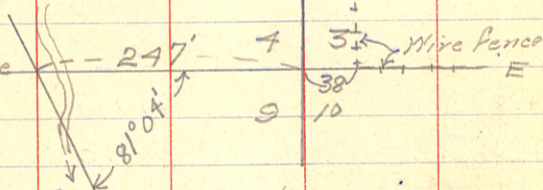
leave "

9+30

enter "

9+37

leave "

9+87.1 Δ Sec. Line

Going east on Sec line

0+26 enter creek

0+29 leave "

2+47 Stake, supposed to be Sec. Cor.

11+36.5 Δ 44° 24' L N. 55° 45' W, creek 4' R.

12+09

enter creek & follow up

12+60

leave " same side

12+89

enter "

12+96

leave "

14+85

enter "

14+95

leave "

14+99.7 Δ 87° 39' R N. 32° E

15+85

enter "

16+13

leave "

A. N. Molyneux

19

16+92

enter creek

17

8' L. center creek

17+08

leave " same side

17+43

enter "

17+62

leave "

17+70

enter " from west side

18+08

leave " " " "

18+20

" 2' R. Narrows

18+64

enter "

18+73

leave "

19+56

enter "

19+88

leave "

19+93.4 Δ 78° 46' R, S. 69° 10' E

20

Bank of "

Rocks

20+40

" " "

23+37.8 Δ

S. 68° 50' E. N. & S. road bridge, 81.20' R.

23+50

" " " 2 wire fence.

26+70

enter creek

27+10

leave "

27+70.2 Δ 28° 41' L, N. 82° 30' E

" 20' R.

32+19.2 Δ 29° 54' R.

33+10

enter "

33+45

leave "

33+65

enter "

33+75

leave "

33+85

enter "

33+93

leave "

A. N. Molyneux

20

Co. Ditch No 2

34+16

enter creek

34+25

leave "

35+27

enter "

35+37

leave "

35+49

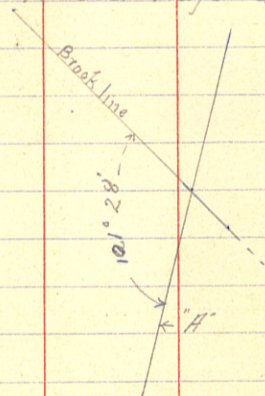
enter "

35+66

leave } same side

35+91.3 Δ 101° 28' L N. 19° 10' E

Outlet "A" over ridge connects with



37+48

enter creek

37+58

leave "

37+67

enter "

37+77

leave "

38+39

enter "

38+47

leave "

38+75

enter "

38+85

leave "

39+91

enter "

39+50

leave "

J. N. Molyneux

CASS Co.

21

41+34

enter creek

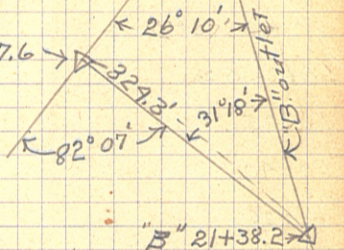
41+61

leave "

41+67.6 Δ

Quit for the day
95+48.6 = B 27+56.3Tuesday July 13, 1915
Same Creek -

41+67.6 →



41+67.6 Δ 24° 50' L, N. 5° 30' W.

41+78

enter creek

42+08

leave "

42+29

enter "

42+35

leave "

45+48.6 Δ 26° 10' L, N. 31° 45' W.

= B 27+56.3
Creek 3' L.

46+39

enter "

46+69

leave "

49+87

enter "

49+95

leave "

50+07.6 Δ

N. 31° 45' W.

20' L.

50+21

enter "

50+35

leave "

51+69

enter "

51+89

leave "

53+08

C "

53+20

L "

J. N. Molyneux

54+00		enter creek.	
54+14		leave "	
55+39.0	$\Delta 51^{\circ}34'R, N.19^{\circ}50'E$		
56+29		E. "	
56+32		L. "	
58+80			B. Dam.
60+21.5	Δ		B. "
60+25		E. "	
60+40		L. "	
62+25		E. "	
62+32		L. "	
62+62		E. "	
62+71		L. "	
63+21		E + W -	2 Wire fence creek 70' E
63+32.9	$\Delta 19^{\circ}48'L, N.0^{\circ}15'W.$		
63+87		E. creek	
64		L. "	
68+88		E. "	
69+16		L. "	
70+88.0	$\Delta 6^{\circ}58'R, N.7^{\circ}00'E$		6 R.
70+95		creek.	
71+37		"	
83+27		"	
85+65		"	
86+78	Δ	South side of road grade	
Torn line N. side Sec. 3			
Continued on page 26			

M. J. Molyneux

12+38.3 $\Delta 17^{\circ}35'L, S.86^{\circ}20'E$

13

23' R. to edge of C.W. River

14

53 " " " " "

15

64' " " " " "

16

46' " " " " "

17

30' " " " " "

17+44.7 Δ

S.86°20'E

18

6' " " " " "

19

3 " " " " "

19+87.1 $\Delta 14^{\circ}27'R, S.72^{\circ}10'E$

20

14 " " " " "

20+50

Road to old ford 10' R.

21

7' R. to edge of river

21+38

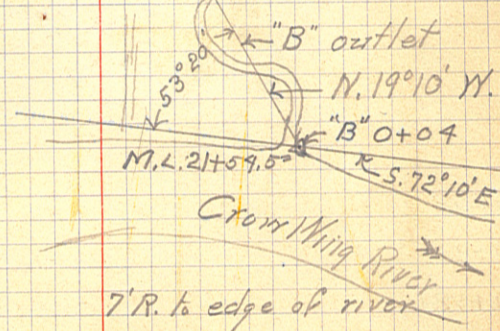
enter small creek.

21+52

leave " "

21+54.5 $\Delta = 0.04$ of "B" outlet

* small creek



22

7' R. to edge of river

22+47.5 Δ

M. J. Molyneux

13+13.2
1269

~~32348~~ 4.8
1384
32248.4
2564

3254450 914

15 60
27894
240
2905
130

38
39
34



6.3
6.3
12.6
378
3969

38
38
304

3
1969

8
4569

3969 5
1488

105
3001

5 2781 4
14117
85781 3813

90
5117
11117

303
3319.1
113
600.667
166
156
167
11640
13720
1120200

30
3320.23
30
30
202

26079.2
1120
259852
2058
261908

CASS Co

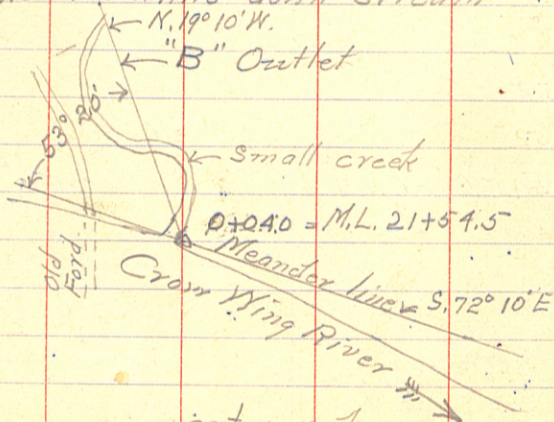
23	40' R. to edge of river.
24	51' " " " " "
25	53' " " " " "
26	49' " " " " "
27	16' " " " " "
27+40	0.0 " " " " "

Outlet meander line
 Bank of river thick brush.
 River falling fast.

"B" Outlet.

0+00 is on north bank of C.W. River and
 east bank of small creek.

0+04 Δ 21+54.5 of M. line down stream

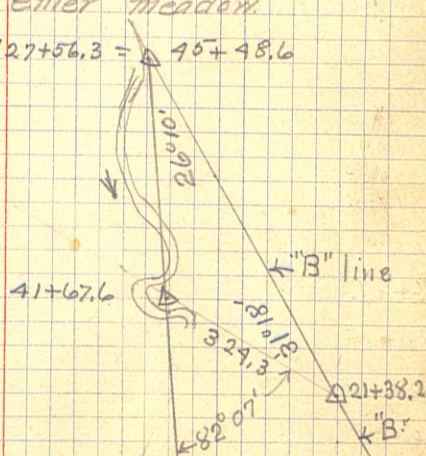


0+08	enter creek
0+20	leave "
0+72	creek
2+00	On point from east

J.M. Molyneux

Ditch No 2

2+78	Creek
2+91.4 Δ 49° 07' R., N. 30° 10' E	" 10' R.
4+14.2 Δ 30° 07' L., N. 0° 10' E	On beaver dam
6+42	Creek
6+80	"
7+70.5 Δ	On beaver dam, creek 60' R
8+65	" "
8+71.8 Δ 23° 46' L., N. 23° 30' W.	" 20' R
10+30	enter marsh
10+46.5 Δ 37° 14' L., N. 60° 45' W	
12+45	beaver dam
13+67	" "
14+03	E. & W. 2' wire fence S. side of Sec. 3
15	Creek
15+47.0 Δ 29° 00' R., N. 31° 45' W	enter meander.
16	
21+38.2 Δ	"B" 27+56.3 = Δ 45+48.6
27+56.3 Δ = 45+48.6	



J.M. Molyneux

Cass County

209+41.0 Δ

N. 26° 25' E

214+62.5 Δ

N. 26° 45' E

219+53.5 Δ 27° 50' L, N. 1° 30' E.

232

Cross ditch - 26" deep 4' wide

Bears N. 2° W.

233+49.6 Δ

N. 1° 10' E On big beaver dam

239+88.0 Δ 38° 05' R. N. 40° 0' E Ditch 18' L250+89.4 Δ 18° 53' R N. 58° 45' E Upper point of Little Island1/4 Sec Cor. \rightarrow Flag

Sec. 10

Sec. 11

Sec. 15

Sec. 19

260+74.2 Δ

N. 1° 50' W

71.5 Sec. 15

15'

260+91.5 Δ

Sec. 22

Sec. 23

Ditch line N.

260+91.5 Δ 60° 11' L N. 1° 35' W.

Noon

J. N. Molyneux

Co. Ditch No. 2

266+63.8 Δ

N. 1° 40' W.

276+59.7 Δ

N. 1° 05' W.

284+63.0 Δ

N. 0° 35' W.

291+60.2 Δ

N. 1° 10' W.

299+49.4 Δ

N. 1° 10' W.

308+30.9 Δ 317+48.4 Δ 322+01.2 Δ

329

 Δ 51° 17' L. N. 53° 10' W. 200' N. to Δ edge of hill1655 north to point 15' E of
1/4 Sec Cor of Secs 10+11

328+68

E & W. 2 wire, pasture fence

328+86.5 Δ

N. 52° 35' W. Hard ground

333+17.8 Δ 337+56.5 Δ 33° 51' R.

N. 18° 50' W.

345+93.1 Δ

346+01

ditch, N. 45° E END

346+05.6

E & W. 3 W. fence.

Quit
Day cool and fine J. N. Molyneux
Rain 6:15 P.M.

Cass County
FRIDAY, JULY 16, 1915

Field notes for figuring acres
benefitted.

Mets and bounds, run as close as possible
to the margin of the land benefitted.

Fine cool morning, Same crew

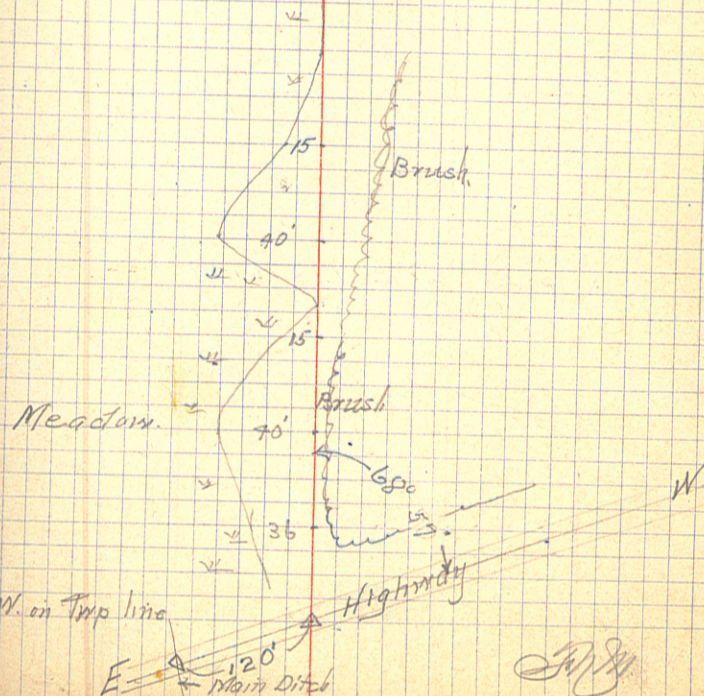
To determine low land in Sec. 3+4, 133-32

Station

Station	Distance	Ang	Bearing	Distance to Margin of Benefits	
				R	L
7.					
6					
5					
4					
3	+38.5	Δ 338.5'	62° 44' R.	5.82° 15' W.	
2					
1					
0+00			68° 57' L	5.20° 10' W	

Co. Ditch No 2.

Sketch



Station	Distance	Angle	Bearing	R	L
---------	----------	-------	---------	---	---

20

19+48	Δ 570.7'	83°33'	L. S. 56°40'E		
-------	----------	--------	---------------	--	--

19

18

17

16

15

14

13+85	Δ 222.5'	12°55'	R. S. 26°50'W		
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13

12

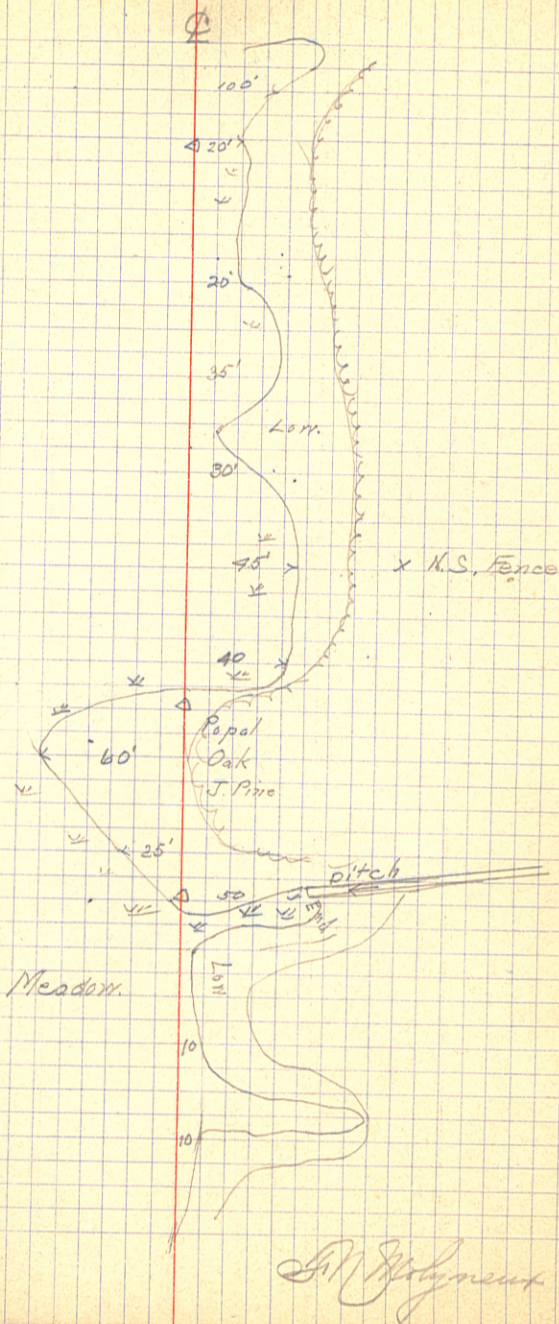
11+54.8	Δ 816.3	68°12'	L. S. 14°10'W		
---------	---------	--------	---------------	--	--

11

10

9

8



36

+27
+19.5 Δ 600' $11^{\circ} 06' R.$ $S. 9^{\circ} 10' E$

33

32

31

30

29

28

+19.5 Δ 290.2 $14^{\circ} 20' R.$ $S. 20^{\circ} 00' E$

27

26

25

+29.3
24 481.3 $22^{\circ} 13' R.$ $S. 34^{\circ} 15' E$

23

22

+80

21

Co. Ditch #3

37

E. & N. 2 Wire fence

150'

 Δ 30 Brush Δ 10 Brush

N. S. 2 Wire fence

J. M. Polymere

10

+84

60

59 +25.5 Δ 693.8 69°07' L S. 15°30' E

58

57

56

55

54

53 +27.9 Δ

52 +31.7 Δ 553.7 67°51' R S. 53°25' W

51

50

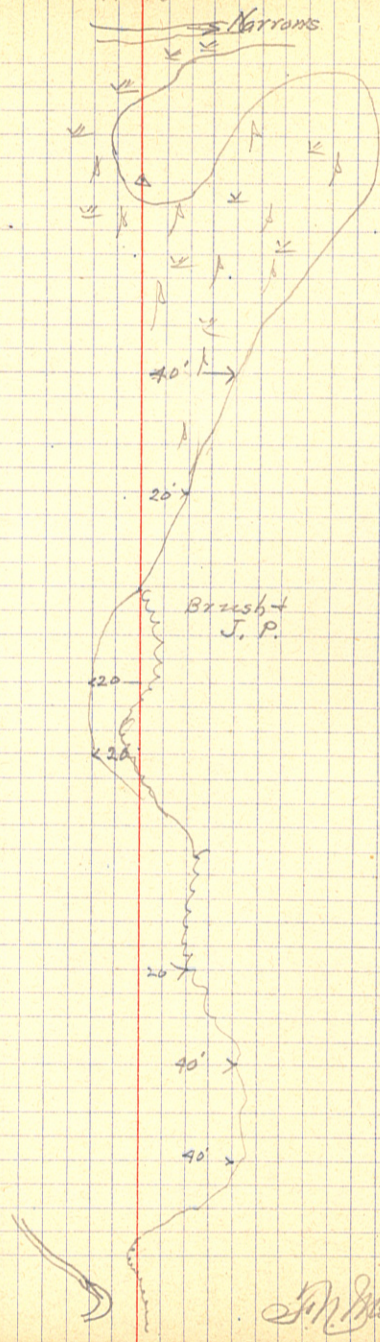
49

48

Creek

Co. Ditch No 23

11



J. M. Polymers

74

73

+68.5 Δ

N.72° 30' E

72

71

70

69

+78.9 Δ 738.4' 44° 15' L N.72° 30' E

68

+25

67

66

65 +12.1 Δ 171.4' 11° 15' L S.68° E

64

63

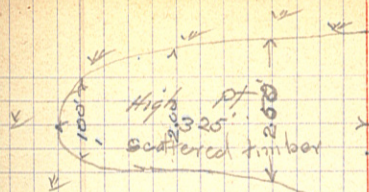
62

+90.5 Δ 215' 47° 57' L S.63° E

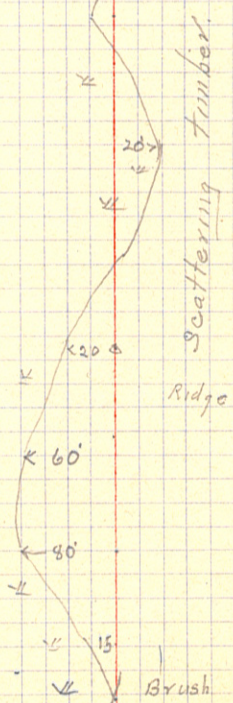
61 +08

Co. Ditch #2

73



Cross "A" Outlet



= M.D. 29+10

Dr. J. Molyneux

44

86

85

84 +43.5 Δ 686.1 96° 42' L S. 79° 30' W

83

82

81

80

79

78

+57.4 Δ 235.8 12° 19' R. N. 3° 45' W

77

76

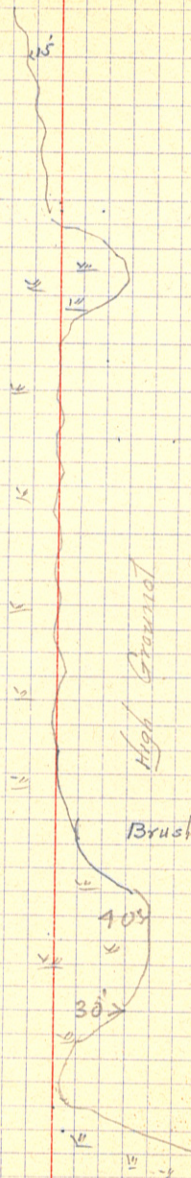
75 +21.6 Δ 642.7 88° 40' L. N. 16° 10' W

+78 =

74

Co. Ditch #2

45



B. Outlet 17+45.5

J. N. Golyneus

46

99

98

+49 Δ 494' 32° 52' R. N. 2° 0' E

97

96

95

94

93

+55 Δ 471.5 4° 22' L N. 30° 50' W.

92

91

90

89

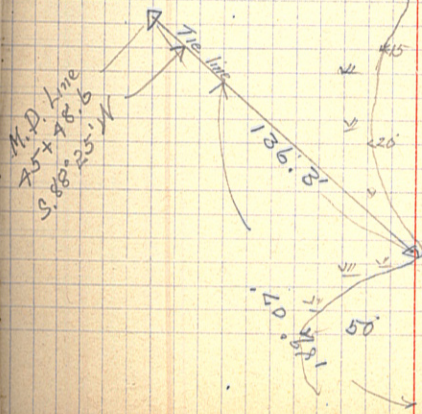
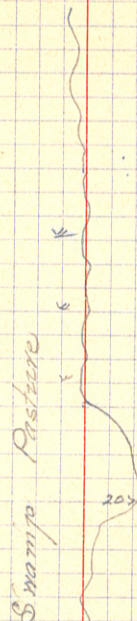
88

+83.5 Δ 340° 73° 57' R. N. 26° 40' W.

87

Co. Ditch #2.

47



J. N. Molyneux

112

111

110

109 +95.7 Δ 423.2 $20^{\circ} 19' R.$ N. $20^{\circ} 30' E$

108

9 107

9 106

105

+72.5 Δ 305' $32^{\circ} 50' L$ North.

104

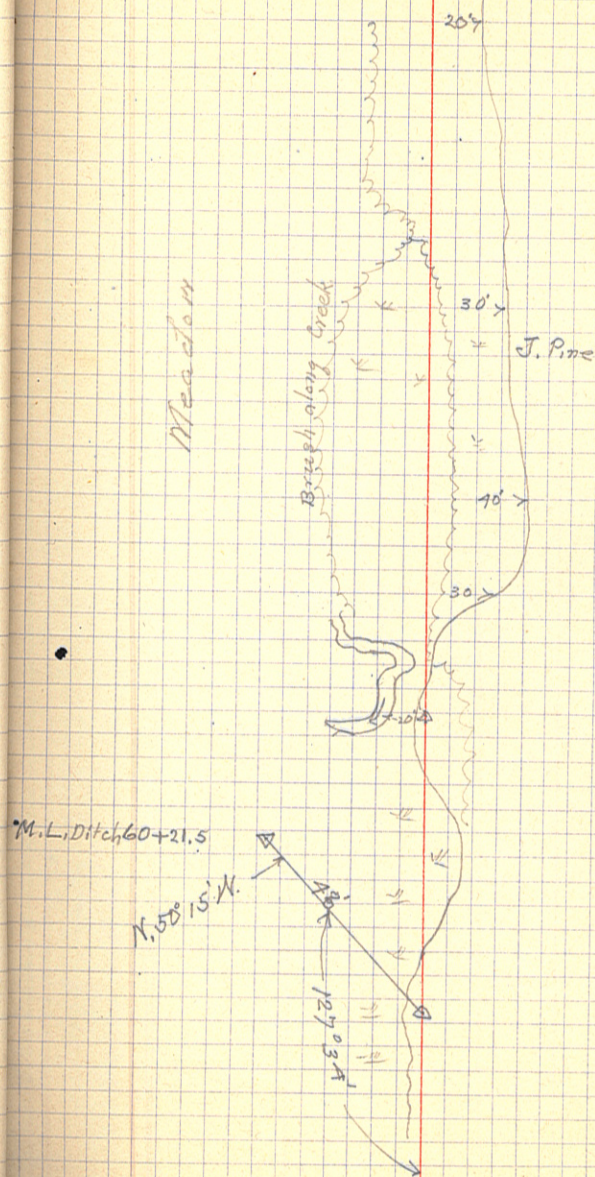
103

8 102

+67.5 Δ 418.5 $31^{\circ} 12' R.$ N. $33^{\circ} 15' E$

8 101

100



E. M. Molyneux

50

125

+48 Δ 453.3 $21^{\circ}28'R$ $N. 12^{\circ}0'E.$
124

123

122

121

120

119
+94.7 Δ 384' $19^{\circ}40'L$ $N. 9^{\circ}30'W.$

118

117

116

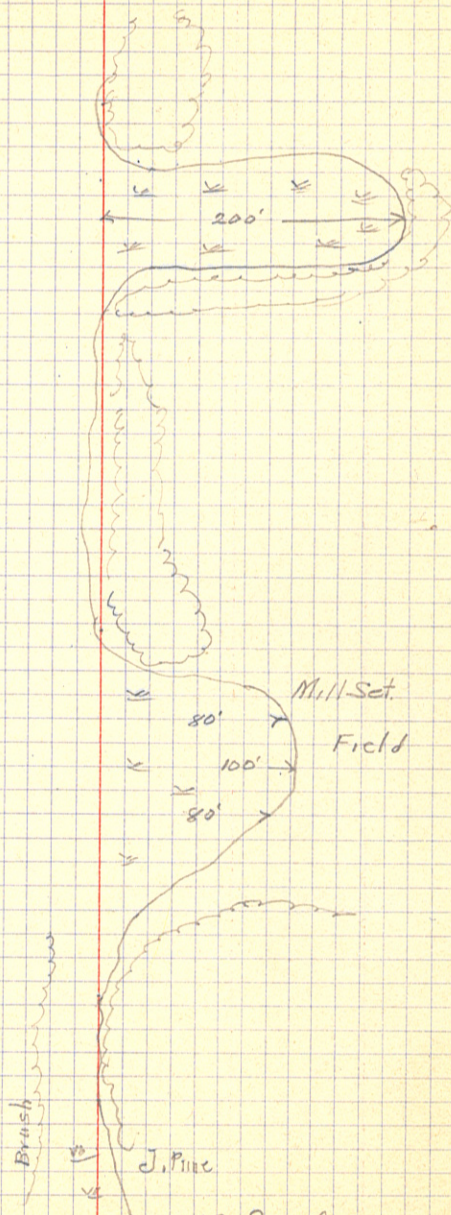
115 +10.7 Δ 615' $10^{\circ}28'L$ $N. 10^{\circ}15'E.$

114

113

Co. Ditch No. 2.

51



129+17 Δ 469'

128

127

126

Main line of Ditch

190'

Highway

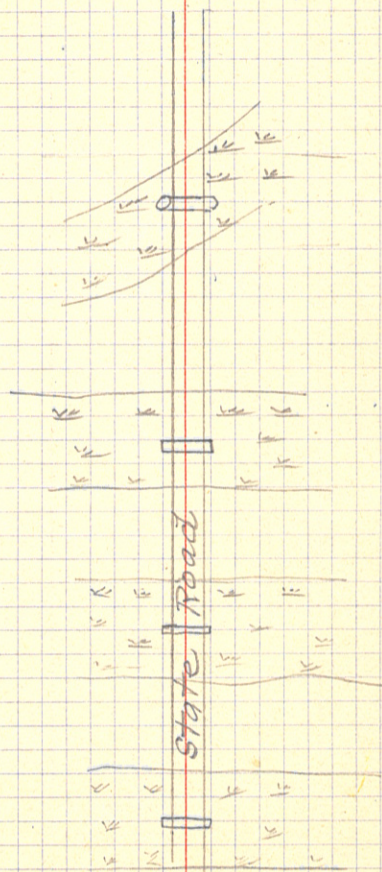
56.96'

Meadow

S. M. Johnson

Chaining along road on S. side of Sec. 34-134-32
 For $W. \frac{1}{2}$ mile see sketch page 26
 To locate marshes, and drainage boxes.

41+57.6 Center of N+S. road.
 37+60 Leave marsh
 36+80 18" G.I.P.
 35+30 Enter marsh
 32+47.4 Δ
 29+00 Leave marsh.
 27+55 Bridge 2.5' wide.
 26+90 Enter marsh
 22+20 Leave marsh
 21+23 Bridge 4' wide
 20+69 Enter marsh
 18+30 Leave marsh
 17+85 1x1 box
 17+32 Enter marsh.
 15+20
 0+00 = point where Main Ditch crosses the
 Trip Line.



Line projected from stone at S.W. corner of
 Sec. 34, east through $\frac{1}{4}$ Sec. Cor.

Post in road claimed to mark
 position of Gov. $\frac{1}{4}$ Cor

J. N. Molyneux

SATURDAY JULY 17, 1915

Notes for figuring acres benefited.

Metes and bounds^{No 2} run as close as possible to boundary of land benefited
 9 To determine tax land in the S. 1/2 Sec. 27 + Sec. 34

8

7

6

5

4

3

2

1

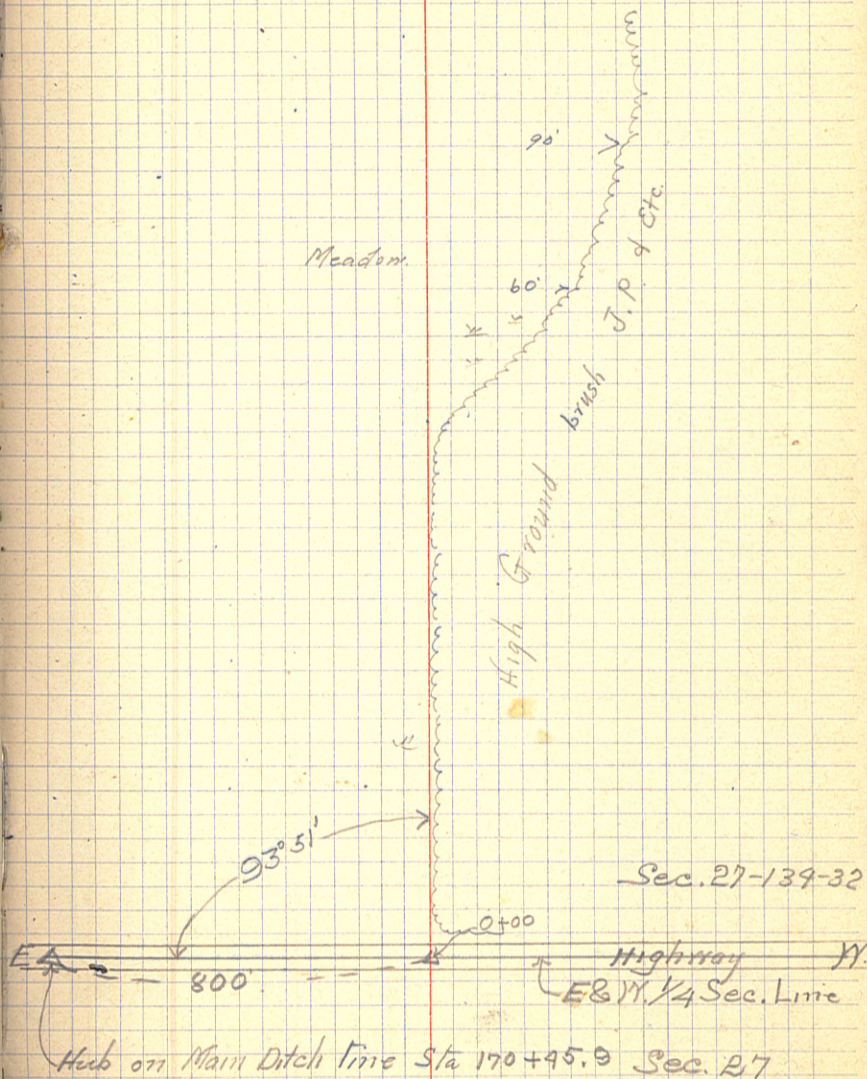
0+00

+64.5 Δ 564.5 1° 03' R S. 2° 15' W.

S. 1° 40' W.

CO. DITCH # 2

Metes & Bounds Line # 2



AM Holman

Co. Ditch No 2
Metes & Bounds No 2

22

21

20

19 +15 Ditch

18 +90 Ditch

17

16

15

14 +70.1 Δ 805.6 $\text{N} 40^{\circ} \text{L S, } 12^{\circ} 45' \text{E}$

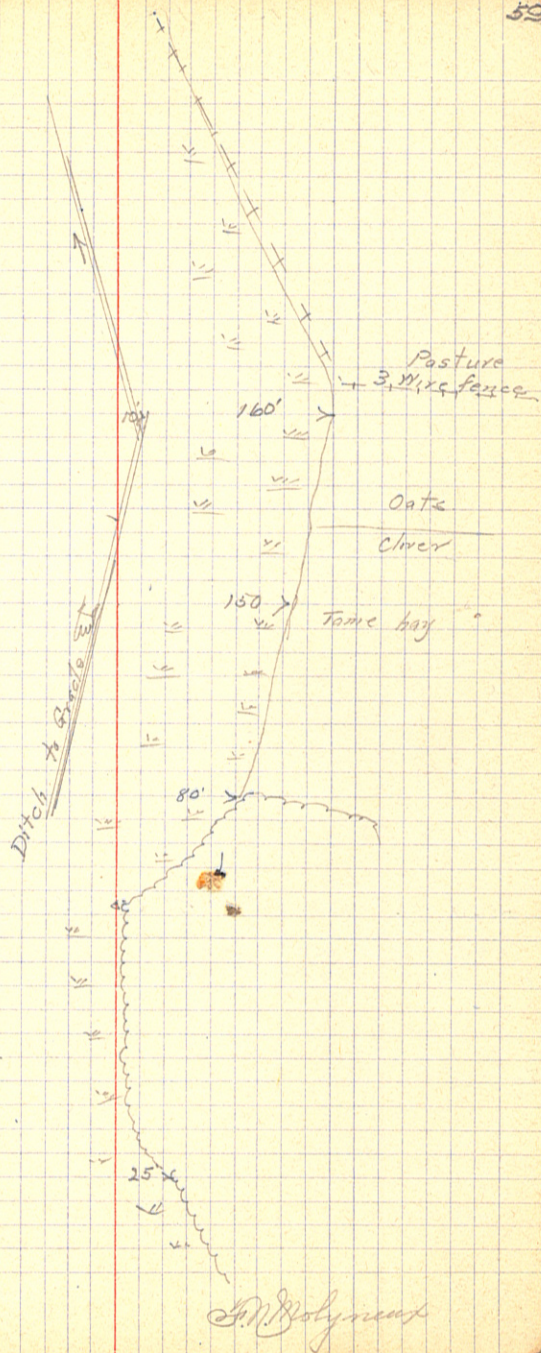
13

12

11

10

Cass Co.



35

34

33

32

31

30

29

28

27

+56.0 Δ 1245.9 7°42' R. S. 4°35' E

+45 E.W. 2 Wire Fence

26

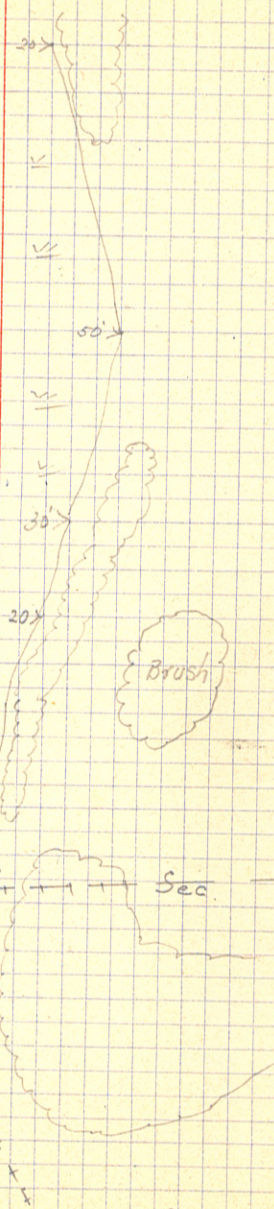
25

24

+69 Fence

23

Big Meadow



J. N. Molyneux.

62

Co. Ditch No 2, Cass Co. Minn.
Metes & Bounds No 2

18

+38.5

394.5

106° 48'

S. 79° 30' E

47

46

45

44

+44

△

622.6

24° 56' R

S. 27° 15' W

43

42

41

40

39

38

+21.4

△

1065.4

6° 40' R

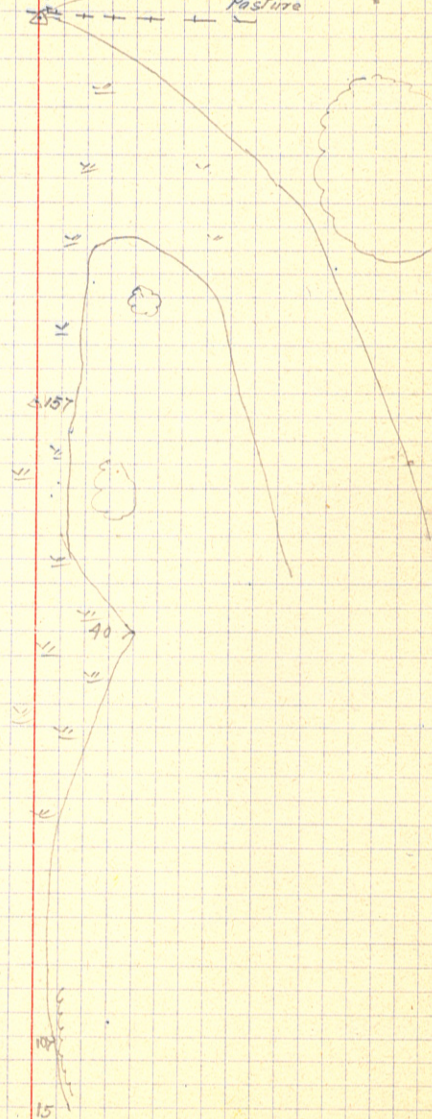
S. 2° 0' W

37

36

63

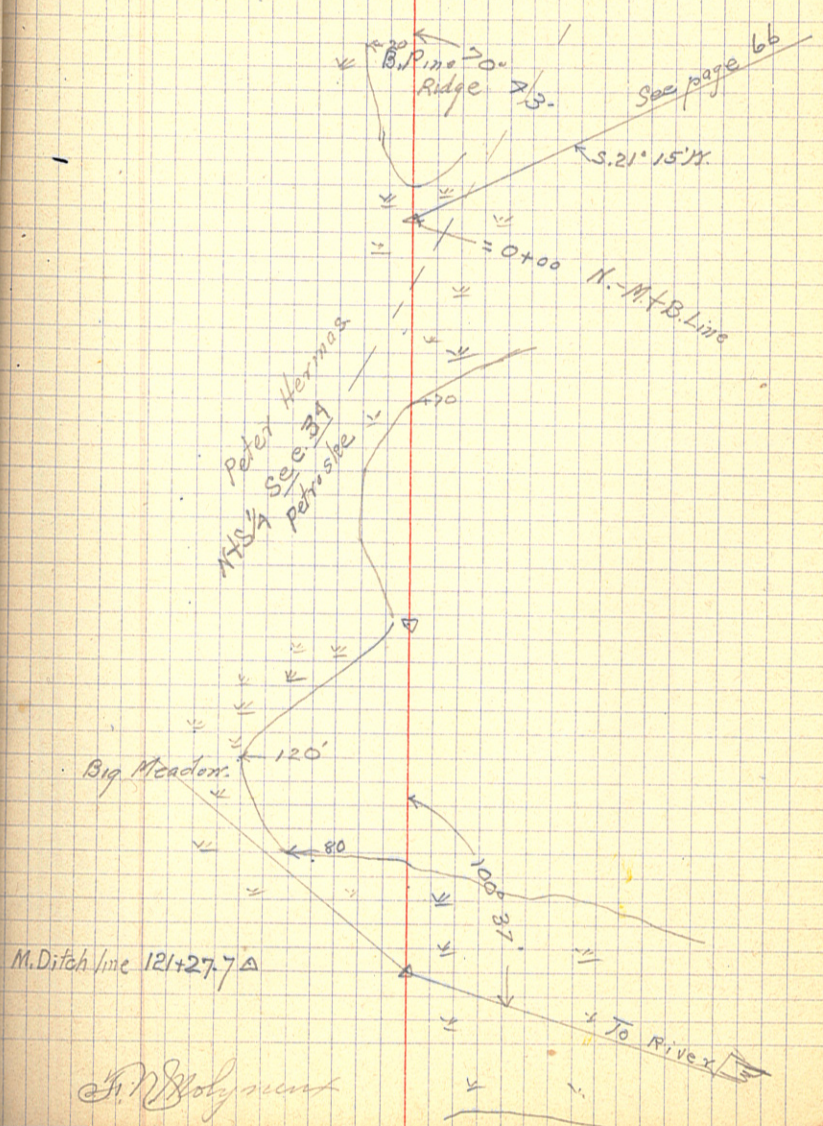
Lawn Flat Country
Pasture



M. J. Molyneux

64 Co. Ditch No 2, Cass Co. MINNESOTA
 METES & BOUNDS No 2
 Continued on page 70

4 61
 4 62
 +54.5 Δ 592.1
 4 59
 4 58
 +68.5 Δ S.49° 15' E
 4 57
 +95 -
 4 56
 4 55
 4 54
 +42.4 Δ 603.9 30° 30' R S.49° 10' E
 40 53
 39 52
 38 51 High Ground
 37 56
 +79.8 Δ = S.79° 40' E
 3 49



J. N. Johnson

66

"N." Line

Narrow swamp outlet from big meadows, in high water

12 across Sec. 34.

11

10

9

8

7

6

+46.1 \triangle

5

4

3

+23 \triangle

S. 21° 15' W.

2

1

0+00

S. 21° 15' W.

COUNTY DITCH No 2, CASS COUNTY, MINNESOTA 67

End of Benchmarks

< 150' 50' >

< 80' 100' >

< 60' 120' >

< 40' 120' >

< 30' >

170'

170'

150'

\triangle = 57+68.5 M+B #2

Black Pine Ridge

Brush Willow Brush

Swamp
M+B #1
M+B #2

M+B #2

J. M. Golyne

"O" Line

Narrow swamp, high water outlet, from meadow, south across Sec. 34.

10

9

8

7

6

5

4

+53.5 Δ 353.5 25° 0' R. S. 6° 0' E

3

2

1

+18
0+00 Δ

S. 31° 20' E

To Trap Line

Sec 3

E Highway
Sec. 34

Trap Line

18720

17432

Wet marshy ground
will average 100' wide south to Trap Line

Brush
Low and wet
Over flow outlet

B. Pine Ridge

B. Pine Ridge

Marsh high
60' Δ 40'
and nearly dry

100'

30'

58'

100'

40'

N.S. 1/4 S.L. fence

"P" Line
S. 21° 15' W

Δ = "P" 3+23

AM Johnson

71

70

+76. Δ $\sqrt{189.7}$

69

+12 Ditch

68

+18 Δ

67

66

+25 Leave

65

+90 Hard ground

+86.3 Δ 177.3 $43^{\circ} 25' L$ $N. 58^{\circ} 30' E$

64

63 +09 Δ 966.6 $29^{\circ} 20' L$ $S. 78^{\circ} 15' E$

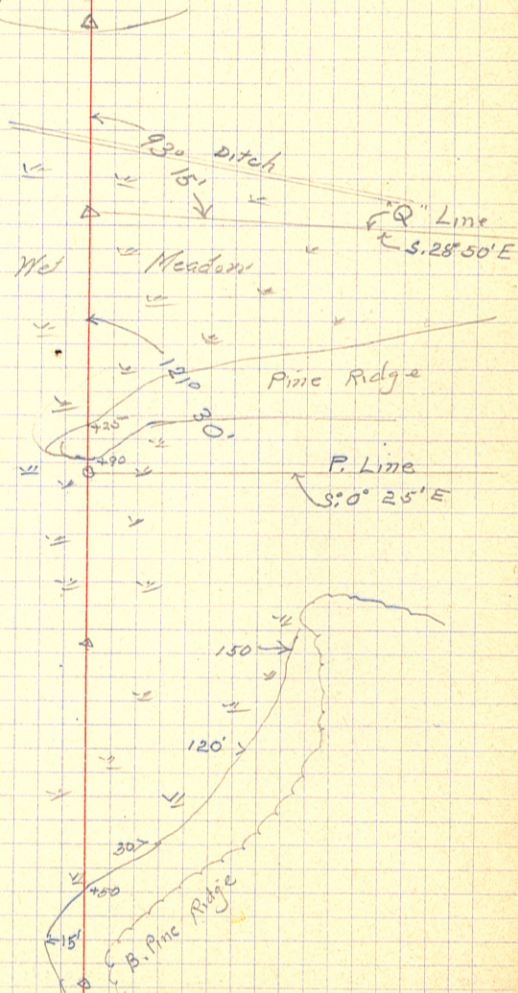
62

61

60

59 +59.5 Δ $S. 49^{\circ} 38' E$

High Ground Timothy



Amalgamation

12

+68.6

11 +27.3 Δ

10

9

8

7

6

5

4 +02.9 Δ

3

2

1

0+00

S 0° 25' E

S 0° 25' E

E+W 3 Wire fence.

130'

60'

B. Pine

80' 100' 130'

90'

Black Pine Ridge

Brush

B. Pine

Brush

115'

Brush

135'

J.P. Ridge

121° 30'

109° 00'

= 67 + 86.3 of M. + B #2.

S. M. Dwyer

25+23 = 21+03 of Road Line, See page 57+58

24 +55 Wire Fence

24

23

22

21

20

19

18

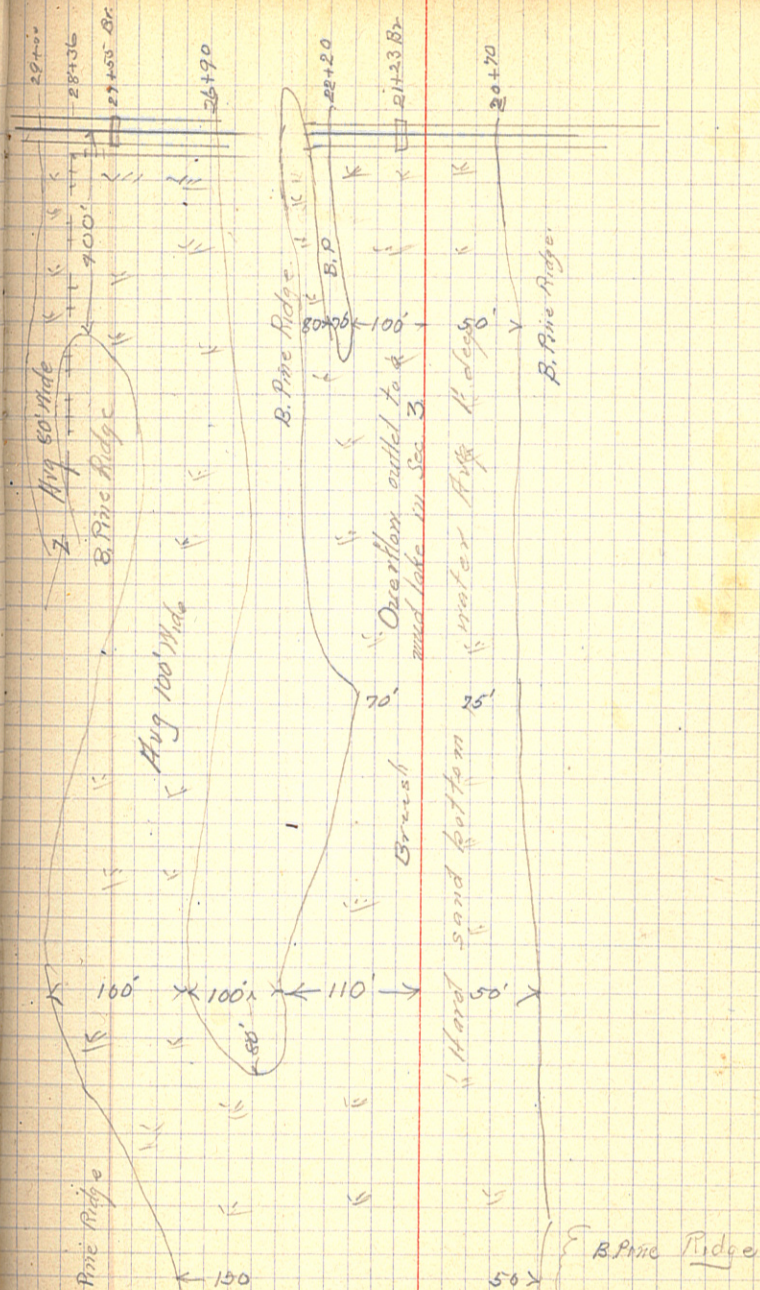
17

16

15

14

13



G. M. Holmquist

"Q" Lime

12

11

10

9

8

7

6

5

4

3

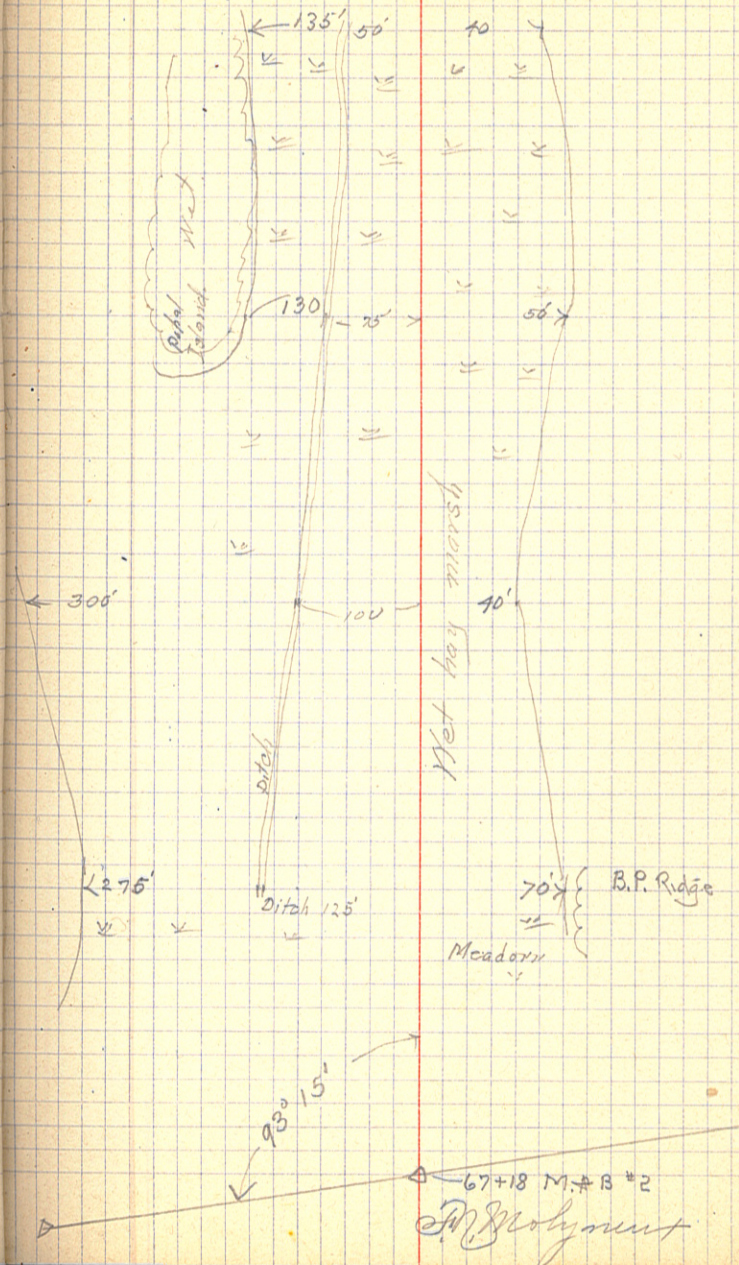
2

1

0+00



S 28° 50' E



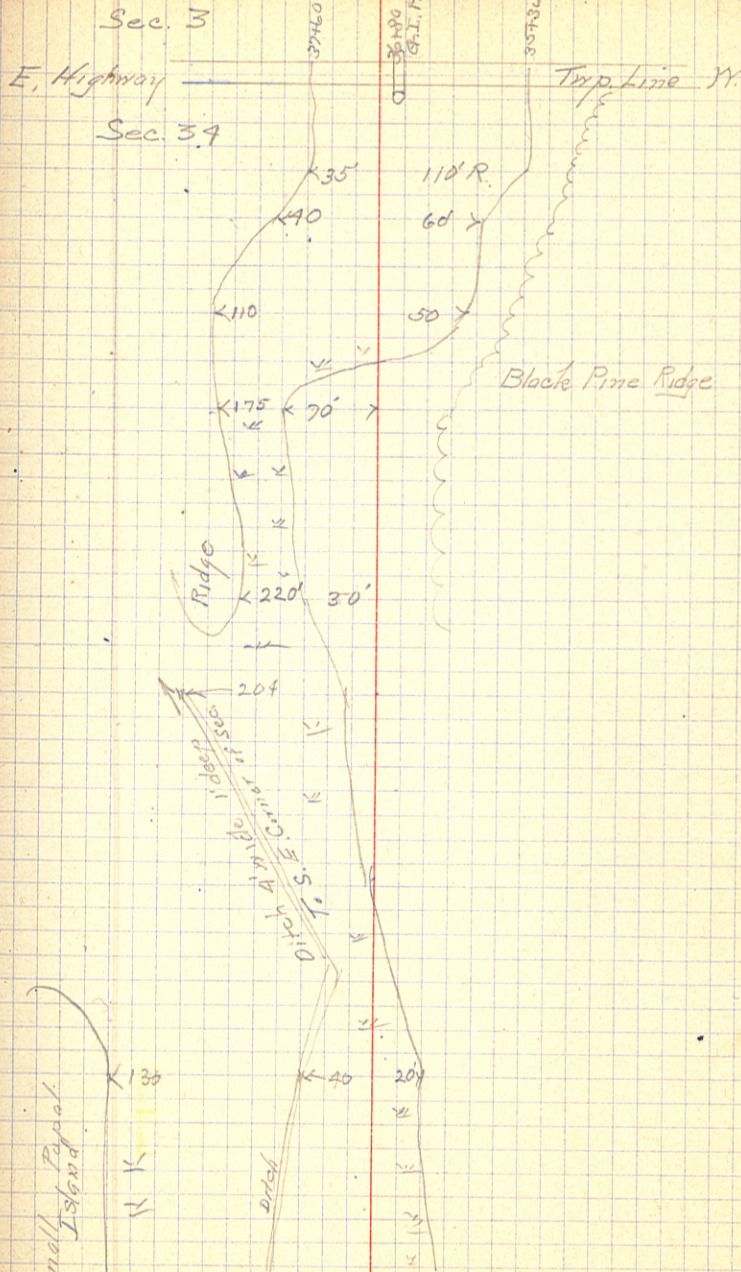
County Ditch No 2, Cass Co Minn.

"Q" Line, Cont.

29 + 42.3 = Road Line 36 + 93.3

- 28
- 26
- 25
- 24
- 23
- 22
- 21
- 20
- 19
- 18
- 17 + 02.7 Δ
- 16
- 15
- 14
- 13

2942.3 feet.



M. J. J. J. J. J.

780. COUNTY DITCH N^o 2, CASS Co., MINN.

MONDAY JULY, 19, 1915.

Cloudy and wet, heavy rain last night.

Same crew

Metes & Bounds N^o 2 Cont

+53. Δ

77

+56 Δ

N. 33° 30' E

76

+26.5 Δ

450.5 34° 38' R. N. 33° 05' E

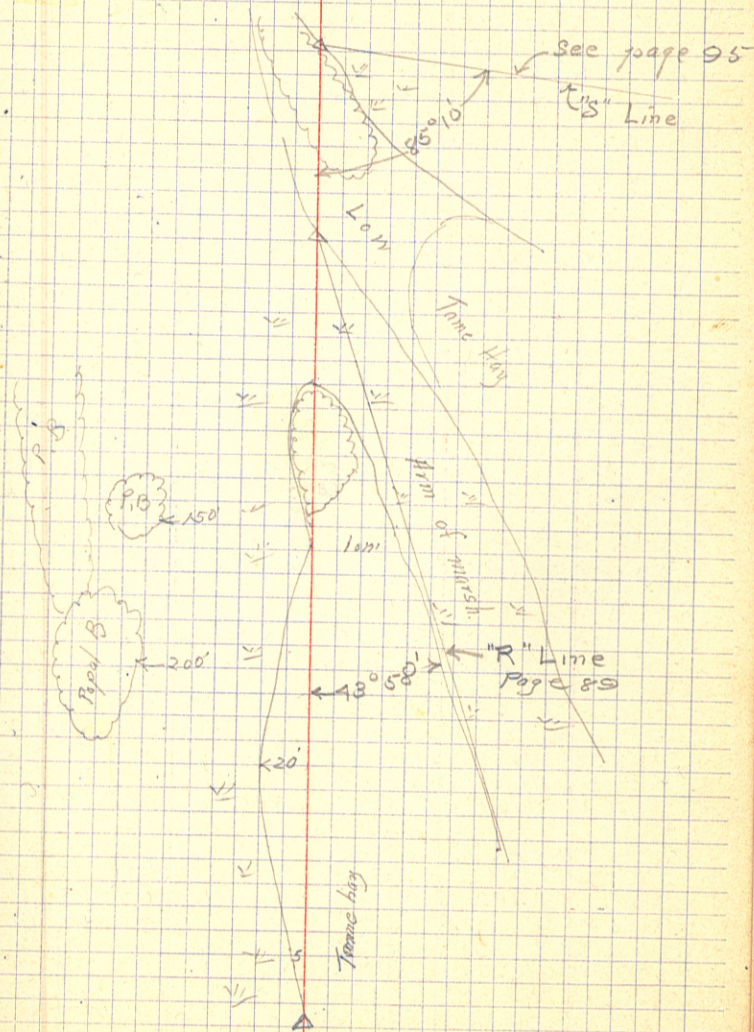
73

72

70

69+76 Δ 489.7 59° 35' L N. 1° 45' W.

Continued from page 70.



J. N. Molyneux

92

91

90

89

88

87

86

85

+63 Δ 1036.5 55°53' R N 89°55' E

84

83

+15 enter clover field

81

80

79+53 Δ

Low Paper covered ground

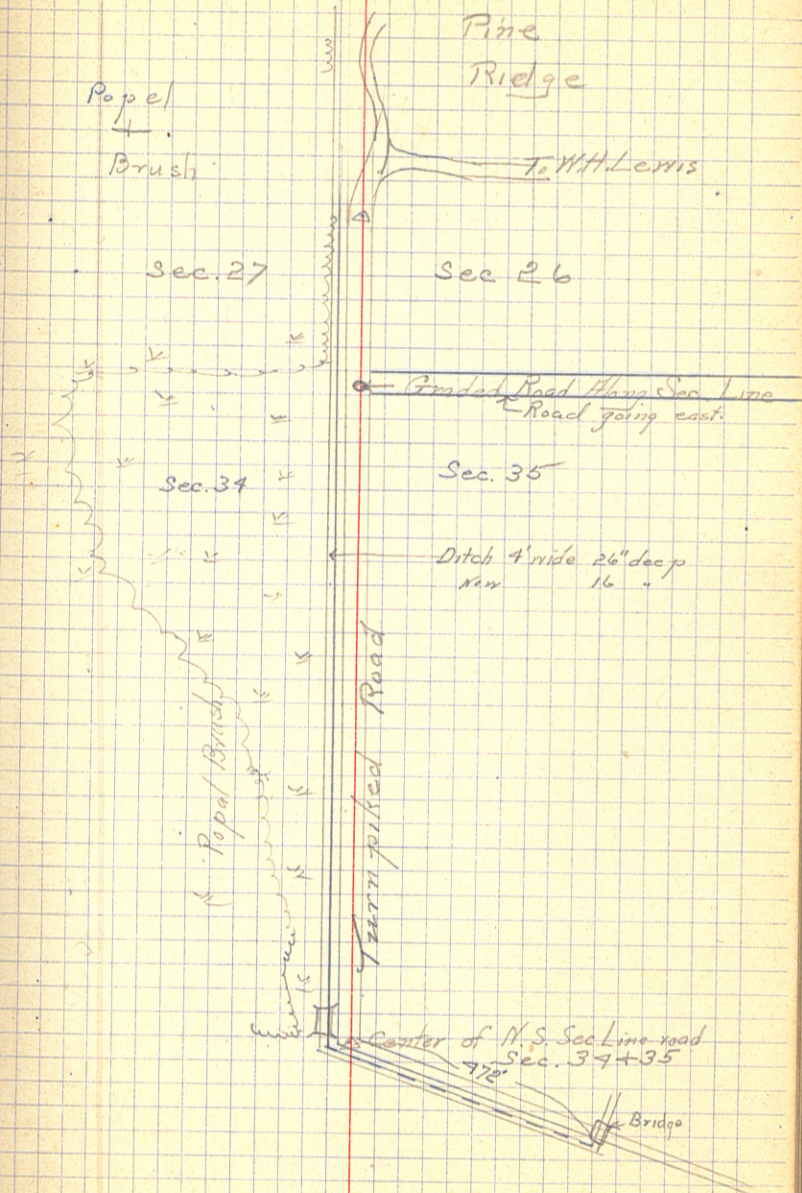
1/4 fence line 10' N. of this course

Clover
Low ground

Low Ground

M. J. Molyment

16
 15
 14
 13
 12
 11 +87.3 1332.4 71° 31' L. N. 43° 10' W
 110 382.6
 9 +09.7. Sec. Cor
 108
 7
 6
 5
 4
 3
 2
 1
 100 1332.4
 99
 98
 97
 96
 95 +72.3 1009.3 91° 40' L. N. 1° 45' W
 94
 93



137 +59.2 Δ = 1910 East on 1/4 Sec. line from ditch line
662.16

136
135
134
133
132
131

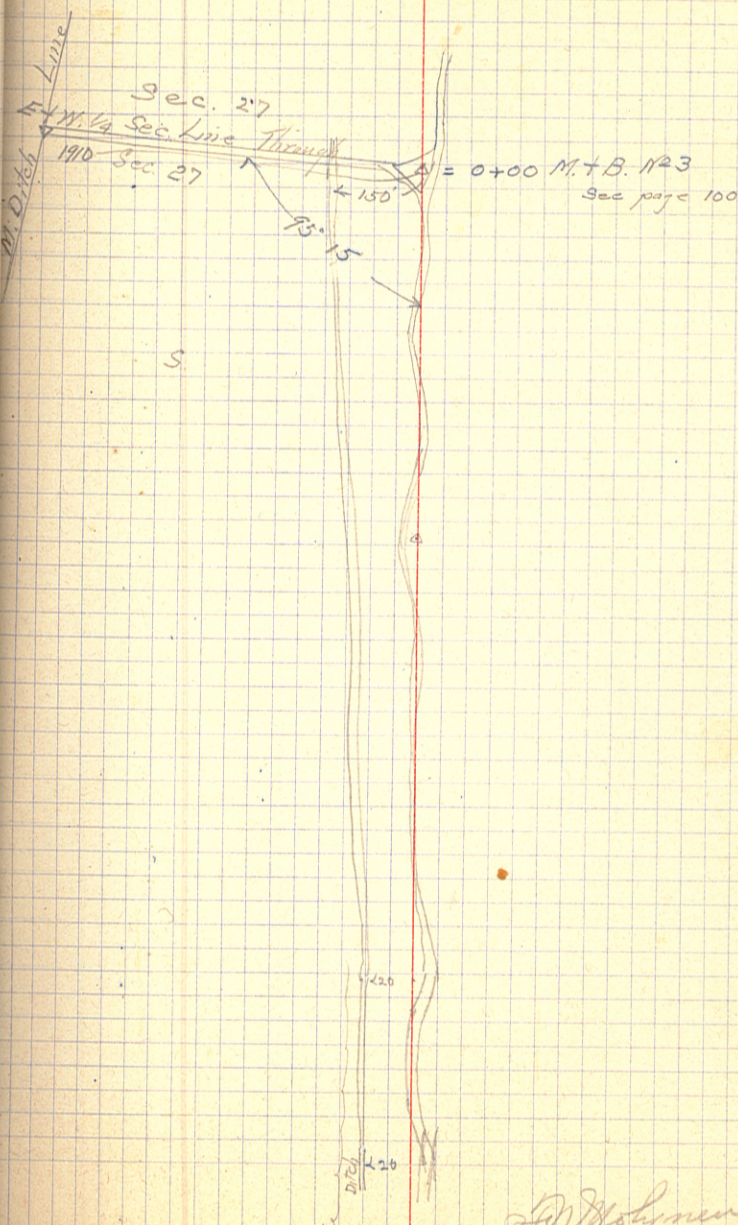
130 +91.6 Δ 1021.6 4° 21' R. N. 9° 45' W

129
128
127
126
125
124
123
122
121

120 +70 Δ 398.3 15° 22' R. N. 12° W

119
118

117 +21.7 Δ 53 A. Δ 16° 14' R. N. 27° 20' W



M. J. Holmquist

"R" LINE

12

11

+52.5 Δ 1052.5 26° 17' L S 36° E

10

9

8

7

6

5

4

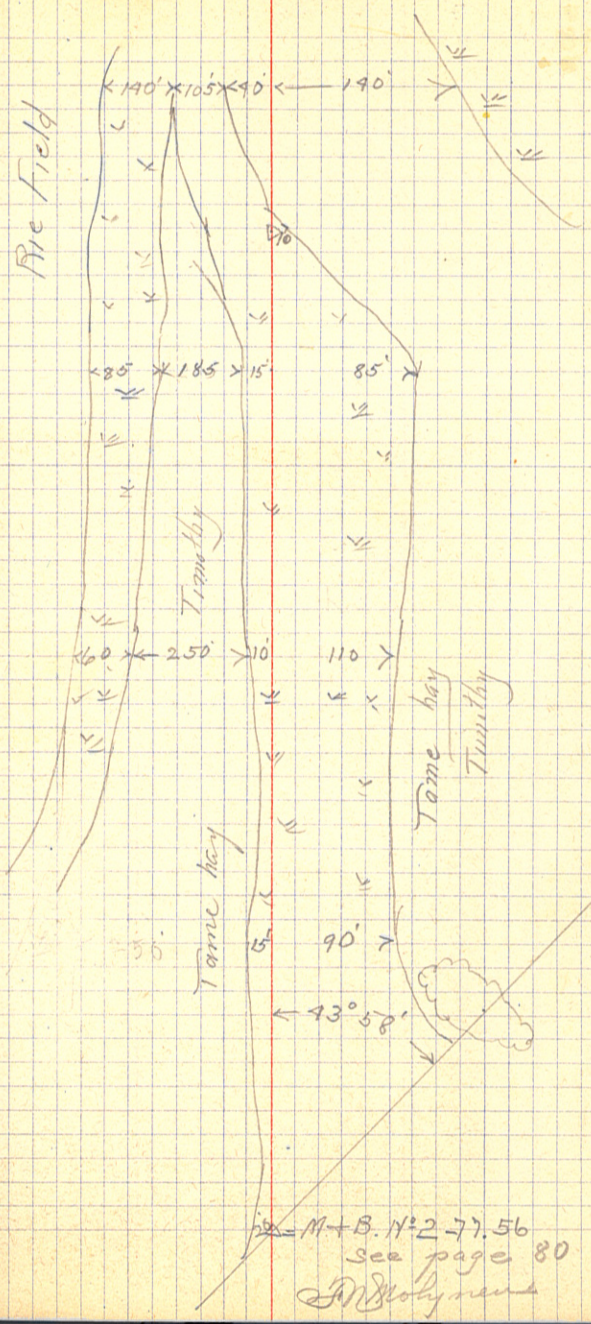
3

2

1

0700

S. 10° 15' E



See M+B. N: 2-77.56
See page 80
M. J. Johnson

20 Co. Ditch No 2, Cass Co. Minn.
"R" Line Cont

25

24

23

22

21

20

19

18

+96.2 Δ

17

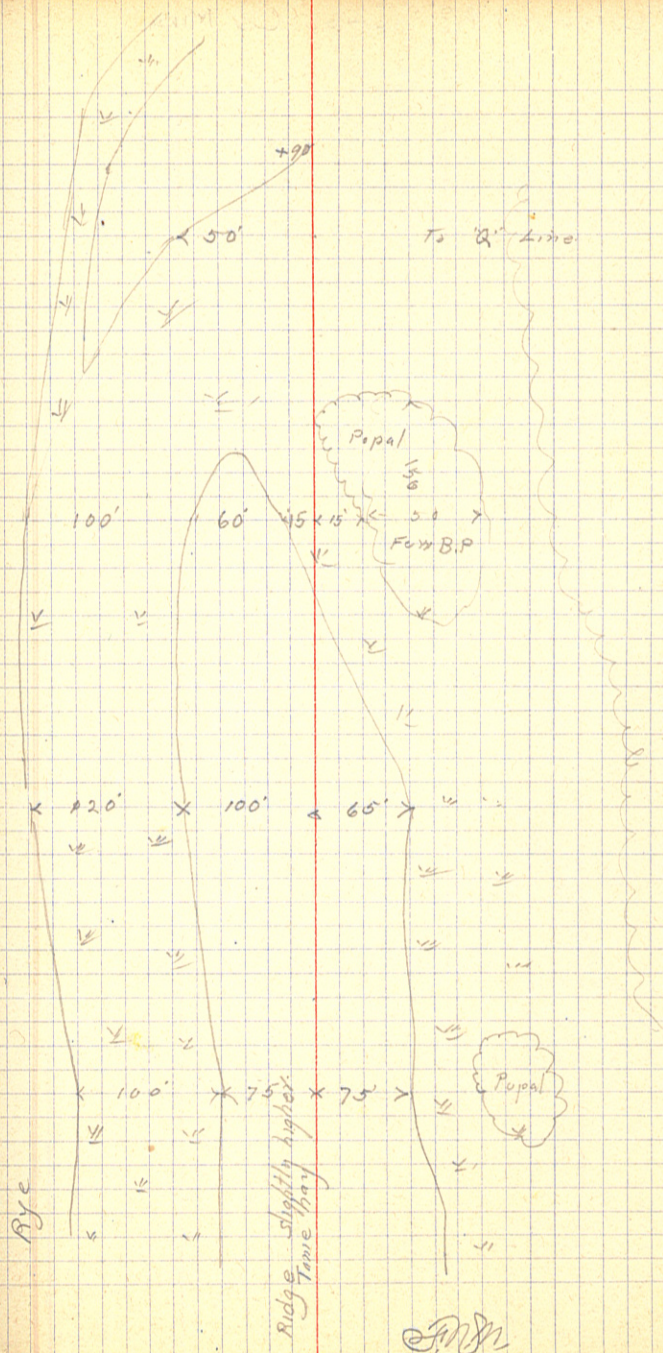
16

15

14

13

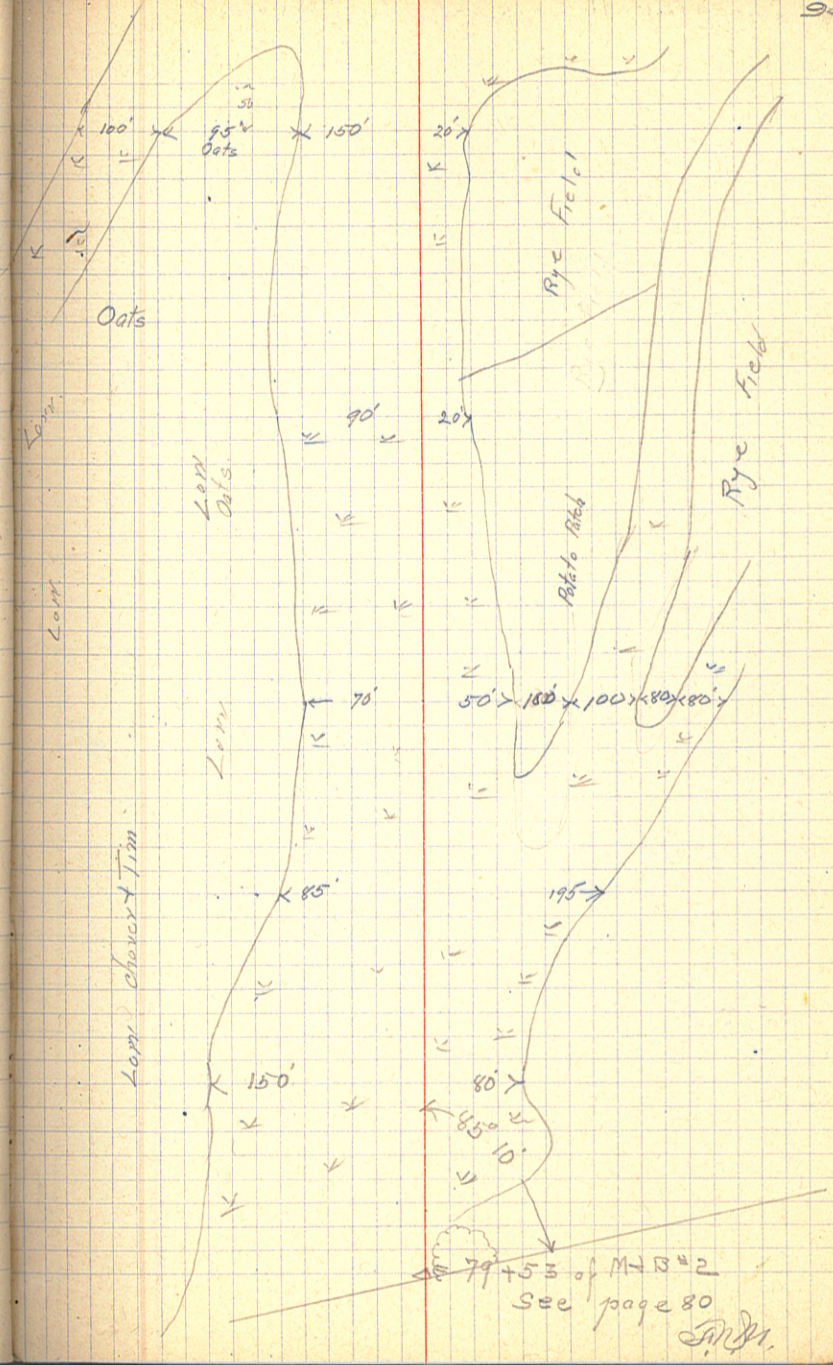
S. 36° 15' E



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

0+00

55° 15' E

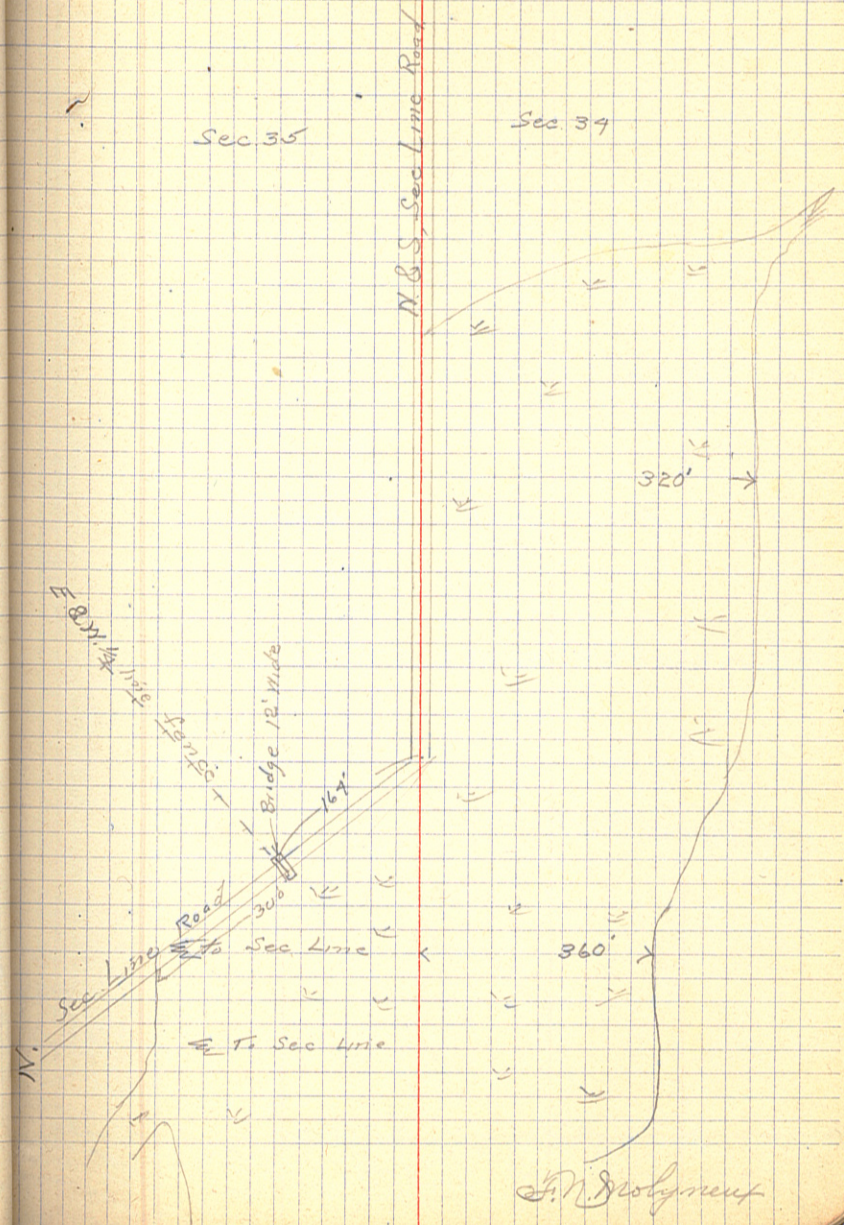


"S" Line, Cont.

22
21
20
19
18
17
16
15
14
13

Along Highway

+27.2 Δ 1727.5 50° R. S. 1° 15' E



9-28 Co. Ditch No. 2, Cass Co., Minn.
 BACKUS LAKE DITCH
 Pro. lateral to take care of outlet of lake
 29+51.6 Δ Tack on west end of bridge
 745.7

22+05.9 Δ 451.9 52° 37' R. N. 82° 10' E

17+59 Δ 491.2 11° 05' L. N. 29° 15' E

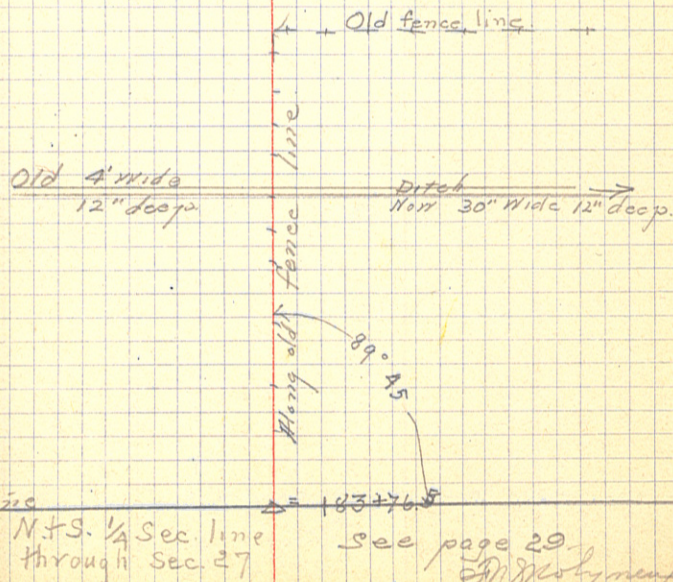
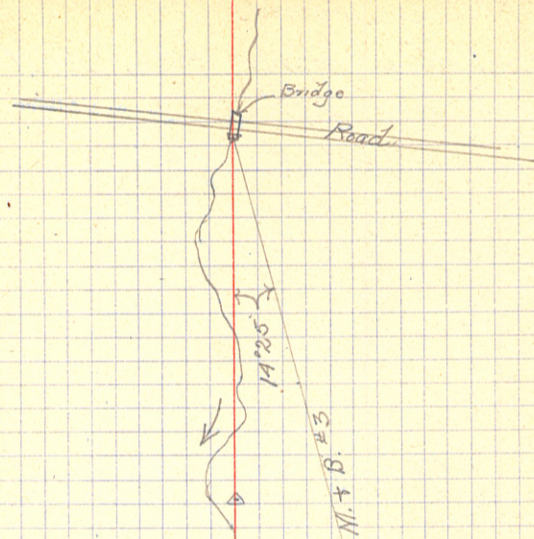
13+13.2 Δ 1313.2 47° 41' L. N. 40° 45' E

3 +34 Ditch

0+00 Δ N. 1° 50' E

99

230 7/1



M. D. Line
 Along N. + S. 1/4 Sec. line
 through Sec. 27

183+76.5
 See page 29
 29 2/2 by reap

100. ✓ Metes & Bounds No 3
 For acreage north from E. & N. 1/4 line
 through Sec. 27

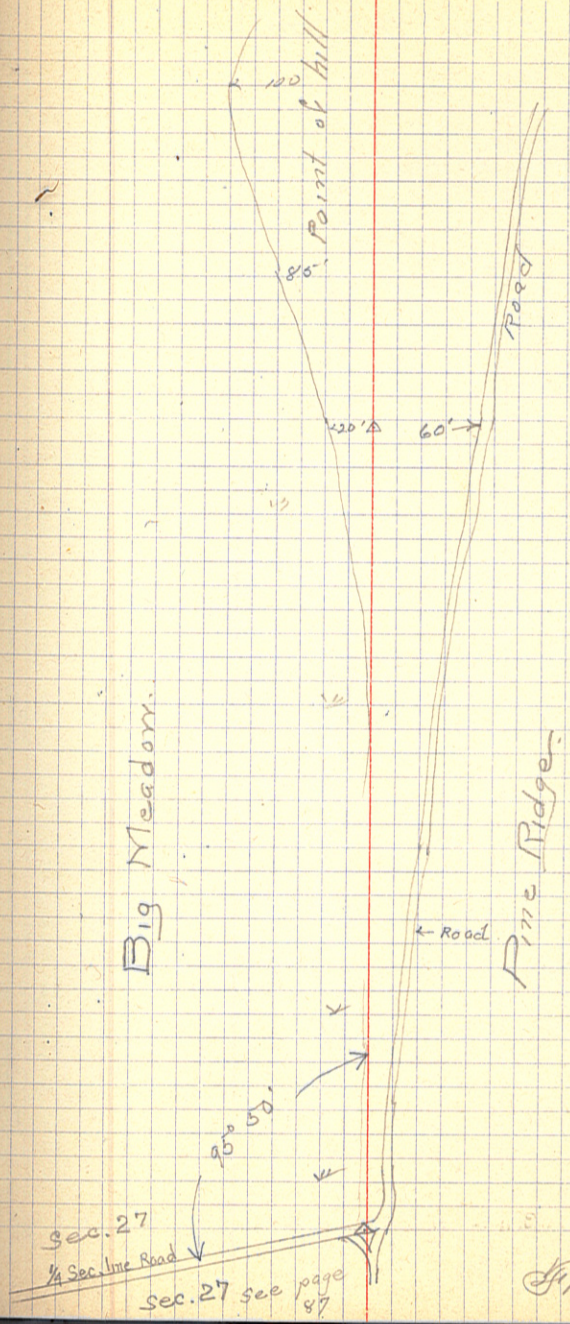
11
10
9
8
7
6
5
4
3
2
1
0

+ 46.0 846 5° 12' R. N. 9° 50' E

0+00 Δ = 137+54.2 M+B. No 2 11° 05' R. N. 4° 0' E
 From last course on
 M+B. No 2

Co. Ditch #2, Cass Co.

101
 ✓
 50
 50
 50
 50



J.M. Johnson

Quit for the day

24 +07.0 Tack on Br. 93° 45' L. N. 26° W.
419.5

23

22

21

20 +87.5 Δ 1141.5 58° 54' R. N. 67° 45' E.

19 +96.9 Δ N. 8° 10' E.

18

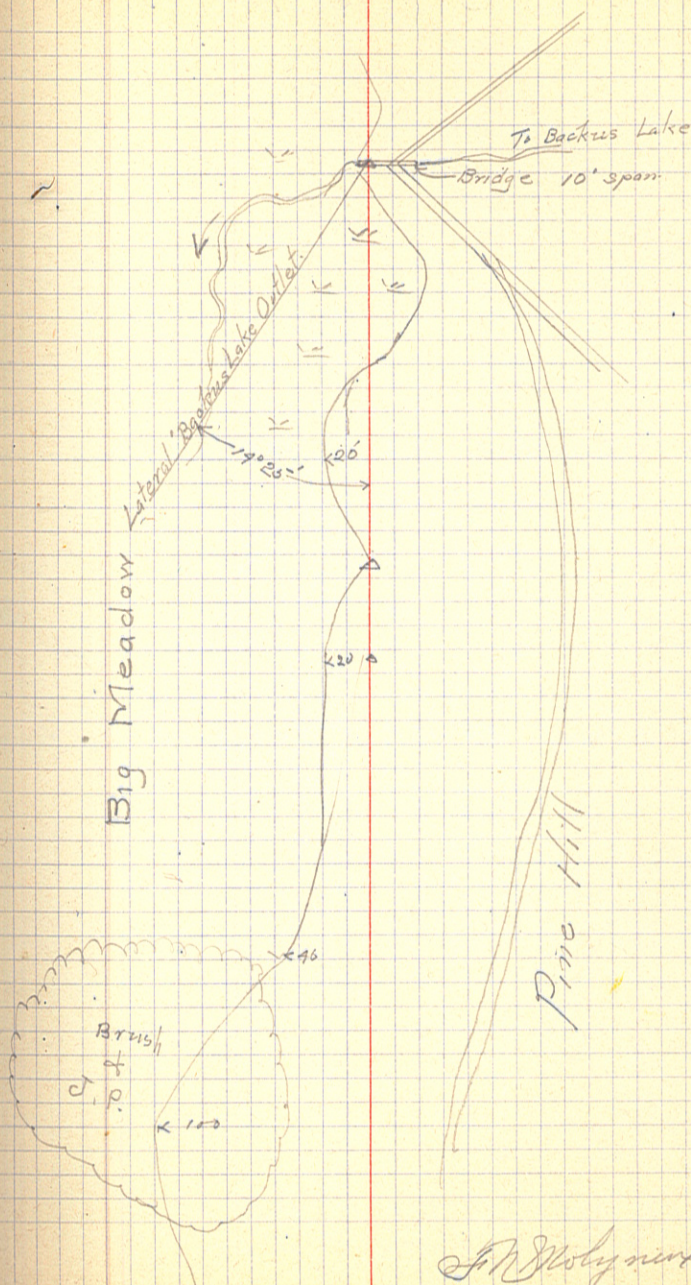
17

16 +25.7 Δ N. 8° 50' E

15

14

13



J. R. Wolynick

9104

✓ Metes + Bounds #3
JULY 20, 1915, TUESDAY
Same Crew. Fine morning

42

41

40

39

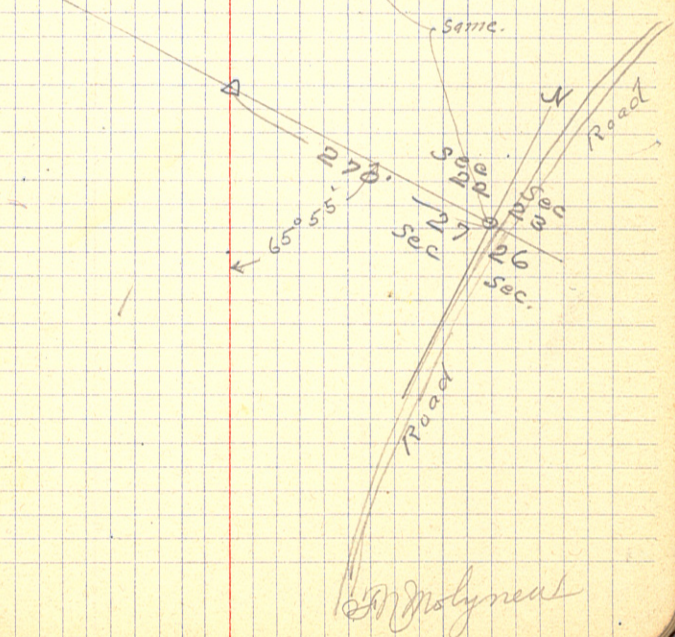
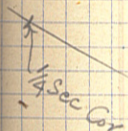
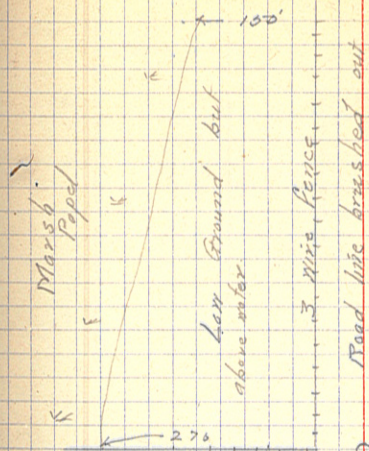
38 + 17.4 Sec. Cor. (270') 47° 37' L. N. 0° 40' W.

35 + 47.4 Δ 740.4 219° 05' R. N. 82° 50' E. E. on Sec. line fence

28 + 07.0 Δ 419.5 93° 45' L. N. 26° W.
Tack in west end of Br.

Co. Ditch #2

Cass Co, Minn ✓ 105



55 +20 Fence

54

53

52

51

50

49

48

+58.0 Δ

47

46

45

44

43

N. 0° 10' E.

House
Ed. Gibney

Bar

370'

Pasture

Lerr.

Lerr & met

160'

Big Meadow

13

water

Shire fence

170'

Brush

Lerr bul above

Fence brushed out.

Poplar & B. Pine.

Pasture

J. M. Polynant

108 ✓

M. & B. #3

68

67

+79.0 Δ

N. 0° 10' E.

66

65

64

63

62

61

60

59

58

+78.9 Δ

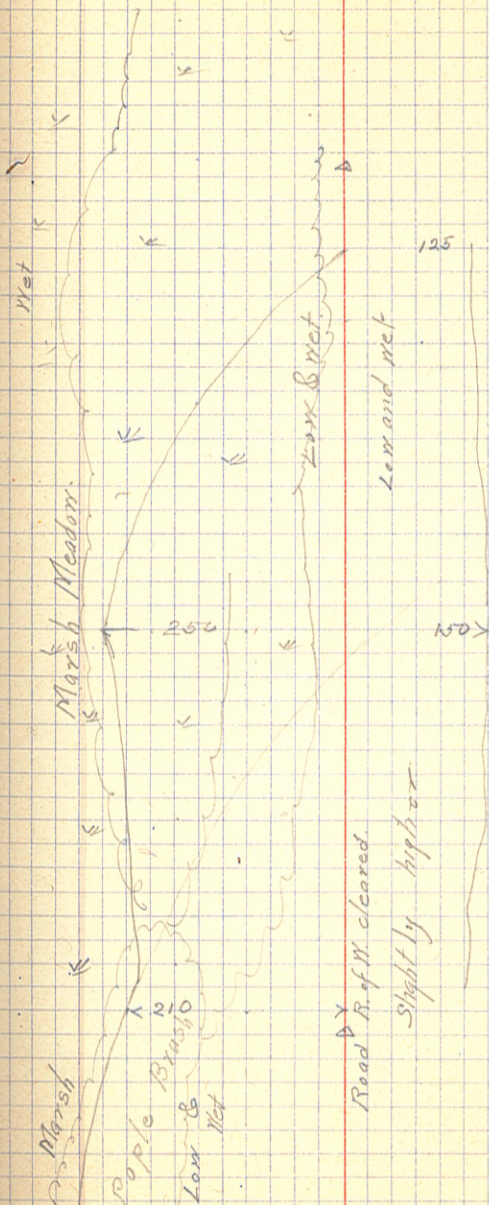
N. 0° 15' E.

57

56

Co. Ditch No 3

109 ✓



J. M. Molyneux

110 ✓

M. & B. #3

81

80

79

78

77

76

75

74

73

72

71

70

69

+44.5 Δ

N. 0° 05' E.

+49.0 Δ

North

Co. Ditch #2.

✓ 111





81

83

91

+46.5 Δ 5329.1
+11.5 Cross sec. line

90

89

+50

88

87

86

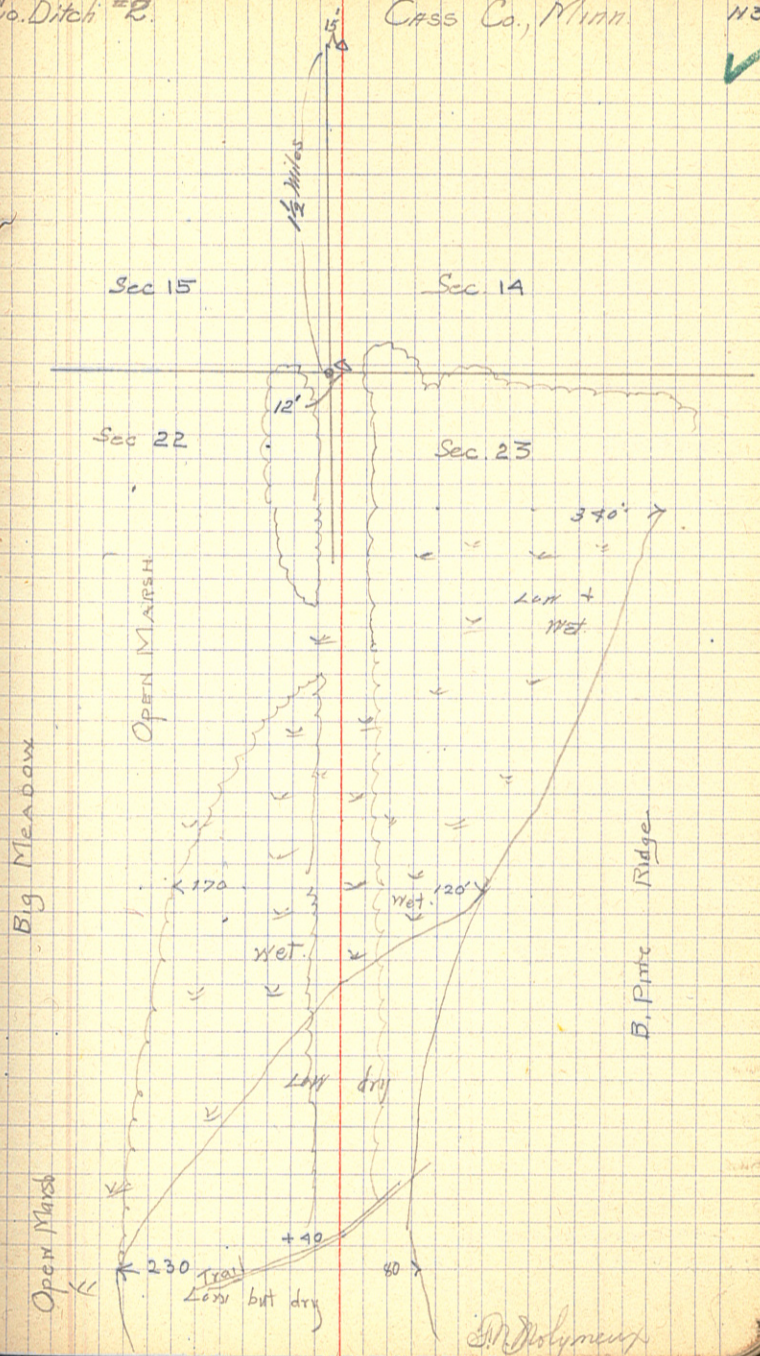
85

84

83

+40 Trail

82



114

M. & B. No 3

104

103

102

101

100 +04.3 Δ

N. 34° 20' E

99

98

97

96

95

+71.4

329.9

28° 48' L N. 34° 55' E.

94

93

92

+49.7 = 261 + 01.0 M. Ditch

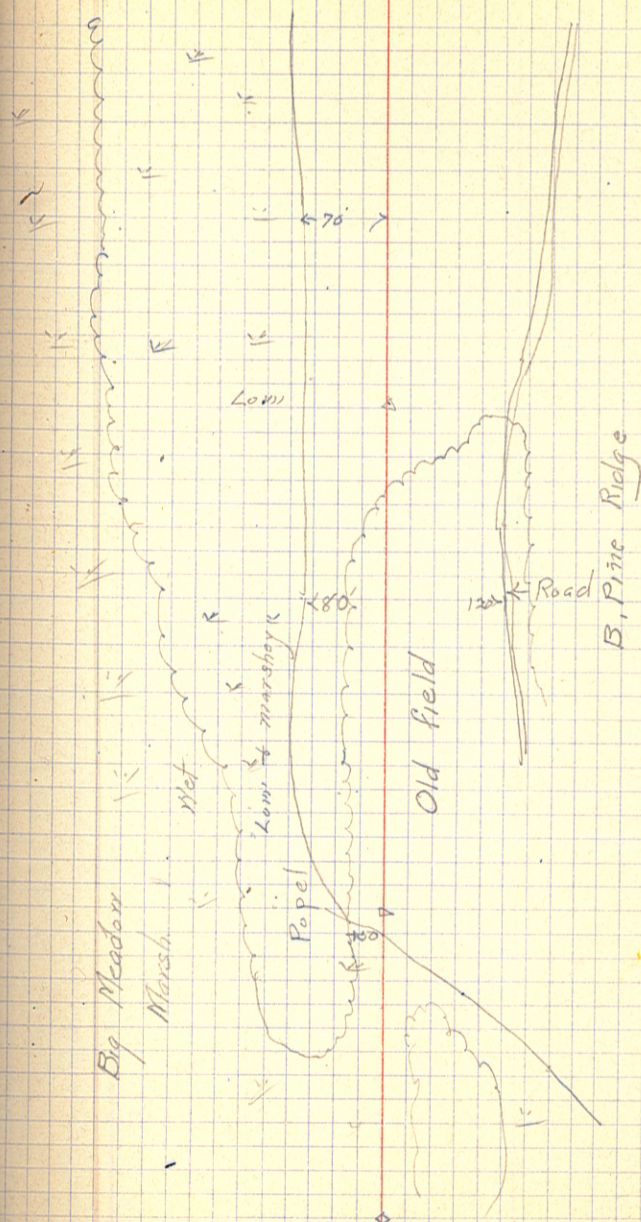
91 + 46.5 Δ

63° 03' R. N. 63° 10' E.

Co. Ditch No 2

CASS CO. MINN.

115



A. J. Polymant

116 ✓

M. & B. No 3

116

$$\begin{array}{r} 115 + 20.7 \\ 94 + 17.9 \\ \hline 2049.3 \end{array}$$

+20.7 Δ 2049.3 30° 16' L. N. 5° 0' E

115

114

113 Leave Marsh

112

+51.0 Δ

N. 39° 36' W.

111

110

109

108

107

106

105

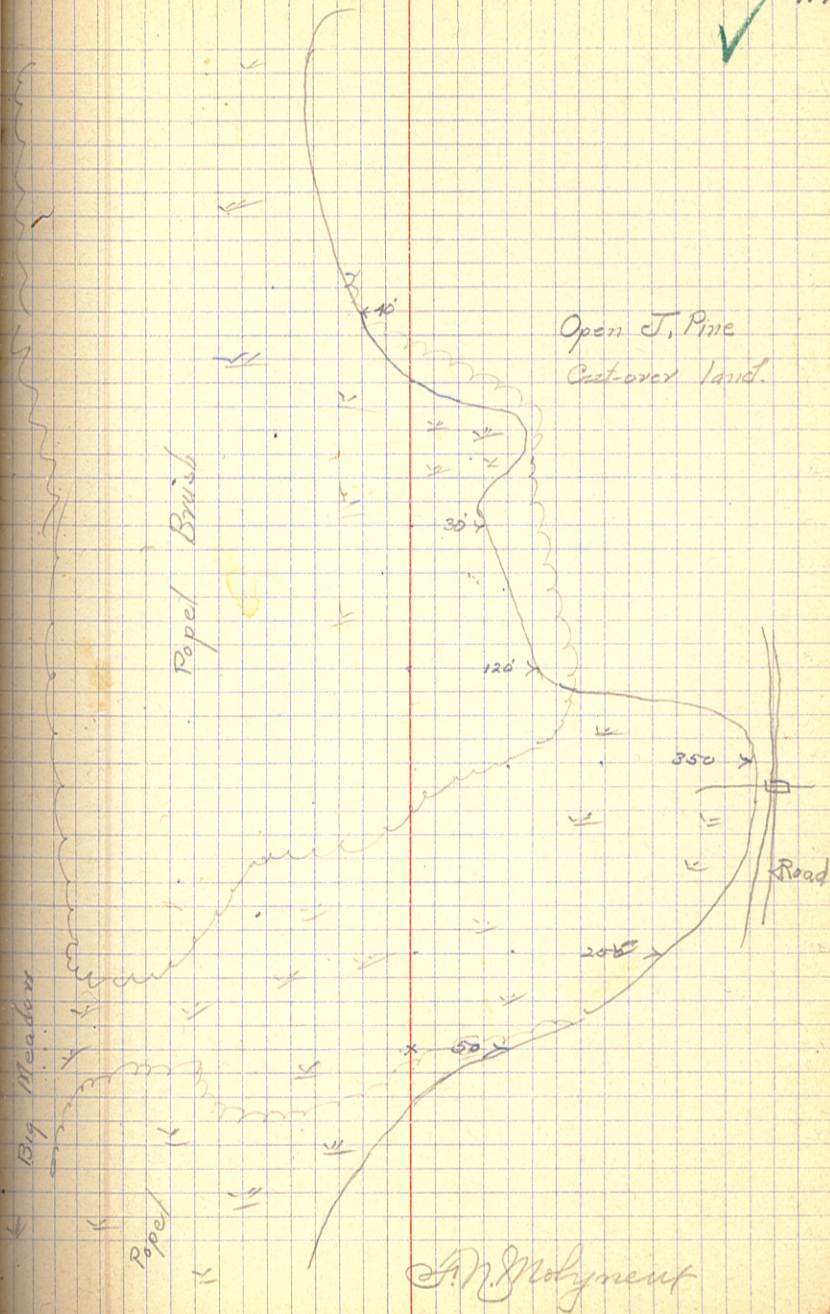
104 + 93.3

N. 35° 10' E.

Co. Ditch No 2

Cass Co. MINN.

117 ✓





129

128

+40 Δ 1219.3 53°55' L N.48°40' W
127

126

125

124

123

122 Δ N.42°5' E

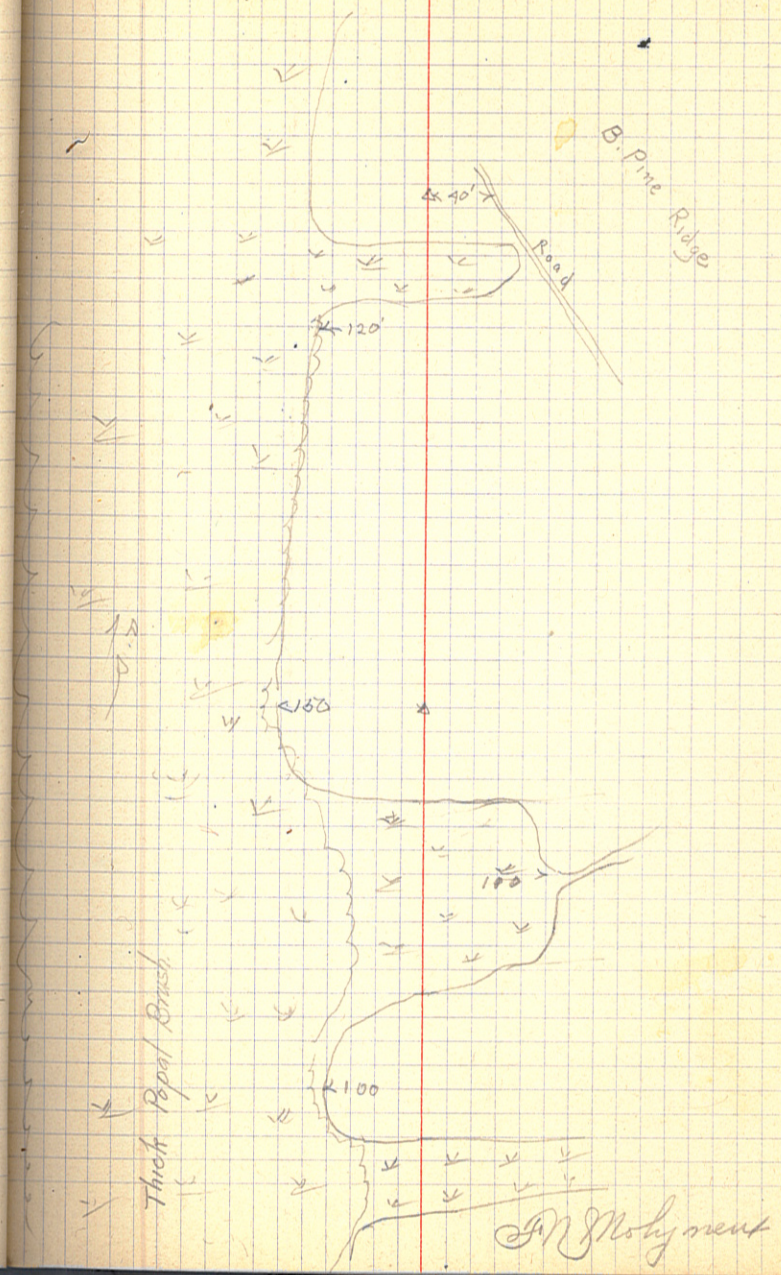
121

120

119

118

117



122

M. & B. N^o 3

155

+69 Leave

+62 Enter Iron Creek

159

153

152

151

+99 Δ 747.6 $9^{\circ}28' R$ $N.10^{\circ}0' E$

150

149

148

147

146

145

144

+46.7 Δ 636.6 $17^{\circ}52' R$ $N.0^{\circ}30' E$

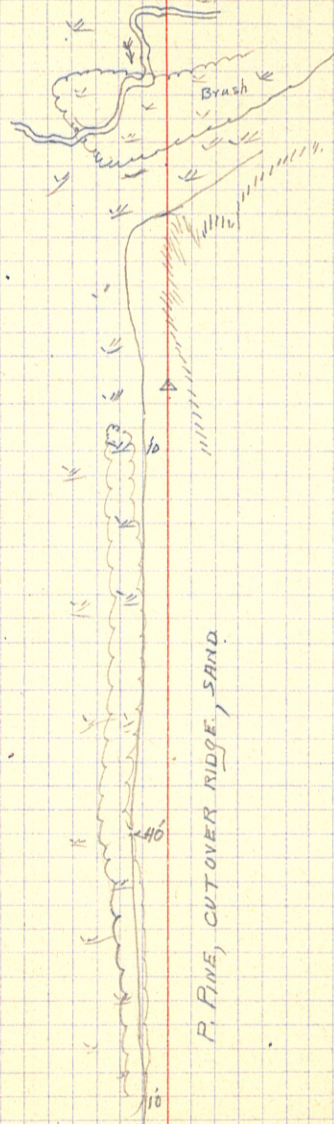
143

Co. Ditch, N^o 2

CASS, CO., MINN.

123

Pine Ridge



J. M. Holmquist

Quit for the day
 Shower 2 P.M.
 Heavy rain on way home

164 Enter timber

163

162

161

160

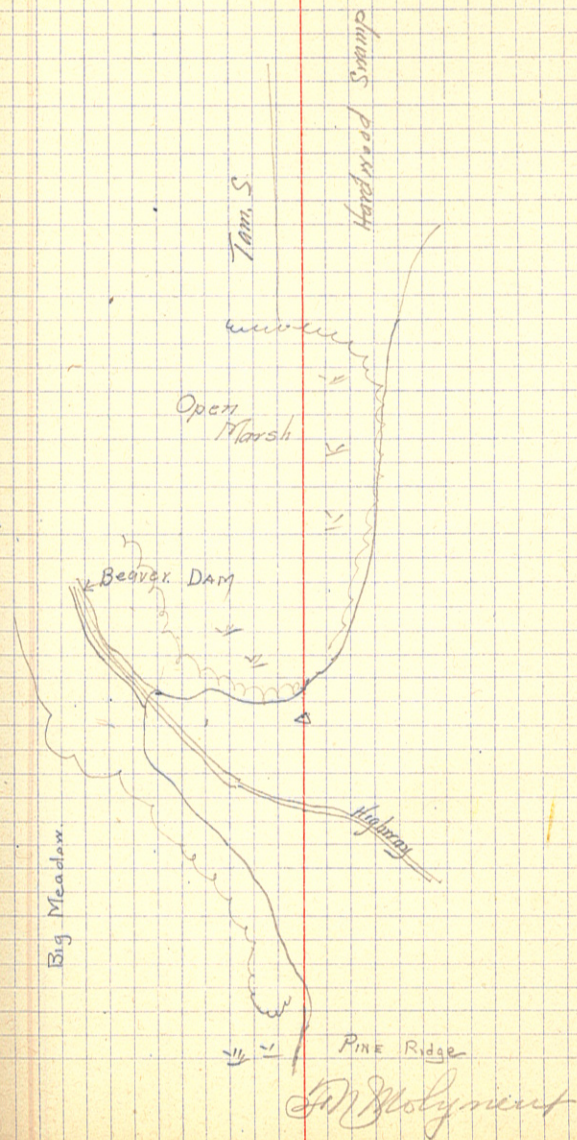
+59 Δ 820' $77^{\circ}03'R, N. 87^{\circ}25'E$

159 +14 Highway

158

157

156



WEDNESDAY, JULY 21, 1915

Fine morning; Same crew.

176

175

+11.2 Δ 1452.2 72° 20' L. N. 14° 30' E
174+07.9 Δ N. 87° E
173

172

171

170

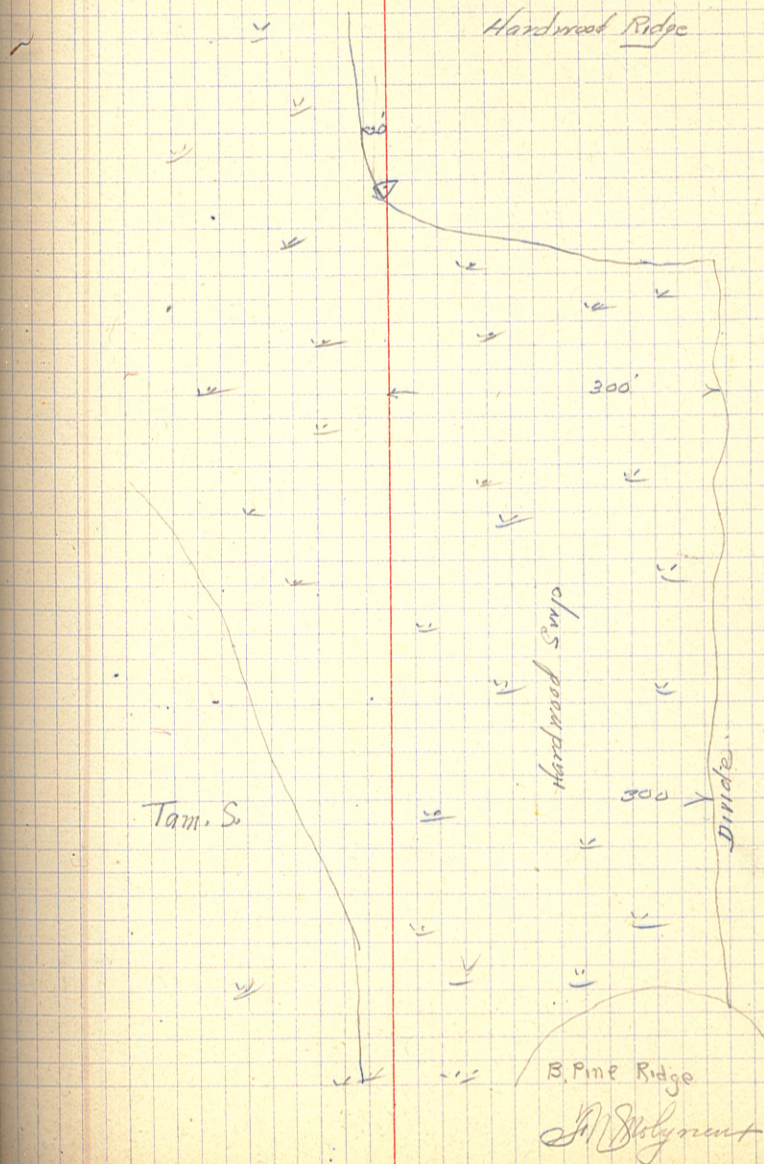
169

168

167

166

165



128

M. & B. No 3

189

188

187

186

+65 Big B. Dam

185

184

183

182

181

180

179

+16.6 Δ 505.4' 0° 08' L N. 11° 50' E

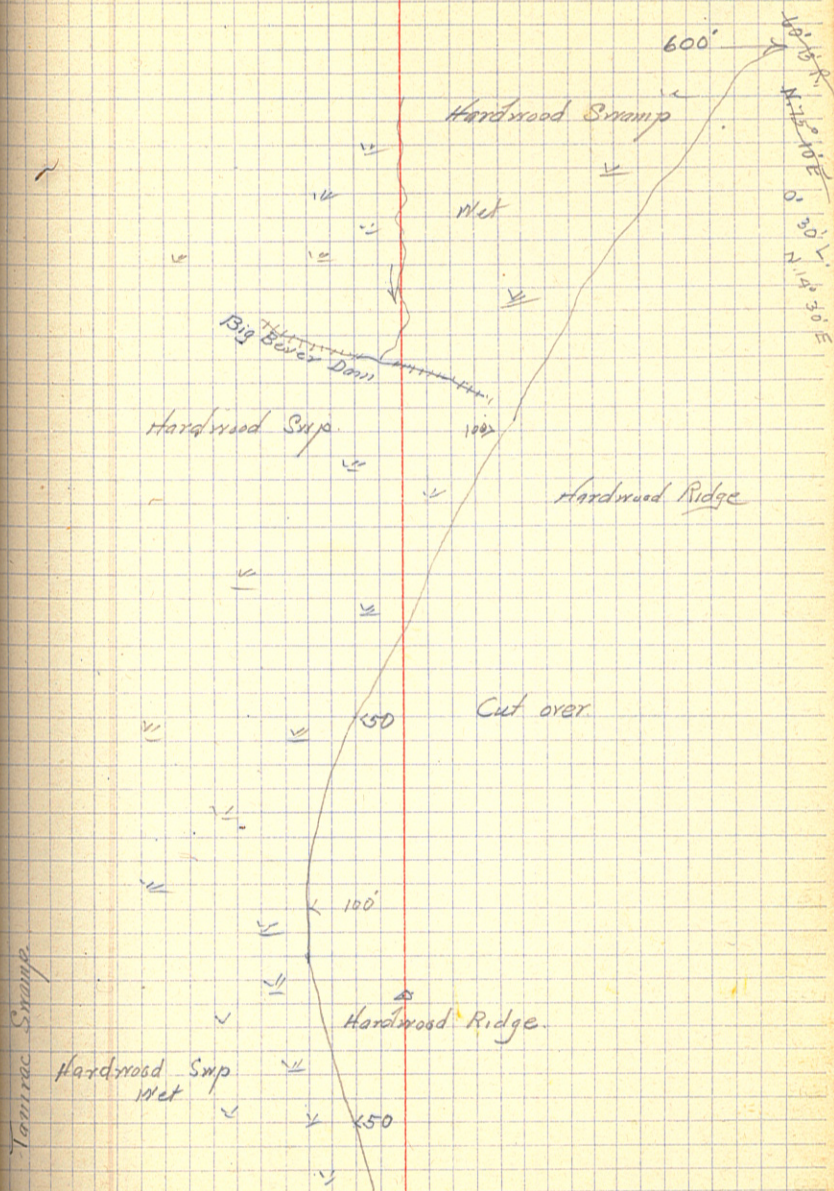
178

177

Co. Ditch No 2,

CASS Co. MINN.

129



Tauzac Swamp

130

M. & B. No 3

202

201

200

199

198

197

196

195

+86.6 Δ 482.6 36° 40' L N. 22° 15' W.

194

193

192

191

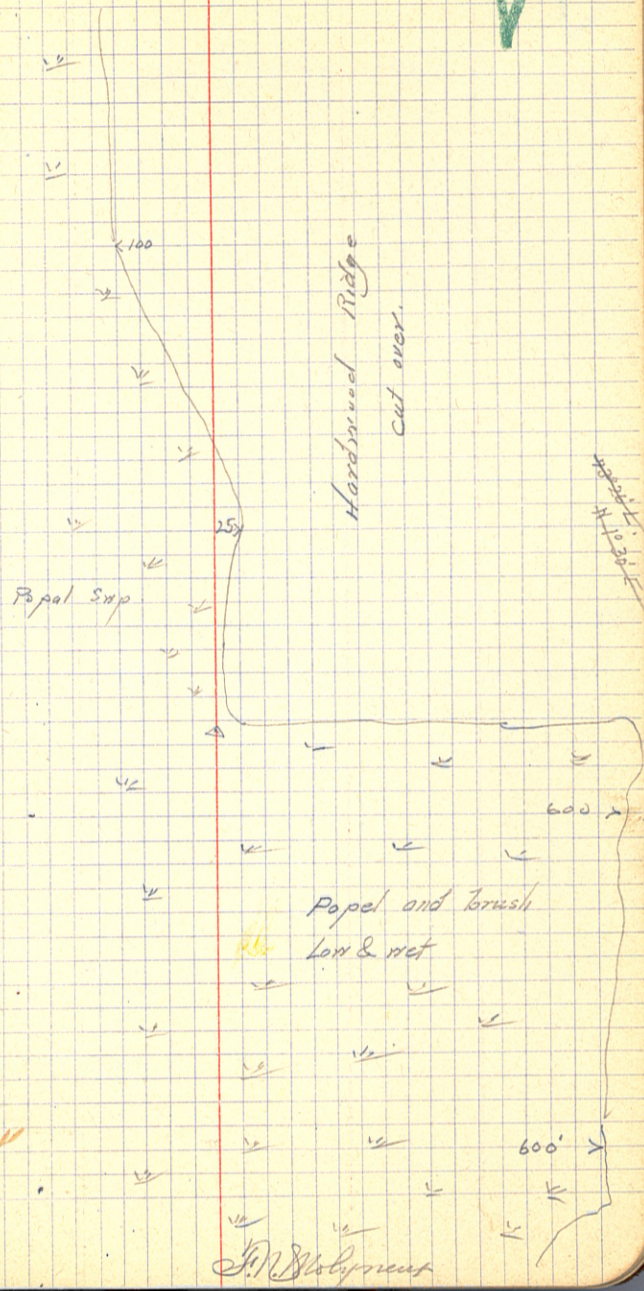
190

+03.4 1086.8 0° 30' L N. 14° 30' E

Co. Ditch No 2

Cass Co. MINN.

131



132

M. & B. No 3.

215

+88.0 Δ 639' 39° 41' R. N. 12° 0' W

214

213

212

211

210

209

208

+49 Δ 317.7 29° 30' R. N. 57° 45' W

207

206

205

+31.3 Δ 1045.3 58° 34' L. N. 81° W

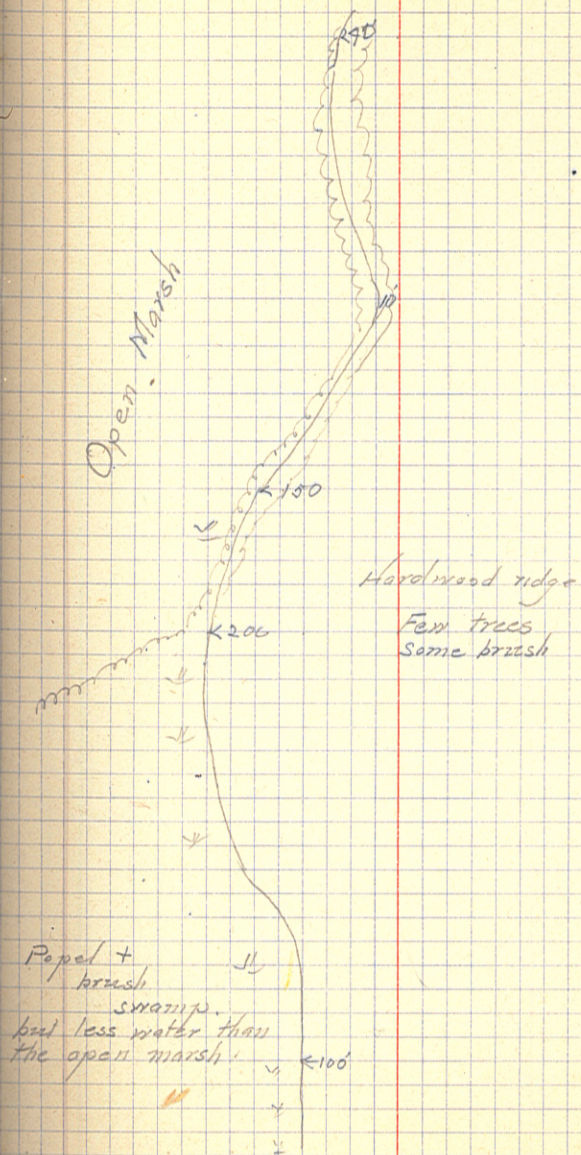
204

203

Co. Ditch No 2.

CASS CO. MINN.

133



J. N. Holgren

134

M. & B. No 3

228

227

226

+25.9 Δ 358' 10° 16' R. N. 69° 30' E

225

224

223

222

+67.9 Δ 453' 33° 09' R. N. 58° 40' E

221

220

219

218

+14.9 Δ 226.9 37° 08' R. N. 25° 30' E.

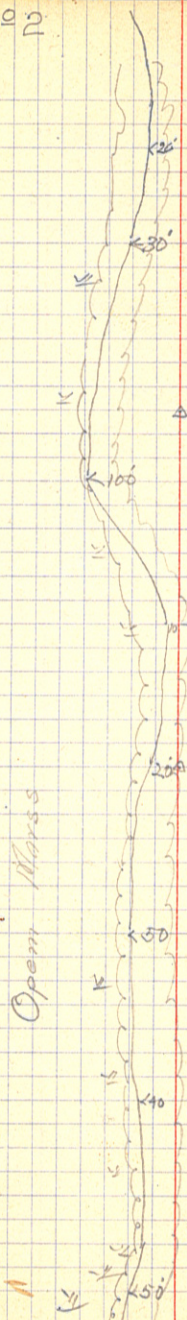
216

Co. Ditch No 2

CASS CO., MINN.

135

Tamarac Swamp



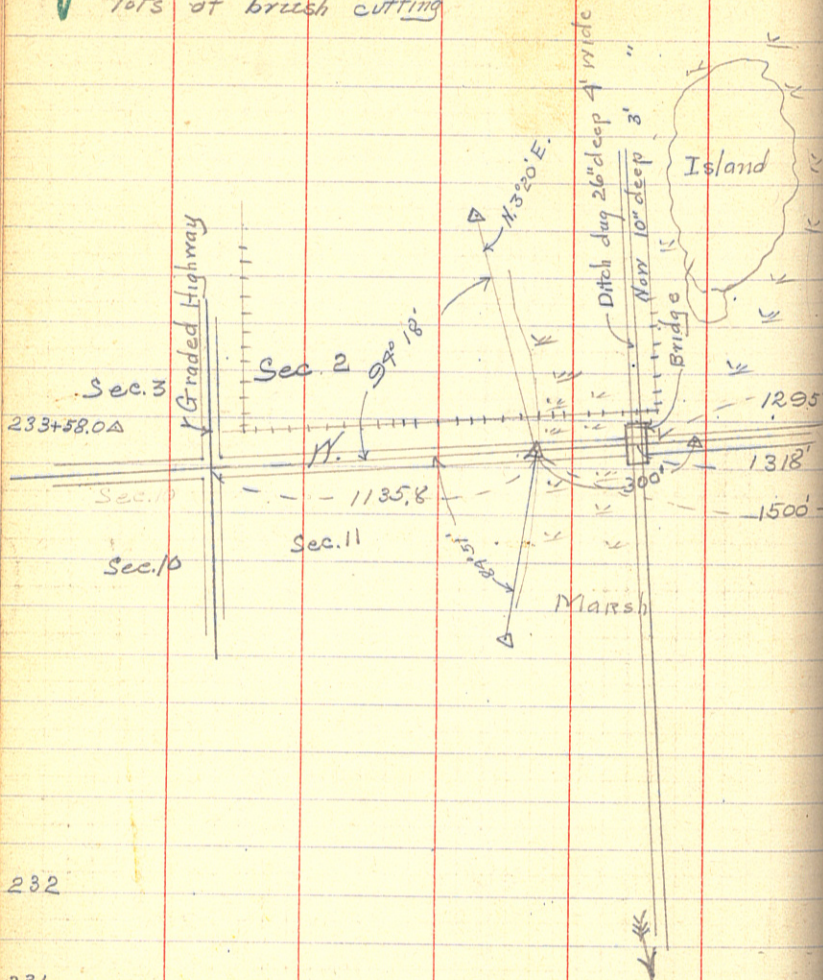
CUT OVER

HARDWOOD RIDGE

FEW SCATTERING PINE

M. B. Holmquist

Quit July, 21, 1915, Fine day
lots of brush cutting



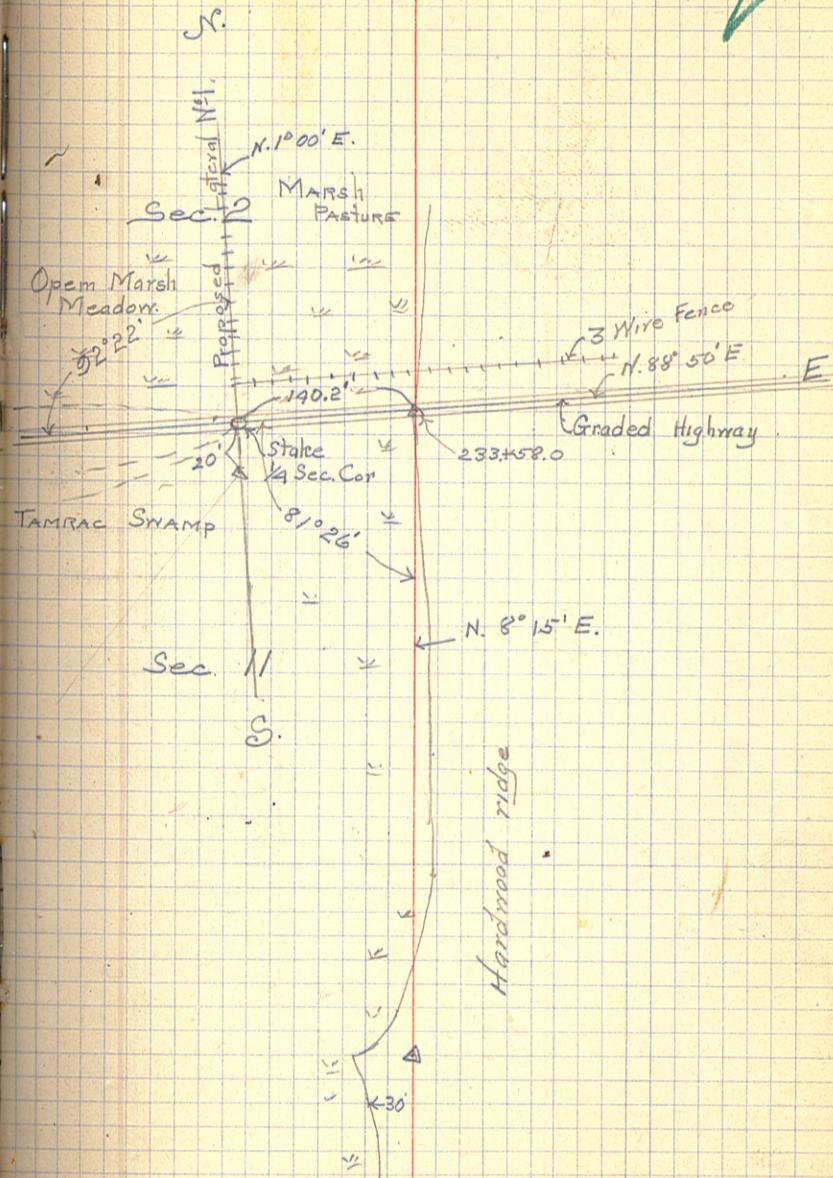
232

231

+50.0 Δ 524.1 61°27' L N. 8°15' E

230

229



Wm. Holyment

138

M. & B. No 3

JULY 22, 1915, THURSDAY

FINE MORN. SAME CREW.

255

259

253

252

251

250

249 + 98.2 Δ 1640.2 $84^{\circ} 51' L$ $S. 3^{\circ} 40' W$ West side of Marsh

248 + 16.2

Cross Ditch

246 + 98.2 Δ 235
+ 98.2 \odot $\frac{1}{4}$ Sec. Cor $\frac{2}{11}$

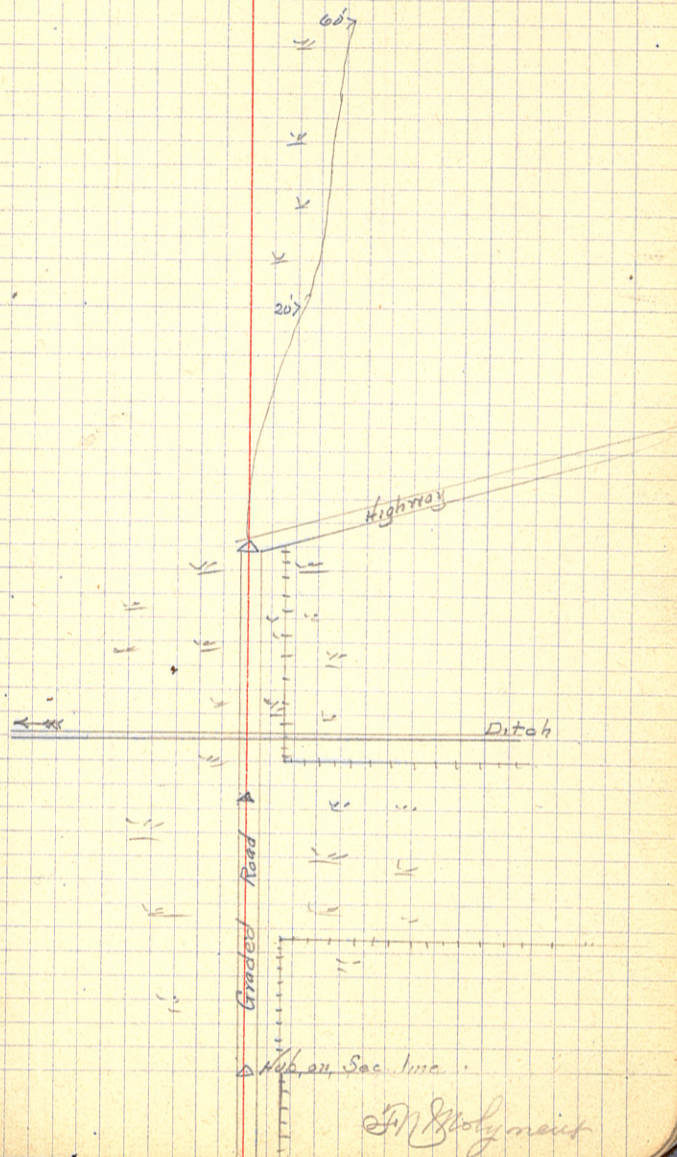
234

233 + 58.0 Δ 308' $98^{\circ} 24' L$ $S. 88^{\circ} 51' W$ along Sec line

Co. Ditch No 2

CASS CO. MINN.

139



140

M. & B. No 3

270

269

268

267

266

+85.0 Δ 698.5 17° 14' R. S. 0° 45' E.

265

$$\begin{array}{r} 265.7035 \\ 238.865 \\ \hline 698.5 \end{array}$$

264

263

262

261

260

+86.5 Δ 868.3 21° 42' L. S. 18° 0' E.

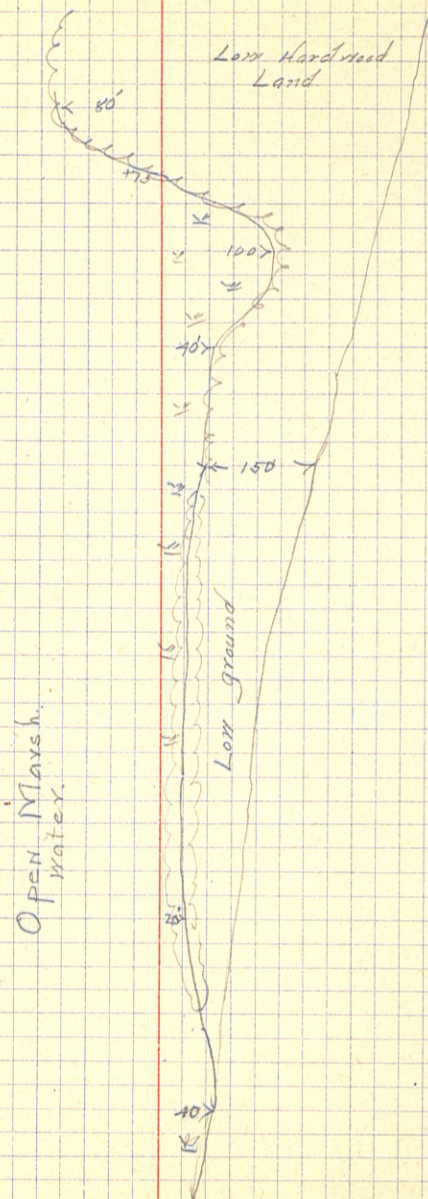
258

256

Co. Ditch No 2

CASS Co. MINN.

141



E. M. Holmquist

283

282

+42.3 Δ

281

280

279

+56.0 Δ

278

277

276 Enter Marsh ~~+15.3~~ 25° 39' R. S. 25° 30' N.

275

274

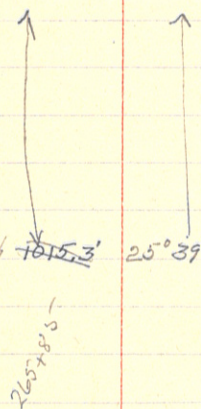
273 +90.5 Δ

272

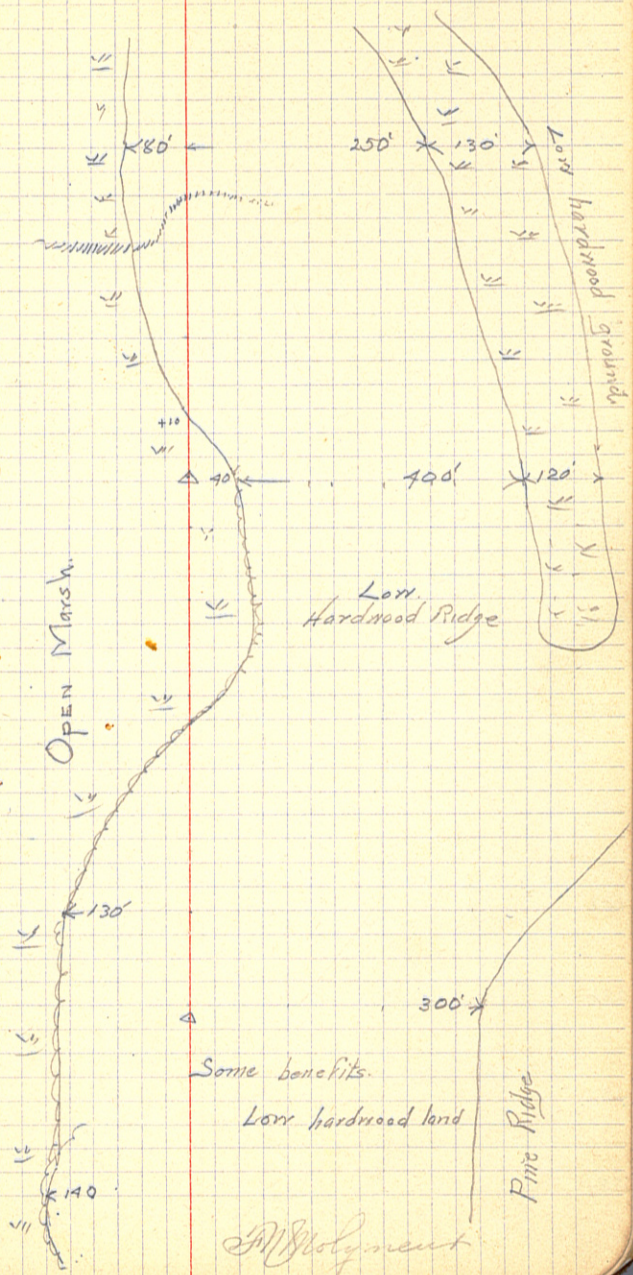
271

S. 25° 0' N. On big beaver dam.

~~254~~
~~278~~
~~272.3~~
~~276~~
~~286.3~~



S. 0° 45' E



✓
144.

M. & B. No 3

2 296

2 295

2 294

2 293

+82.3 Δ 558' 116° 51' R. N. 86° 10' W.

2 292

2 291

2 290

2 289

2 288

2 287 +23.3 Δ 1123.3 47° 43' L S. 21° 50' E

2 286 +25 L. Marsh
247 x 23.3
218 x 52.3
27/6 621.3

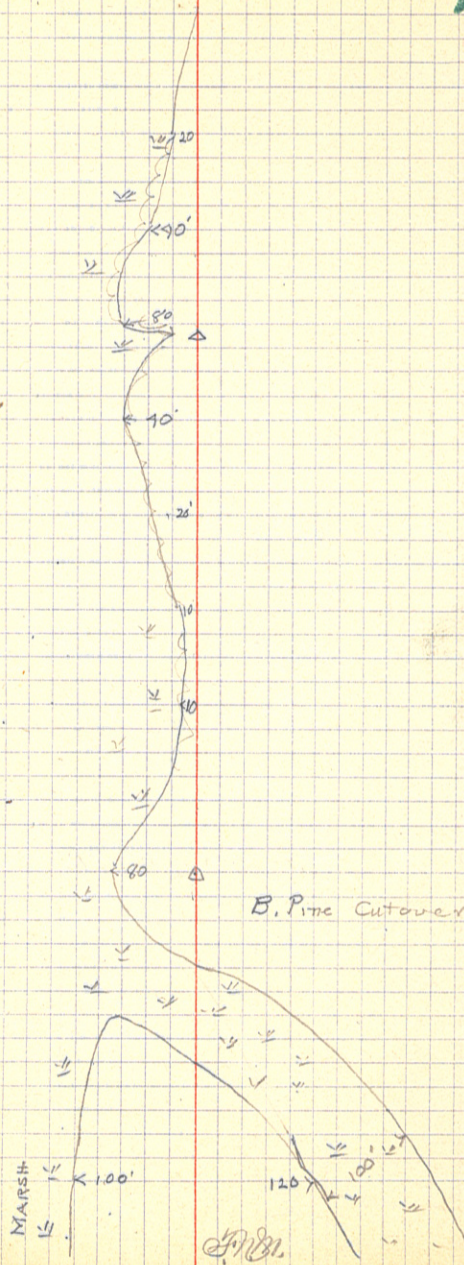
2 285 +25 Enter Marsh

2 284

Co. Ditch No 2

Cass Co., Minn.

✓
145



17 146

M. & B, No 3

Quit for the day

Fine day. Considerable brush
much water.

2

2

2

2

2

2

+83.7 Δ 128.4' 43° 26'

2 303

+85.3 Δ 973' 51° 58' L. S. 42° 05' W. On Beaver Dam

2 302

2 301

+21.5 Δ

N. 86° 0' W.

2 300

2 299

2 298

2 297

Go. DITCH No 2

CASS Co. MINN.

147

S
S. 17° 10' E
MAIN DITCH
15' E. of Sec. Line

200'

To Main ditch Line. Hub 200'
North of hub at Sta 329+00
See page 31

Hub is 15 feet east and 1455
feet south of the $\frac{1}{4}$ corner
between Secs. 10 + 11



F. W. Gislengren

METES & BOUNDS OF
BEAVER ISLAND, SEC. 11, 134-32

9

8

7

6

5

4

+27.7 Δ

53°36' R. S. 4° 0' E Quit for the day

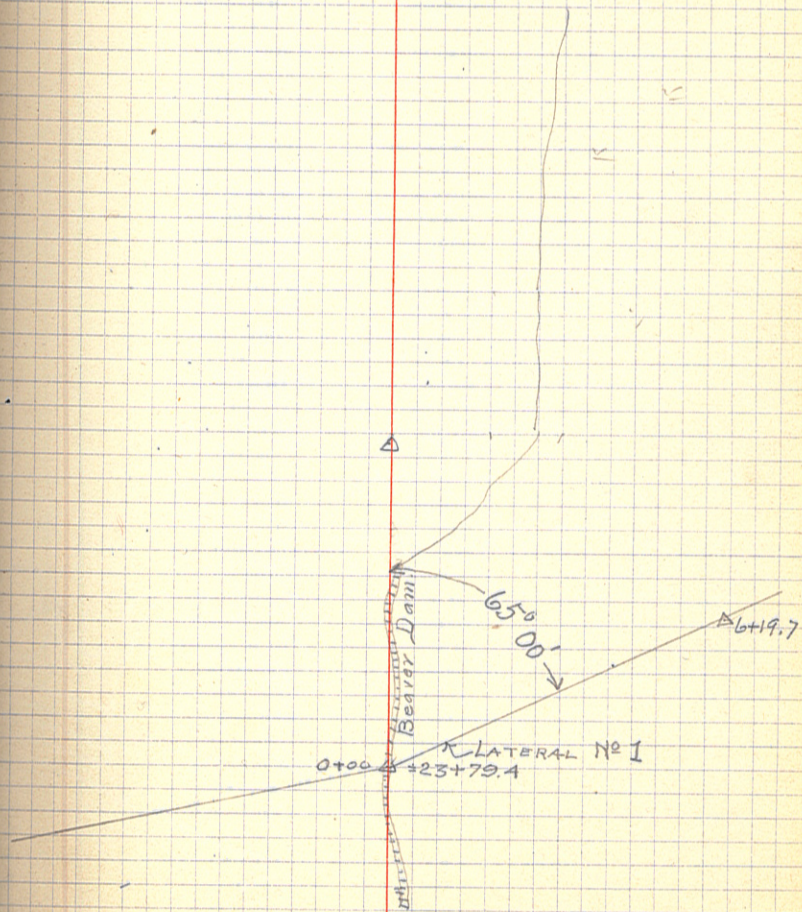
2

End of dam.
edge of island

0+00 Δ

S. 57°30' E = 23+79.4 of lateral
No 1

4 P.M. SATURDAY JULY 24, 1915
SAME CREW



A. M. Holmquist

SUNDAY JULY 25, 1915

CIRCUITED COUNTRY, FIXED STAKES
& ETC.

156 IRON CREEK, OUTLET.

PRO. LATERAL TO TAKE WATER FROM MOUTH
OF IRON CREEK TO MAIN DITCH.

July 30, 1916, Friday

20

19

18

17

+42.3 Δ

33° 45' R. S. 67° 30' E Pt on Rock

16

+97
+50

Creek
Creek

14

13

11+59.8 Δ

N. 88° 50' E

+54

Ed of Road

+36.6 Δ

9

8

+51

Creek

7

+52

Creek

5

+40

Creek

3

2

1

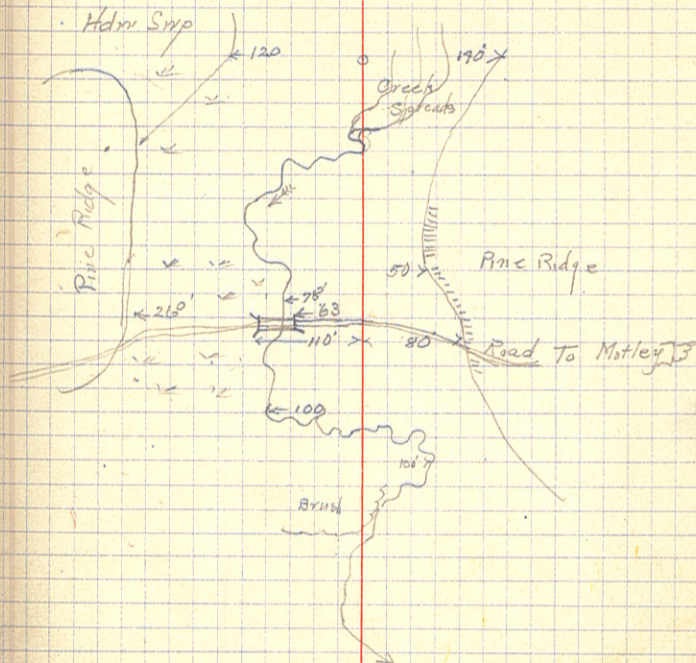
0+00 Δ

N. 88° 50' E = 313+87 of Main ditch
This is about 15' S. of
E+W Sec line

Co. Ditch No 2

CASS Co., MINN.

157



SEC. 11

SEC. 14

MAIN DITCH
317+48.4
See page 31
SEC. 10

90°
Sec. Cor. DESTROYED
308+30.9
SEC. 15

M. Polymix

Bruit for day.

57+07

$$\begin{array}{r} 57457 \\ 42790 \\ \hline 14667 \end{array}$$

N. 10° W. Up marsh.

50+79

creek

46+25

creek

44+15

Creek 8' wide 2' deep
dead water.

42+90

$$\begin{array}{r} 42790 \\ 36757 \\ \hline 6033 \end{array}$$

N. 86° 45' E.

$$\begin{array}{r} 3.25 \\ 3.00 \\ \hline .25 \end{array}$$

36+51

$$\begin{array}{r} 36751 \\ 26725 \\ \hline 9026 \end{array}$$

S. 85° 25' E

26+56.7 Δ

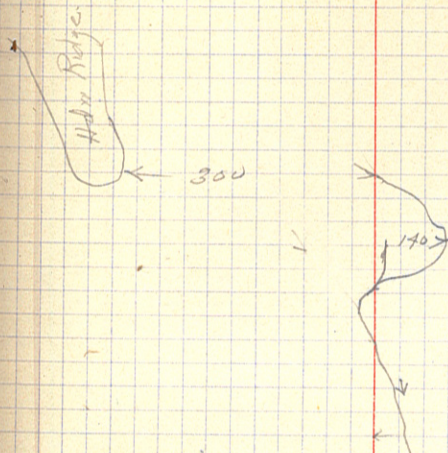
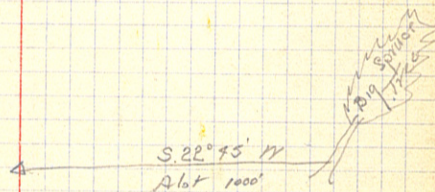
$$\begin{array}{r} 26756.7 \\ 16722.3 \\ \hline 10034.4 \end{array}$$

1° 50' ↓

S. 83° 30' E Soft.

$$\begin{array}{r} 583.30 \\ 567.30 \\ \hline 16 \end{array}$$

21

Open field
1200

L. to M + B. to North

300'

F. N. DeLyne

15160 SUMMARY OF LINES RUN.

	Stations
Main Ditch ✓	346+05.6
Meander Lines - up C.W. River ✓	10+00.0
" " down " " ✓	27+90.0
"B" Outlet ✓	27+56.3
Metes & Bounds ✓	129+17.0
Temp. Road Line ✓	41+56.6
" " " " ✓	11+18.0
1/4 Sec. L. Sec. 22 ✓	27+20.0
M & B N° 2 ✓	137+57.2
" " "N" ✓	12+00.0
" " "O" ✓	10+00.0
" " "P" ✓	25+23.0
" " "Q" ✓	29+42.3
" " "R" ✓	38+83.8
" " "S" ✓	22+00.0
Backus Lake Lateral ✓	29+01.6
M & B N° 3 ✓	303+83.7
Iron Creek Outlet ✓	57+59.0
M & B; Bever Island ✓	10+00.0
Sec line 10+11 - 14+15	79+55.0
	1369+14.8

Natural Trigonometrical Ratios.

Angle.	Sine.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	Angle.	Sine.	Tan.	Sec.	Cosec.	Cotg.	Cosin.
0°	0	0	1	∞	∞	1	90°	1	∞	∞	0	0	0
10	.0029	.0029	1.0001	343.8	343.8	.99998	80	.1392	.1405	1.0098	7.185	7.115	.99027
20	.0058	.0058	1.0003	171.8	171.8	.99998	70	.1421	.1435	1.0102	7.040	6.968	.98986
30	.0087	.0087	1.0004	114.6	114.6	.99996	60	.1449	.1465	1.0107	6.900	6.827	.98944
40	.0116	.0116	1.0001	85.94	85.94	.99993	50	.1478	.1495	1.0111	6.766	6.691	.98902
50	.0145	.0145	1.0001	68.76	68.75	.99989	40	.1507	.1524	1.0115	6.636	6.561	.98858
1	.0175	.0175	1.0002	57.30	57.29	.99985	30	.1536	.1554	1.0120	6.512	6.435	.98814
10	.0204	.0204	1.0002	49.11	49.10	.99979	20	.1564	.1584	1.0125	6.394	6.314	.98769
20	.0233	.0233	1.0003	42.98	42.96	.99973	10	.1593	.1614	1.0129	6.277	6.197	.98723
30	.0262	.0262	1.0003	38.20	38.19	.99966	0	.1622	.1644	1.0134	6.166	6.084	.98676
40	.0291	.0291	1.0004	34.38	34.37	.99958	359	.1650	.1673	1.0139	6.059	5.976	.98629
50	.0320	.0320	1.0005	31.26	31.24	.99949	350	.1679	.1703	1.0144	5.955	5.871	.98580
1	.0349	.0349	1.0006	28.65	28.64	.99939	341	.1708	.1733	1.0149	5.855	5.769	.98531
10	.0378	.0378	1.0007	26.45	26.43	.99929	332	.1738	.1763	1.0154	5.759	5.671	.98481
20	.0407	.0407	1.0008	24.56	24.54	.99917	323	.1768	.1793	1.0160	5.665	5.576	.98430
30	.0436	.0437	1.0010	22.93	22.90	.99905	314	.1794	.1823	1.0165	5.575	5.485	.98378
40	.0465	.0466	1.0011	21.49	21.47	.99892	305	.1822	.1853	1.0170	5.488	5.396	.98325
50	.0494	.0495	1.0012	20.23	20.21	.99878	296	.1851	.1883	1.0176	5.403	5.309	.98272
1	.0523	.0524	1.0014	19.11	19.08	.99863	287	.1880	.1914	1.0181	5.320	5.226	.98218
10	.0552	.0553	1.0015	18.10	18.07	.99847	278	.1908	.1944	1.0187	5.241	5.145	.98163
20	.0581	.0582	1.0017	17.20	17.17	.99831	269	.1937	.1974	1.0193	5.164	5.066	.98107
30	.0610	.0612	1.0019	16.38	16.35	.99813	260	.1965	.2004	1.0199	5.089	4.989	.98050
40	.0640	.0641	1.0020	15.64	15.60	.99795	251	.1994	.2035	1.0205	5.016	4.915	.97992
50	.0669	.0670	1.0022	14.96	14.92	.99776	242	.2022	.2065	1.0211	4.945	4.843	.97934
1	.0698	.0699	1.0024	14.34	14.30	.99756	233	.2051	.2095	1.0217	4.877	4.773	.97875
10	.0727	.0729	1.0027	13.76	13.73	.99736	224	.2079	.2126	1.0223	4.810	4.705	.97815
20	.0756	.0758	1.0029	13.23	13.20	.99714	215	.2108	.2156	1.0230	4.745	4.638	.97754
30	.0785	.0787	1.0031	12.75	12.71	.99692	206	.2136	.2186	1.0236	4.682	4.574	.97692
40	.0814	.0816	1.0033	12.29	12.25	.99668	197	.2164	.2217	1.0243	4.620	4.511	.97630
50	.0843	.0846	1.0036	11.87	11.83	.99644	188	.2193	.2247	1.0249	4.560	4.449	.97566
1	.0872	.0875	1.0038	11.47	11.43	.99619	179	.2221	.2278	1.0256	4.502	4.390	.97502
10	.0901	.0904	1.0041	11.10	11.06	.99594	170	.2250	.2309	1.0263	4.445	4.331	.97437
20	.0929	.0934	1.0043	10.76	10.71	.99567	161	.2278	.2339	1.0270	4.390	4.275	.97371
30	.0958	.0963	1.0046	10.43	10.39	.99540	152	.2306	.2370	1.0277	4.336	4.219	.97304
40	.0987	.0992	1.0049	10.13	10.08	.99511	143	.2334	.2401	1.0284	4.284	4.165	.97237
50	.1016	.1022	1.0052	9.839	9.788	.99482	134	.2363	.2432	1.0291	4.232	4.113	.97169
1	.1045	.1051	1.0055	9.567	9.514	.99452	125	.2391	.2462	1.0299	4.182	4.061	.97100
10	.1074	.1080	1.0058	9.309	9.255	.99421	116	.2419	.2493	1.0306	4.133	4.011	.97030
20	.1103	.1110	1.0061	9.065	9.010	.99390	107	.2447	.2524	1.0314	4.086	3.962	.96959
30	.1132	.1139	1.0065	8.834	8.777	.99357	98	.2476	.2555	1.0321	4.036	3.914	.96887
40	.1161	.1169	1.0068	8.614	8.556	.99324	89	.2504	.2586	1.0329	3.994	3.867	.96815
50	.1190	.1198	1.0072	8.405	8.345	.99290	80	.2532	.2617	1.0337	3.949	3.821	.96742
1	.1219	.1228	1.0075	8.206	8.144	.99255	71	.2560	.2648	1.0345	3.906	3.776	.96667
10	.1248	.1257	1.0079	8.016	7.953	.99219	62	.2588	.2679	1.0353	3.864	3.732	.96593
20	.1276	.1287	1.0082	7.834	7.770	.99182	53	.2616	.2711	1.0361	3.822	3.689	.96517
30	.1305	.1317	1.0086	7.661	7.596	.99144	44	.2644	.2742	1.0369	3.782	3.647	.96440
40	.1334	.1346	1.0090	7.496	7.429	.99106	35	.2672	.2773	1.0377	3.742	3.606	.96363
50	.1363	.1376	1.0094	7.337	7.269	.99067	26	.2700	.2805	1.0386	3.703	3.566	.96285
							17	.2728	.2836	1.0394	3.665	3.526	.96206
							8						.96126
							0						.96044
							359						.95962
							350						.95879
							341						.95795
							332						.95711
							323						.95626
							314						.95541
							305						.95455
							296						.95369
							287						.95282
							278						.95195
							269						.95108
							260						.95020
							251						.94932
							242						.94843
							233						.94754
							224						.94664
							215						.94574
							206						.94483
							197						.94392
							188						.94300
							179						.94208
							170						.94115
							161						.94022
							152						.93928
							143						.93834
							134						.93739
							125						.93643
							116						.93547
							107						.93450
							98						.93353
							89						.93255
							80						.93157
							71						.93058
							62						.92958
							53						.92858
							44						.92757
							35						.92656
							26						.92554
							17						.92452
							8						.92350
							0						.92247
							359						.92144
							350						.92040
							341						

30 29 28 27

31 32 33 34 35 36 46.99 2
3837 46.99 2
53

17960
8945
9015

197104.4
2640
904694

- 69 = 48.056
- 88 = 48.992
- 67 = 46.944
- 66 = 46.891
- 65 = 46.838
- 64 = 46.785
- 63 = 46.732
- 62 = 46.679
- 61 = 46.626
- 60 = 46.573
- 59 = 46.520
- 58 = 46.467
- 57 = 46.414
- 56 = 46.361
- 55 = 46.308
- 54 = 46.255
- 53 = 46.202
- 52 = 46.149

1205
053
46.99 2
3837 46.99 2
53
891
53
898
53
985

75.786
75
14.735

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1 1/2 TO 1.

FOR SINGLE TRACK EMBANKMENT.

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

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

MADE IN GERMANY.