

#27

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S

ENGINEERS'
FIELD BOOK

1894

EUGENE DIETZGEN CO.

DRAWING MATERIALS, MATHEMATICAL and
SURVEYING INSTRUMENTS

Chicago New York San Francisco New Orleans Pittsburg Toronto

Distances from Center of Roadway for Cross-Sectioning
Roadway 16 feet wide. Side Slopes 1 on 1.
For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	0
1	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	1
2	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	2
3	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	3
4	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	4
5	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	5
6	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	6
7	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	7
8	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	8
9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	9
10	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	10
11	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	11
12	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	12
13	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	13
14	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	14
15	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	15
16	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	16
17	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	17
18	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	18
19	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	19
20	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	20
21	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	21
22	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	22
23	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	23
24	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	24
25	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	25
26	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	26
27	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	27
28	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	28
29	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	29
30	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	30
31	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	31
32	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	32
33	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	33
34	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	34
35	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	35
36	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	36
37	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	37
38	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	38
39	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	39
40	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 30.6. For same slopes but other widths of roadbed, correct above figures by one-half difference in width of roadbed; thus in example above, for 20 ft. roadbed distance will be $30.6 + (20 - 16) \div 2$ or 2 ft. added to $30.6 = 32.6$. For slopes of 1 on 1½ see inside of back cover.

Copyright, 1914, by Eugene Dietzgen Co.

Eugene Schaub
Togon Utah

1017

No Smithfield City
Notes in this book

Checked for Index
8/3/33
288

2

#3

Dist

8

7

6

5

4

3

2

1

0

275

200

250

2203

90° 29'

0

△ #5+30

0 #5

90°

Old Telephone
pole



0
0

0

585



0



Fairview

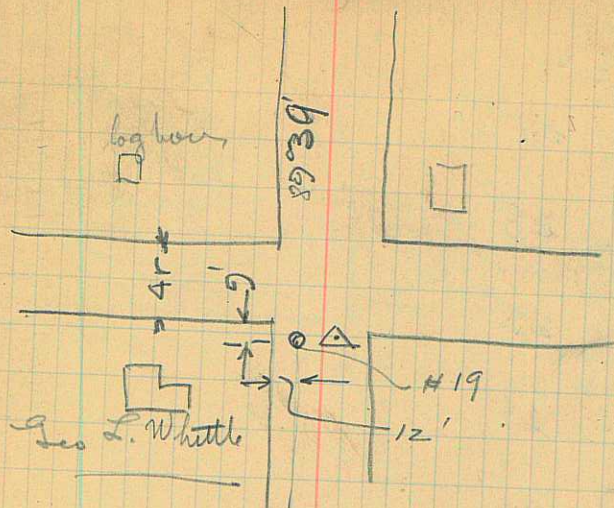


4

- 21
- 20
- 19
- 18
- 17
- 16
- 15
- 14
- 13
- 12
- 11
- 10
- 9

196
~~196~~

5



0029
 200
 2

6
 $\begin{array}{r} 5280 \\ 2600 \\ \hline 7920 \end{array}$

List

- 24
- 23
- 22
- 21
- 20
- 19
- 18
- 17
- 16
- 15
- 14
- 13
- 12

1592

lane to eight

318

field

187

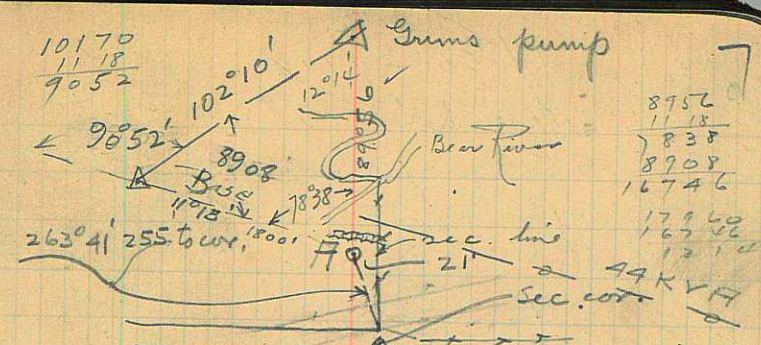
203

256

24 Δ

23

22



8956
 $\begin{array}{r} 1118 \\ 7838 \\ \hline 8908 \\ 16746 \\ \hline 17960 \\ 16746 \\ \hline 1214 \end{array}$

8908
 $\begin{array}{r} 9052 \\ \hline 1800 \end{array}$

1592 #29 to FF

1214
 $\begin{array}{r} 7838 \\ 8908 \\ \hline 18000 \end{array}$

ENGLET
 LANE

0 # 29

by sine $\frac{8908}{2} = \frac{12014}{1800}$

log 1800 = 3.255273
 log sin 8908 = 7.999450
 $\hline 3.255223$

log sin 12014 = 7.326117
 by dist = $\frac{3.929106}{84.94}$

84.94
 $\begin{array}{r} 79.00 \\ \hline 5.94 \end{array}$

ROBLEY
 LANE

from 10' fence

89039

8

16. side.
1/15/30 - 1919
No 13 list
Distance 170.

ance. Station 12. 299

12

10

10

9

8

7

6

240

5

216 -13°

4

119

3

193

2

240

1

Utah P.
at Fairview

9
99 08
91 52
191 00
95 30
98 68
95 30
3 38

91
190 60
95 30
95 30

Coped
and sent
with Plat
2/5/19

99° 08'

27908'
180
9908

Standard span

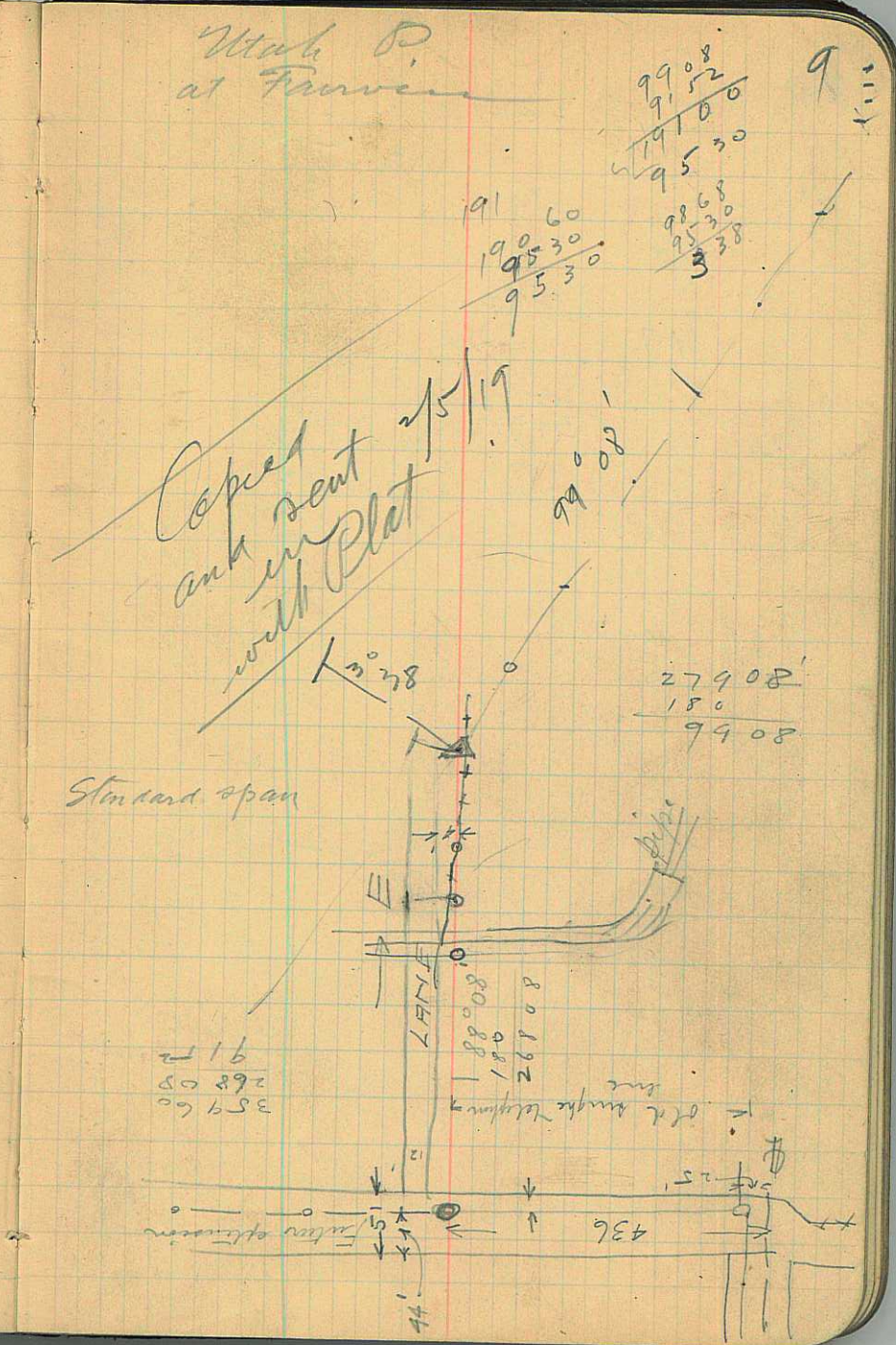
216
268 08
359 60
91 2

80192
180
88008

of the angle

436

Intersections
15
14



10

20

240

19

240

18

290

17

~~327~~
~~319~~ triangles

16

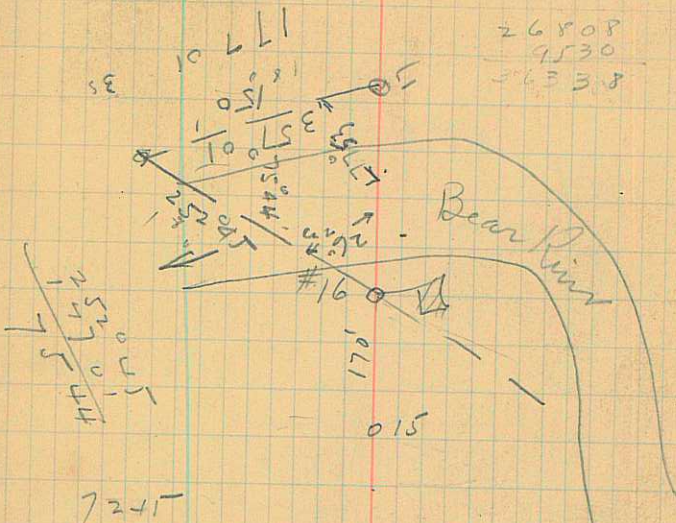
170'

15

+ 182 to find E+W

2491
182
182

26808
9530
26808
9530
26808



22981
22981
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22981

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7241
2292
17216
39862

27608

35701
35661
27908
7753

28

27

26

240

25

240

24

240

23

255 + 9° 18'

22

240

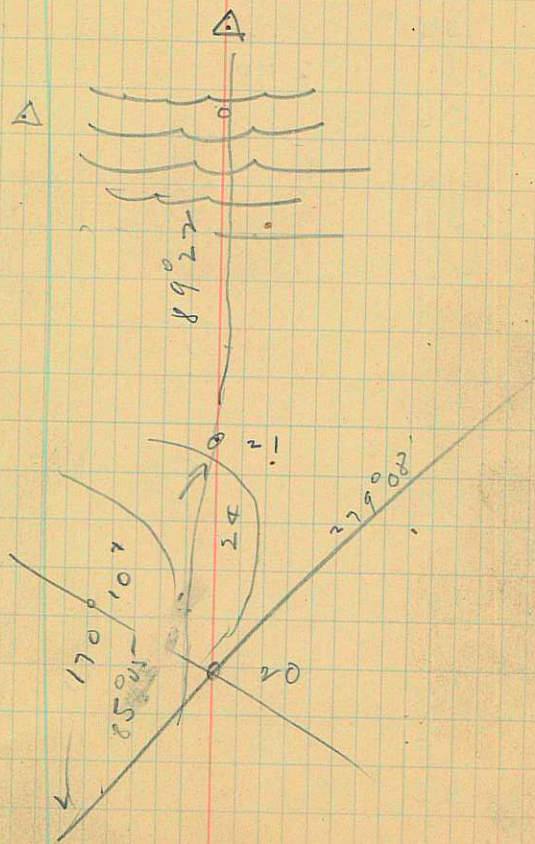
21

240

20

$$\begin{array}{r} 9908 \\ 9868 \\ \hline 4008 \end{array}$$

8930'

23 + 50' to Δ 

14

off on Road ^{only} 29-28

height 51°05 + 12°40 41,15 P

height 51°54 + 11°55

5129'30 12'45

height 51°37 12°15

height 52°22 11°35

5159'30 11'55

Sum 5140'30 12'05

+208 correct

37

P

200

36

+210 - same

35

+158 same

34

33

32

31

30

29

28

29

Jan 30 - 1919

15

h = 12°01 corrected

P = -17°47

Sum

552°16' W

Z = 9759

add 21

0 +40

+16'

0 29

16

$$\begin{array}{r} 7 \\ 5.1 \\ \hline 1.8 \end{array}$$

360

$$\begin{array}{r} 5.1 \\ 2 \\ \hline 1.5 \\ \hline 0.6 \end{array}$$

5.1

1.1

$$\begin{array}{r} 900 \overline{) 360} \\ \underline{180} \times 25 \\ 1800 \end{array}$$

11

90

17

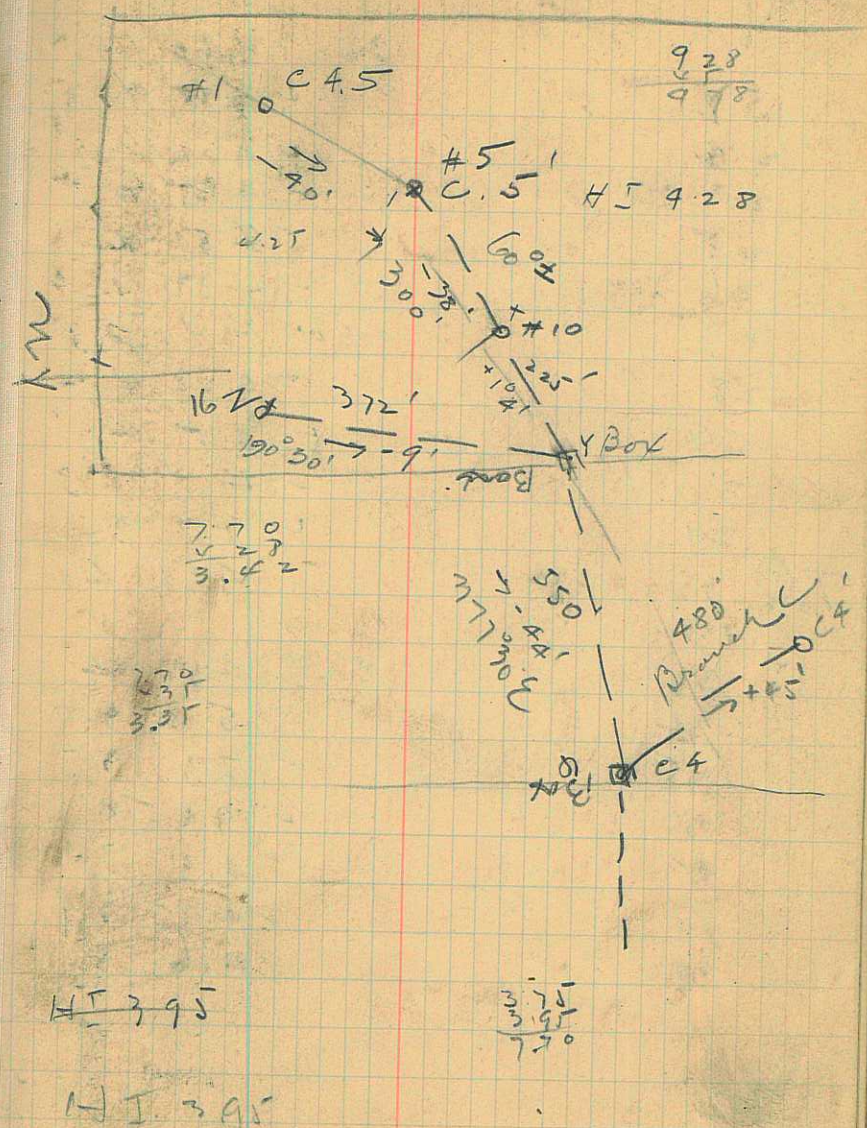
7.8

#	RR _W	RR _{cut}	cut
1	9.28	4.78	4'-6"
2	9.28 4.3 4.9	4.3	4'-11"
3		4.35	4'-11"
4	9.28	4.1	5'-2"
Δ 5	pt. angle	4.28	5'-0"
6		4	5'-3"
7		3.9	5'-4"
8		4.2	5'-1"
9	9.28 4.68	4.6	4'-8"
10	9.28 1.1	5.1	4'-2"
11		5.28	4
12	7.70	3.70	4
13		3.5	4'-3"
14		4.1	3'-8"
15		4.28	3'-5"
#16	7.70 3.45	3.70	4.00
17		4.25	3'-6"
18		4.35	3'-5"
19		4.3	3'-5"
20		3.6	4'-2"
15	7.70 4.3	3.15	4'-6"
22		3.40	4'-4"
#15			3'-9"

9.28
3.3
5.38

O.S.L.

19



Fisher Drain
at Richmond

70 P4
20 Q

15 Y

23

24

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π Q 32

σ 33

34

35

36

37

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39

R R m
grade mile cut

8.60 4.60 ✓

✓ 4.85 3.75

✓ 4.00 4-8"

✓ 4.15 4-5"

✓ 4.50 4-1

✓ 4.50 4-1

8.60 ✓ 4.5 4-3"

✓ 4.25 4-4

✓ 4.5 4-1

✓ 4.5 4-3

✓ 4.7 3-11"

4.60 4

8.60 4.60 4

✓ 5.00 3-8"

✓ 5.3 3-5"

✓ 4.65 4'

✓ 4.7 3-11"

✓ 4.95 3-9"

✓ 4.6 4'

HI

8.60
✓ 4.85
3.75

8.60
✓ 4.85
3.75

8.60
✓ 4.85
3.75

8.6
✓ 4.85
3.75

8.60
✓ 4.85
3.75

8.60
✓ 4.85
3.75

8.60
4.85

56 (12)
48 5 21

78

3

8.6
4.85
3.75

22

6.30

5.35

1.05

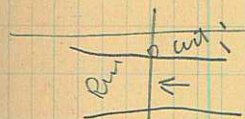
W. side River
at Paulina

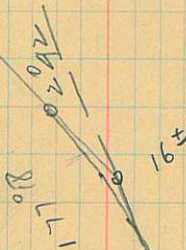
23

$$\begin{array}{r} 1100 \\ - 2 \\ \hline 1300 \end{array}$$

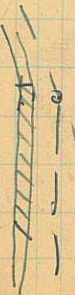

4.6

45

4.3Hyman Col.
4/10/19

$$\begin{array}{r} 17960 \\ - 1112 \\ \hline 16848 \end{array}$$


Cont.

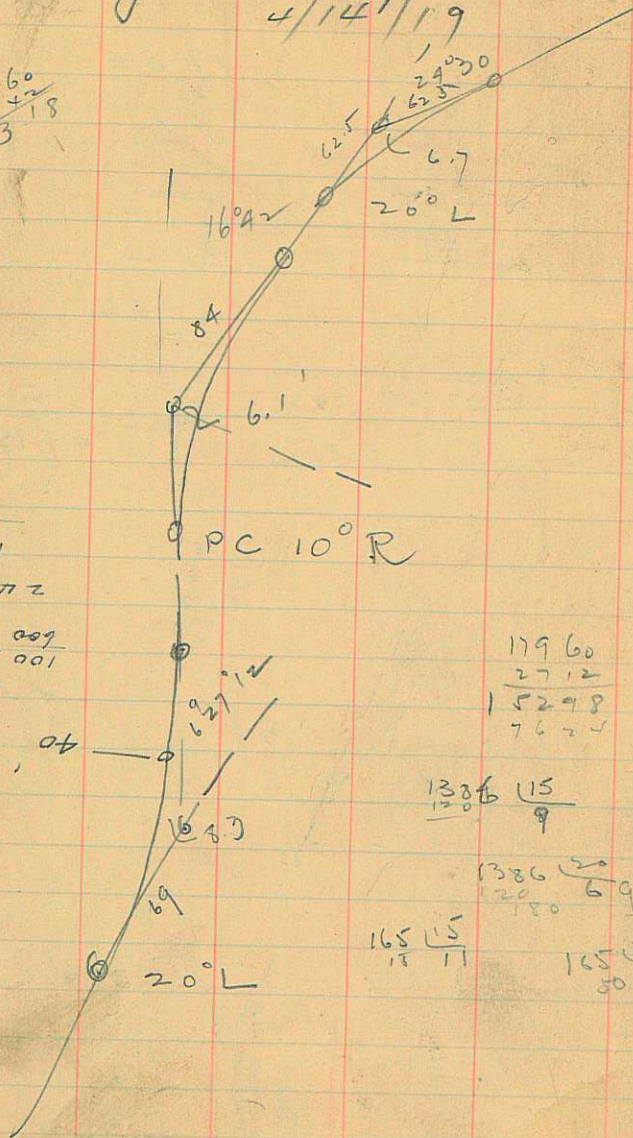


24

Hyrum City, Co.

4/14/19

$$\begin{array}{r} 17960 \\ 1642 \\ \hline 16318 \end{array}$$



01

$$\frac{200}{40} = 5$$

$$\begin{array}{r} 17960 \\ 2712 \\ \hline 15248 \\ 7624 \end{array}$$

$$\frac{1386}{120} = 11.55$$

$$\frac{1386}{120} = 11.55$$

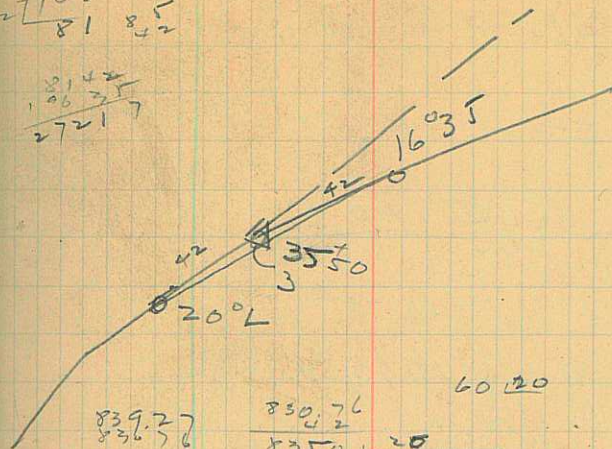
$$\frac{165}{15} = 11$$

$$\frac{165}{20} = 8.25$$

$$\begin{array}{r} 17960 \\ 1642 \\ \hline 16318 \\ 81842 \end{array}$$

$$\begin{array}{r} 8142 \\ 1642 \\ \hline 27217 \end{array}$$

25



$$\begin{array}{r} 839.27 \\ 836.76 \\ \hline 48.51 \\ 4.22 \end{array}$$

$$\begin{array}{r} 850.76 \\ 4.22 \\ \hline 855.0 \\ 35 \\ \hline 112 \end{array}$$

$$\frac{20}{41.7}$$

60.20

$$\begin{array}{r} 17960 \\ 2430 \\ \hline 15530 \\ 7745 \\ 20575 \\ \hline 28215 \\ 1200 \\ \hline 17960 \\ 15812 \\ \hline 2148 \end{array}$$

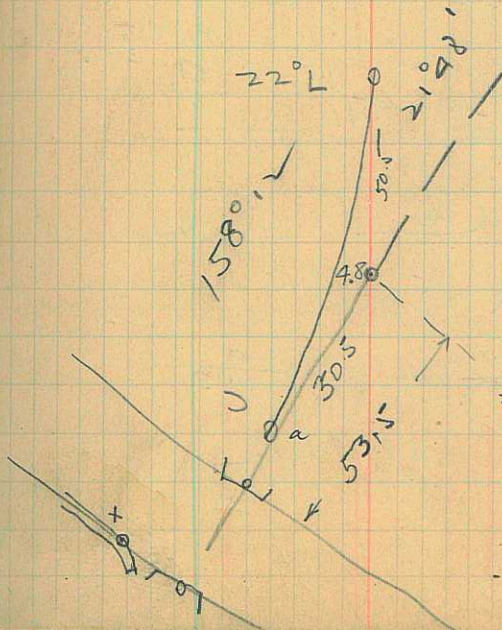
$$\frac{110520}{1055}$$

$$\frac{110520}{10574}$$

$$\frac{110520}{110550}$$

$$\frac{502}{2}$$

$$\frac{105.6}{83} = 1.27$$



levels

- 4.9 on L about
- x 4.6 on R "
- 5.2 Paulin grade
- + 6.5 at stake a

28

Levels down Hyam

135 F3 in Ele
38 88 / 535 720
152.62 159.82

37.71 1 4.50 155.3 ✓

135 F3
on log L side stream 3.70
6.58 → 9.10
in bottom hinge app. 48.65 HI
151 154.72

e		145.62
d	7.2	145.0
c	8.0	144.20
b	8.0	144.20
f	6.95	145.25
on H2O	6.73	145.47
	12.00	140.20 152.18
		Water 6' below crest dam
old 46	3.9	148.30

152.62
159.82

38 88 / 535
377 1

148.61
98
138.8
39
152.7

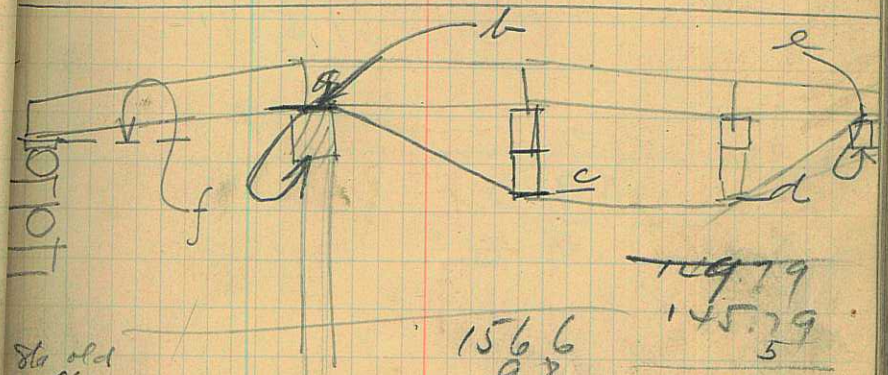
153.7
3
149.3 1010 50 / 20

159.82
155.52

172
152
200 38
208 6

20°

155.26
98
148.38
39
155.26



old 46

156.6	109.79
98	145.79
145.8	5
39	145.29
149.7	12
	157.29

152.6
140.18
12
152.18
140.68
12

30

087
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996
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087
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+35
251

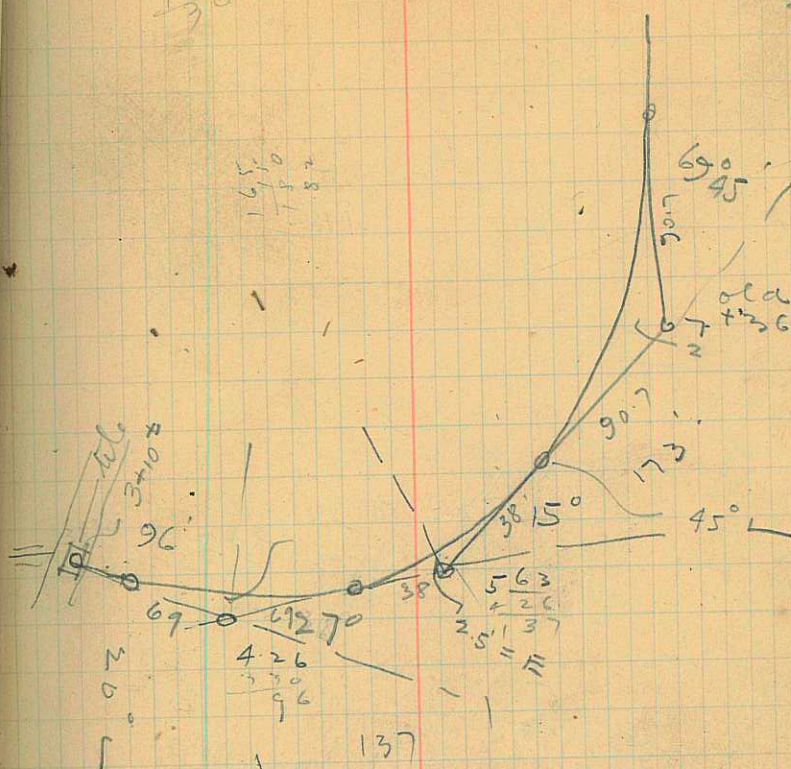
4800
3
154

1720
15716

157
149.3
8.0

178000
42700
136

31



32

$$\begin{array}{r} 3999.5 \\ 3987.2 \\ \hline 12.3 \end{array}$$

$$\begin{array}{r} 6.1 \\ 3987.2 \\ \hline 3993.3 \end{array}$$

$$\begin{array}{r} 49 \\ 3993.3 \\ \hline 3993.3 \end{array}$$

$$\begin{array}{r} 35 \\ 143 \\ \hline 140 \end{array}$$

$$\begin{array}{r} 35 \\ 114 \\ \hline 114 \end{array}$$

$$\begin{array}{r} 1731 \\ 1249 \\ \hline 1249 \end{array}$$

$$\begin{array}{r} 1250 \\ 105 \\ \hline 200 \end{array} \begin{array}{r} 35 \\ 39 \end{array}$$

+100

$$\begin{array}{r} 1210 \\ 50 \\ \hline 1260 \end{array} \begin{array}{r} 40 \\ 31 \\ \hline 71 \end{array} \begin{array}{r} 80 \end{array}$$

$$\begin{array}{r} 1250 \\ 140 \\ \hline 350 \end{array} \begin{array}{r} 45 \\ 29 \\ \hline 74 \end{array}$$

$$\begin{array}{r} 1253 \\ 90 \\ \hline 350 \end{array} \begin{array}{r} 45 \\ 28 \\ \hline 73 \end{array}$$

$$\begin{array}{r} 3993 \\ 8 \\ \hline 3993 \end{array} \begin{array}{r} 40 \\ 8 \end{array}$$

$$\begin{array}{r} 3993 \\ 360 \\ \hline 393 \end{array} \begin{array}{r} 45 \\ 88.9 \\ \hline 90.7 \end{array}$$

$$\begin{array}{r} 330 \\ 315 \\ \hline 315 \end{array}$$

33

$$\begin{array}{r} 11015 \\ 557 \\ \hline 11015 \end{array}$$

22

$$\begin{array}{r} 2230 \\ 1115 \\ \hline 1115 \end{array}$$

$$\begin{array}{r} 50098 \\ 3924 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 98 \\ 4900 \\ \hline 4900 \end{array}$$

$$\begin{array}{r} 145 \\ 50 \\ \hline 9700 \end{array}$$

$$\begin{array}{r} 754320 \\ 1543 \\ \hline 37.7 \end{array}$$

$$\begin{array}{r} 495 \\ 94 \\ \hline 20 \\ 2.5 \end{array}$$

27

$$\begin{array}{r} 1375.6 \\ 120 \\ \hline 175 \end{array} \begin{array}{r} 20 \\ 68.78 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 162.8 \\ 160 \\ \hline 28 \end{array} \begin{array}{r} 20 \\ 8.1 \end{array}$$

27

$$\begin{array}{r} 180 \\ 27 \\ \hline 53 \end{array} \begin{array}{r} 6.30 \\ 27 \\ \hline 10330 \end{array}$$

34

$$\begin{array}{r} 20 \overline{) 66} \\ \underline{40} \\ 26 \\ \underline{30} \\ 30 \end{array}$$

$$\begin{array}{r} 06 \\ 00 \\ \underline{26} \end{array}$$

$$\begin{array}{r} 1087 \\ 622 \\ \underline{7327} \\ 330 \end{array}$$

10

7-

9 312°33

8-

8 214°42

6

7 210°07

5-

6 268°37 0.75 fine stakes

5 268°37 4.00

4

4 268°37 11.00

3-

15.727

3 359°17 6.24

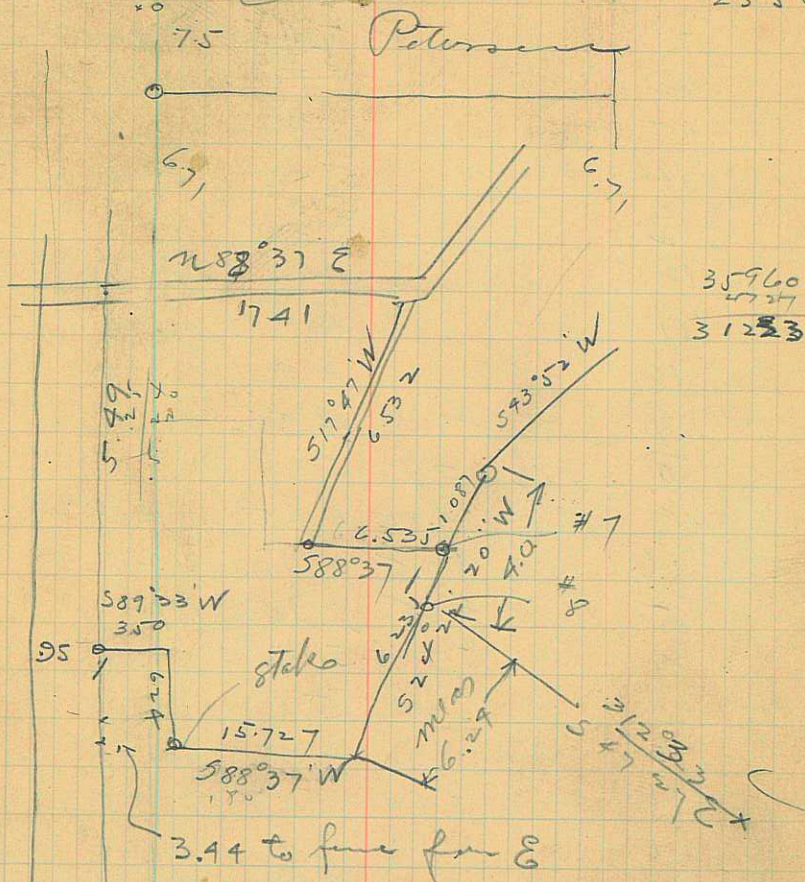
2

2 269°33 3.54 from a line 4 links west of E end

1-

Final line location 35
out on Am

2356



$$\begin{array}{r} 35960 \\ 4737 \\ \underline{31223} \end{array}$$

Peter Peterson, Alm
Amalgam
Final subdivision

21 35917

40

163

$$\begin{array}{r}
 1695 \\
 1544 \\
 \hline
 15163 \\
 126 \\
 \hline
 250
 \end{array}$$

165 u

154.0

2.4

2.4

74

10

14000

74

214

170 (2200

88

3x

168

$$\begin{array}{r}
 1695 \\
 151 \\
 \hline
 18.574 \\
 128 \\
 \hline
 370
 \end{array}$$

41

180.15

5.02

175.13

6.53

181.66

3.52

178.14

4.22

182.36

7.66

174.70

42

	BS	F5	RR on ground	Ele HT
4+123.7			14.13	
4+23.7			14.13	182.36
4+49.1			13.4	
4+23.7	3.90	7.66		174.70 178.60
4+23.7			10.37	
4+93.4			10.52	
5+66.9			10.80	
5 46.9				
6+05.9				
6+23			10.97	
6+77.7	6.52	5.16	11.13	173.94 179.96
6+78			12.49	
7+99.2			12.69	
7 76.2			12.79	
8+29.0			12.95	
8+68.7			13.07	
9+37.4			13.27	

RR
on
groundcut
6'-6"Elev.
on
hub
174.90 ✓

166.38

$$\begin{array}{r} 14.134 \\ 7.66 \\ \hline 6.47 \end{array}$$

$$\begin{array}{r} 174.66 \\ 3.90 \\ \hline 178.56 \\ 5.16 \\ \hline 173.40 \\ 2.52 \\ \hline 179.92 \end{array}$$
test hole in H₂O
$$\begin{array}{r} 6.97 \\ 3.9 \\ \hline 10.37 \end{array}$$

4.5	6'-0"	174.10	✓
5.28	5'-6"	173.32	✓
10.65		167.95	✓
10.2		168.40	✓

Riv

test hole in H₂O

10.4		168.20	✓
10.6		168	✓
5.82	5'-2"	172.78	✓

Riv

test hole in H₂O

5+66.9 + 87

$$\begin{array}{r} 10.97 \\ 5.16 \\ \hline 16.13 \end{array}$$

$$\begin{array}{r} 5.56 \\ 6.23 \\ \hline 11.79 \end{array}$$

6+77.7	6.52	5.16	11.13	173.94	179.96
6+78			12.49		
7+99.2			12.69		
7 76.2			12.79		
8+29.0			12.95		
8+68.7			13.07		
9+37.4			13.27		

5.97

6.45 6'-3" 173.51 ✓

6.27 6'-6" 173.69 ✓

4.4 8'-6" 175.56

4.35 8'-9" 175.61 ✓

$$\begin{array}{r} 11.13 \\ 5.97 \\ \hline 6.16 \end{array}$$

$$\begin{array}{r} 12.69 \\ 6.2 \\ \hline 18.89 \end{array}$$

$$\begin{array}{r} 12.95 \\ 8.1 \\ \hline 21.05 \end{array}$$

$$\begin{array}{r} 13.07 \\ 8.1 \\ \hline 21.17 \end{array}$$

$$\begin{array}{r} 6.52 \\ 5.16 \\ \hline 11.68 \end{array}$$

$$\begin{array}{r} 12.79 \\ 6.52 \\ \hline 19.31 \end{array}$$

44

B 5

F 5

in Ele H₂
grad

179.96

~~9+37~~
9+37.4
87.5

13.27

10+24.9 3.19

4.28

13.53 175.68 175.89 ✓

10+24.9
64.5

12.45

10+88.4

12.65

117 50.0

12.82

12+00 3.99

11.90

12.97 166.97 170.96 ✓

12

5.06

14+15

5.70

old 18+38

166.34

old 19

163.41

Levels down
chudes back from 12.0012⁰⁰
mm

119.2

166.97 178.89 ✓

11+50

7.80 171.09

10+89

8.12 170.77 ✓

10+25

3.18 175.91 ✓

9+37

4.26 3.20

175.69 179.95

8+69

4.10 175.85

8+29

4.33 175.62

7+76

4.39 175.56

7+44

6.25 173.70

6+78 5.71

6.52

6.42 173.53

173.43 179.14

700
6786
96Eleon
mib
175.81 ✓

4.15 9'-2"

9.25

13.27
9-12

13.53

4.28

9.25

8.19

12.45

3.17 9'-6"

175.70 -

12.45
9.47

4.1

8.1 7'-9"

170.77 ✓

12.97

3

1.07

1.07

2.15

3.99

.645

5.06

6.2

164.76 (below grad.)

4.62

166.34

170.92

179.92

4.28

7.55

163.41

174.62

175.64

166.30

3.19

170.92

178.83

7.55

166.93

163.37

3.99

170.92

on bank
on tablet in rock S of Goot gauge house

46

BS

FS m

47

6+23		6.36	172.78-179.14
5+67		5.86	173.28 ✓
4+73		5.00	174.10
4+24		4.55	174.59
3+95		4.36	174.78
3+50	5.50	1.92	177.22-182.72
3+17		4.79	177.93
2+73		4.59	178.13 ✓
2+35		4.71	178.01 ✓
1+97		5.18	179.54 ✓
1+72		5.23	177.49 ✓
1+30	3.22	5.53	177.19 (180.4)
+99.5		3.45	176.96 ✓
+30		5.23	175.18
Pan	1.63		178.78

$$\begin{array}{r} 175.29 \\ \hline 174 \end{array}$$

~ hub

near old 13+30 on Gotmail 2' steep

174x

$$\begin{array}{r} 27.00 \\ \hline 2 \end{array}$$

48

Hydrum
Levels at lower
end Gageuron flat

4/20/19

BS FS W

Bm Willow

2.47

178.84 181.31

9.2 174.1

5.76 175.55

7.50

8.00

2 3.50

2 3.82

4.13 3.38

15.95 9.14

16.02

8.00

2 3.50

5.57

3.42 4.18

16.99 9.45

17.13

49

$$\begin{array}{r} 750 \\ 576 \\ \hline 174 \end{array}$$

178.84

2.47

181.31

7.2

174.1

181.31

5.76

175.55

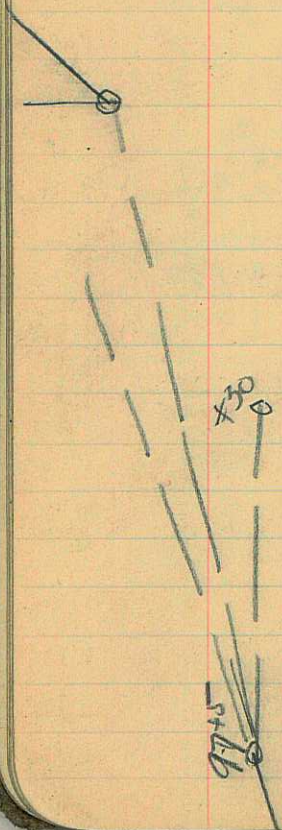
on H₂O m test near Bm Willowon H₂O Riveron H₂O test hole near ^{old} Sto 0
gauge at East 1.9on H₂O near Willow Bm

on Spr hole 200' SE of 0

on test at Willow Bm

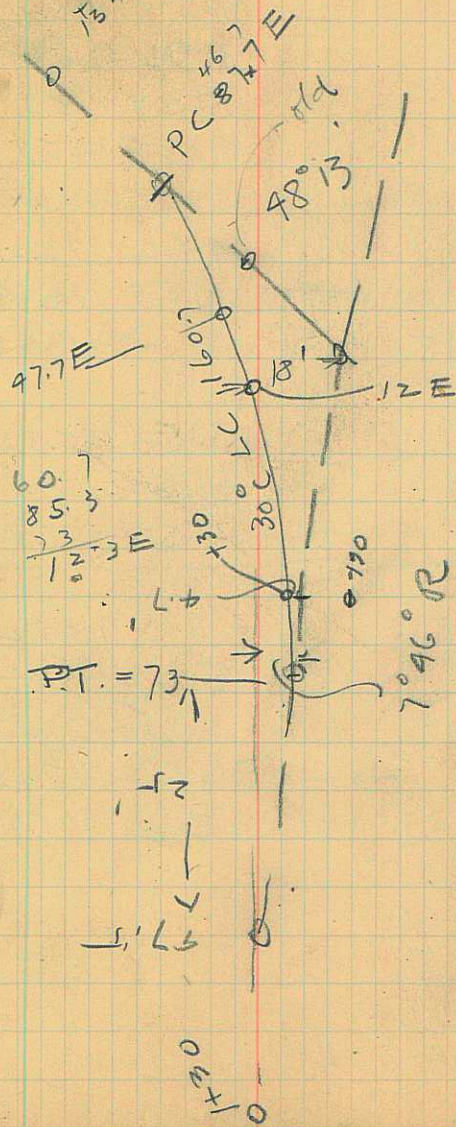
50

Lynn Ex



⊕ PM 3730

o dno
 2400.6 E
 26.6 E
 174.0 E
 37.6
 134.4 E



51
 60
 730
 2200
 3000
 51450
 90

107
53

17960
 4813
 (13147
 6553

2561 30
 161 853
 110 86

547 30
 217 18
 210

48.21 30
 182 160
 21

88
 133
 73 160.7

160.7
 73
 87.7

52

	BS	FS	in at hub	Coll	# I
BM 3+30	2.15			178.72	180.87
47.7E			6.01	174.86	
89.7E			4.80	176.07	
1+34.4E			3.93	176.94	
1+74 E			5.28	175.59	
2+00.6 E			4.28	176.59	
2+50 E			6.4	174.47	
old 0			4.66	176.21	
		6.58	6.58	174.29	
	5.15	4.66		176.21	181.36

5.53 175.83
6.62 174.74
2.52 178.84

BM 3+30 2" string	2.52			178.72	181.24
12 E			5.62	175.62	
+30			6.35	174.89	
+30			6.11	175.13	
73			5.60	175.64	

15.60
178.72
2.15
180.87
4.66
176.21
5.1
181.36

100 = 143
900
43, 630
43
43
4.73
175.29
24

old 1+66

no stake in hole possible chamber here

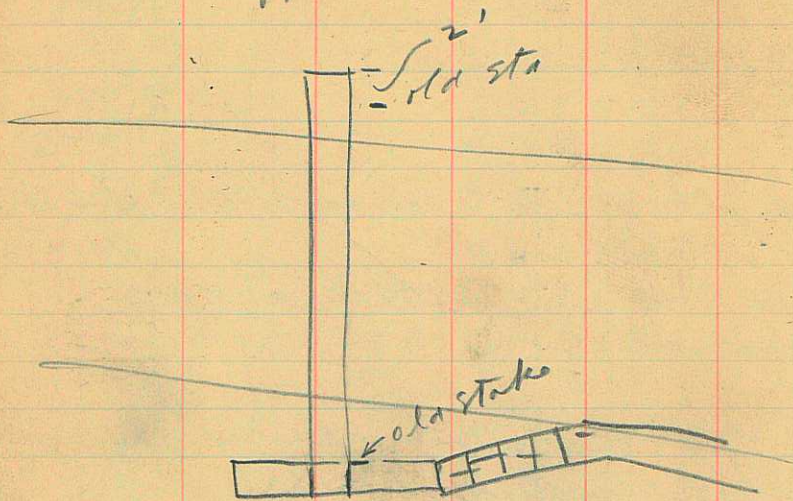
on H₂O in test hole at old 0
hub at old 0

H₂O Power minus Wallow BM
" in test " " "
BM wallow

178.72
2.15
181.24

on curve
on old, line trench 250

5-4

Hyrum
Upper Bridge notesHyrum Exp
at River near Paulson
House

6.15

6.07

6.4

5-5



200
120
90
410

on R. abut.
on rock R side

56

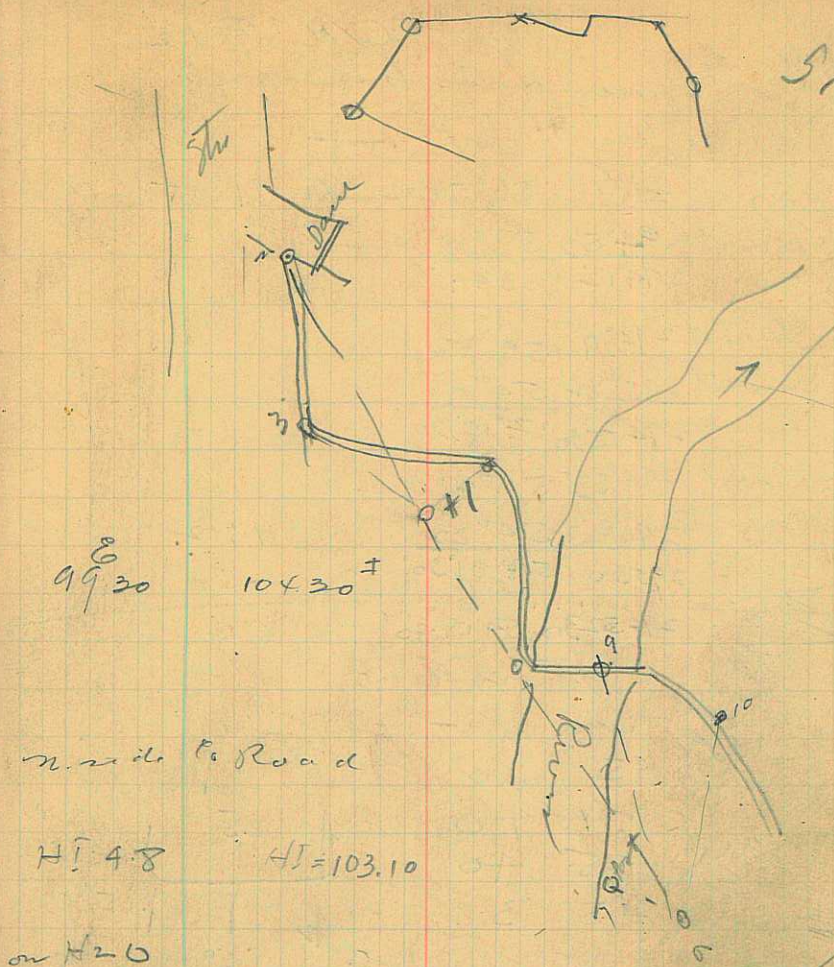
Ino Lumbani
final proof Survey
Big Creek

any

L Stadia

15	151°17'		7	+15'	11.42
14 ^D	187°		4	-11'	6.02
13	330°		5		5.98
13		on H ₂ O 5.48			
12-					
12	211°20'	FS 3.8	3	+04'	5.02
11 ^D	140°18'		4	+30'	5.02
10 ^D	107°50'		9	+3°	10.95
9 ^{pp}	80°36'		3		5.30
8 ^P	202°56'		5	+1°	5.76
7 ^P	71°20'		5		5.66
6-					
6	246°45'	7.95 ^{FS}	8	+18'	11.86
5		7.3			
5	233°21'		10	-1°30'	11.38
4	111°22'		5		5.38
3	50°38'		3		5.67
2	58°35'		2		6.04
2	58°35'		0°	6.25	
1-	71°13'				
	65°20'	old division	2	-25'	5.05

57



99.30 104.30[±]
H_I 4.8 H_I = 103.10
on H₂O
left end pipe lot
on H₂O 100.00 106.25
O.S. Water Tower

Add to all
13 any

58 Jno Leeshman on #12
 ay out +

direct 29331 53°50' ~~10~~ 11:05

Invert 29453 53°38' ~~10~~
 - 29412 53°44'

direct 29419 54°20'

direct 29532 54°01'
 - 2945530 54°10'30"

Invert 29453 54°41'

Invert 29607 54°22' 11:12
 29530 54°31'30"

~~Z~~ 2945230 54°08'40'

Water Meas

time Rev

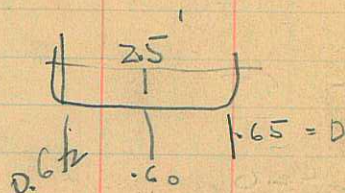
45 30

51 40

45 40

45 30

Mean



52 40 back + front

3595960
 852820
 2793120
 852840

May 24 - 1919

59

one hour fast - real time 10:05

on #12

$h(\text{corrected}) = 5408$

$Z = 89^{\circ}60' - 54^{\circ}08' = 35^{\circ}52'$

$\phi = 41^{\circ}38' 40''$

$\rho = +20^{\circ}39' 40''$

$$\sin \frac{\rho}{2} = \frac{\cos \frac{1}{2}(Z + \phi + \rho) \sin \frac{1}{2}(Z + \phi - \rho)}{\sin Z \cos \phi}$$

35°52'
 41 38 40
 20 39 40

76 90 40 $\frac{52}{112}$
 20 39 50
 2 156 51 00
 28 25 30

$\sqrt{981020}$
 $\log \cos 79^{\circ}05'10'' = 7.8161909$
 $\sin 28^{\circ}25'30'' = 7.6776142$
 7.4938051

$\log \sin 35^{\circ}52' = 7.7678242$
 7.7259809

$\log \cos 41^{\circ}38'40'' = 7.8734850$
 7.8524959

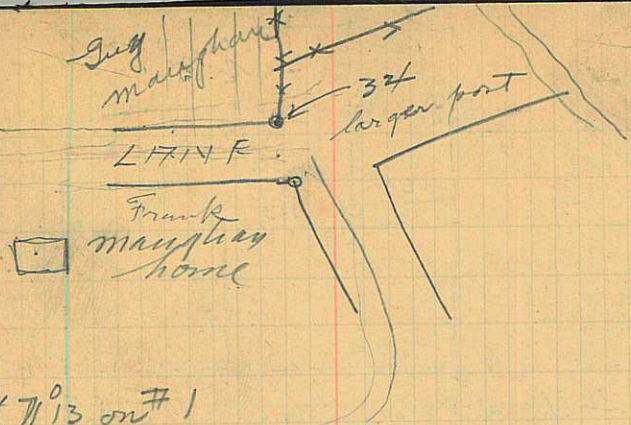
72 44 20
 7.9262979

60

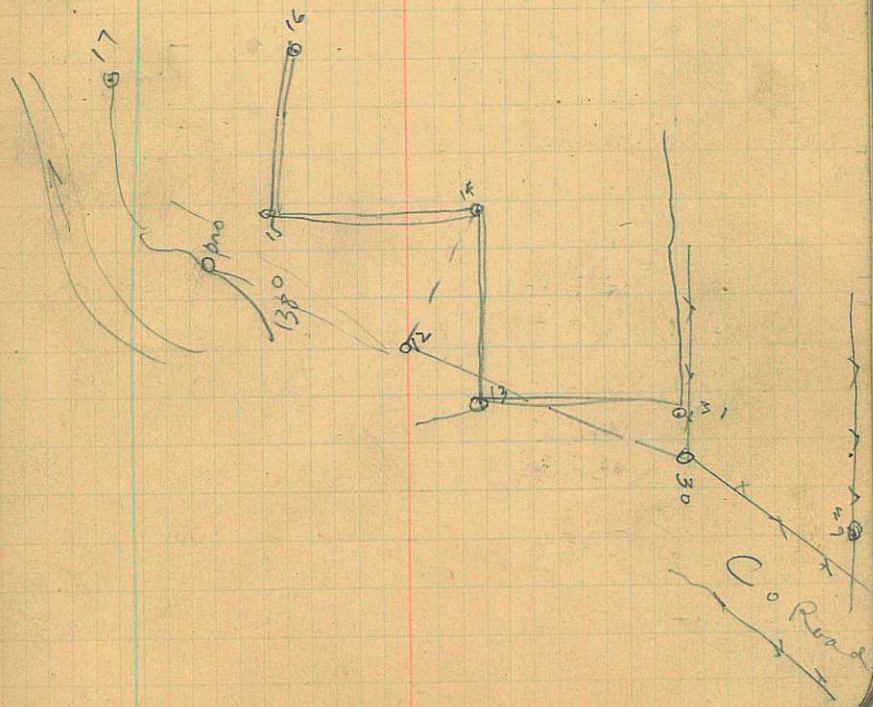
Dno Lishman

		U	C	U
33-	34 or 35 9°41'	3.00	-5°15'	5.53
	33 5°03'		4	9.98
32 -				
	32 15°44'	3	+2°45'	9.05
1-		3	+2°45'	9.04

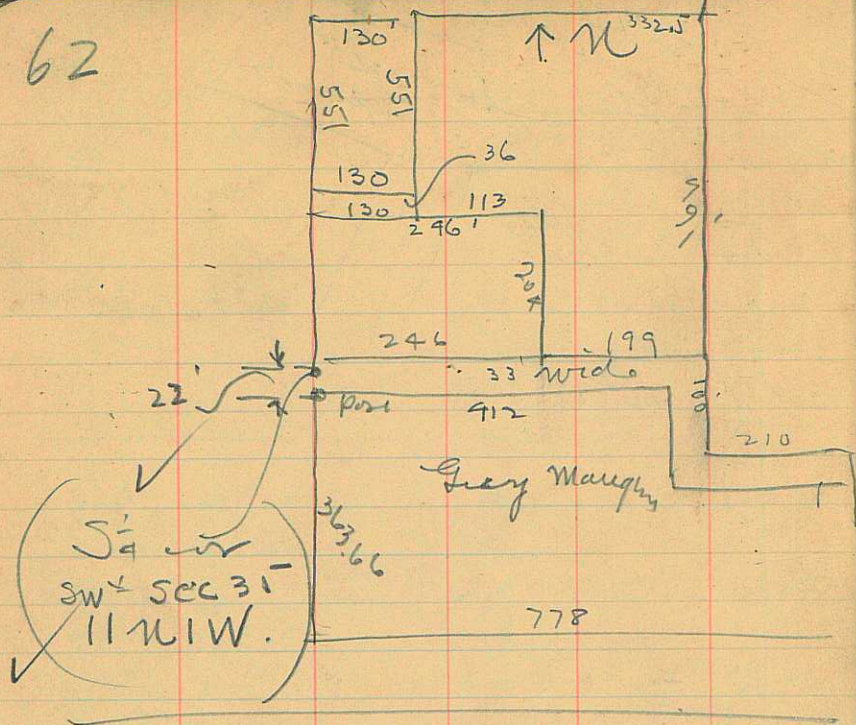
31 D	281°20'	4		5.42
30 D+p	294°08'	4		5.55
29 R	287°16'	1	-5'	5.65
28 R	200°45'	4	10.2	-5'
27 R	210°	5	-9'	11.70
26 R	195°	0	-20'	13.00
25 R	181°30'	0	-20'	12.6
24 R	173°25'	0	-20'	12.4
23 R	173°25'	0	-20'	10.5
22 R	169°20'	2.0	-20'	11.3
21 D	170°15'	3.0	-20'	11.75
20 D	168°45'	4	-20'	11.1
19 D	170°15'	6	-14'	11.8
18	165°20'	6	-10'	11.7
17 R	143°01'	3	-04'	11.4
16	151°53'	5	+02'	11.
14	187			



set 7113 on #1



62



63

Maughan Estate
 the for Geo Lushan

Note # 12 is approx
 739' E + 2355' N of
 S $\frac{1}{4}$ cor of SW $\frac{1}{4}$ sec 35

64

1a 29519 ✓

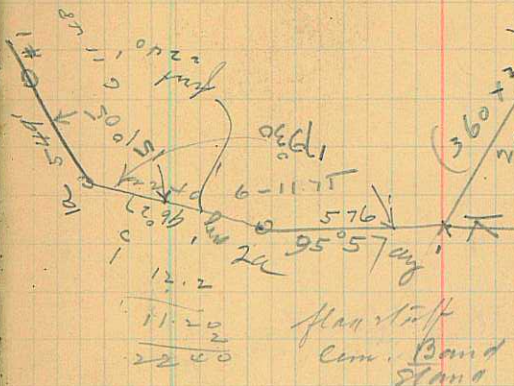
1-

Gro Lushman
65

159° 48' to 1120 spins

 $E \frac{1}{4}$ cor 35

O C 7.6



new assumed

 $(20653 - 9557) + 180$

117	
5	1340
670	916
	2256

5.58	
4.58	+ 1030
916	
670	
246	

1a - 2a

$$((117 - 5) \cdot 2 + 10130) \cdot (5.58 - 1) \cdot 2$$

Set on #1 ang 71° 13' to O.S.L water tower

6.6

4 ac

24 ac ft

30.00

Jerrop Study of Storage

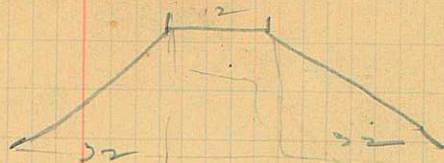
mat for a 16 foot dam

30 ac ft
cost \$500.00
does not pay

Lester + Almy Jerrop

-4°50

08200.67
16,000



$$\begin{array}{r} 1 \\ 6000 \\ \hline 3000 \end{array}$$

$$\begin{array}{r} 200 \\ 20 \\ \hline 320 \end{array}$$

4000

400

$$\begin{array}{r} 20 \\ 200 \\ \hline 2000 \end{array}$$

$$\begin{array}{r} 32 \\ 16 \\ \hline 32 \end{array}$$

3(40)

123
200.00

20000 150

68 Levels at
Baruda Res. 6/1/19

	B.S.	F.S.	E.L.	H.I.
B.M.	0.46		198.00	198.46
			180.40	
			181.23	
			180.83	
P.M.B.		5.80	192.66	
P.M.B.	0.71			193.37
cur	a	1.70		
"	b	1.80		
"	c	5.80		
"	d	6.30		
"	e	13.63		
"	f	13.46		
"	g	13.18		179.91
	re over	12.65		

Sta	head	
0-15	50'	1500 stake
15-27	75.00'	2000 stake
27-42	100'	3000 stake
42-55	125'	4200 stake and 100 beg 125
55-75	150'	5000 and 125 beg 150
75-90	175'	5500 to W. in Sta H 5 1/2 dikes 7500 stake and 150 beg 175

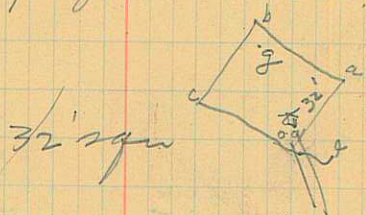
14.63
3

185
120 300
65

30.00 200.69
10000 001.5

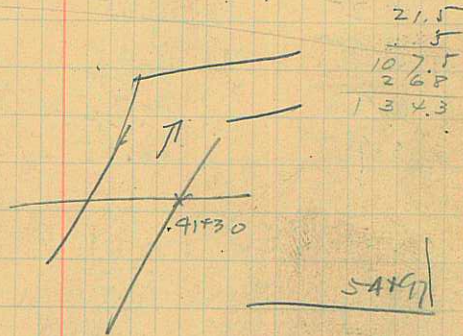
floor clean-out
L cone
Grade at Res.

2 o/p grade out



9.5 12
P

198.46
5.85
192.61
7.1
199.37
13.46
179.91



55 Miles
Sta 68 and 6"



70

Sta

RR

B 3

F 3

RR on
grad

Ele

H 5
cut

cut

15.00
12.65
2.35
9.06
11.41

11.41
8.1
3.31

193.37
12.65
180.72

71

8+ 9.06

12.65

15.00

180.72

2.35

3'-4"

11.41
3.31
13.63

11.07
8.1
2.97

15.00
13.25
1.75

12.65
13.25

1⁰⁰
+50
8.1
m
45.5

11.41
3.31
11.07

189.78

3'-

10.57
4.13
6.40

15.00
13.25
1.75

189.78
179.73
10.05

0

10.57

6'

180

10.05
5.80

10.05
5.35
5.70

10.95
1.65

185
80
105 50
2

main
Pipe

0

180.83

55

4.25

new
10.35

10.05

179.73

65' 10" 6'-1"

189.78
10.05
179.73

16.95

2 1/2

1⁰⁰

5.65

11.45

10.95

5'-4" 5'-10"

189.78
4.25
185.53

12.95
8.9

2.5
5.5

1⁵⁰

6.4

12.70

11.95

5'-6" 6'-3"

185.53
7.45
178.08

12.5
12.5

2

8.9

13.95

12.95

5'-05"

192.98
13.95
180.61
5.05
12.33

1.375

180.83
1.5

1.375

2

5.56

10.61

11.36

5.56

189.78
179.43
10.35

10.35
4.25
6.10

180.83
179.43

4.5
2.5
2.25
9.0
1.25

2+50

8.1

11.86
8.1
3.76

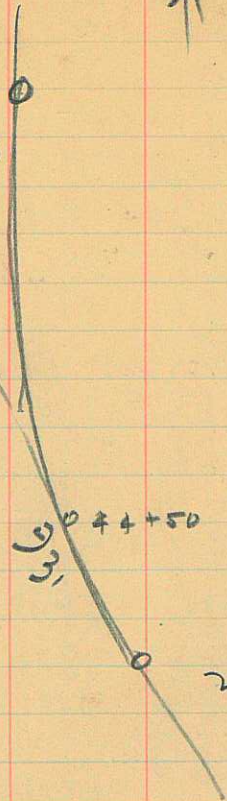
12.70
6.2
5.56
5.05
10.61

11.45
5.65
5.80

72 Band 1.

↑ W

35°50



33°44+50

20° curv

73

$$\begin{array}{r} 1852 \\ \underline{352} \\ 120 \end{array}$$

$$\begin{array}{r} 20 \\ 92.5 \end{array}$$

$$\begin{array}{r} 292 \\ \underline{92} \\ 120 \end{array}$$

$$\begin{array}{r} 20 \\ \underline{44} \\ 120 \end{array}$$

$$\begin{array}{r} 35.8 \\ \underline{15.8} \\ 17.9 \end{array}$$

$$\begin{array}{r} 20 \\ 17.9 \end{array}$$

$$\begin{array}{r} 35.50 \\ \underline{17.40} \\ 17.10 \end{array}$$

74

Mellor's H₂OExtension on old
System

70' 4 m J

280 6" " "

300 6" " "

6x6x2" tee

75

270°34'

7~~8~~

7 post

10.015

6 post

7~~8~~ 180°12'

6 173°17' .202

#5a 270°20'

2 270° on ob. log

1-

1 20.10

1/5 17.128

#4 10.25

#3 #3 .12

2-

rec
cov.

29.765

2-

set 331°18' Sight to Joe Smith house tower

Brown Elm

Jones Elm Elm lot 2

#3 W side Prov. road

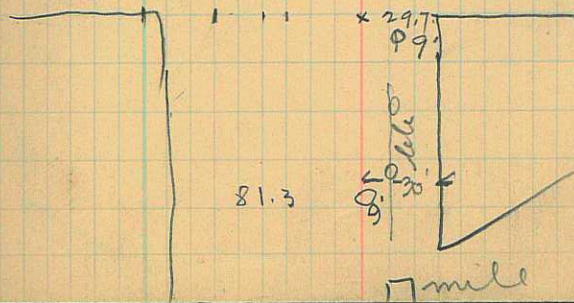
80

Mulville
Electric Dist.

8/18/19

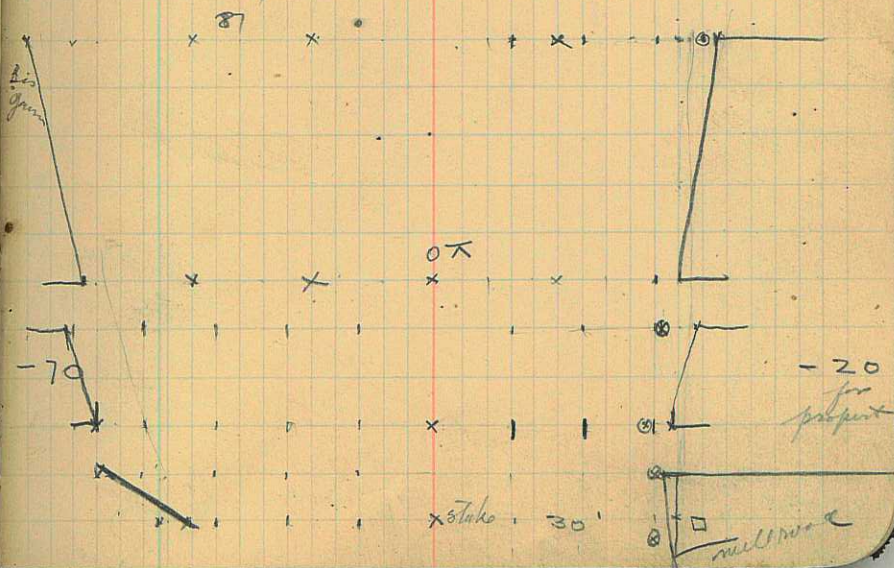
81

834



P2

83



P 4
No

hlist

660
~~3580~~
190



2
1

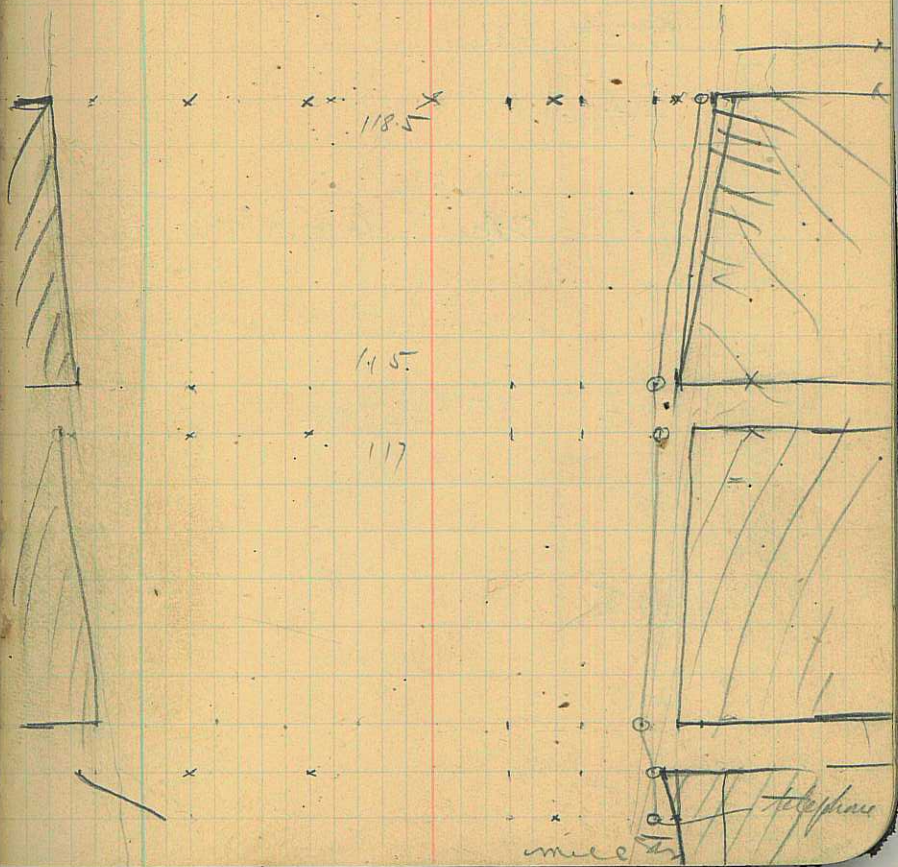
125
135
133

30-
81-

87
311
1181
592

21.5
85.5
1170

Milwaukee Stall
Mile Str E + W



86 span Mill Str
No Unit Plus

47306
176

11
263 240

10
255

31-31
198

9
~~176~~
250 75 east no Str.

8
~~178~~
256 221

7
~~178~~
250

6
~~178~~
200 5' to tile
24' to Erie main

5 706

77
~~82~~
5 35 4 0-1

4
181

3
185

2
210

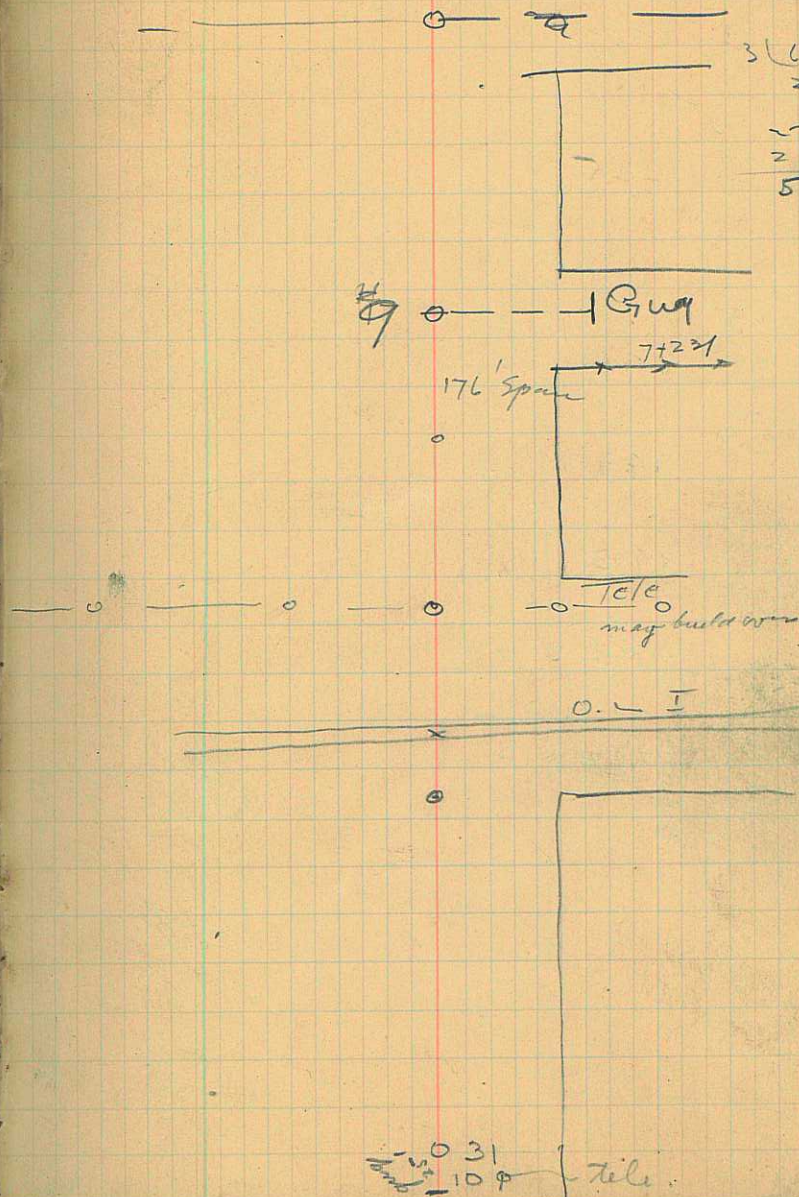
1
25
Guy

4711
23

70

190
2 660
380 4700
200 48770

250
3660
220
72
230
502



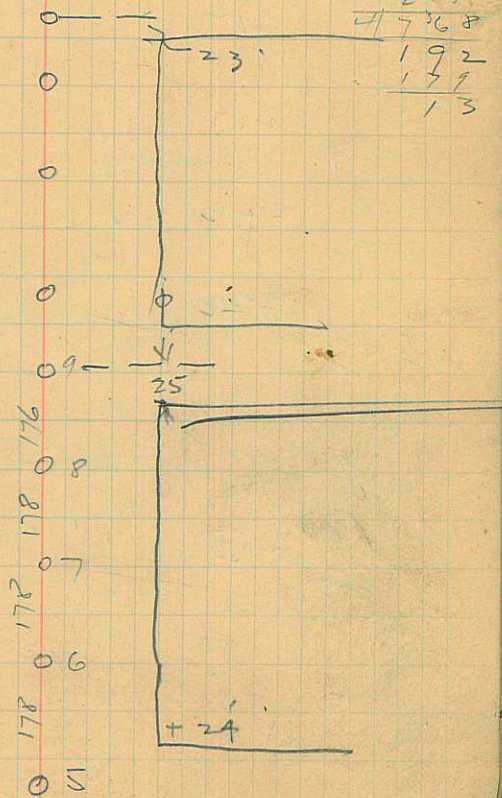
0 31
109 } tile

88

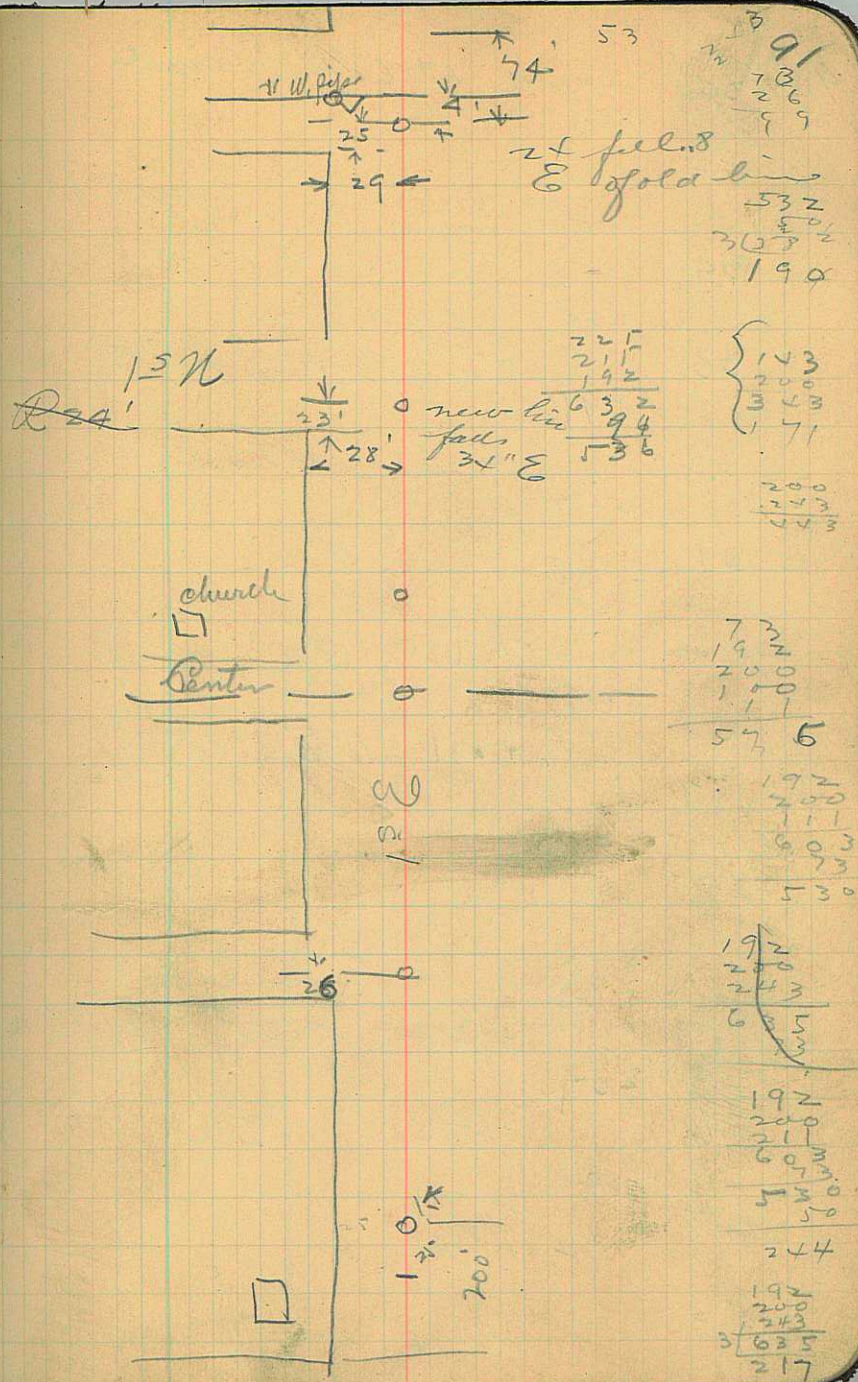
13	
	191
12	
	192
11	
	192
10	
	192
9	

89

263
250
215
47368
192
177
13



90			
24	+74	n side str	
	192		
23	+167	To Smith Str	
	215		
22			
	225		
△ 21	+71	To main str	
	209		
20	+184	To Smith Str	
	217		
19			
	217		
9			
	223		
18	+91	to str	
	220		
17			
	192		
16	+73	To main str	
	203		
15	+177	Smith Str	
	200		
14			



92 36

end at City Limits

190

35

200

34

200

33

+71

n side str

191

1

32

+166

s side

217

31

217

30

+71

n side str

196

+1*71

to E side str

X 29

200

28

233

27

+74

n side str

207

26

+182

side

220

25

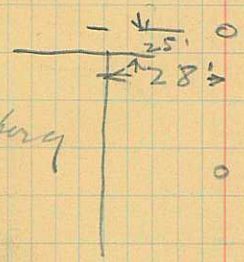
215

24

93

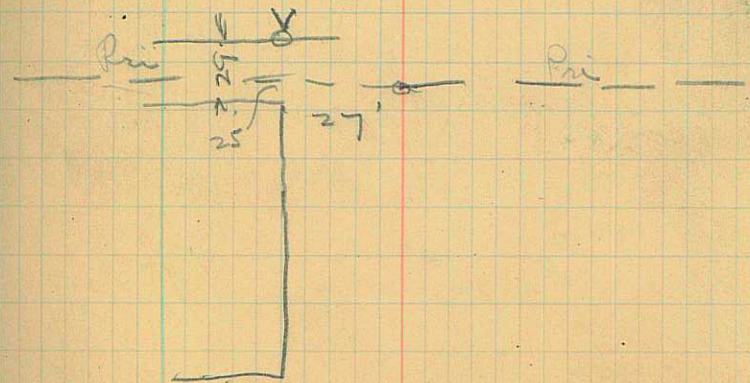
at M. Larson

2	33
2	00
4	33
630	
171	
46	
217	



Snow line
3' west

Mr. Syobbery



94

95

225
 215
 192
 211
 214
 204
 203
 206
 207
 203

21 2410
 21

21
 21

192
 220

192
 200
 205
 205
 211

21
 21

Pole in Corn. Sept 3, 1919

96

45

213

44

~~243~~
225

43

~~190~~
195

42

190

38

41

208

40p

208

39

210

38

202.5

37

+132 to Side Street

210

36

220

13

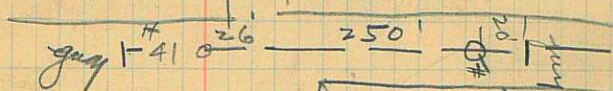
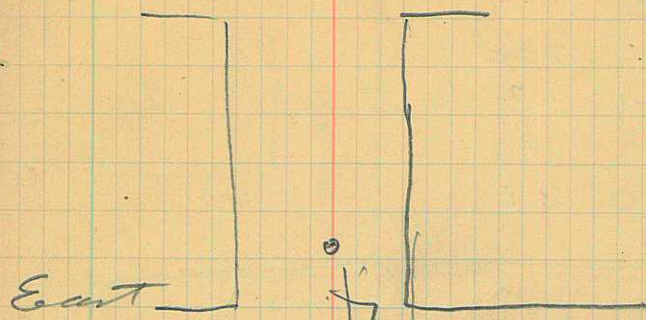
J.W. Gurr

↑ - gurg 40'

97

↓ 23'

660
99
~~535~~
190



400

390

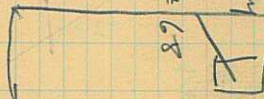
#38 26 27.5

23'

0

0

0 23'



98 54

188
~~177~~

53

189
~~200~~

52

200

51

190

50

50

219

49

200

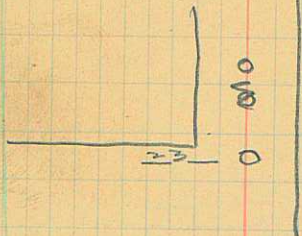
48

210

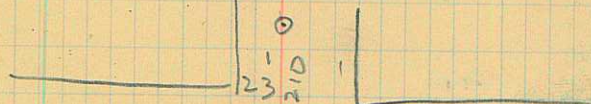
45

395
2595
247

99
2377
189



0

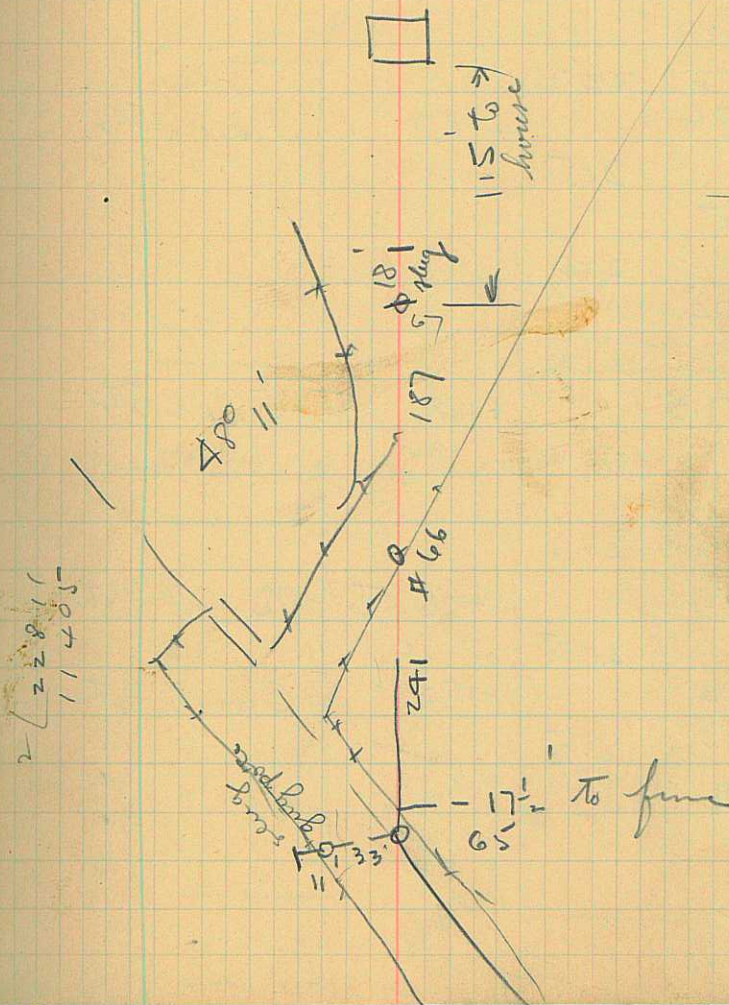


0 45



0 247

76
10 248 0 200
4 247



241
187
438
111
553

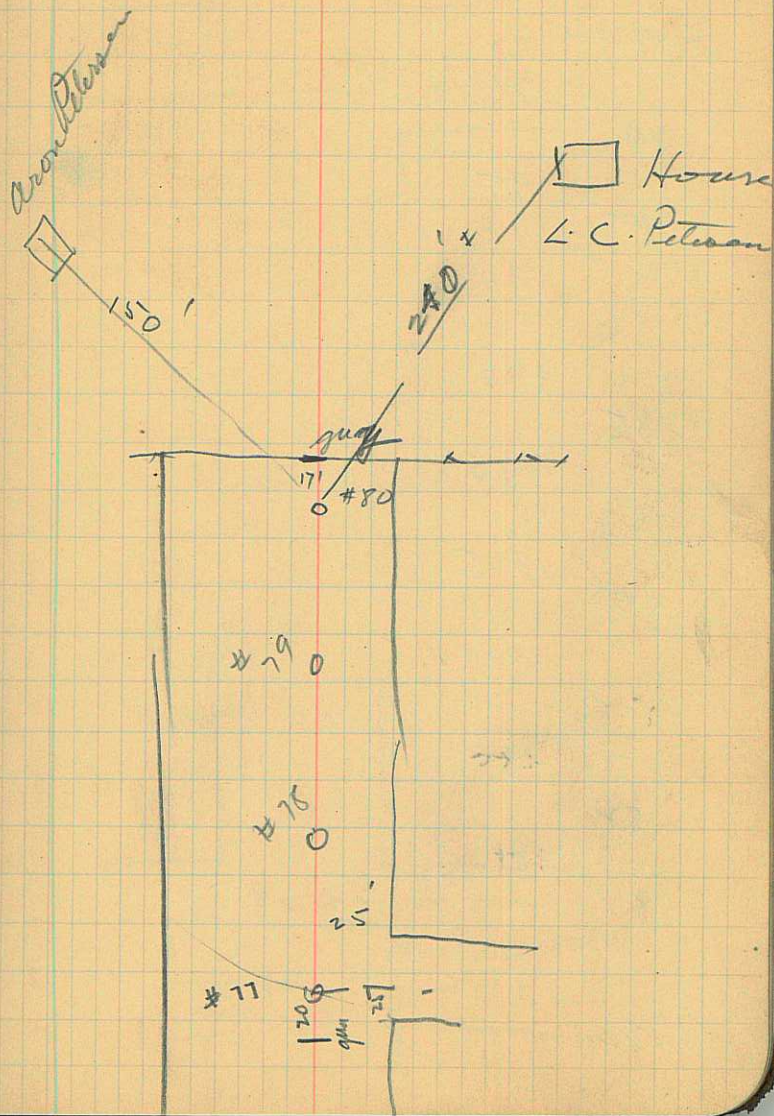
106

80		+17' to gully
	260	
79		
	240	
78		
	235	
77		

107

113
68
45

113
29
1



108

slug

20'

Guy pole

76

74

195

87

190

86

190

85

190

27

181.5

84

181

83

181

82

181

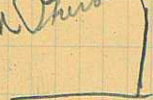
81

109

$$\begin{array}{r} 227 \\ 248 \\ 244 \\ \hline 719 \\ 781 \end{array}$$

196

m. Phoson

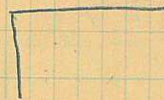


$$\begin{array}{r} 28 \\ \hline \end{array}$$

4760

190

740



660

3710

237

4738

177

250

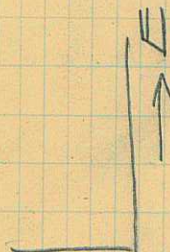
217

2497

248

87

48



Jas. P. O'Brien

#810

24'

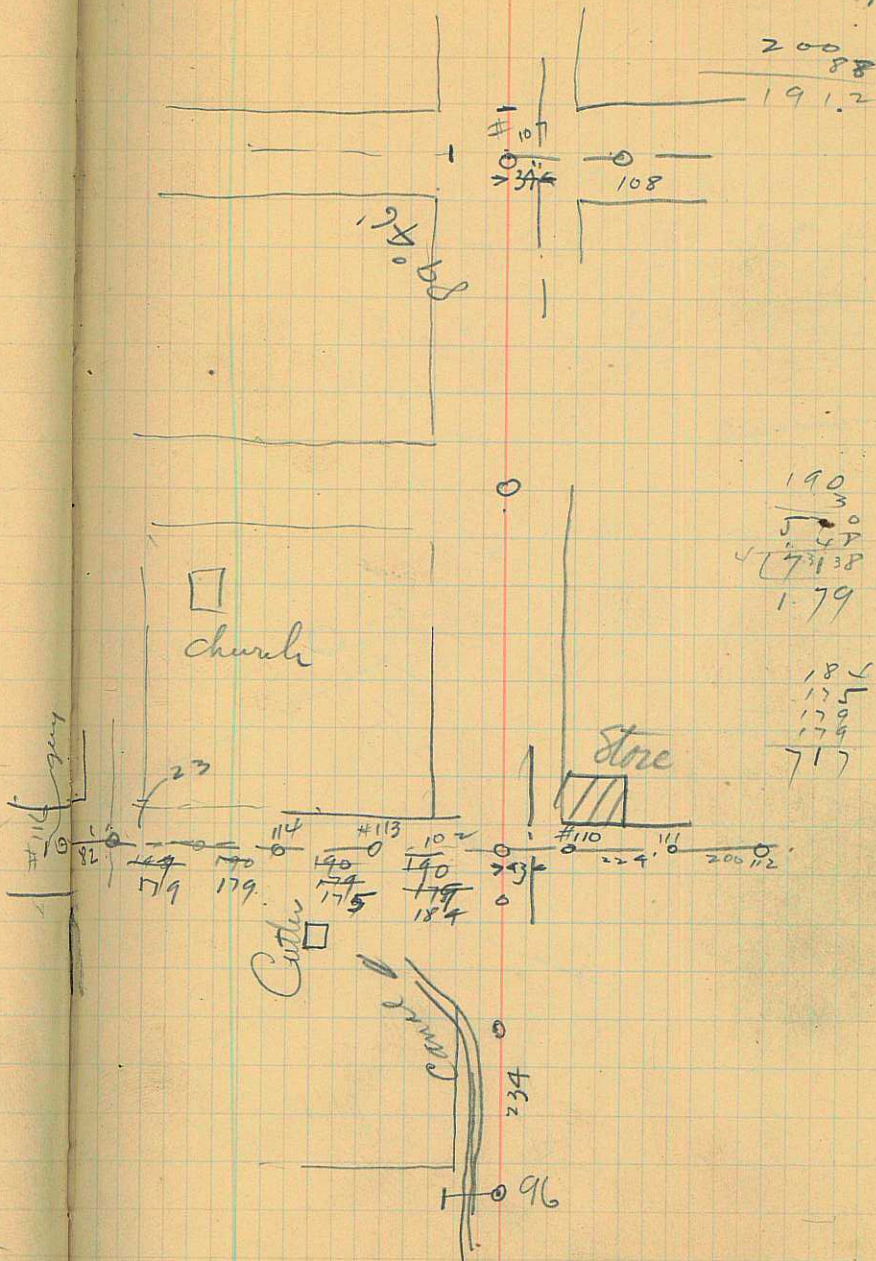
Main St
U.I.C.

112

#112	200
111	229
110	78. over D.I.C
102	
<u>109</u>	243
108	79
107	
106	208
	220
105	210
5	
104	212
103	200
	225
102	240
	191.2
101	
	210
100	234
96	

225
18
3

113

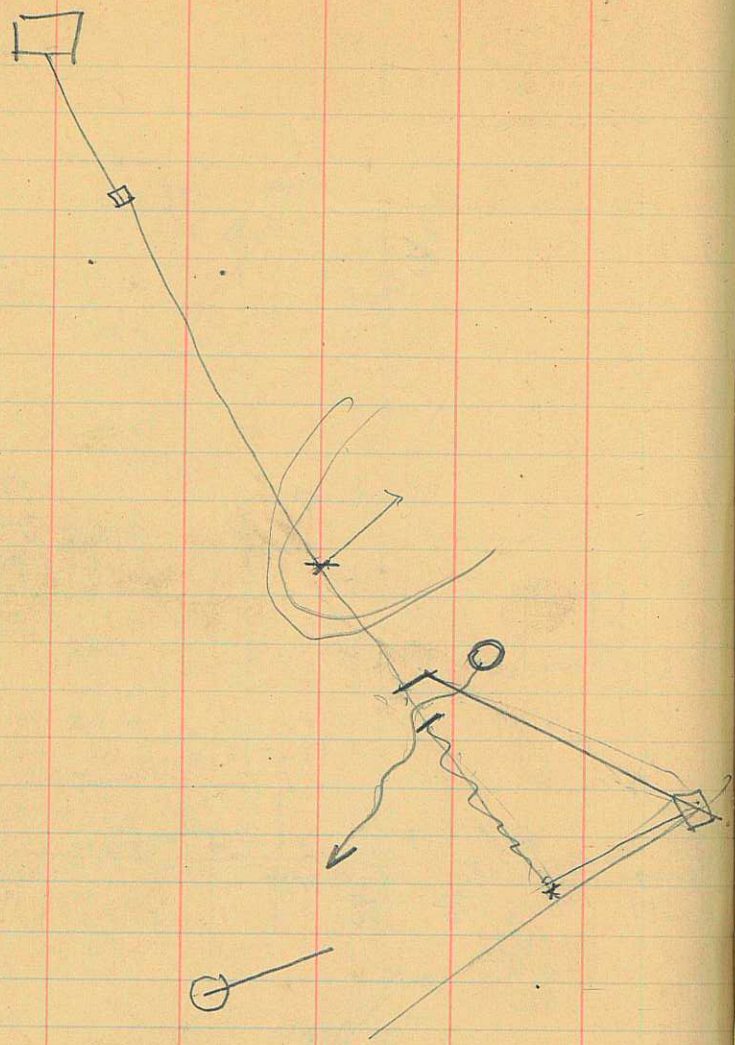


200
88
191.2

190
3
5
47
4
73138
23
179

184
175
179
179
717

114



115

$$\frac{\ln 26^{23}}{110} = \frac{\ln 71^{44}}{2}$$

$$\begin{array}{r} 2.176091 \\ \ln 71^{44} \quad 7.986395 \\ \hline 2.162486 \\ \ln 26^{23} \quad 1.647749 \\ \hline 2.514737 \end{array}$$

$$\begin{array}{r} 165 \\ 1220 \\ \hline 395 \\ 9 \quad 28 \\ \hline 5 \quad 20 \\ \hline 5 \quad 27.8 \\ \hline 1.92 \end{array}$$

$$\begin{array}{r} 317.7 \\ \hline 327 \end{array}$$

116
 West of White 950' Sec
 from pole 19 to 20 Sec 500' Sec
 from pole 24 to 29 in 3. field

250
 1250
 1022

150
 103
 47

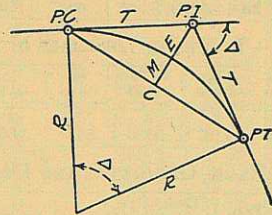
250
 47
 63

150
 87
 63

250
 63
 187

DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES

Copyright, 1914, by Eugene Dietzgen Co., New York City



CURVE FORMULAS

Radius= $R = \frac{50}{\sin \frac{\Delta}{2}}$ (1) Degree of Curve= D and $\sin \frac{D}{2} = \frac{50}{R}$ (2)

Tangent= $T = R \tan \frac{\Delta}{2}$ (3) Length of Curve= $L = 100 \frac{\Delta}{D}$ (4)

Middle ordinate= $M = R(1 - \cos \frac{\Delta}{2}) = R \text{vers} \frac{\Delta}{2}$ (6)

External= $E = T \tan \frac{\Delta}{4} = R \cos \frac{\Delta}{2} (1 - \cos \frac{\Delta}{2}) = R \text{exsec} \frac{\Delta}{2}$ (8)

Long Chord= $C = 2 R \sin \frac{\Delta}{2}$ (10) Δ = Central Angle

EXPLANATION AND USE OF TABLES

Stations.—Given P. I. = Sta. 161 + 60.35 to find Sta. of P. C. and P. T. $\Delta = 62^\circ 10'$ $D = 8^\circ 20'$. From Table IV for 1° curve $T = 3454.1$ and $\div 8\frac{1}{3} = 414.49$ ft. From Table V correction = .36 or $T = 414.85$ ft. P. C. = Sta. P. I. - $T = 157 + 45.50$. Also from (4) $L = 746.00$ and P. T. = Sta. P. C. + $L = 164 + 91.50$.

Offsets.—Tangent offsets vary (approximately) directly with D and with square of the distance. Thus tangent offset for Sta. 158 on above curve is 2.16 ft. found as follows. From Table III tangent offset for 100 ft. = 7.27 ft. Distance = $158 - \text{Sta. P. C.} = 54.50$, hence offset = $7.27 (54.50 \div 100)^2 = 2.16$ ft. Also square of any distance divided by twice the radius equals (approximately) the distance from tangent to curve. Thus $(54.50)^2 \div (2 \times 688.26) = 2.16$ ft.

Deflections.—Deflection angle = $\frac{1}{2} D$ for 100 ft., $\frac{1}{4} D$ for 50 ft., etc. For c ft. = (in minutes) $.3 \times C \times D^\circ$ or = defl. for 1 ft. from Table III $\times C$. For Sta. 158 of above curve = $.3 \times 54.5 \times 8\frac{1}{3} = 136.2'$ or $2^\circ 16.2'$, or = $2.50 \times 54.5 = 136.2'$ from Table III. For Sta. 159 deflection angle = $2^\circ 16.2' + 8^\circ 20' \div 2 = 6^\circ 26.2'$, etc.

Externals.—May be found in similar manner to tangents. Thus E for curve above is 91.37. For from Table IV for 1° curve $E = 960.6$ for $8^\circ 20' = 960.6 \div 8\frac{1}{3} = 91.27$ and from Table V correction = .10 or $E = 91.37$ ft. Or suppose $\Delta = 32^\circ$ and E is measured and found to be 42 ft. What is D ? From Table IV $E = 230.9$ and $\div 42 = 5.5$ or $D = 5^\circ 30'$.