

BURTON

CLARIDON-BURTON
COUNTY-ROAD.
SEC. "A"

74

DIARY BOOK

1807

PLEASE RETURN TO
GEAUGA COUNTY ENGINEER
COURT HOUSE
CHARDON, O.
PHONE 250-X

0 to 35 - 1 ft. detail
36 to 49 ✓ " "
50 to 8480 + " "
57+00 to 60+50 = 1:1 slope both sides
46+00 to 54+00 = 1:1 " " "
37+00 to 44+00 = 1:1 " " "

COUNTY ROAD

CLARIDON ~ BURTON
SEC. "A"

BURTON TWP.

GEAUGA COUNTY, O.

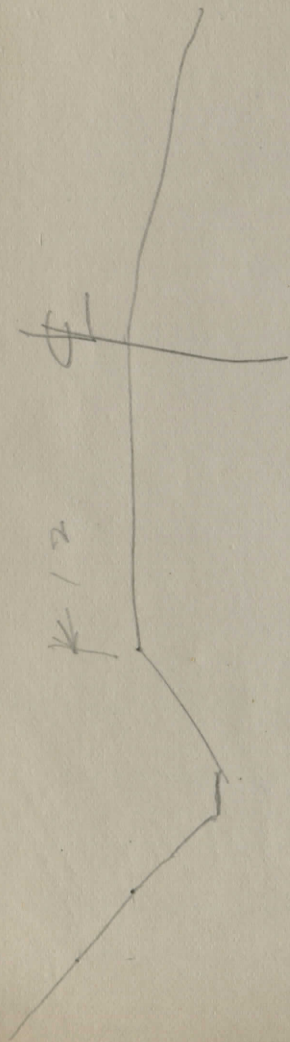
L. J. McNAUGHTON
CO. ENGR.

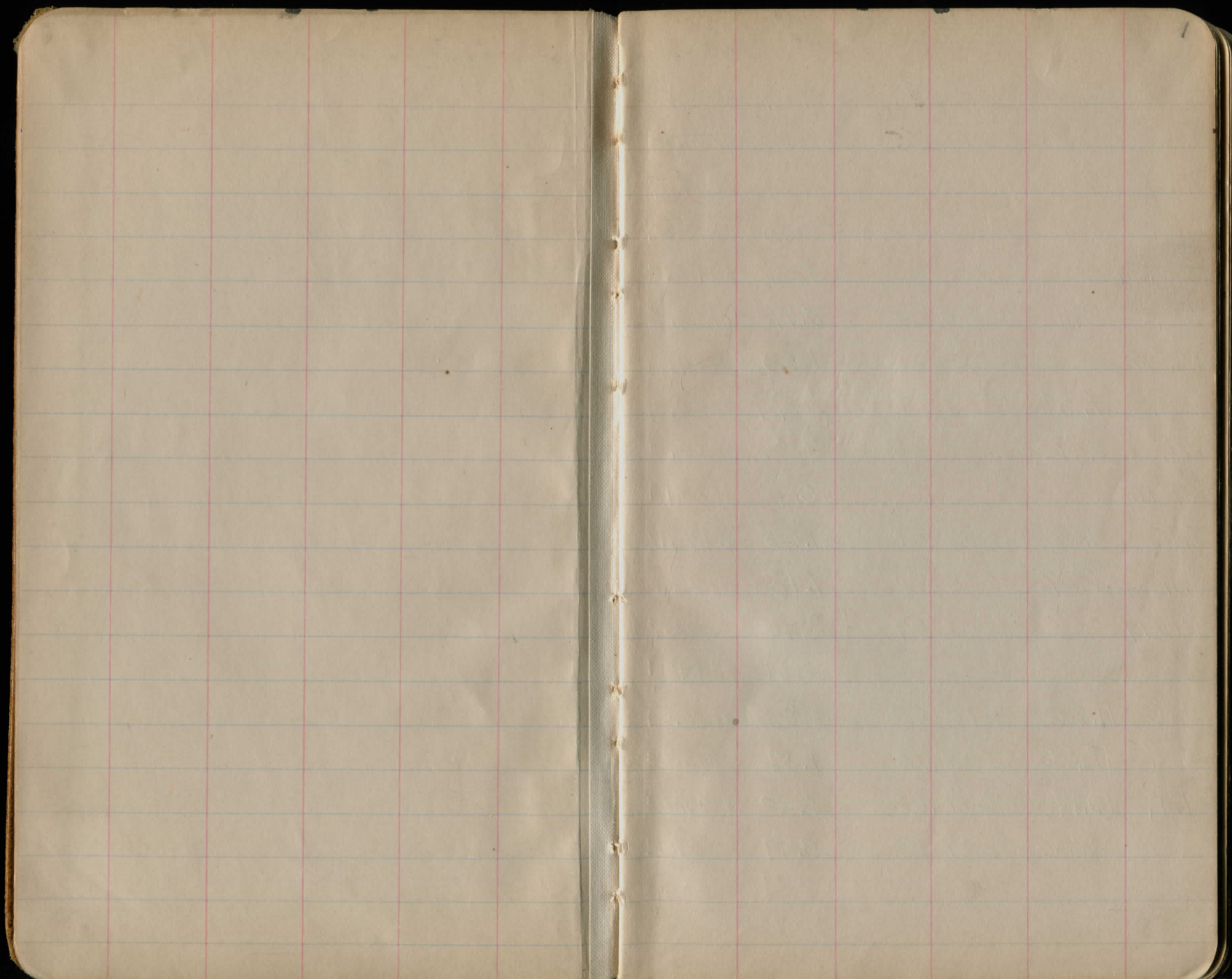
Nov. 1916.

Benchmarks - pg - 1-3

X-Sections - pg - 4-15

74





11-27-16
Fair-windy
3/4 sk

R. Hamra
R. Powrey

2

Sta	B.S.	H.	I.	F.S.	
B.M.#13	9.43	1213	75	1204.32	Tack on root 10" W. Cherry Sta 0-80 Claverton
T.P.	12.48	1222	19	4.04 1209.71	
T.P.	3.45	1222	39	3.25 1213.94	
B.M.#14				3.51 1212.38	Tack in W. root end Maple E. side of Rd.
T.P.	9.11	1230	79	0.71 1221.68	
B.M.#15				6.69 1224.10	Tack in S. root 3" Maple in lot by Appleby's barn
T.P.	1.54	1221	89	10.44 1220.35	
T.P.	0.82	1210	85	11.86 1210.03	
B.M.#16				9.48 1201.37	Tack in S.E. root 14" B. Nat tree W. side Rd + S. of Mill race
T.P.	1.32	1200	51	11.66 1199.19	
T.P.	6.32	1205	70	1.13 1199.38	
B.M.#17	4.47	1207	27	2.40 1202.80	Tack in W. root 40" Maple front of Snyder's house
T.P.				8.61 1198.66	on S.W. cor. E. head wall.
T.P.	11.26	1216	60	1.93 1205.34	
T.P.	12.66	1227	75	1.51 1215.09	
T.P.	10.17	1237	60	0.32 1227.43	
B.M.#18	12.99	1247	12	3.47 1234.13	Tack in W. root 40" Oak in front of Parkers.

96.02

5372

Sta	B.S.	H. I.	F.S.	Elev		
		1247	12			
T.P.	11.30	1256	43	1.99	1245.13	
T.P.	11.98	1266	28	2.13	1254.30	
B.M.#19				6.52	1259.76	Tack in W. root 2nd Maple S. of water Trough
T.P.	12.90	1278	59	0.59	1265.69	
T.P.	12.29	1288	31	2.57	1276.02	
B.M.#20				3.85	1274.16	Tack in top 12" Maple stump 150' N of Taylor's House
T.P.	1.20	1287	41	2.10	1286.21	
B.M.#21				3.56	1283.75	Tack in S.W. root 1st Maple S. of Russell's house.
T.P.	3.08	1277	81	12.68	1274.73	
B.M.#22				3.33	1274.48	Tack on S.E. side of top of old stump Lt. Sta O.
T.P.	12.46	1289	54	0.75	1278.16	
T.P.	12.97	1302	23	0.26	1289.26	
T.P.	12.08	1313	95	10.36	1301.87	
T.P.	13.09	1326	92	0.12	1313.73	
T.P.	10.67	1337	01	0.58	1326.34	
T.P.	6.50	1341	00	2.51	1334.50	
B.M.				2.71	1338.29	on town hall
					1337.83	U.S.G.S. B.M.
					46	

CROSS-SECTIONS

12-6-16
Fair-Very Windy

Hanna
Downing

4

Sta B.S. H. I. F.S. Elev
B.M.# 1.60 1276 08 1274.48

-200 0.0 76.1

-100 1.6 74.5

0 3.23 72.9

3.2 end of pavement.

1 4.0 72.1

-0.7 -0.3 -1.1 -1.4 -0.7 0.0 -0.6 -1.6 -1.4 -0.6 -0.6
4.7 4.3 5.4 5.1 4.7 4.0 4.6 5.6 5.4 4.6 4.6
2.5 1.8 1.7 1.4 1.2 0.3 1.1 1.4 1.7 1.8 2.5

2 4.7 71.4

-1.2 -0.8 -1.5 -1.5 -0.7 0.0 -0.6 -1.6 -1.3 -0.6 -0.8
5.9 5.5 6.2 6.2 5.9 4.7 5.3 6.3 6.0 5.3 5.5
2.5 1.8 1.7 1.4 1.2 1.1 1.4 1.7 1.8 2.5

3 4.4 71.7

-2.3 -2.4 -3.3 -3.4 -2.4 -1.1 +0.1 0.0 0.0 -1.4 -2.5 -2.3 -1.3
6.7 7.0 7.7 7.8 6.8 5.5 4.3 4.4 4.4 5.8 6.9 6.7 5.7
2.5 2.2 2.0 1.8 1.6 1.4 1.1 1.1 1.4 1.7 2.1 2.3 2.5

Temp B.M. 3.28 1272.80

on N. end E. parapet of Culvert

4 5.1 71.0

+1.0 +0.7 -0.2 -1.0 -0.6 -0.3 0.0 -0.5 -1.2 -1.3 -0.6 -0.5
4.1 4.4 5.3 6.1 5.7 5.9 5.1 5.6 6.3 6.4 5.7 5.6
2.5 1.9 1.5 1.4 1.1 1.1 1.2 1.5 1.6 1.9 2.5

5 3.8 72.3

+0.7 +0.3 -0.4 -0.9 -0.5 0.0 -0.4 -0.9 -0.8 -0.4 -0.3
3.1 3.5 4.2 4.7 4.3 3.8 4.2 4.7 4.6 4.3 4.1
2.5 2.0 1.4 1.2 1.1 1.1 1.1 1.3 1.7 1.9 2.5

6 2.2 73.9

+1.2 +1.1 +0.5 -1.2 -0.9 -0.5 0.0 -0.2 -1.3 -1.0 -0.3 +0.8
1.0 1.1 1.7 3.4 3.1 2.7 2.2 2.4 3.5 3.3 2.5 1.4
2.5 1.9 1.5 1.3 1.1 1.1 1.3 1.5 1.8 2.1 2.5

T.P. 1025 1285 33 1.00 1275.08

✓

Sta. B.S. H. I. 1285 33 F.S. Elev.

7 9.5 75.8

+1.7 +1.6 +1.2 -1.1 -0.6 -0.4 0.0 -0.5 -1.3 -0.7 +0.6 +1.8 +2.1
78 79 83 106 101 99 95 100 108 102 89 77 74
25 20 16 13 10 9 13 14 16 17 22 74
25

8 7.6 77.7

+1.2 +1.3 +0.4 -1.2 -0.7 -0.4 0.0 -0.6 -1.0 -1.3 +0.4 +0.8 +1.0
61 63 72 88 85 80 76 82 86 89 72 68 66
25 20 14 12 10 8 13 14 16 18 22 25

9 5.9 79.4

+1.1 +0.5 0.0 -0.4 -1.0 -0.6 0.0 -0.5 -0.7 -1.2 -0.4 +0.5
47 54 59 73 69 65 59 64 68 71 63 54
21-25 19 14 12 10 9 12 14 16 17 25

10 4.6 80.7

+1.0 +1.1 +0.7 0.0 -1.1 -0.8 -0.4 0.0 -0.4 -0.9 0.0 +0.4 +1.4
36 35 37 46 57 54 50 46 50 55 46 42 32
25 20 18 15 14 12 10 10 13 15 16 19 25

B.M. # 121 1.57 1283.76

on Maple 30' Pt Sta 10+30

11 2.8 82.5

+1.3 +1.1 0.0 -1.1 -0.6 -0.3 0.0 -0.2 -0.7 0.0 +0.3 +1.4
15 17 28 39 34 31 28 30 35 28 29 14
25 18 16 14 12 11 11 14 15 21 25

12 1.1 84.2

+1.1 +0.8 +0.6 -0.5 -1.5 -1.2 -0.5 0.0 -0.4 -0.9 +0.1 +0.5 +1.5
00 03 05 16 26 23 16 11 15 20 10 06 -04
25 22 19 17 14 13 10 10 14 16 20 25

T.P. 6.11 1289 83 1.61 1283.72

13 4.3 85.5

+1.1 +0.6 +0.4 -1.0 -1.7 -1.2 -0.2 0.0 +0.1 -1.2 +0.1 +0.4 3.5
32 37 39 53 60 55 45 43 42 55 42 39 25
25 22 19 17 15 14 12 10 12 15 16 20

+4.5 3.8 86.0

Intersection of rd to Lt.

5.2 84.6

100' W. on " " "

5.8 84.0

200' W. " " "

14 4.1 85.7

+0.4 -0.1 -0.8 -1.6 -1.1 -0.6 0.0 -0.3 -0.9 -1.6 -0.7 -0.2 +0.1
37 40 44 57 52 47 41 44 50 57 48 43 40
25 19 16 14 12 10 8 8 11 14 16 19 25

Sta. B.S. H. I. F.S. Elev.

Lt. E Rt.

1289 83

15 4.1 85.7

+0.3 +0.2 -0.7 -1.3 -1.6 -0.9 -0.3 0.0 -0.3 -1.2 -1.7 -0.6 -0.3 0.0
3.8 3.9 4.8 5.1 5.7 5.0 4.4 4.1 4.4 5.3 5.8 4.7 4.1 4.1
25 17 14 12 11 9 6 9 12 13 15 19 25

16 3.3 86.5

-0.8 -0.6 -1.3 -1.7 -0.9 0.0 -0.7 -1.6 -1.9 -1.4 -0.9
4.1 3.9 4.6 5.0 4.2 3.3 4.0 4.9 5.2 4.7 4.2
25 17 13 11 8 9 12 14 15 25

17 3.7 86.1

+1.2 +1.4 +0.7 0.0 -0.6 -1.3 -0.7 0.0 -0.6 -1.0 -0.5 +0.3 +0.5
2.5 2.3 3.0 3.7 4.3 5.0 4.4 3.7 4.3 4.7 4.2 3.4 3.2
25 21 17 14 12 11 9 10 12 14 19 25

18 2.7 87.1

+0.8 +0.6 +0.2 -0.3 0.0 -0.4 -1.3 -1.6 -0.7 0.0 +0.2
1.9 2.1 2.5 3.0 2.7 3.1 4.0 4.3 3.4 2.7 2.5
25 21 16 9 9 11 13 15 19 25

19 5.3 84.5

+0.2 -0.1 -0.6 +0.3 0.0 -0.1 -1.3 +1.5
5.1 5.4 5.9 5.6 5.3 5.4 4.0 3.8
25-22 14 12 10 6 15 25

B.M. 20 123 1285 60 5.37 1284.46

Targeted instamp 30' Lt. Sta. 19+60 +2.4

20 4.7 81.0

+1.6 +1.5 0.0 -1.4 -0.6 0.0 -0.6 -0.7 -0.1 +0.6 +1.9
3.1 3.2 4.7 6.1 5.3 4.7 5.3 5.4 4.8 4.1 2.8 +2.6
25 19 16 14 12 6 9 10 12 15 20

21 7.6 78.1

+2.8 +0.1 -1.2 -0.3 0.0 -0.3 -0.9 +0.4 +1.2 +2.3 +2.4
4.8 7.5 8.8 7.9 7.6 7.9 8.5 7.2 6.9 5.3 5.2
25-20 13 11 9 7 10 13 15 20 25

22 11.6 74.1

+2.4 +1.9 +1.4 +0.2 -1.2 -0.3 0.0 -0.4 -1.2 -0.6 +0.5 +2.3
9.2 9.7 10.2 11.4 12.8 11.1 11.6 12.0 12.8 12.2 11.1 9.6 9.3
25 20 16 12 10 9 8 11 13 16 19 25

T.P. 1.79 1271 78 12.70 1272.99

✓

Sta. B.S. ^{H.}1274.78 ^{I.} F.S. Elev.

23 4.3 70.5

24 7.4 67.4

25 9.8 65.0

T.P. 113 1266.80 9.11 1265.67

26 3.6 63.2

27 7.4 59.4

B.M. #19 7.04 1259.76

28 10.2 56.6

n-7-116 AM,
cold - partly cloudy

B.M. #19 1.36 1261.12 1259.76

29 7.5 53.6

30 10.9 50.2

T.P. 1.14 1251.74 10.52 1250.60

+1.5 -0.2 -1.2 00 00 -0.5 -1.2 -0.1 +0.7 +1.5

$\frac{2.8}{25} \frac{4.5}{11} \frac{5.5}{9} \frac{13.4}{6} \frac{3.7}{11} \frac{5.5}{13} \frac{4.1}{15} \frac{3.7}{18} \frac{2.8}{25}$

+1.0 +0.8 -0.1 -0.7 -0.2 00 -0.3 -0.7 +0.4 +1.1

$\frac{6.4}{25} \frac{6.6}{15} \frac{7.5}{10} \frac{8.3}{9} \frac{7.6}{7} \frac{7.4}{11} \frac{7.7}{13} \frac{8.1}{15} \frac{7.0}{25} \frac{6.3}{25}$

+0.9 -0.1 -0.8 -0.5 00 -0.2 -0.7 +0.5 +1.0

$\frac{8.9}{25} \frac{9.9}{15} \frac{10.6}{10} \frac{10.3}{8} \frac{9.7}{6} \frac{10.0}{9} \frac{10.5}{13} \frac{9.3}{21} \frac{8.8}{25}$

+1.1 +0.8 -0.1 -1.3 -0.6 00 +0.1 -0.4 -1.0 +0.2 +0.9 +1.2

$\frac{2.5}{25} \frac{2.8}{15} \frac{3.7}{11} \frac{4.9}{9} \frac{4.2}{6} \frac{3.6}{7} \frac{3.5}{11} \frac{4.0}{13} \frac{4.6}{15} \frac{3.4}{15} \frac{2.7}{22} \frac{2.1}{25}$

+2.0 +1.2 +0.5 -1.2 -0.5 00 -0.3 -1.0 +0.2 +1.3 +2.4

$\frac{5.4}{25} \frac{6.2}{15} \frac{6.9}{10} \frac{8.6}{8} \frac{7.9}{6} \frac{7.4}{10} \frac{7.7}{13} \frac{8.4}{15} \frac{7.2}{15} \frac{6.6}{17} \frac{5.0}{25}$

on W Root of Maple 30' RT Sta 27+80

+1.1 +0.3 -0.4 -1.0 -0.6 00 -0.1 -0.4 +0.9 +1.7

$\frac{9.1}{25} \frac{9.9}{11} \frac{10.6}{9} \frac{11.2}{8} \frac{10.8}{5} \frac{10.2}{5} \frac{10.3}{13} \frac{10.6}{12} \frac{9.3}{19} \frac{8.5}{25}$

on W Root Maple 30' RT Sta 27+80

+1.3 +0.2 -0.8 -0.2 0.0 +0.1 -0.6 +0.5 +1.5 +1.0

$\frac{6.2}{25} \frac{7.3}{9} \frac{8.3}{7} \frac{7.7}{5} \frac{7.5}{5} \frac{7.1}{9} \frac{8.1}{12} \frac{7.0}{14} \frac{6.0}{17} \frac{6.5}{25}$

+3.2 +2.6 +1.4 -0.1 -0.7 -0.1 0.0 -0.1 -1.0 +0.4 +1.7 +1.8

$\frac{7.7}{25} \frac{8.3}{19} \frac{9.5}{14} \frac{11.0}{9} \frac{11.6}{7} \frac{11.0}{6} \frac{10.9}{6} \frac{11.0}{10} \frac{11.9}{13} \frac{10.5}{15} \frac{9.2}{17} \frac{9.1}{25}$

✓

Sta B.S. H. I. F.S. Elev.

Lt. Σ Ft.

1251 74

31 4.8 46.9

+2.2	+1.6	+0.2	-0.8	-0.2	0.0	-0.4	-0.8	+0.3	+1.3	+1.3
<u>26</u>	<u>32</u>	<u>46</u>	<u>56</u>	<u>50</u>	<u>48</u>	<u>52</u>	<u>56</u>	<u>45</u>	<u>35</u>	<u>35</u>
25	19	13	9	6		10	12	16	20	25

32 7.4 44.3

+1.5	-0.1	-1.3	-0.4	0.0	-0.2	-1.1	+0.3	+0.7
<u>59</u>	<u>75</u>	<u>87</u>	<u>78</u>	<u>74</u>	<u>76</u>	<u>85</u>	<u>71</u>	<u>67</u>
25	15	11	8		10	12	17	25

150 8.7 43.0

+0.3	+0.2	-1.0	-0.3	0.0	-0.3	-1.0	+0.5	+0.8
<u>84</u>	<u>85</u>	<u>97</u>	<u>90</u>	<u>87</u>	<u>90</u>	<u>97</u>	<u>82</u>	<u>79</u>
25	12	8	5		9	12	16	25

33 10.8 40.9

+1.0	+0.8	+0.8	-1.4	-0.7	0.0	-0.3	+1.6	+2.0
<u>98</u>	<u>102</u>	<u>100</u>	<u>122</u>	<u>115</u>	<u>108</u>	<u>111</u>	<u>92</u>	<u>88</u>
25	18	13	18	17		9-13	16	25

T.P. 422 1242 98 12,98 1238.76

150 5.0 38.0

+4.0	+3.7	+2.8	+1.6	-1.0	0.0	0.0	-0.5	-0.8	+1.5	+2.8	+3.5
<u>10</u>	<u>13</u>	<u>22</u>	<u>34</u>	<u>6.0</u>	<u>5.5</u>	<u>5.0</u>	<u>5.5</u>	<u>5.8</u>	<u>3.5</u>	<u>2.2</u>	<u>4.5</u>
25	20	14	12	9	7		10	13	16	20	25

34 8.3 34.8

+2.7	+2.5	+1.7	-1.3	-0.6	0.0	-0.4	0.0	+4.3	+5.6
<u>55</u>	<u>57</u>	<u>63</u>	<u>95</u>	<u>88</u>	<u>82</u>	<u>86</u>	<u>82</u>	<u>3.9</u>	<u>36</u>
25	14	14	11	8		7	10	19	25

B.M. # 888 1234.10

35 12.6 30.4

on W. root 40" oak, 27' ft Sta 34+96

-0.5	-0.4	-1.4	-0.7	0.0	-0.4	-1.5	+0.4	+1.5	+2.9
<u>131</u>	<u>130</u>	<u>140</u>	<u>133</u>	<u>124</u>	<u>13.0</u>	<u>141</u>	<u>122</u>	<u>111</u>	<u>97</u>
25	17	15	10		7	11	15	20	25

T.P. 4.12 1236.68 1042 1232.56

Temp. 7.16 1229.52

34 8.4 28.3

x on SW. cor. W. parapet

-2.7	-2.4	-1.5	-0.5	0.0	-0.3	-1.3	-2.1	-1.6	-1.5
<u>106</u>	<u>109</u>	<u>99</u>	<u>89</u>	<u>81</u>	<u>87</u>	<u>97</u>	<u>105</u>	<u>100</u>	<u>99</u>
25	18	16	13		6	7	11	15	25

Sta. B.S. H. I. F.S. Elev.
1236.68

37 8.8 27.9

+2.3 +0.6 -0.5 -1.1 -0.2 0.0 0.0 -1.2 -0.6 -1.2
6.5 8.3 9.3 9.9 9.0 8.8 8.8 1.00 9.4 10.0
2.5 1.7 1.5 1.2 1 1 1 1.2 1.4 2.5

38 5.1 31.6

+4.3 +2.8 +1.1 -0.8 -0.1 0.0 -0.4 -1.1 +0.5 +1.4 +2.7
0.8 3.3 4.0 5.9 5.4 5.1 5.5 6.3 4.6 3.7 2.4
2.5 1.7 1.2 1.0 1 1 1.0 1.3 1.5 1.9 2.5

+7.5 3.8 32.9

+0.8 +0.4 0.0 -0.1 -0.6 +1.1 +1.2 +1.6
3.0 3.7 3.8 3.9 4.4 2.7 2.6 2.2
2.5 1.4 1 1 1.2 1.6 2.5

39 4.5 32.2

+3.5 +3.1 +1.6 -0.1 0.0 -0.1 -0.3 +1.9 +2.1 +1.7
1.0 1.1 2.9 4.6 4.5 4.6 4.7 2.6 3.1 2.8
3.0 2.5 1.4 1.0 1 1 1 1.7 2.5

40 8.8 27.9

+6.2 +6.1 +1.8 -0.8 -0.3 0.0 -0.3 -0.7 +1.0 +2.8 +6.0 +6.3
2.6 2.7 4.0 9.6 9.1 8.8 9.1 9.5 7.8 6.4 2.8 2.5
3.0 1.9 1.5 1.1 1 1 1.7 1 1.1 1.4 1.3 3.0

41 13.3 23.4

+5.8 +4.0 +1.5 -1.1 -0.4 0.0 -0.2 -0.8 +1.0 +3.2
7.5 9.3 10.8 14.1 13.7 13.3 13.5 14.1 12.3 12.1 15.3 +5.6
3.0 1.8 1.4 1.1 1 1 1.5 1 1.0 1.4 1.7 3.0

T.P. 1.94 1226.81 11.81 1224.87

42 8.1 18.7

-7.5 +4.1 +1.7 -0.6 -0.2 0.0 -0.3 -0.8 +1.5 +4.6 +7.4 +7.9
0.6 4.1 6.7 8.7 8.3 8.1 8.4 8.9 6.6 3.5 0.7 0.2
3.0 2.0 1.1 1.3 1.0 1 1 1 1.6 2.0 3.0

43 15.1 11.7

+8.0 +4.6 +0.8 -0.5 +0.2 0.0 -0.2 -0.6 +1.5 +4.1 +6.7 9.6
7.1 10.5 14.3 15.6 15.3 15.1 15.3 15.7 13.6 11.0 8.7 5.7
3.0 2.7 2.0 1.5 1.0 1 1 1.6 1.7 1.2 1.8 2.1 2.8 3.0

T.P. 0.57 1214.47 12.91 1213.90



0.01

579

12/4 47

44 #52 10.0 045

T.P. 1.54 12 04 49 11.52 1292.95

45 6.3 98.2

Temp
E.P. 5.87 1198.62

46 8.1 96.4

B.M. #11 1.74 1202.75

47 8.1 96.4

8.1

48 6.3 98.2

T.P. 6.28 1206 87 3.90 1200.59

49 7.8 99.1

50 6.3 1200.6

+50 4.3 02.6

-1.1 -1.5 -0.5 0.0 -0.7 -1.2 -0.4 +0.4 +1.0

1.1	1.5	1.5	1.0	10.7	11.2	10.4	9.6	9.0
25	16	12	8	7	10	13	19	25

-4.4 -3.2 -1.9 -0.3 +0.2 0.0 +0.4 -2.8 -4.4 -5.3 -5.7

1.7	9.5	3.2	6.6	6.1	6.3	5.9	9.1	10.7	11.6	12.0
25	20	15	12	8	7	14	16	22	30	

X ON SW, 24K E, W, H

-4.7 -3.0 -1.3 -0.1 0.0 0.0 -1.5 -1.6

12.8	11.7	9.4	3.2	8.1	8.1	9.6	9.7
25	17	14	9	9	9	13	25

OK W. J. 3' 1/2" 27' 1/2" Sta 47+00

-0.5 -0.7 -0.2 0.0 -0.4 -0.9 +1.4 +3.7 +5.4 +6.4

8.6	9.0	8.3	8.1	8.5	9.0	6.7	7.4	2.7	1.7
25	21	14	12	5	7	10	14	20	25

Back starts out of H0 (figure with 21) ending

+2.7 +2.6 +1.0 -0.5 -0.3 0.0 -0.4 -0.9 +1.3 +3.8 +4.6

3.6	3.7	5.3	6.8	6.6	6.3	6.7	7.2	5.0	2.5	1.8
25	22	17	14	13	6	7	10	14	25	

-1.3 +1.1 +0.1 -0.1 0.0 -0.3 -0.9 -0.1 +0.2 +1.0

9.1	8.9	7.7	7.9	7.8	8.1	8.7	7.9	7.6	6.8
21	21	7	14		5	6	8	17	25

+1.4 +1.0 -0.1 0.0 -0.3 -0.8 +0.2 +1.6 +2.8 +2.8

4.9	5.3	6.6	6.3	6.6	7.1	6.1	4.7	3.8	3.5
25	18	15		5	7	9	15	20	25

+1.6 +1.1 +0.2 -0.4 -0.2 0.0 -0.6 -1.0 +2.5

2.7	3.2	4.1	4.7	4.5	4.3	4.9	5.3	1.8
25	19	16	14	12		5	7	15-25

Sta B.S. 12 09 24 H J F S
 T.P. 1173 1214 73 1.21 03.00
 59 9.5 05.2

60 3.5 11.2
 T.P. 1232 1225 5.9 1.16 13.27
 +50 10.4 15.2

61 9.7 15.9

62 7.2 18.4

63 5.5 20.1

64 3.5 22.1

B.M. #15 1.50 24.09

65 0.8 24.8

T.P. 5.88 1231 2.4 0.23 12.526

+7.8 +9.1 +4.1 +0.8 -2.0 -0.7 0.0 -0.3 -1.0 +2.5 +8.1
 1.7 1.4 5.1 8.7 11.5 12.9 9.5 9.8 10.5 7.0 1.1
 30 25 17 12 8 6 9 11 15 25 -30

+6.5 +3.5 +2.5 -0.3 +0.7 0.0 +0.2 +1.6 +3.5 +4.0
 -3.0 0.0 1.0 3.8 2.8 3.5 3.3 1.9 0.0 -0.5
 30 15 12 8 7 8 14 25 30

+2.0 +1.3 -0.9 -0.2 0.0 -0.5 -0.8 0.0 +1.7 +1.9
 8.1 9.1 11.3 10.6 10.1 10.9 11.2 10.4 8.7 8.5
 25 -20 12 8 5 10 12 14 17 25

+1.4 -1.1 -0.3 0.0 -0.3 -0.7 +0.6 +1.4 +2.2
 8.3 10.8 10.9 9.7 10.0 10.4 9.1 8.3 9.5
 25 -11 8 6 12 14 16 19 25

+1.3 +0.3 +0.2 -1.1 -0.2 0.0 -0.3 -0.9 -0.3 +0.1
 5.7 6.7 7.0 8.3 7.4 7.2 7.5 8.1 7.5 7.1
 25 17 12 10 7 11 14 25 25

2 120 large stamp in R. of page 11/11

+1.2 +1.0 +0.3 -0.8 -1.4 -0.4 0.0 -0.5 -1.1 +0.1 +0.2
 1.3 1.5 5.2 6.3 6.7 5.7 5.5 6.0 6.9 5.1 5.3
 25 21 14 12 10 7 13 16 20 2.5

+1.6 +0.8 -0.3 -1.5 -0.6 0.0 -0.4 -1.6 -1.1 -0.5 +0.3
 1.4 2.7 3.8 5.0 4.1 3.5 3.9 5.1 4.6 4.0 3.8
 2.5 1.8 1.1 1.2 1.7 1.3 1.5 1.6 1.7 2.0 2.5

cm W. cut 4' Mark 35' H. Sta. 64+30

+1.8 +0.7 -1.1 -0.4 0.0 -0.3 -0.8 -0.1
 1.0 2.0 1.9 1.8 0.8 1.1 1.6 0.9
 2.5 1.2 9 6 12 16 2.5

H I
 Sta B.S. 1231 24 F.S. Elev.
 66 4.9 26.3

+50 4.2 27.0

67 4.9 26.3

68 5.9 25.3

+12 6.3 24.9

7.0 24.2

9.6 21.6

5.2 26.0

4.7 26.5

69 7.8 23.4

70 9.7 21.5

T.P. 0.62 1221 22 10.4 1220.60

+1.1 +0.3 -1.1 -0.3 0.0 -0.4 -1.5 -1.1
 $\frac{38}{25} \frac{76}{14} \frac{60}{10} \frac{5.2}{7} \frac{4.9}{7} \frac{5.3}{12} \frac{6.7}{15} \frac{6.0}{17-25}$

+0.4 +0.3 -0.6 -1.4 +0.6 0.0 -0.4 -1.8 -1.0 +0.2 +0.1
 $\frac{38}{25} \frac{3.9}{13} \frac{4.8}{10} \frac{5.6}{9} \frac{4.8}{7} \frac{4.2}{7} \frac{4.6}{12} \frac{6.0}{14} \frac{5.2}{18} \frac{4.0}{20} \frac{4.1}{25}$

+0.3 -0.4 -1.0 -0.3 0.0 -0.2 -1.3 -0.7 +0.3 +1.0
 $\frac{4.6}{25-15} \frac{5.3}{11} \frac{5.9}{7} \frac{5.2}{7} \frac{4.9}{7} \frac{5.1}{11} \frac{6.2}{15} \frac{5.6}{16} \frac{4.6}{20} \frac{3.9}{25}$

-0.5 -0.3 +0.4 0.0 +0.2
 $\frac{6.4}{25} \frac{6.2}{17} \frac{5.5}{10} \frac{5.9}{7} \frac{5.7}{9} -2.5$

2 X Road

100' W on " "

200' " " " "

100' E " " " "

200' " " " "

+1.6 +0.8 -0.2 -0.7 -0.3 0.0 -0.1 -0.5 0.0 +0.7 +1.3
 $\frac{6.2}{25} \frac{7.0}{13} \frac{8.0}{11} \frac{8.5}{10} \frac{8.1}{8} \frac{7.8}{7} \frac{7.9}{9} \frac{8.3}{10} \frac{7.8}{18} \frac{7.1}{18} \frac{6.5}{25}$

+0.7 +0.3 -0.3 -1.1 -0.6 0.0 -0.5 -0.8 -0.3 0.0
 $\frac{9.0}{25} \frac{9.1}{20} \frac{10.0}{14} \frac{10.8}{13} \frac{10.3}{10} \frac{9.7}{8} \frac{10.2}{10} \frac{10.5}{10} \frac{10.0}{12} \frac{9.7}{15-25}$

Sta. B.S. H. I. F.S.

71 2.8 18.4

B.M. #1A 2.34 1213.32

72 3.8 17.4

73 4.8 16.4

P.M.

TR 4.17 1217.05

12-13-16
SNGOLD

TR 5.26 1222.31 1217.05

74 5.7 16.5

75 5.3 17.0

76 4.4 17.9

77 3.2 19.1

✓

+0.8 -0.1 -0.6 -0.3 0.0 -0.2 -0.6 0.0 +1.0 +1.9
2.0 3.9 3.4 3.1 2.8 3.0 3.1 2.8 1.8 3.9
25-15 12 11 9 8 10 11 20 25

on W. root N. side 27' Rt. Sta 71+95

-0.4 -0.9 -0.5 0.0 -0.4 -0.8 -0.2 -0.2 +0.4
4.2 4.7 4.3 3.8 4.2 4.6 4.0 4.0 3.4
25-12 11 9 8 7 10 20 25

-0.3 -0.2 -0.3 0.0 -0.3 -0.7 0.0 -0.4
5.1 5.6 5.1 4.8 5.1 5.5 4.8 5.2
25-13 11 9 8 7 11 17 25

on road 26' Rt. Sta 74+07

08

-0.9 -0.7 -0.5 -0.3 0.0 -0.1 -0.3 -0.3 -0.5 -0.2
6.5 6.5 6.3 6.1 5.7 6.4 6.1 6.3 6.0
25 16 12 8 6 8 10 18 26

-0.2 -0.6 -1.0 -0.3 0.0 -0.4 -0.9 -0.8 -0.4 -0.1
5.5 5.9 6.3 5.6 5.3 5.7 6.2 6.1 5.7 5.1
25 11 13 12 5 6 8-13 7 25

+0.4 -1.1 -0.3 0.0 0.0 -0.5 -1.0 -0.6 0.0 +1.4 +1.6
4.0 5.5 4.7 4.4 4.4 4.9 5.4 5.0 4.4 3.0 2.8
25-20 16 11 10 11 6 8 14 17 25

+0.3 -0.8 +0.1 0.0 -0.5 -1.3 -0.3 -0.1 +0.7 +1.0
2.9 4.0 3.1 3.7 4.5 3.5 3.3 2.5 2.2
27 23 20-15 11 5 7 10 11 25

Sta. B.S. H. I. 1222 31 F.S. Elev

77+00E 3.2 19.1

" " 3.0 19.3

" " 3.0 19.3

78 4.5 17.8

T.P. 3.63 1220 49 545 1216.26

79 5.1 15.4

80 11.6 08.9

79+75 8.3 12.2

T.P. 1.90 12 11 66 1073 1209.76

B.M.#3 7.34 1201.32

81 11.00 1200.7

Sta 0+11 on Garrison Road 1196.3

L Diagonal Rd/Lt

100' on "

200' " "

+1.7 +1.5 +0.7 0.0 -0.7 -0.4 -0.1 0.0 -0.3 -0.5 -0.3 +0.5 +1.3 +0.6
28 3.0 3.8 4.5 5.2 4.4 4.6 4.5 4.8 5.0 4.8 4.0 3.2 3.9
25 21 15 15 14 12 9 4 6 7 9 14 20 25

+2.7 +0.1 -0.8 -0.5 0.0 -0.1 -0.7 0.0 +1.1 +2.7
21 5.0 5.9 5.6 5.1 5.1 5.8 5.1 4.0 3.1
25 16 4 7 5 6 8 10 13 20 25

+4.2 +0.6 -1.0 -0.2 0.0 -0.1 -0.8 +0.6 +4.8 +4.6
24 11.0 12.6 11.8 11.6 11.7 12.4 11.0 6.8 7.0
25 14 8 7 5 5 7 10 18 25

sec. same as sta 79.

on N. root 10" W. Cherry 30' Ft. Sta. 81+10

+5.0 +3.0 +1.7 +0.3 -1.0 -0.2 0.0 -0.1 -1.0 +0.5 +3.3 +4.0
4.0 8.0 7.5 10.1 11.0 11.2 11.0 11.1 12.0 10.5 11.1 7.0
20 19 12 9 7 5 6 11 14 20 30

Use End. Sec. from "Christian" survey. Sta 0+0

+0.4 +0.4 -0.7 8.3 +0.2 -0.2 +2.9 +2.9
25 20 7 00 13 16 20 25

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BRIDGES & CULVERTS

Sta 73

Probable Location for 12" Pipe

Sta 73+00

54+98 380 1188.68 1184.87

477 330 1199.39 1184.00

500 1183.69

527 1183.91

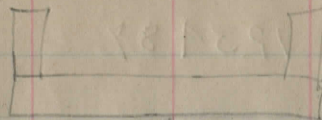
493 1183.75

45+24

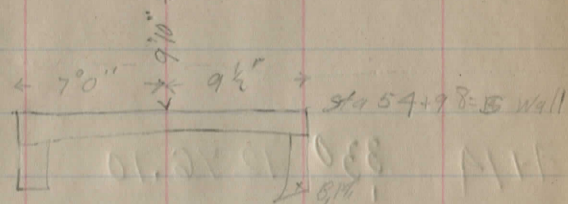
977 1199.39 1198.2

S. Pr. Sent 330 96.1

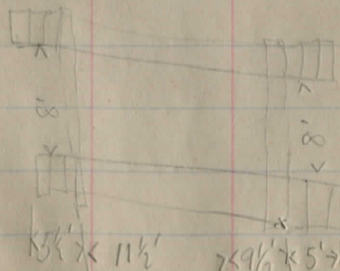
N. " " 360 95.8



Opening = 18' x 9'
Walls = Fair Cond.



1179.1 1179.8 1185.2 1179.8 1180.4
 $\frac{9.6}{30}$ $\frac{8.9}{41}$ $\frac{3.5}{20}$ $\frac{8.9}{105.4}$ $\frac{8.3}{30}$ instream



18' Road way
Parapets 15" C' thick
" 12' long
Masonry good.
TOP good concrete

1187.6 1197.8 1197.3 1197.3 1187.8 1188.2
 $\frac{16}{12}$ $\frac{16}{10}$ $\frac{16}{7}$ $\frac{16}{10}$ $\frac{11.7}{25}$

Sta BS. H. I

35+75

B.M. 077 1234.87

1234.10

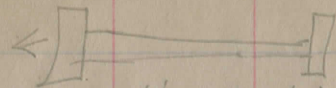
3
114 330 1276.10

1276.80

4.2 1271.9

7.4 1268.7

on pit
1254.35

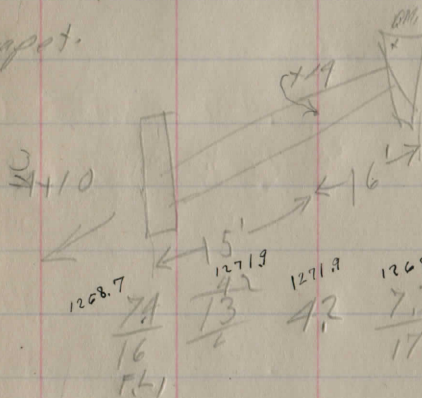


Stone Box 2x3

No floor
Fair cond.

125.6 9.3 25	126.0 8.9 16 FL	129.2 5.7 14	129.2 5.7 3	129.2 5.7 3 FL	126.1 8.8 25	127.2 8.7 25
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one parapet.



Stone 3x2

1268.7 7.1 16 FL	1271.9 7.2 13 FL	1271.9 4.2	1268.8 7.3 17FL
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Hot
sultry

6/18/19

Grass
Thompson
Zettlmayr

Stakes set 11-00 East of R

20

Sta Rods H.I. Stake Grade Elev

BM#13 +10.00 124.32 1204.32

79+50 1.17 1.22 1218.10

80 4.69 4.72 09.60

80+50 9.18 8.22 06.10

+76.99 12.10 10.11 04.21

BM#13 +1.18 1205.50 1204.32

81+10 5.42 3.45 02.05

81+60 7.96 5.99 1199.5

BM#13 +11.56 1215.88 1204.32

T.P. -0.30 1215.58

79 +8.27 1223.85 7.92 7.94 15.91

78+50 5.49 6.50 17.35

78 4.74 5.75 18.10

77+50 4.13 5.15 18.70

77 3.82 4.84 19.01

76+50 3.80 4.83 19.02

76 5.09 5.12 18.73

Grade

Grade

F1.0

F2.0

F2.0

F2.0

Grade

C1.0

C1.0

C1.0

C1.0

C1.0

Grade

Sta Rods H.I. Stake Grade Elev

75+50 1223.85 6.03 5.55 1218.30 F0.5

75 -5.57 6.56 ~~6.04~~ 17.80 F0.5

T.P. +2.67 1221.01 1218.34

74+50 3.97 3.50 17.51 F0.5

74 4.17 3.69 17.32 F0.5

73+50 3.70 3.71 17.30 Grade

73 3.56 3.58 17.43 Grade

72+50 3.30 3.27 17.74 Grade

72 2.79 2.80 18.21 Grade

BM#14 -2.03 +7.04 1225.92 1218.88 1218.78

71+50 7.54 7.08 18.84 F0.5

71 6.78 6.28 19.64 F0.5

70+50 5.90 5.40 20.52 F0.5

70 4.52 4.52 21.40 Grade

69+50 3.59 3.64 22.28 Grade

69 1.72 2.76 23.16 C1.0

68+50 0.86 1.88 24.04 C1.0

68 1.00 24.92

67+50

Rough Grades 4/28/19 Grav
Thompson
Zet Mayr

cool - windy

Sta Rods H.I. Stake. Gravel Elev.

B.M.#14 +5.36 / 224.24 1218.88

T.P. +7.44 1231.40 1223.96

68 5.49 6.48 1224.92 5.10

67+50 4.60 5.60 25.80 0.10

67 4.69 4.72 26.68 Grade

66+50 4.27 4.30 27.10

66 4.86 4.80 26.60

~~65+50 5.76 25.64~~

65 6.66 6.72 24.68

64 8.62 8.64 22.76

T.P. -9.90 0.30 1221.80 1221.50

63 9.9 0.96 20.84 Grade 2' offset

62 2.85 2.88 18.92

61 4.30 5.31 16.49 C 1.0 2' offset

60 9.78 10.80 1211.00 C 1.0 $\frac{4.0}{25.0}$

T.P. -11.63 +6.01 1216.18 1216.17

59 11.16 11.18 1205.00 Grade $\frac{3.2}{26.0}$

T.P. -8.19 +0.52 1208.51 1207.99

B.M.#16 -7.14 1201.37

$\frac{7.8}{21.0}$

$\frac{8.6}{26.5}$

58 1208.51 10,49 9,51 1199.00

T.P. -12.96
+(-6.02) 1195.53 1195.55

57 3.50 2.53 93.00

56 7.88 7.90 87.63

55 9.22 9.15 86.38

54 7.15 7.18 88.35

T.P. -0.71
+11.18 1206.00 1194.82

53 11.18 13.20 92.80

52 6.40 8.40 97.60

51 1.83 4.35 1201.65

50 4.79 4.80 1201.20

T.P. -5.94
+5.01 1205.07 1200.06

49 5.12 5.07 1200.00

48 5.77 6.27 98.80

47 6.45 7.47 97.60

B.M.#7 -2.28
+5.53 1208.33 1262.80
1202.79

46 11.40 11.41 96.92

45 8.47 8.57 99.82

44 2.40 2.43 05.90

T.P. -0.18
+12.95 1221.10 1208.151

F1.0 4.4
23.0

F1.0

Grade

C 2.0 11.2
20.0

C 2.0 6.0
20.5

C 2.5 0.80
21.5

Grade

C 0.5 4.0
20.5
19.5

C 1.0

Grade

7.2
24.0
2.0
24.5
0.35
22.0
2.8
20.0

2.8 ✓
21.5 10.5
3.5 ✓
22.0 21.0

43 -0.05 1221.10 7.70 8.70 1212.40
 T.P. +11.85 1232.90 1221.05

42 1242 14 x 45 18.45

~~41~~

41 -2.49 7.30 9.30 23.60
 T.P. +8.53 1238.94 1230.41

40 9.62 10.64 28.30

39 4.53 7.54 31.40
 T.P. -3.79 - 1235.15

6/30/19 fair worm
 Grad Thompson
 Zampaya

38 +2.66 1237.81 6.57 6.57 31.36

37 8.30 8.21 29.60

36 8.42 8.42 29.39

35 #18 -3.69 5.65 5.66 32.15
 B 11# +12.18 1246.31 1234.13
 1234.12

34 9.94 9.91 36.40

33 5.64 5.66 40.65

32 -0.78 1.69 1.72 44.59
 T.P. +11.01 1256.54 1245.53

30 59.90

21.0 $\frac{1.7}{25.5}$ ✓ $\frac{0.2}{25.5}$ ✓
~~24.5~~

22.0 $\frac{6.9}{25.5}$ ✓ $\frac{6.4}{25.0}$ ✓
~~24.5~~

2.0 $\frac{3.3}{23.0}$ ✓ $\frac{3.8}{22.5}$ ✓
~~21.0~~

1.0 $\frac{5.1}{22.5}$ ✓ $\frac{4.9}{23.0}$ ✓
 3.0 $\frac{4.0}{20.5}$ ✓ $\frac{4.5}{21.0}$ ✓
 20.5

SE cor. plot stone in front of Hinderton house str. 38410

Grady $\frac{2.7}{21.5}$ $\frac{4.0}{19.5}$

$\frac{8.9}{19.5}$ $\frac{5.1}{22.0}$ 1:1 slope

31 1256.54 8.62 8.64 1247.90

30 5.64 5.64 50.90

29 2.63 2.64 53.90

T.P. -0.37
+10.57 1266.74 1256.17

28 9.83 9.84 56.90

27 6.83 6.84 59.90

26 3.83 3.83 62.91

25 0.78 0.79 65.95

B.M. #19 -6.99
1266.75 ^{1259.76}
~~1259.76~~

T.P. -1.27
+11.28 1276.76 ~~1265.48~~

24 7.80 7.76 69.00

23 4.72 4.71 72.05

22 1.65 1.66 75.10

T.P. -0.30
+10.90 1287.36 1276.46

21 9.22 9.21 78.15

20 6.14 6.16 81.20

19 2.25 3.25 84.11

18 1.30 1.32 86.04

B.M. #20 -2.91
1284.46
~~1284.45~~

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

Grade

7/1/19

Grav
Thompson
Luthmayer

fair-hot
Sta Rods

H.T. Stake Grady Elev

BM#20 -6.46 1290.92 1284.46

17 4.03 4.06 1286.86

16 4.23 4.22 86.70

15 4.50 4.52 86.40

T.P. -5.29
+3.78 1289.41 1285.63

14 3.48 3.47 85.94

13 4.23 4.26 85.15

12 5.36 5.37 84.04

11 6.78 6.81 82.60

10 8.41 8.41 81.00

-5.62
BM#21 +0.68 1284.47 1283.79

9 5.06 5.07 79.40

8 6.64 6.67 77.80

7 8.25 8.27 76.20

6 9.87 9.87 74.60

5 11.46 11.47 73.00

-11.46
T.P. +3.08 1276.09 1273.01

Grady Elev

Grady

Grady

Grady

"

"

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"

"

4	127609	4.24	4.24	727.85	Grade
3		4.49	4.49	71.60	"
2		4.28	4.29	71.80	"
1		4.06	4.09	72.00	"
0		3.16	3.19	72.90	± Burton ± Pavement
BM#22	-1.55			1274.48 1274.57	

Hanna
Drake
Thompson

9-3-19

B.M. 3.88 1208.20

1700 claridon

82 + 41¹ - 20 + 62² P.T.

+25

82

+75

+50 -

+25 ✓

81 ✓

+76²⁰ PC, ✓

+50 ✓

T.P. 11.59 1217 60

80 ✓

+50 ✓

79 ✓

T.P. 7.13 1223 56

+50 ✓

78 ✓

+50 ✓

77 ✓

1204.32

11.30
11.20 97.00

- 11.06
10.96 97.24

- 10.77
10.67 97.53

- 10.18
10.08 98.12

- 9.37
9.27 98.93

- 8.34
8.24 99.96

- 7.10
7.00 01.20

- 5.20
5.13 02.67

- 4.09
3.99 04.21

- 2.20
2.10 06.10

2.19 1206.01

- 8.10
8.00 08.60

- 4.60
4.50 13.10

- 1.79
1.69 15.91

1.17 1216.43

- 6.31
6.21 12.35

- 5.56
5.46 18.10

- 4.26
4.16 18.70

- 4.65
4.55 19.01

+50 ✓

76 -

+50 -

75 ✓ ^{os low}

+50 ^{os low}

74 -

+50 -

T.P. 8.52 1225 69

73 -

+50 ✓

72 ✓

B.M.

+50 -

71 -

+50 ^{os low} ✓

70 -

+50 -

69 ✓

+50 -

68 ✓

1223 56

- 4.64
4.54 19.02

- 4.93
4.83 18.73

- 5.36
5.26 18.30

- 5.70
5.70 17.86

- 6.15
6.05 17.51

- 6.34
6.24 17.32

- 6.36
6.26 17.30

6.39 1217.17

- 8.36
8.26 17.43

- 8.05
7.95 17.74

- 7.58
7.48 18.21

6.80 1218.89

- 6.95
6.85 18.84

- 6.15
6.05 19.64

- 5.27
5.17 20.52

- 4.09
4.29 21.40

- 3.51
3.41 22.28

- 2.63
2.53 23.16

- 1.75
1.65 24.04

- 0.57
0.77 24.92

28

1225 69

T.P. 1.97 1230 18 0.48 1225.21

+50 ✓ $\begin{array}{r} \checkmark 4.48 \\ 4.38 \end{array}$ 25.80

67 ✓ $\begin{array}{r} \checkmark 3.60 \\ 3.50 \end{array}$ 26.68

B.M. ✓ $\begin{array}{r} 24.00 \\ 6.05 \end{array}$ 24.13

+50 ✓ $\begin{array}{r} \checkmark 3.18 \\ 3.08 \end{array}$ 27.10

66 ✓ $\begin{array}{r} \checkmark 3.68 \\ 3.58 \end{array}$ 26.60

+50 ✓ $\begin{array}{r} \checkmark 4.64 \\ 4.54 \end{array}$ 25.64

65 ✓ $\begin{array}{r} \checkmark 5.60 \\ 5.50 \end{array}$ 24.68

+50 ✓ $\begin{array}{r} \checkmark 6.56 \\ 6.46 \end{array}$ 23.72

64 ✓ $\begin{array}{r} \checkmark 7.52 \\ 7.42 \end{array}$ 22.76

+50 ✓ $\begin{array}{r} \checkmark 8.48 \\ 8.38 \end{array}$ 21.80

63 ✓ 20.84

62+50 ✓ 19.88

HOPKINSON - L. THOMPSON R. 6/4/20

10.02
1.828
2.14
3.4 = 27.50

B.M.#15 1.72 1226.02 1224.10

62 ✓ $\begin{array}{r} \checkmark 7.10 \\ 7.20 \end{array}$ 18.92

+50 ✓ $\begin{array}{r} \checkmark 8.06 \\ 8.16 \end{array}$ 17.96

61 ✓ $\begin{array}{r} \checkmark 9.53 \\ 9.63 \end{array}$ 16.49

T.P. 1.42 1216.93 10.51 1215.51

+50 ✓ $\begin{array}{r} \checkmark 2.93 \\ 3.03 \end{array}$ 14.00

60 ✓ $\begin{array}{r} \checkmark 5.93 \\ 6.03 \end{array}$ 11.00

+50 ✓ $\begin{array}{r} \checkmark 8.93 \\ 9.03 \end{array}$ 08.00

59 ✓ $\begin{array}{r} \checkmark 11.93 \\ 12.03 \end{array}$ 05.00

T.P. 1.43 1206.33 12.03 1204.90

+50 ✓ $\begin{array}{r} \checkmark 4.37 \\ 4.43 \end{array}$ 02.00

58 ✓ $\begin{array}{r} 7.33 \\ \checkmark 7.43 \end{array}$ 1199.00

+50 ✓ $\begin{array}{r} \checkmark 10.33 \\ 10.43 \end{array}$ 119.6.00

T.P. 1.02 1195.34 12.01 1194.32

57 ✓ $\begin{array}{r} \checkmark 2.34 \\ 2.44 \end{array}$ 93.00

+50 ✓ $\begin{array}{r} \checkmark 5.34 \\ 5.44 \end{array}$ 90.00

56 ✓ $\begin{array}{r} \checkmark 7.71 \\ 7.81 \end{array}$ 87.63

+50 ✓ $\begin{array}{r} \checkmark 8.84 \\ 8.94 \end{array}$ 86.50

55 ✓ $\begin{array}{r} \checkmark 8.96 \\ 9.06 \end{array}$ 86.38

+50 ✓ $\begin{array}{r} \checkmark 8.34 \\ 8.44 \end{array}$ 87.00

1195 34

88

54 $\checkmark \frac{6.99}{7.09}$ 88.35
 +50 $\checkmark \frac{4.94}{5.04}$ 90.40
 53 $\checkmark \frac{2.54}{2.64}$ 92.80
 T.P. 10.87 1205.27 0.94 1194.40
 +50 $\checkmark \frac{10.07}{10.17}$ 95.20
 52 $\checkmark \frac{7.67}{7.77}$ 97.60
 +50 $\checkmark \frac{5.77}{5.87}$ 1200.00
 51 $\checkmark \frac{3.42}{3.72}$ 01.65
 +50 $\checkmark \frac{3.47}{3.67}$ 01.80
 50 $\checkmark \frac{4.07}{4.17}$ 01.20
 B.M. #17 $\frac{2.50 \text{ ck.}}{2.47}$ 02.80
 +50 $\checkmark \frac{4.67}{4.77}$ 00.60
 49 $\checkmark \frac{5.27}{5.37}$ 00.00
 +50 $\checkmark \frac{5.97}{5.77}$ 99.40
 48 $\checkmark \frac{6.47}{6.57}$ 98.80
 +50 $\checkmark \frac{7.07}{7.17}$ 98.20

B.M. 535 1208.15

1202.80

$\checkmark \frac{9.95}{10.05}$ 98.20
 47 $\checkmark \frac{10.55}{10.65}$ 97.60
 +50 $\checkmark \frac{11.15}{11.25}$ 97.00
 46 $\checkmark \frac{11.23}{11.33}$ 96.92
 +50 $\checkmark \frac{10.25}{10.35}$ 97.90
 45 $\checkmark \frac{8.33}{8.43}$ 99.82
 +50 $\checkmark \frac{5.50}{5.60}$ 1202.65
 44 $\checkmark \frac{2.35}{2.35}$ 05.90
 T.P. 10.40 1218.24 0.29 1207.86
 +50 $\checkmark \frac{9.11}{9.21}$ 09.15
 43 $\checkmark \frac{5.86}{5.96}$ 12.40
 +50 $\checkmark \frac{2.72}{2.82}$ 15.54
 T.P. 1273 1230.50 0.49 1217.77
 42 $\checkmark \frac{12.05}{12.15}$ 18.45
 +50 $\checkmark \frac{9.36}{9.46}$ 21.14
 41 $\checkmark \frac{8.90}{9.00}$ 23.60
 +50 $\checkmark \frac{4.55}{4.65}$ 25.95
 40 $\checkmark \frac{2.20}{2.30}$ 28.30
 T.P. 9.83 1238 02 2.31 1228.19

1238,02

+50 $\checkmark \frac{7,77}{2,87}$ 30,25

39 $\checkmark \frac{6,52}{4,72}$ 31,40

+50 ? $\frac{6,27}{6,37}$ 71,75

B.M. 3,85 1237,98 $\frac{6,23}{6,33}$ 1234,13

37+50 $\frac{6,23}{6,33}$ 71,75

B.M. 1,12 1260 88 1259,76

27 $\checkmark \frac{2,58}{2,48}$ 58,40

+50 $\checkmark \frac{3,98}{4,08}$ 56,90

28 $\checkmark \frac{5,48}{5,58}$ 55,40

+50 $\checkmark \frac{6,98}{7,08}$ 53,90

29 $\checkmark \frac{8,48}{8,58}$ 52,40

+50 $\checkmark \frac{9,98}{10,08}$ 50,90

30 $\checkmark \frac{11,48}{11,58}$ 49,40

+50 T.P. 1,44 1250 74 11,58 1249,30

31 $\checkmark \frac{2,84}{2,94}$ 47,90

+50 $\checkmark \frac{4,42}{4,52}$ 46,32

32 $\checkmark \frac{6,15}{6,25}$ 44,59

+50 $\checkmark \frac{8,04}{8,14}$ 42,70

33 $\checkmark \frac{10,09}{10,19}$ 40,65

T.P. 1,12 1241 67 10,17 1240,55

$\frac{33}{750}$ $\checkmark \frac{3,14}{3,24}$ 38,53

34 $\checkmark \frac{5,37}{5,37}$ 36,40

+50 $\checkmark \frac{7,39}{7,49}$ 34,28

35 $\checkmark \frac{9,52}{9,62}$ 32,15

B.M. 7,56 1234,14

+50 $\checkmark \frac{11,27}{11,37}$ 30,40

36 $\checkmark \frac{12,28}{12,38}$ 29,37

~~750~~ 4,87 1234 78 11,78 1229,89

+50 $\checkmark \frac{3,66}{3,76}$ 29,12

37 $\checkmark \frac{5,18}{5,28}$ 29,60

+50 $\checkmark \frac{4,33}{4,43}$ 30,45

38 $\checkmark \frac{3,48}{3,58}$ 31,30

+50 $\checkmark \frac{3,03}{3,13}$ 31,75

B.M. 8,77 1268,53 1259,76

27 $\checkmark \frac{8,93}{8,73}$ 59,90

26+50 $\checkmark \frac{7,13}{7,23}$ 61,40

24 $\checkmark \frac{5,62}{5,72}$ 62,91

25+50 $\checkmark \frac{4,10}{4,20}$ 64,43

25 $\checkmark \frac{2,58}{2,68}$ 65,95

+50 $\checkmark \frac{2,05}{2,15}$ 67,47

low

B.M. 10.15 1269 91 1259.76

25 ✓ $\frac{3.96}{7.06}$ 65.95

+50 ✓ $\frac{2.43}{2.53}$ 67.48

24 ✓ $\frac{0.91}{1.01}$ 69.00

T.P. 10.37 1279 27 1.01 1168.90

+50 ✓ $\frac{8.74}{8.84}$ 70.53

23 ✓ $\frac{7.22}{7.32}$ 72.05

+50 ✓ $\frac{5.69}{5.79}$ 73.58

22 ✓ $\frac{4.17}{4.27}$ 75.10

+50 ✓ $\frac{2.64}{2.74}$ 76.63

21 ✓ $\frac{1.12}{1.22}$ 78.15

T.P. 10.91 1289 24 0.94 1278.33

+50 ✓ $\frac{9.56}{9.66}$ 79.68

20 ✓ $\frac{8.94}{8.14}$ 81.20

+50 ✓ $\frac{6.51}{6.61}$ 82.73

B.M. 1284.46
1284.47

19 ✓ $\frac{5.13}{5.23}$ 84.11

+50 ✓ $\frac{4.92}{4.12}$ 85.22

18 ✓ $\frac{3.20}{3.30}$ 86.04

+50 ✓ $\frac{2.45}{2.75}$ 86.59

1289 24 ✓ $\frac{2.38}{2.48}$ 86.86

T.P. 3.88 1290 64 2.48 1286.76

+50 ✓ $\frac{3.79}{3.89}$ 86.83

16 ✓ $\frac{3.94}{4.04}$ 86.70

+50 ✓ $\frac{4.99}{4.19}$ 86.55

15 ✓ $\frac{4.24}{4.34}$ 86.40

+50 ✓ $\frac{4.43}{4.53}$ 86.21

14 ✓ $\frac{4.70}{4.80}$ 85.94

+50 ✓ $\frac{5.13}{5.23}$ 85.51

13 ✓ $\frac{5.19}{5.59}$ 85.15

+50 ✓ $\frac{6.90}{6.10}$ 84.64

B.M. 1283.76
1283.75

103
low

104
low

~~5/8~~ BS H I F.S.
B.M. 2.90 1286.65 1283.75

12 ✓ $\frac{2.91}{2.71}$ 84.04

+50 ✓ $\frac{3.29}{3.39}$ 83.36

11 ✓ $\frac{4.95}{4.15}$ 82.60

+50 ✓ $\frac{1.75}{4.95}$ 81.80

10 - $\frac{5.95}{5.75}$ 81.00

+50 ✓ $\frac{6.45}{5.55}$ 80.20

9 ✓ $\frac{7.25}{7.35}$ 79.40

+50 - $\frac{8.05}{8.15}$ 78.60

TP 131 1279 81 8.15 1278.50

8 ✓ $\frac{2.01}{2.11}$ 77.80

+50 ✓ $\frac{2.81}{2.91}$ 77.00

7 ✓ $\frac{3.91}{3.71}$ 76.20

+50 ✓ $\frac{4.41}{4.51}$ 75.40

6 ✓ $\frac{5.20}{5.31}$ 74.60

+50 ✓ $\frac{6.01}{6.11}$ 73.80

TP 2.26 1275.95 6.12 73.69

5 ✓ $\frac{2.95}{3.05}$ 73.00

+50 ✓ $\frac{3.64}{3.74}$ 72.31

4

+50

3

+50

2

+50

1

0+50

B.M.

- $\frac{4.10}{4.20}$ 71.85

✓ $\frac{4.34}{4.44}$ 71.61

- $\frac{4.35}{4.45}$ 71.60

- $\frac{4.35}{4.35}$ 71.70

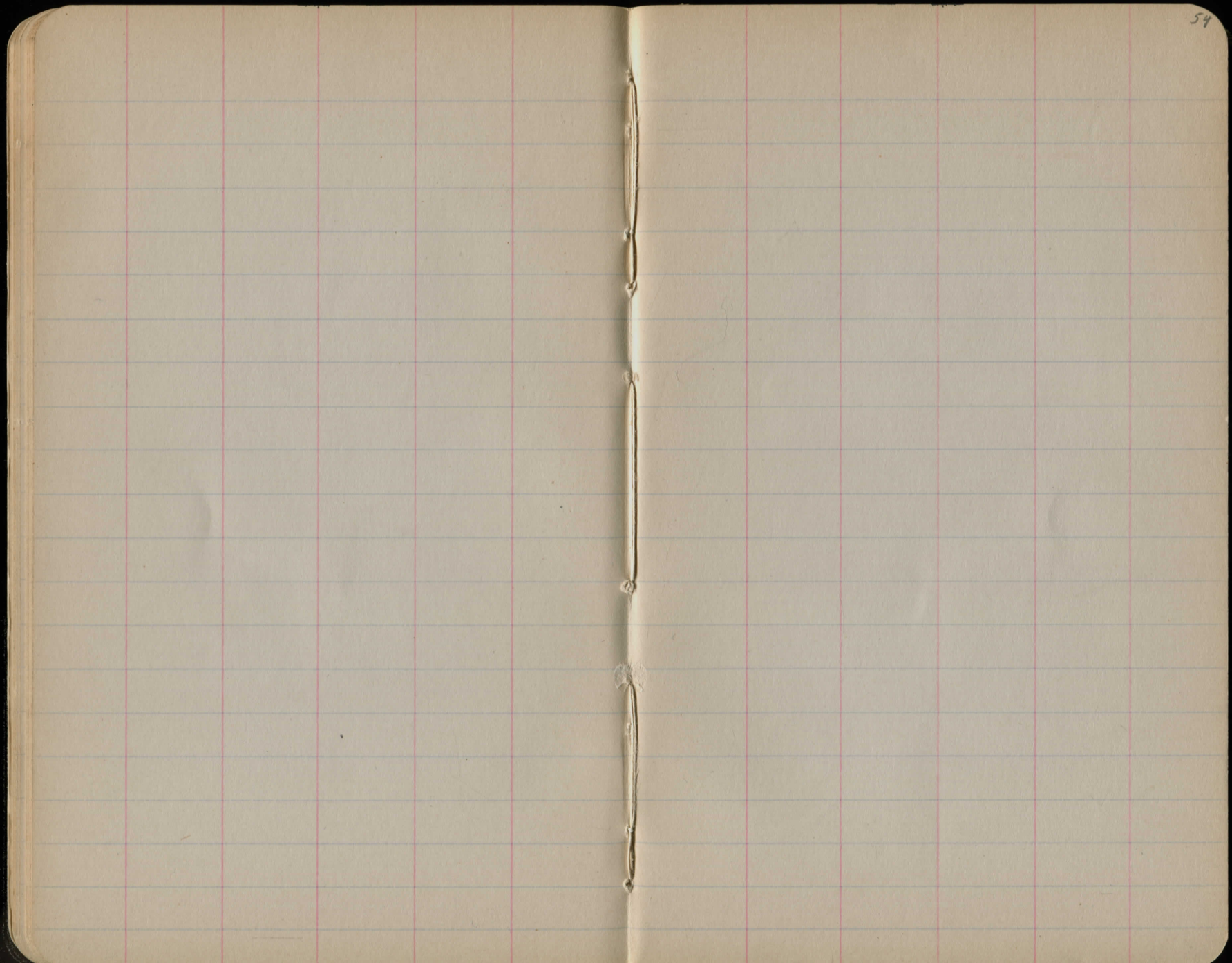
- $\frac{4.15}{4.25}$ 71.80

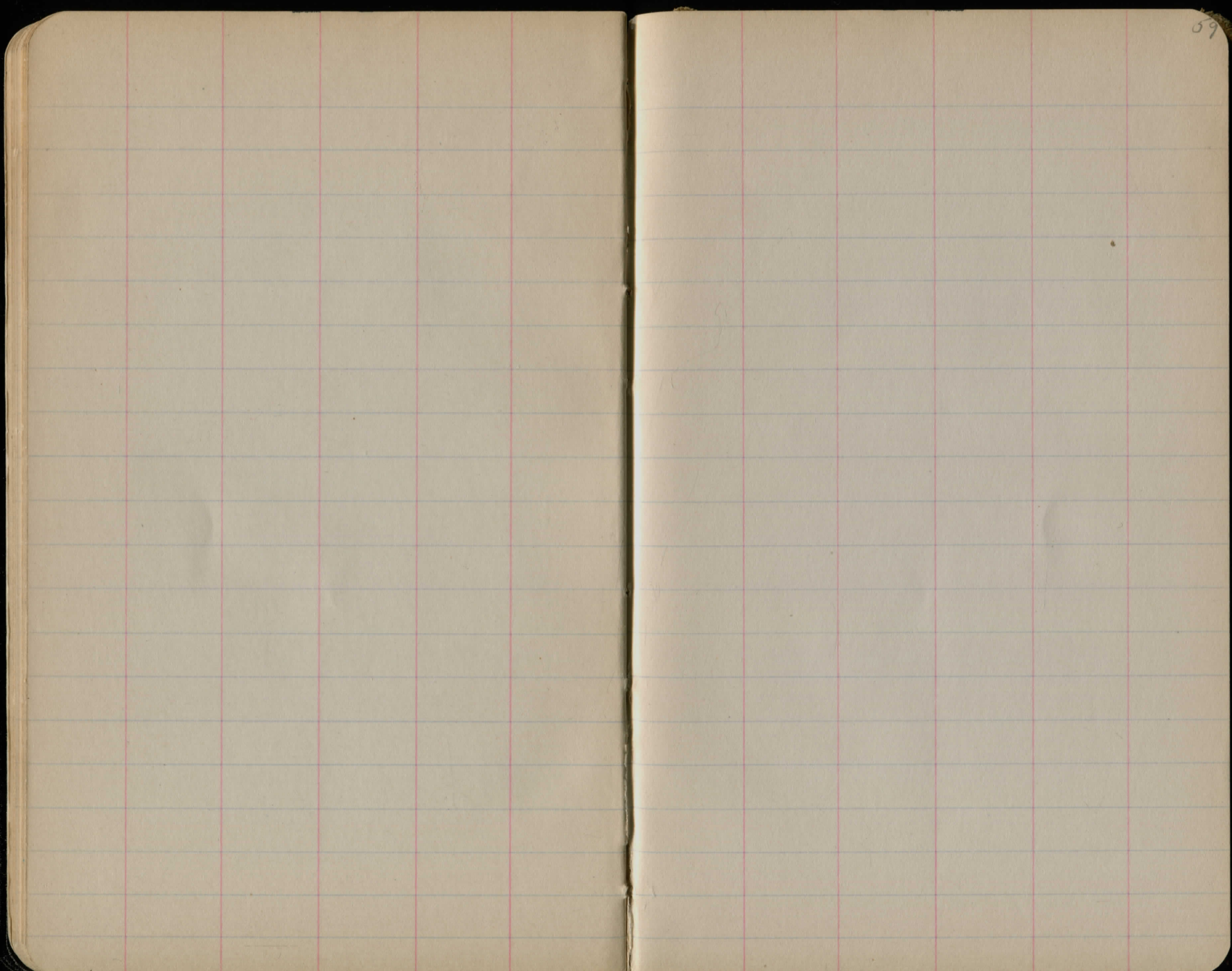
- $\frac{4.95}{4.15}$ 71.90

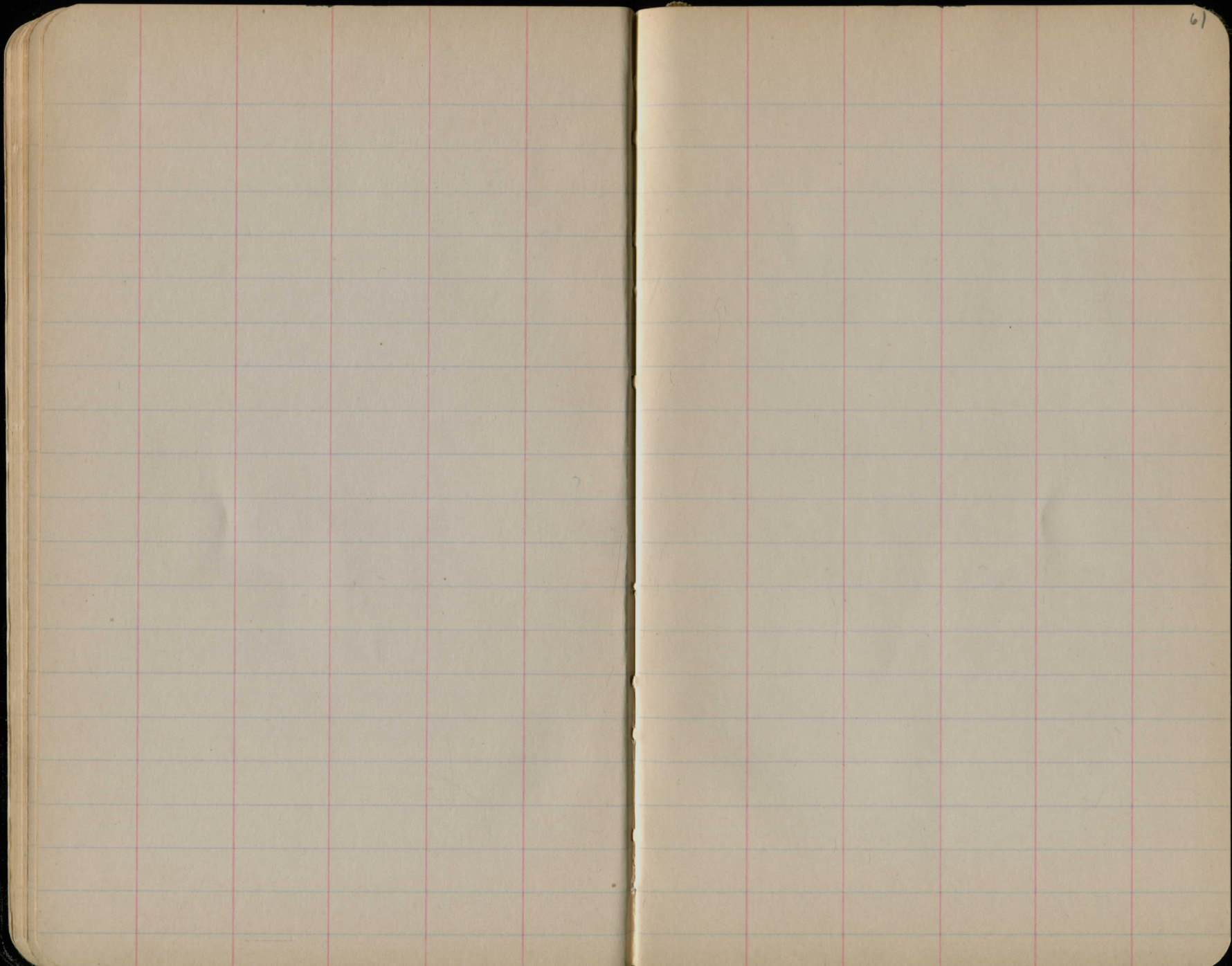
- $\frac{3.95}{4.05}$ 72.00

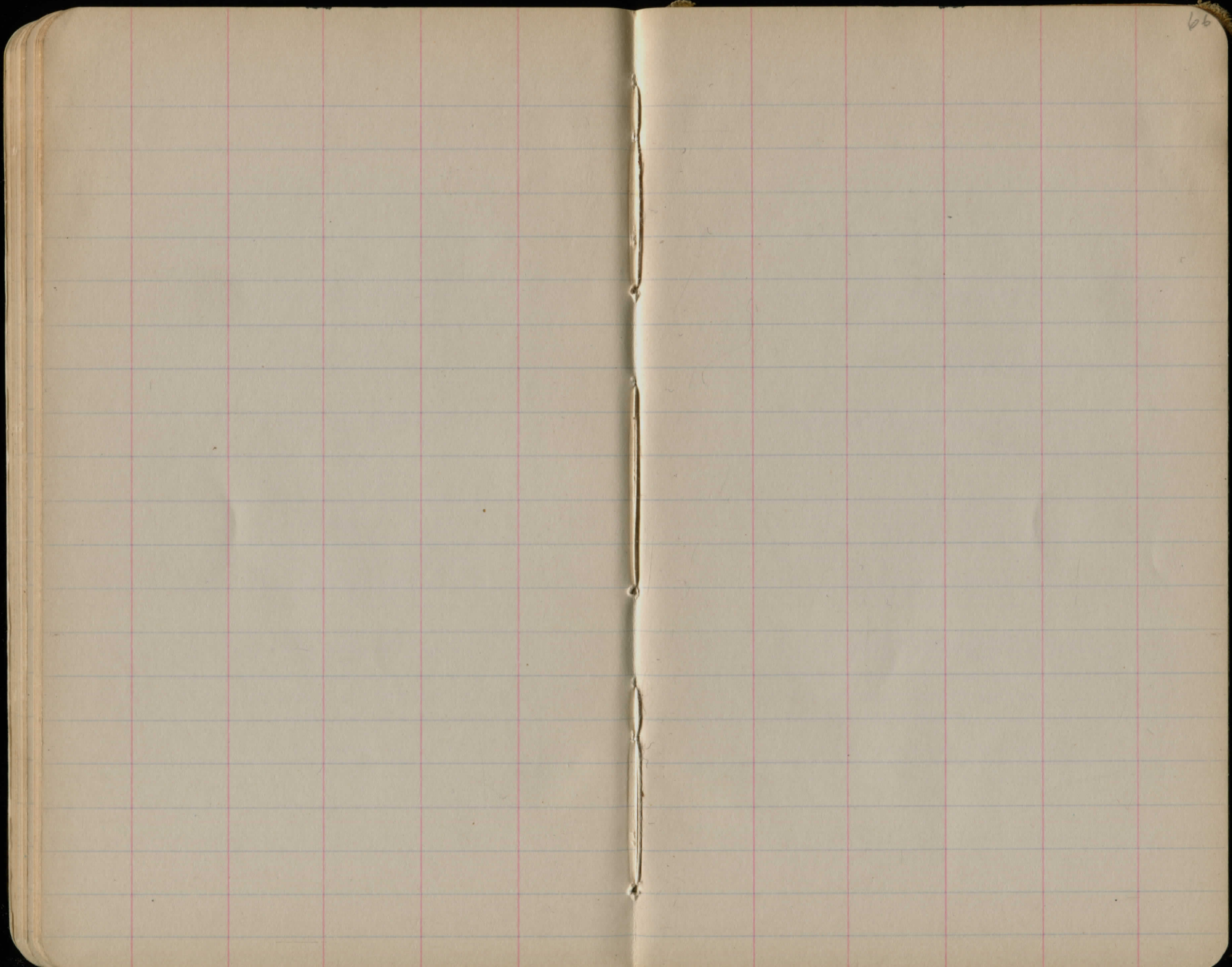
✓ $\frac{3.97}{3.77}$ 72.28

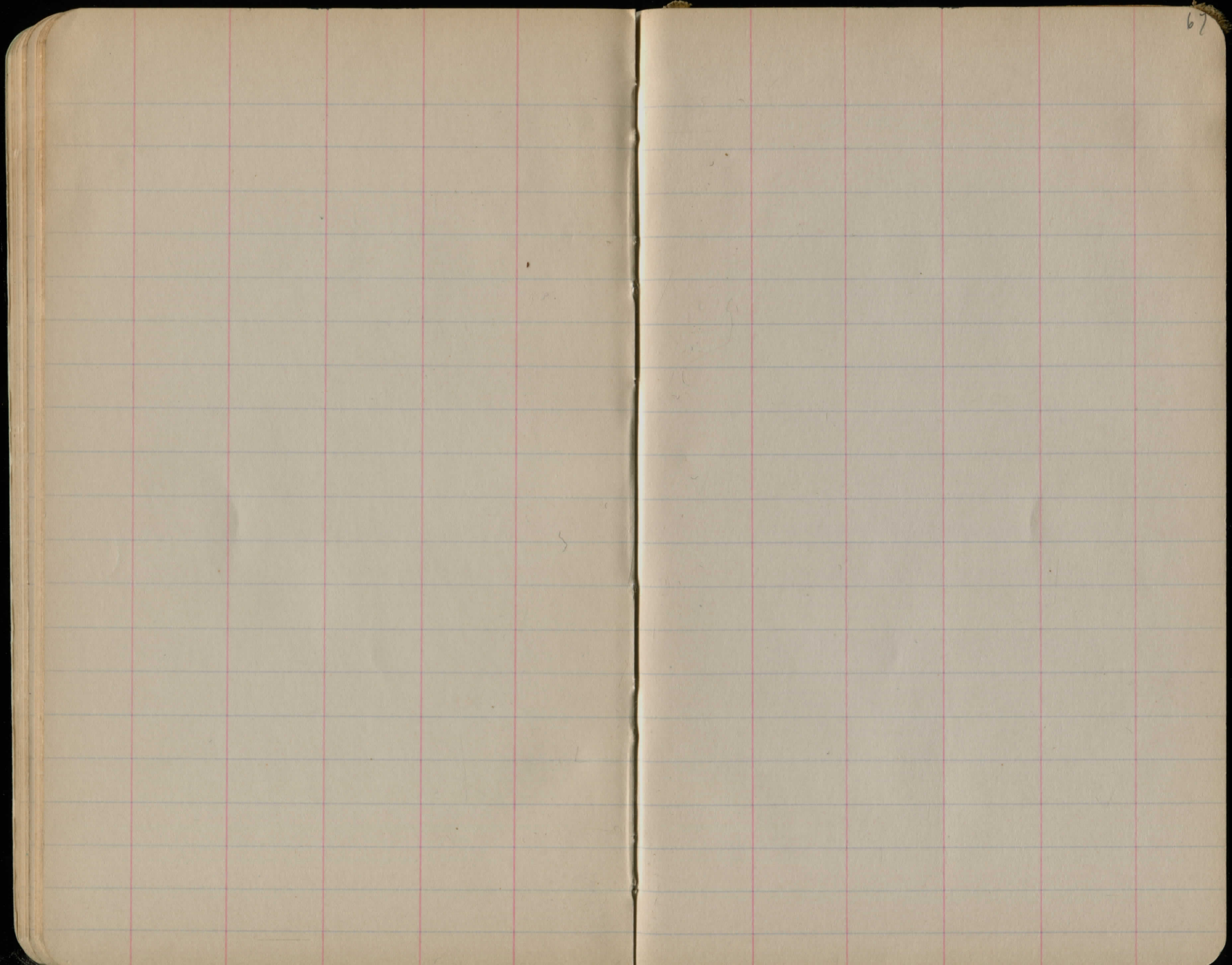
1.49 1274.96

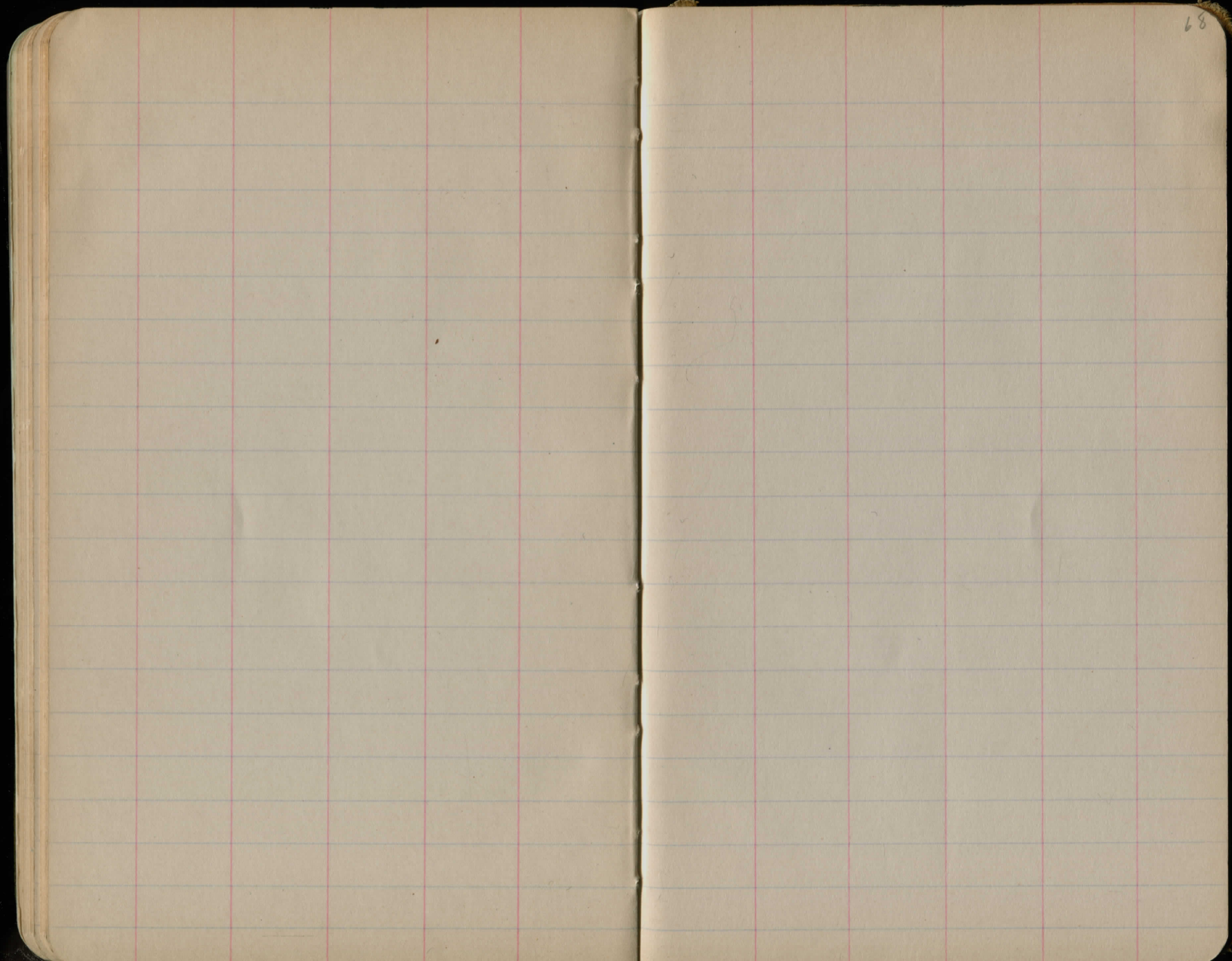












DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder
stake for any width roadway, slope 1 1/2 to 1.
If ground is nearly level, the cut or fill at side
stake is located by the double entry method in
left column and top row. The number in both

IMPROVED TABLES

AND

INFORMATION

TABLE No. 2.

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

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

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

TABLE II—Continued
TRIGONOMETRIC FORMULAE (continued)

In any triangle:

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

Use Law of Lines.

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

Use Law of Lines.

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

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

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

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

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

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

Area of a triangle:

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

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

PRISMOIDAL FORMULA.

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

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

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

	0	1	2	3	4	5	6	7	8	9	10	11	
$\frac{1}{16}$	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219	$\frac{1}{8}$
$\frac{1}{8}$	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271	$\frac{3}{16}$
$\frac{3}{16}$	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323	$\frac{1}{4}$
$\frac{1}{4}$	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375	$\frac{5}{16}$
$\frac{5}{16}$	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427	$\frac{3}{8}$
$\frac{3}{8}$	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479	$\frac{7}{16}$
$\frac{7}{16}$	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531	$\frac{1}{2}$
$\frac{1}{2}$	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583	$\frac{9}{16}$
$\frac{9}{16}$	.0469	.1302	.2135	.2969	.3803	.4635	.5469	.6302	.7135	.7969	.8802	.9635	$\frac{5}{8}$
$\frac{5}{8}$	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688	$\frac{11}{16}$
$\frac{11}{16}$	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740	$\frac{3}{4}$
$\frac{3}{4}$	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792	$\frac{7}{8}$
$\frac{7}{8}$	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844	$\frac{15}{16}$
$\frac{15}{16}$	.0729	.1563	.2396	.3229	.4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896	1
1	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948	
	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	1.0000	
	0	1	2	3	4	5	6	7	8	9	10	11	

TABLE IV
USEFUL RELATIONS.

Lineal feet	×.00019	= miles
Lineal yards	×.0006	= miles
Square inches	×.007	= square feet
Square feet	×.111	= square yards
Square yards	×.0002067	= acres
Acres	×4840	= square yards
Cubic inches	×.00058	= cubic feet
Cubic feet	×.03704	= cubic yards
Links	×.22	= yards
Links	×.66	= feet
Feet	×1.5	= links

$$360^\circ = 21600' = 1296000''$$

$$\text{Radius} = \text{arc of } 57.2957790''$$

$$\text{Arc of } 1^\circ (\text{radius} = 1) = .017453292$$

$$\text{Arc of } 1' (\text{radius} = 1) = .000290888$$

$$\text{Arc of } 1'' (\text{radius} = 1) = .000004848$$

$$\pi = 3.141592654 \quad \sqrt{\frac{1}{4}} = 0.564190$$

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

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

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

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

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

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

Curvature in feet = $0.667 (\text{Dist. in miles})^2$

Difference between arc and chord length, 0.05 feet in $11\frac{1}{2}$ miles

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

Error in chaining of 0.01 feet in 100 feet:

Due to—

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

STADIA REDUCTION FORMULÆ.

Horizontal Distance = $R - R \sin^2 a + C \cos a$

Vertical Distance = $R \frac{1}{2} \sin 2a + C \sin a$

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

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

a = angle of elevation for mid Reading

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

deg	sin	tan	sin	tan	sin	tan	sin	tan	sin	tan	sin	tan	sin	tan	deg
0'	0'	10'	10'	20'	20'	30'	30'	40'	40'	50'	50'	60'	60'	0'	0'
46	7193	1.0855	7214	1.0416	7234	1.0477	7254	1.0533	7274	1.0599	7294	1.0661	43		
47	314	.0724	333	.0786	353	.0850	373	.0913	392	.0977	412	.1041	42		
48	434	.1106	451	.1171	470	.1237	490	.1303	509	.1369	528	.1436	41		
49	547	.1504	566	.1571	585	.1640	604	.1708	623	.1778	642	.1847	40		
										1.2203					
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	.2647	7753	1.2276	39		
51	771	.2349	790	.2423	808	.2497	826	.2572	844	.3111	862	.2723	38		
52	880	.2799	898	.2876	916	.2954	934	.3032	951	.3597	969	.3190	37		
53	986	.3270	8004	.3351	8021	.3452	8039	.3514	8056	.4106	8073	.3680	36		
54	8090	.3764	107	.3848	124	.3934	141	.4019	158	.4641	175	.4193	35		
55	192	.4281	208	.4370	225	.4460	241	.4550	258	.5204	274	.4733	34		
56	290	.4826	307	.4919	323	.5013	339	.5108	355	.5798	371	.5301	33		
57	387	.5399	403	.5497	418	.5597	434	.5697	450	.6426	465	.5900	32		
58	480	.6003	496	.6107	511	.6212	526	.6319	542	.7090	557	.6534	31		
59	572	.6643	587	.6753	601	.6864	616	.6977	631		646	.7205	30		
60	660	1.7321	8675	1.7437	8689	1.7556	8704	1.7675	8718	1.7797	8732	1.7917	29		
61	746	.8040	760	.8165	774	.8291	788	.8418	802	.8546	816	.8676	28		
62	829	.8807	843	.8940	857	.9074	870	.9210	884	.9347	897	.9486	27		
63	910	.9626	923	.9768	936	.9912	949	2.0057	962	2.0204	975	2.0353	26		
64	988	2.0503	9001	2.0655	9013	2.0809	9026	.0965	9038	.1123	9051	1.283	25		
65	9063	1.445	075	1.609	088	1.775	100	.1943	112	.2113	124	.2286	24		
66	135	.2460	147	.2637	159	.2817	171	.2998	182	.3183	194	.3369	23		
67	205	.3559	216	.3750	228	.3945	239	.4142	250	.4342	261	.4545	22		
68	272	.4751	283	.4960	293	.5172	304	.5386	315	.5605	325	.5826	21		
69	336	.6051	346	.6279	356	.6511	367	.6746	377	.6985	387	.7228	20		
70	397	2.7475	9407	2.7725	9417	2.7980	9426	2.8239	9436	2.8502	9446	2.8770	19		
71	455	.9042	465	.9319	474	.9600	483	.9887	492	3.0178	502	3.0475	18		
72	511	3.0777	520	3.1084	528	3.1397	537	3.1716	546	.2041	555	.2371	17		
73	563	.2709	572	.3052	580	.3402	588	.3759	596	.4124	605	.4495	16		
74	613	.4874	621	.5261	628	.5656	636	.6059	644	.6470	652	.6891	15		
75	659	.7321	667	.7760	674	.8208	681	.8657	689	.9136	696	.9617	14		
76	703	4.0108	710	4.0611	717	4.1126	724	4.1653	730	4.2193	737	4.2747	13		
77	744	.3315	750	.3897	757	.4494	763	.5107	769	.5736	775	.6382	12		
78	781	.7046	787	.7729	793	.8430	799	.9152	805	.9894	811	5.0658	11		
79	816	1.4446	822	5.2257	827	5.3093	833	5.3955	838	5.4845	843	5.764	10		
80	9848	5.6713	9853	5.7694	9858	5.8708	9863	5.9758	9868	6.0844	9872	6.1970	9		
81	877	6.3138	881	6.4348	886	6.5606	890	6.6912	894	.8269	899	.9682	8		
82	903	7.1154	907	7.2687	911	7.4287	914	7.5958	918	7.7704	922	7.9530	7		
83	925	8.1443	929	8.3450	932	8.5555	936	8.7769	939	9.0098	942	9.2553	6		
84	945	9.5144	948	9.7882	951	10.078	954	10.385	957	10.711	959	11.059	5		
85	962	11.430	964	11.826	967	12.250	969	12.706	971	13.197	974	13.727	4		
86	976	14.300	978	14.924	980	15.605	981	16.350	983	17.169	985	18.075	3		
87	986	19.081	988	20.206	989	21.470	990	22.903	992	24.542	993	26.432	2		
88	994	28.636	995	31.242	996	34.368	997	38.189	997	42.964	999	49.104	1		
89	999	57.290	999	68.750	999	85.940	999	114.58	1.000	171.88	1.000	343.77	0		
	60'	60'	50'	50'	40'	40'	30'	30'	20'	30'	10'	10'			
deg	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	deg		

TABLE VII
RODS IN FEET AND INCHES

Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches
1	16-6	21	346-6	41	676-6	61	1006-6	81	1336-6
2	33-0	22	363-0	42	692-0	62	1023-0	82	1353-0
3	49-6	23	379-6	43	709-6	63	1039-6	83	1369-6
4	66-0	24	396-0	44	726-0	64	1056-0	84	1386-0
5	82-6	25	412-6	45	742-6	65	1072-6	85	1402-6
6	99-0	26	429-0	46	759-0	66	1089-0	86	1419-0
7	115-6	27	445-6	47	775-6	67	1105-6	87	1435-6
8	132-0	28	462-0	48	792-0	68	1122-0	88	1452-0
9	148-6	29	478-6	49	808-6	69	1138-6	89	1468-6
10	165-0	30	495-0	50	825-0	70	1155-0	90	1485-0
11	181-6	31	511-6	51	841-6	71	1171-6	91	1501-6
12	198-0	32	528-0	52	858-0	72	1188-0	92	1518-0
13	214-6	33	544-6	53	874-6	73	1204-6	93	1534-6
14	231-0	34	561-0	54	891-0	74	1221-0	94	1551-0
15	247-6	35	577-6	55	907-6	75	1237-6	95	1567-6
16	264-0	36	594-0	56	924-0	76	1254-0	96	1584-0
17	280-6	37	610-6	57	940-6	77	1270-6	97	1600-6
18	297-0	38	627-0	58	957-0	78	1287-0	98	1617-0
19	313-6	39	643-6	59	973-6	79	1303-6	99	1633-6
20	330-0	40	660-0	60	990-0	80	1320-0	100	1650-0

TABLE VIII
LINKS IN FEET AND INCHES

Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches
1	0-7.92	18	11-10.56	35	23-1.20	52	34-3.84	69	45-6.48	86	56-9.12
2	1-3.84	19	12-6.48	36	23-9.12	53	34-11.76	70	46-2.40	87	57-5.04
3	1-11.76	20	13-2.40	37	24-5.04	54	35-7.68	71	46-10.32	88	58-0.96
4	2-7.68	21	13-10.82	38	25-0.96	55	36-3.60	72	47-6.24	89	58-8.88
5	3-3.60	22	14-6.24	39	25-8.88	56	36-11.52	73	48-2.16	90	59-4.80
6	3-11.52	23	15-2.16	40	26-4.80	57	37-7.44	74	48-10.08	91	60-0.72
7	4-7.44	24	15-10.08	41	27-0.72	58	38-3.36	75	49-6.00	92	60-8.64
8	5-3.36	25	16-6.00	42	27-8.64	59	38-11.28	76	50-1.92	93	61-4.56
9	5-11.28	26	17-1.92	43	28-4.56	60	39-7.20	77	50-9.84	94	62-0.48
10	6-7.20	27	17-9.84	44	29-0.48	61	40-3.12	78	51-5.76	95	62-8.40
11	7-3.12	28	18-5.76	45	29-8.40	62	40-11.04	79	52-1.68	96	63-4.32
12	7-11.04	29	19-1.68	46	30-4.32	63	41-6.96	80	52-9.60	97	64-0.24
13	8-6.96	30	19-9.60	47	31-0.24	64	42-2.88	81	53-5.52	98	64-8.16
14	9-2.88	31	20-5.52	48	31-8.16	65	42-10.80	82	54-1.44	99	65-4.08
15	9-10.80	32	21-1.44	49	32-4.08	66	43-6.72	83	54-9.36	100	66-.000
16	10-6.72	33	21-9.36	50	33-0.00	67	44-2.64	84	55-5.28	101	66-7.92
17	11-2.64	34	22-5.28	51	33-7.92	68	44-10.56	85	56-1.20	102	67-3.84

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=10°	I	T	E	I=20°	I	T	E	I=30°
1°	50.00	.218		11°	551.70	26.500		21°	1061.9	97.577	
10'	58.34	.297	+	10'	560.11	27.313	+	10'	1070.6	99.155	+
20'	66.67	.388	5° C.	20'	568.53	28.137	5° C.	20'	1079.2	100.75	5° C.
30'	75.01	.491	T	30'	576.95	28.974	T	30'	1087.8	102.35	T
40'	83.34	.606	.03	40'	585.36	29.824	.06	40'	1096.4	103.97	.10
50'	91.68	.733	E	50'	593.79	30.686	E	50'	1105.1	105.60	E
2°	100.01	.873	.001	12°	602.21	31.561	.006	22°	1113.7	107.24	.013
10'	108.35	1.024		10'	610.64	32.447		10'	1122.4	108.90	
20'	116.68	1.188		20'	619.07	33.347		20'	1131.0	110.57	
30'	125.02	1.364		30'	627.50	34.259		30'	1139.7	112.25	
40'	133.36	1.552		40'	635.93	35.183		40'	1148.4	113.95	
50'	141.70	1.752		50'	644.37	36.120		50'	1157.0	115.66	
3°	150.04	1.964	10° C.	13°	652.81	37.070	10° C.	23°	1165.7	117.38	10° C.
10'	158.38	2.188	T	10'	661.25	38.031	T	10'	1174.4	119.12	T
20'	166.72	2.425	.06	20'	669.70	39.006	.13	20'	1183.1	120.87	.19
30'	175.06	2.674	E	30'	678.15	39.993	E	30'	1191.8	122.63	E
40'	183.40	2.934	.003	40'	686.60	40.992	.011	40'	1200.5	124.41	.025
50'	191.74	3.207		50'	695.06	42.004		50'	1209.2	126.20	
4°	200.08	3.492		14°	703.51	43.029		24°	1217.9	128.00	
10'	208.43	3.790		10'	711.97	44.066		10'	1226.6	129.82	
20'	216.77	4.099		20'	720.44	45.116		20'	1235.3	131.65	
30'	225.12	4.421		30'	728.90	46.178		30'	1244.0	133.50	
40'	233.47	4.755		40'	737.37	47.253		40'	1252.8	135.35	
50'	241.81	5.100	15° C.	50'	745.85	48.341	15° C.	50'	1261.5	137.23	15° C.
5°	250.16	5.459	T	15°	754.32	49.441	T	25°	1270.2	139.11	T
10'	258.51	5.829	.09	10'	762.80	50.554	.19	10'	1279.0	141.01	.29
20'	266.86	6.211	E	20'	771.29	51.679	E	20'	1287.7	142.93	E
30'	275.21	6.606	.004	30'	779.77	52.818	.017	30'	1296.5	144.85	.038
40'	283.57	7.013		40'	788.26	53.969		40'	1305.3	146.79	
50'	291.92	7.432		50'	796.75	55.132		50'	1314.0	148.75	
6°	300.28	7.863		16°	805.25	56.309		26°	1322.8	150.71	
10'	308.64	8.307		10'	813.75	57.498		10'	1331.6	152.69	
20'	316.99	8.762		20'	822.25	58.698		20'	1340.4	154.69	
30'	325.35	9.230		30'	830.76	59.914		30'	1349.2	156.70	
40'	333.71	9.710	20° C.	40'	839.27	61.141	20° C.	40'	1358.0	158.72	20° C.
50'	342.08	10.202	T	50'	847.78	62.381	T	50'	1366.8	160.76	T
7°	350.44	10.707	.13	17°	856.30	63.634	.26	27°	1375.6	162.81	.39
10'	358.81	11.224	E	10'	864.82	64.900	E	10'	1384.4	164.86	E
20'	367.17	11.753	.006	20'	873.35	66.178	.022	20'	1393.2	166.95	.051
30'	375.54	12.294		30'	881.88	67.470		30'	1402.0	169.04	
40'	383.91	12.847		40'	890.41	68.774		40'	1410.9	171.15	
50'	392.28	13.413		50'	898.95	70.091		50'	1419.7	173.27	
8°	400.66	13.991		18°	907.49	71.421		28°	1428.6	175.41	
10'	409.03	14.582		10'	916.03	72.764		10'	1437.4	177.55	
20'	417.41	15.184	25° C.	20'	924.58	74.119	25° C.	20'	1446.3	179.72	25° C.
30'	425.79	15.799	T	30'	933.13	75.488	T	30'	1455.1	181.89	T
40'	434.17	16.426	.16	40'	941.69	76.869	.32	40'	1464.0	184.08	.49
50'	442.55	17.065	E	50'	950.25	78.264	E	50'	1472.9	186.29	E
9°	450.93	17.717	.007	19°	958.81	79.671	.028	29°	1481.8	188.51	.065
10'	459.32	18.381		10'	967.38	81.092		10'	1490.7	190.74	
20'	467.71	19.058		20'	975.96	82.525		20'	1499.6	192.99	
30'	476.10	19.746		30'	984.53	83.972		30'	1508.5	195.25	
40'	484.49	20.447		40'	993.12	85.431		40'	1517.4	197.53	
50'	492.88	21.161		50'	1001.7	86.904		50'	1526.3	199.82	
10°	501.28	21.887	30° C.	20°	1010.3	88.389	30° C.	30°	1535.3	202.12	30° C.
10'	509.68	22.624	T	10'	1018.9	89.888	T	10'	1544.2	204.44	T
20'	518.08	23.375	.19	20'	1027.5	91.399	.39	20'	1553.1	206.77	.59
30'	526.48	24.138	E	30'	1036.1	92.924	E	30'	1562.1	209.12	E
40'	534.89	24.913	.008	40'	1044.7	94.462	.034	40'	1571.0	211.48	.078
50'	543.29	25.700		50'	1053.3	96.013		50'	1580.0	213.86	

T = R tan 1/2 I

E = R exsec 1/2 I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=40°	I	T	E	I=50°	I	T	E	I=60°
31°	1589.0	216.3		41°	2142.2	387.4		51°	2732.9	618.4	
10'	1598.0	218.7	+	10'	2151.7	390.7	+	10'	2743.1	622.8	+
20'	1606.9	221.1	5° C.	20'	2161.2	394.1	5° C.	20'	2753.4	627.2	5° C.
30'	1615.9	223.5	T	30'	2170.8	397.4	T	30'	2763.7	631.7	T
40'	1624.9	226.0	.13	40'	2180.3	400.8	.17	40'	2773.9	636.2	.21
50'	1633.9	228.4	E	50'	2189.9	404.2	E	50'	2784.2	640.7	E
32°	1643.0	230.9	.023	42°	2199.4	407.6	.037	52°	2794.5	645.2	.056
10'	1652.0	233.4		10'	2209.0	411.1		10'	2804.9	649.7	
20'	1661.0	235.9		20'	2218.6	414.5		20'	2815.2	654.3	
30'	1670.0	238.4		30'	2228.1	418.0		30'	2825.6	658.8	
40'	1679.1	241.0		40'	2237.7	421.4		40'	2835.9	663.4	
50'	1688.1	243.5		50'	2247.3	425.0		50'	2846.3	668.0	
33°	1697.2	246.1	10° C.	43°	2257.0	428.5	10° C.	53°	2856.7	672.7	10° C.
10'	1706.3	248.7	T	10'	2266.6	432.0	T	10'	2867.1	677.3	T
20'	1715.3	251.3	.26	20'	2276.2	435.6	.34	20'	2877.5	682.0	.42
30'	1724.4	253.9	E	30'	2285.9	439.2	E	30'	2888.0	686.7	E
40'	1733.5	256.5	.046	40'	2295.6	442.8	.075	40'	2898.4	691.4	.112
50'	1742.6	259.1		50'	2305.2	446.4		50'	2908.9	696.1	
34°	1751.7	261.8		44°	2314.9	450.0		54°	2919.4	700.9	
10'	1760.8	264.5		10'	2324.6	453.6		10'	2929.9	705.7	
20'	1770.0	267.2		20'	2334.3	457.3		20'	2940.4	710.5	
30'	1779.1	269.9		30'	2344.1	461.0		30'	2951.0	715.3	
40'	1788.2	272.6		40'	2353.8	464.6		40'	2961.5	720.1	
50'	1797.4	275.3	15° C.	50'	2363.5	468.4	15° C.	50'	2972.1	725.0	15° C.
35°	1806.6	278.1	T	45°	2373.3	472.1	T	55°	2982.7	729.9	T
10'	1815.7	280.8	.40	10'	2383.1	475.8	.51	10'	2993.3	734.8	.63
20'	1824.9	283.6	E	20'	2392.8	479.6	E	20'	3003.9	739.7	E
30'	1834.1	286.4	.070	30'	2402.6	483.4	.116	30'	3014.5	744.6	.168
40'	1843.3	289.2		40'	2412.4	487.2		40'	3025.2	749.6	
50'	1852.5	292.0		50'	2422.3	491.0		50'	3035.8	754.6	
36°	1861.7	294.9		46°	2432.1	494.8		56°	3046.5	759.6	
10'	1870.9	297.7		10'	2441.9	498.7		10'	3057.2	764.6	
20'	1880.1	300.6		20'	2451.8	502.5		20'	3067.9	769.7	
30'	1889.4	303.5	20° C.	30'	2461.7	506.4	20° C.	30'	3078.7	774.7	20° C.
40'	1898.6	306.4	T	40'	2471.5	510.3	T	40'	3089.4	779.8	T
50'	1907.9	309.3	.53	50'	2481.4	514.3	.68	50'	3100.2	784.9	.84
37°	1917.1	312.2	E	47°	2491.3	518.2	E	57°	3110.9	790.1	E
10'	1926.4	315.2	.093	10'	2501.2	522.2	.151	10'	3121.7	795.2	.225
20'	1935.7	318.1		20'	2511.2	526.1		20'	3132.6	800.4	
30'	1945.0	321.1		30'	2521.1	530.1		30'	3143.4	805.6	
40'	1954.3	324.1		40'	2531.1	534.2		40'	3154.2	810.9	
50'	1963.6	327.1		50'	2541.0	538.2		50'	3165.1	816.1	
38°	1972.9	330.2		48°	2551.0	542.2		58°	3176.0	821.4	
10'	1982.2	333.2	25° C.	10'	2561.0	546.3	25° C.	10'	3186.9	826.7	25° C.
20'	1991.5	336.3	T	20'	2571.0	550.4	T	20'	3197.8	832.0	T
30'	2000.9	339.3	.67	30'	2581.0	554.5	.85	30'	3208.8	837.3	.85
40'	2010.2	342.4	E	40'	2591.0	558.6	E	40'	3219.7	842.7	E
50'	2019.6	345.5	.117	50'	2601.1	562.8	.189	50'	3230.7	848.1	.105
39°	2029.0	348.6		49°	2611.2	566.9		59°	3241.7	853.5	.283
10'	2038.4	351.8		10'	2621.2	571.1		10'	3252.7	858.9	
20'	2047.8	354.9		20'	2631.3	575.3		20'	3263.7	864.3	
30'	2057.2	358.1		30'	2641.4	579.5		30'			

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=70°	I	T	E	I=80°	I	T	E	I=90°
61°	3375.0	920.2	+	71°	4086.9	1308.2	+	81°	4893.6	1805.3	+
10'	3386.8	925.9	5° C.	10'	4099.5	1315.6	5° C.	10'	4908.0	1814.7	5° C.
20'	3397.5	931.6	T	20'	4112.1	1322.9	T	20'	4922.5	1824.1	T
30'	3408.8	937.3	.25	30'	4124.8	1330.3	.30	30'	4937.0	1833.6	.30
40'	3420.1	943.1	E	40'	4137.4	1337.7	E	40'	4951.5	1843.1	E
50'	3431.4	948.9	.080	50'	4150.1	1345.1	.110	50'	4966.1	1852.6	.149
62°	3442.7	954.8	10° C.	72°	4162.8	1352.6	10° C.	82°	4980.7	1862.2	10° C.
10'	3454.1	960.6	.51	10'	4175.6	1360.1	.61	10'	4995.4	1871.8	.72
20'	3465.4	966.5	T	20'	4188.5	1367.6	T	20'	5010.0	1881.5	T
30'	3476.8	972.4	.25	30'	4201.2	1375.2	.30	30'	5024.8	1891.2	.36
40'	3488.3	978.3	E	40'	4214.0	1382.8	E	40'	5039.5	1900.9	E
50'	3499.7	984.3	.159	50'	4226.8	1390.4	.220	50'	5054.3	1910.7	.299
63°	3511.1	990.2	15° C.	73°	4239.7	1398.0	15° C.	83°	5069.2	1920.5	15° C.
10'	3522.6	996.2	.51	10'	4252.6	1405.7	.61	10'	5084.0	1930.4	.72
20'	3534.1	1002.3	T	20'	4265.6	1413.5	T	20'	5099.0	1940.3	T
30'	3545.6	1008.3	.25	30'	4278.5	1421.2	.30	30'	5113.9	1950.3	.36
40'	3557.2	1014.4	E	40'	4291.5	1429.0	E	40'	5128.9	1960.2	E
50'	3568.7	1020.5	.159	50'	4304.6	1436.8	.220	50'	5143.9	1970.3	.299
64°	3580.3	1026.6	20° C.	74°	4317.6	1444.6	20° C.	84°	5159.0	1980.4	20° C.
10'	3591.9	1032.8	.51	10'	4330.7	1452.5	.61	10'	5174.1	1990.5	.72
20'	3603.5	1039.0	T	20'	4343.8	1460.4	T	20'	5189.3	2000.6	T
30'	3615.1	1045.2	.25	30'	4356.9	1468.4	.30	30'	5204.4	2010.8	.36
40'	3626.8	1051.4	E	40'	4370.1	1476.4	E	40'	5219.7	2021.1	E
50'	3638.5	1057.7	.159	50'	4383.3	1484.4	.220	50'	5234.9	2031.4	.299
65°	3650.2	1063.9	25° C.	75°	4396.5	1492.4	25° C.	85°	5250.3	2041.7	25° C.
10'	3661.9	1070.2	.51	10'	4409.8	1500.5	.61	10'	5265.6	2052.1	.72
20'	3673.7	1076.6	T	20'	4423.1	1508.6	T	20'	5281.0	2062.5	T
30'	3685.4	1082.9	.25	30'	4436.4	1516.7	.30	30'	5296.4	2073.0	.36
40'	3697.2	1089.3	E	40'	4449.7	1524.9	E	40'	5311.9	2083.5	E
50'	3709.0	1095.7	.159	50'	4463.1	1533.1	.220	50'	5327.4	2094.1	.299
66°	3720.9	1102.2	30° C.	76°	4476.5	1541.4	30° C.	86°	5343.0	2104.7	30° C.
10'	3732.7	1108.6	.51	10'	4489.9	1549.7	.61	10'	5358.6	2115.3	.72
20'	3744.6	1115.1	T	20'	4503.4	1558.0	T	20'	5374.2	2126.0	T
30'	3756.5	1121.7	.25	30'	4516.9	1566.3	.30	30'	5389.9	2136.7	.36
40'	3768.5	1128.2	E	40'	4530.4	1574.7	E	40'	5405.6	2147.5	E
50'	3780.4	1134.8	.159	50'	4544.0	1583.1	.220	50'	5421.4	2158.4	.299
67°	3792.4	1141.4	35° C.	77°	4557.6	1591.6	35° C.	87°	5437.2	2169.2	35° C.
10'	3804.4	1148.0	.51	10'	4571.2	1600.1	.61	10'	5453.1	2180.2	.72
20'	3816.4	1154.7	T	20'	4584.8	1608.6	T	20'	5469.0	2191.1	T
30'	3828.4	1161.3	.25	30'	4598.5	1617.1	.30	30'	5484.9	2202.2	.36
40'	3840.5	1168.1	E	40'	4612.2	1625.7	E	40'	5500.9	2213.2	E
50'	3852.6	1174.8	.159	50'	4626.0	1634.4	.220	50'	5517.0	2224.3	.299
68°	3864.7	1181.6	40° C.	78°	4639.8	1643.0	40° C.	88°	5533.1	2235.5	40° C.
10'	3876.8	1188.4	.51	10'	4653.6	1651.7	.61	10'	5549.2	2246.7	.72
20'	3889.0	1195.2	T	20'	4667.4	1660.5	T	20'	5565.4	2258.0	T
30'	3901.2	1202.0	.25	30'	4681.3	1669.2	.30	30'	5581.6	2269.3	.36
40'	3913.4	1208.9	E	40'	4695.2	1678.1	E	40'	5597.8	2280.6	E
50'	3925.6	1215.8	.159	50'	4709.2	1686.9	.220	50'	5614.2	2292.0	.299
69°	3937.9	1222.7	45° C.	79°	4723.2	1695.8	45° C.	89°	5630.5	2303.5	45° C.
10'	3950.2	1229.7	.51	10'	4737.2	1704.7	.61	10'	5646.9	2315.0	.72
20'	3962.5	1236.7	T	20'	4751.2	1713.7	T	20'	5663.4	2326.6	T
30'	3974.8	1243.7	.25	30'	4765.3	1722.7	.30	30'	5679.9	2338.2	.36
40'	3987.2	1250.8	E	40'	4779.4	1731.7	E	40'	5696.4	2349.8	E
50'	3999.5	1257.9	.159	50'	4793.6	1740.8	.220	50'	5713.0	2361.5	.299
70°	4011.9	1265.0	50° C.	80°	4807.7	1749.9	50° C.	90°	5729.7	2373.3	50° C.
10'	4024.4	1272.1	.51	10'	4822.0	1759.0	.61	10'	5746.3	2385.1	.72
20'	4036.8	1279.3	T	20'	4836.2	1768.2	T	20'	5763.1	2397.0	T
30'	4049.3	1286.5	.25	30'	4850.5	1777.4	.30	30'	5779.9	2408.9	.36
40'	4061.8	1293.6	E	40'	4864.8	1786.7	E	40'	5796.7	2420.9	E
50'	4074.4	1300.9	.159	50'	4879.2	1796.0	.220	50'	5813.6	2432.9	.299

T = R tan ½ I

E = R exsec ½ I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=100°	I	T	E	I=110°	I	T	E	I=120°
91°	5830.5	2444.9	+	101°	6950.6	3278.1	+	111°	8336.7	4386.1	+
10'	5847.5	2457.1	5° C.	10'	6971.3	3294.1	5° C.	10'	8362.7	4407.6	5° C.
20'	5864.6	2469.3	T	20'	6992.0	3310.1	T	20'	8388.9	4429.2	T
30'	5881.7	2481.5	.25	30'	7012.7	3326.1	.25	30'	8415.1	4450.9	.25
40'	5898.8	2493.8	E	40'	7033.6	3342.3	E	40'	8441.5	4472.7	E
50'	5916.0	2506.1	.100	50'	7054.5	3358.5	.1268	50'	8468.0	4494.6	.1360
92°	5933.2	2518.5	10° C.	102°	7075.5	3374.9	10° C.	112°	8494.6	4516.6	10° C.
10'	5950.5	2531.0	.51	10'	7096.6	3391.2	.51	10'	8521.3	4538.8	.51
20'	5967.9	2543.5	T	20'	7117.8	3407.7	T	20'	8548.1	4561.1	T
30'	5985.3	2556.0	.25	30'	7139.0	3424.3	.25	30'	8575.0	4583.4	.25
40'	6002.7	2568.6	E	40'	7160.3	3440.9	E	40'	8602.1	4606.0	E
50'	6020.2	2581.3	.100	50'	7181.7	3457.6	.1268	50'	8629.3	4628.6	.1360
93°	6037.8	2594.0	15° C.	103°	7203.2	3474.4	15° C.	113°	8656.6	4651.3	15° C.
10'	6055.4	2606.8	.51	10'	7224.7	3491.3	.51	10'	8684.0	4674.2	.51
20'	6073.1	2619.7	T	20'	7246.3	3508.2	T	20'	8711.5	4697.2	T
30'	6090.8	2632.6	.25	30'	7268.0	3525.2	.25	30'	8739.2	4720.3	.25
40'	6108.6	2645.5	E	40'	7289.8	3542.4	E	40'	8767.0	4743.6	E
50'	6126.4	2658.5	.100	50'	7311.7	3559.6	.1268	50'	8794.9	4766.9	.1360
94°	6144.3	2671.6	20° C.	104°	7333.6	3576.8	20° C.	114°	8822.9	4790.4	20° C.
10'	6162.2	2684.7	.51	10'	7355.6	3594.2	.51	10'	8851.0	4814.1	.51
20'	6180.2	2697.9	T	20'	7377.8	3611.7	T	20'	8879.3	4837.8	T
30'	6198.3	2711.2	.25	30'	7399.9	3629.2	.25	30'	8907.7	4861.7	.25
40'	6216.4	2724.5	E	40'	7422.2	3646.8	E	40'	8936.3	4885.7	E
50'	6234.6	2737.9	.100	50'	7444.6	3664.5	.1268	50'	8965.0	4909.9	.1360
95°	6252.8	2751.3	25° C.	105°	7467.0	3682.3	25° C.	115°	8993.8	4934.1	25° C.
10'	6271.1	2764.7	.51	10'	7489.6	3700.2	.51	10'	9022.7	4958.6	.51
20'	6289.4	2778.3	T	20'	7512.2	3718.2	T	20'	9051.7	4983.1	T
30'	6307.9	2792.0	.25	30'	7534.9	3736.2	.25	30'	9080.9	5007.8	.25
40'	6326.3	2805.6	E	40'	7557.7	3754.4	E	40'	9110.3	5032.6	E
50'	6344.8	2819.4	.100	50'	7580.5	3772.6	.1268	50'	9139.8	5057.6	.1360
96°	6363.4	2833.2	30° C.	106°	7603.5	3791.0	30° C.	116°	9169.4	5082.7	30° C.
10'	6382.1	2847.0	.51	10'	7626.6	3809.4	.51	10'	9199.1	5107.9	.51
20'	6400.8	2861.0	T	20'	7649.7	3827.9	T	20'	9229.0	5133.3	T
30'	6419.5	2875.0	.25	30'	7672.9	3846.5	.25	30'	9259.0	5158.8	.25
40'	6438.3	2889.0	E	40'	7696.3	3865.2	E	40'	9289.2	5184.5	E
50'	6457.3	2903.1	.100	50'	7719.7	3884.0	.1268	50'	9319.5	5210.3	.1360
97°	6476.2	2917.3	35° C.	107°	7743.2	3902.9	35° C.	117°	9349.9	5236.2	35° C.
10'	6495.2	2931.6	.51	10'	7766.8	3921.9	.51	10'	9380.5	5262.3	.51
20'	6514.3	2945.9	T	20'	7790.5	3940.9	T	20'	9411.3	5288.6	T
30'	6533.4	2960.3	.25	30'	7814.3	3960.1	.25	30'	9442.2	5315.0	.25
40'	6552.6	2974.7	E	40'	7838.1	3979.4	E	40'	9473.2	5341.5	E
50'	6571.9	2989.2	.100	50'	7862.1	3998.7	.1268	50'	9504.4	5368.2	.1360
98°	6591.2	3003.8	40° C.	108°	7886.2	4018.2	40° C.	118°	9535.7	5395.1	40° C.
10'	6610.6	3018.4	.51	10'	7910.4	4037.8	.51	10'	9567.2	5422.1	.51
20'	6630.1	3033.1	T	20'	7934.6	4057.4					

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

C	R	30	28	26	24	22	20	C	R	30	28	26	24	22	20
o /	Feet	Inch	Inch	Inch	Inch	Inch	Inch	o	Feet	Inch	Inch	Inch	Inch	Inch	Inch
0-20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0-40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1-0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1-20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1-40	3438	.39	.34	.29	.25	.21	.17	12	478.3	3.83	2.47	2.15	1.81	1.54	1.26
2-0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2-20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2-40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3-0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3-20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3-40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4-0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.98
4-20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.09
4-40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.5	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.58	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

TABLE XI.
SHORT RADIUS CURVES

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

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

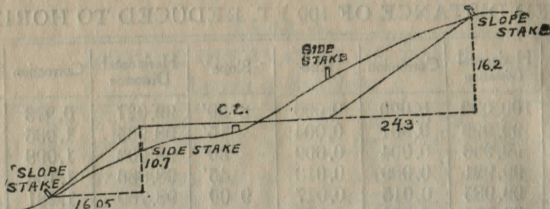
TABLE XII.
INCLINED DISTANCE OF 100 FT. REDUCED TO HORIZONTAL

Slope	Horizontal Distance	Correction	Rise	Slope	Horizontal Distance	Correction	Rise
0°00'	100.000	0.000	0.000	8°00'	99.027	0.973	0.139
15'	99.999	0.001	0.004	15'	98.965	1.035	0.143
30'	99.996	0.004	0.009	30'	98.903	1.098	0.148
45'	99.991	0.009	0.013	45'	98.836	1.164	0.152
1 00	99.985	0.015	0.017	9 00	98.769	1.231	0.156
15	99.976	0.024	0.022	15	98.700	1.300	0.161
30	99.966	0.034	0.026	30	98.629	1.371	0.165
45	99.953	0.047	0.031	45	98.556	1.444	0.169
2 00	99.939	0.061	0.035	10 00	98.481	1.519	0.174
15	99.923	0.077	0.039	15	98.404	1.596	0.178
30	99.905	0.095	0.044	30	98.325	1.675	0.182
45	99.885	0.115	0.048	45	98.245	1.755	0.187
3 00	99.863	0.137	0.052	11 00	98.163	1.837	0.191
15	99.839	0.161	0.057	15	98.079	1.921	0.195
30	99.813	0.187	0.061	30	97.992	2.008	0.199
45	99.786	0.214	0.065	45	97.905	2.095	0.204
4 00	99.756	0.244	0.070	12 00	97.815	2.185	0.208
15	99.725	0.275	0.074	15	97.723	2.277	0.212
30	99.692	0.308	0.078	30	97.630	2.370	0.216
45	99.657	0.343	0.083	45	97.534	2.466	0.221
5 00	99.619	0.381	0.087	13 00	97.437	2.563	0.225
15	99.580	0.420	0.092	15	97.338	2.662	0.229
30	99.540	0.460	0.096	30	97.237	2.763	0.233
45	99.497	0.503	0.100	45	97.134	2.866	0.238
6 00	99.452	0.548	0.105	14 00	97.030	2.970	0.242
15	99.406	0.594	0.109	15	96.923	3.077	0.246
30	99.357	0.643	0.113	30	96.815	3.185	0.250
45	99.307	0.693	0.118	45	96.705	3.295	0.255
7 00	99.255	0.745	0.122	15 00	96.593	3.407	0.259
15	99.200	0.800	0.126	15	96.479	3.521	0.263
30	99.144	0.856	0.131	30	96.363	3.637	0.267
45	99.087	0.913	0.135	45	96.246	3.754	0.271

For each foot take one one-hundredth of each reading.

TABLE XIII.
MINUTES IN DECIMALS OF A DEGREE.

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



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

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

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

Computed by L. Leland Locke.

1283.85
6.30
1277.55
1281
9015
3172
1766
728
1872
438

45.34
94
21.40
5976
72
17
24

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