298A

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ENGINEERING and DRAFTING SUPPLIES

IRVING PARK STATION

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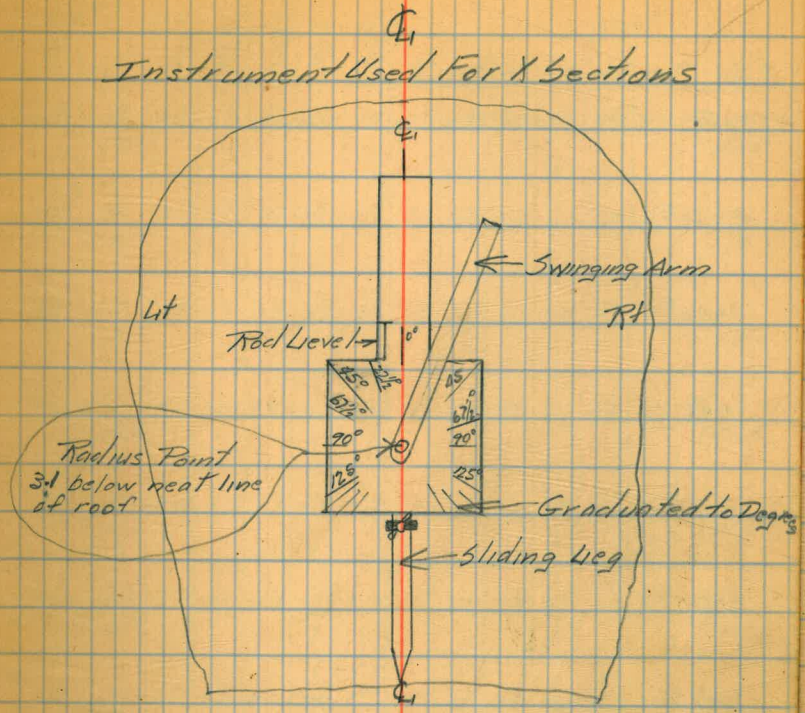
Otay Res. to San Diego 2nd Main Pipe Line

Index

Tunnel #3 X Sections pages 4-56

Instrument Used For X Sections



In the following notes the distances shown are from the radius point and readings are marked "Shot" or "Shot Hole" only when there is conclusive evidence that the over break is caused by shooting.

Otay Res. to San Diego 2nd Main Pipe Line

Date
June 17, 1930

Cross sections of tunnel #3

Elliott Notes
Jacobsen Rule
Bailey Instrument

4

Sta.	Floor at ℄	Lt 135°	90°	67½°	45°	22½°	℄	22½°	45°	67½°	90°	125°	
								Rt					
223+90 (at south face of timber)	38	48	45	39	40	40	40	34	39	41	37	36	37	49
		190°												190°
223+88.5	38	46	41	34	33	38	33	31	33	37	31	32	37	46
		140°												140°
+86.5	38	44	44	35	30	33	36	37	39	37	32	33	41	45
		140°												140°
+86	38	44	40	31	30	31	33	31	34	36	32	33	41	45
		140°												140°
+82.5	38	42	36	30	29	33	37	36	36	37	34	33	37	42
		140												140°
+80	38	43	39	32	32	35	37	35	34	36	34	32	39	43
		140°												140°
+77	36	44	37	33	33	35	34	32	37	38	33	34	38	44
		140°												140°
+73	37	45	40	32	37	34	34	34	32	34	32	32	38	43
		140°												140°
+70	37	44	37	31	30	32	33	31	34	36	33	33	42	46
		142°												130°
+66.5	35	47	40	31	31	33	31	32	37	38	37	35	42	46
		138°												130°
+63	33	45	39	32	34	37	32	40	42	37	35	36	42	45
		140°												140°
+61.5	35	43	39	32	33	39	40	39	39	37	35	35	43	45
		140°												135°

June 17 1930

		Floor at ℄	125°	90°	67½°	45°	22½°	℄	22½°	45°	67½°	90°	125°	
223+59		3 4	4 3 140°	3 5	3 1	3 2	3 5	4 1	4 0	4 0	3 8	3 3	3 2	4 0	4 3 140°
+56		3 4	4 3 140°	3 7	3 0	3 1	3 3	3 7	3 5	3 8	3 9	3 2	3 2	3 9	4 2 140°
59 5	(at North face of timbers)	3 4	4 8 140°	4 5	3 8	3 7	3 8	3 7	3 7	3 9	4 0	3 7	3 6	4 9	4 5 140°
Timber +39 5	(at S. face of timbers)	3 3	4 8 135°	4 4	3 7	3 9	3 8	3 8	3 9	4 0	3 9	4 2	3 9	4 5	4 8 132°
+39		3 3	4 1 140°	3 2	2 7	2 8	4 0	3 2	3 9	4 0	3 9	3 8	3 5	3 8	4 1 140°
+37		3 2	3 9 152	3 7	3 0	3 1	3 2	3 3	3 2	3 6	3 5	3 3	3 3	3 7	3 7 140°
+39		3 2	4 2 150	3 6	2 7	3 1	3 2	3 1	3 3	3 5	3 5	3 5	3 1	3 6	4 1 140
+32		3 3	4 1 140	3 7	2 7	3 0	3 1	3 2	3 1	3 7	3 7	3 9	3 6	3 3	3 6	4 0 140°

June 17, 1930

	Floor at ℄	125°	90°	67½°	45°	22½°	℄	22½°	45°	67½	90°	125°	
223+28	3 3	4 5	4 0	3 5	3 5	3 6	3 5	3 2	3 3	3 2	3 0	2 8	3 5	3 8
		140												142
+23 5	3 3	4 4	4 4	3 7	3 7	3 9	3 6	3 2	3 1	3 3	2 9	2 6	3 1	4 0
		145												150°
+22	3 3	4 3	4 0	3 9	3 7	3 3	3 2	3 1	3 2	3 1	2 9	2 8	3 4	4 0
		145												150
+19	3 3	4 3	3 2	3 0	3 2	3 2	3 1	3 2	3 2	3 7	3 7	3 0	3 8	4 0
		140												145°
+17	3 2	4 0	3 8	3 9	2 8	2 9	3 4	3 4	3 6	3 7	3 8	3 3	3 5	4 0
		145°												140°
+10	3 2	4 0	3 7	3 9	3 3	3 3	3 2	3 1	3 3	3 5	3 3	3 1	3 3	3 9
		145												145
+07 5	3 2	4 1	3 5	2 9	3 0	3 2	3 3	3 1	3 5	3 4	3 2	3 1	3 4	4 0
		140												145
+04	3 3	4 2	3 8	3 3	3 2	3 2	3 6	4 1	3 8	3 7	3 5	3 3	3 6	4 2
		140												142

June 19, 1930

Station	Floor at ℄		125	90	67½	45	22½	℄	22½	45	67½	90	125			Note
223+00	3^{1}	4^{0} 142	3^{8}	3^{1}	3^{2}	3^{4}	3^{6}	3^{1}	3^{3}	3^{1}	2^{9}	2^{8}	3^{1}	3^{6} 150		
222+96	3^{2}	3^{9} 140	3^{7}	3^{1}	3^{2}	3^{2}	3^{2}	3^{1}	3^{1}	3^{4}	3^{1}	3^{0}	3^{3}	3^{8} 145°	✓	
+91	3^{3}	4^{3} 140	4^{0}	3^{5}	3^{4}	3^{4}	3^{2}	3^{5}	3^{5}	3^{3}	3^{5}	3^{0}	3^{3}	3^{8} 145°	✓	Shot High + wide
$+87^{5}$	3^{3}	4^{1} 145	3^{7}	3^{1}	3^{0}	3^{2}	3^{5}	3^{7}	4^{0}	4^{1}	3^{5}	3^{0}	3^{3}	3^{7} 150°	✓	Shot High + wide
+86	3^{3}	4^{3} 145	3^{7}	3^{1}	3^{1}	3^{1}	3^{2}	3^{1}	3^{5}	3^{4}	3^{2}	2^{9}	3^{4}	3^{9} 145°	✓	
+81	3^{5}	4^{4} 140°	3^{8}	3^{2}	3^{2}	3^{2}	3^{4}	3^{5}	3^{6}	3^{9}	3^{2}	3^{1}	3^{4}	4^{0} 145	✓	Shot wide. (3^{5}, 3^{6}, 3^{9}, 3^{2})
+79	3^{5}	4^{3} 145	3^{8}	3^{0}	3^{0}	2^{9}	3^{0}	3^{1}	3^{2}	3^{7}	3^{3}	3^{0}	3^{6}	4^{1} 148	✓	
+73	3^{5}	4^{6} 140	4^{1}	3^{3}	3^{0}	3^{0}	3^{2}	3^{1}	3^{1}	3^{1}	3^{1}	3^{1}	3^{9}	4^{4} 140°		Trimmed Wide (4^{6})

June 19, 1930.

222466[5]

+63

+60

+57[5]

+55

+52

+50

+48

Elevation | 125 | 90 | 67½ | 45 | 22½ | ℄ | 22½ | 45 | 67½ | 90 | 125

Trimmed wide

3[6] 4[4] 3[7] 2[9] 2[9] 3[1] 3[2] 3[7] 3[9] 3[3] 3[3] 3[2] 3[7] 4[6]
140 140°

3[6] 4[1] 3[8] 3[2] 2[9] 3[1] 3[4] 3[8] 3[6] 3[4] 3[4] 3[4] 3[8] 4[4]
142° 142°

3[6] 4[2] 3[5] 3[0] 3[0] 3[2] 3[5] 3[3] 3[4] 3[5] 3[2] 3[3] 3[5] 4[3] ✓
150 140°

Shot wide Shot wide

3[5] 4[1] 3[3] 2[8] 2[9] 3[2] 3[5] 3[9] 3[8] 3[9] 3[4] 3[4] 3[8] 4[2] ✓
145 145°

3[5] 4[1] 3[5] 2[9] 3[0] 3[2] 3[3] 3[3] 3[7] 3[7] 3[5] 3[1] 3[6] 4[1] ✓
145 148

3[6] 4[0] 3[3] 2[7] 2[7] 3[0] 3[5] 3[7] 3[7] 3[6] 3[3] 3[3] 3[5] 4[2] ✓
150 140

3[6] 4[2] 4[0] 2[9] 3[0] 3[2] 3[6] 3[6] 3[7] 3[5] 3[6] 3[1] 3[5] 4[3] ✓
145 140

3[6] 4[2] 3[6] 3[0] 4[1] 3[3] 3[9] 4[2] 3[7] 3[9] 3[6] 3[2] 3[3] 4[4] ✓
145 145

Data
June 21, 1930
Clear-Cool

222+43

2 +40

+35

+28

+24

+20

+18

+15

+11

+ 11

Elliott Notes
Jacobszon Ruler
Bailey Instrument

Floorat ⊕	125°	90°	67½°	45°	22½°	⊕	22½°	45°	67½°	90°	125°	
3⁶	4⁰ 196	3²	2⁸	2⁹	3³	3³	4⁵	4⁴	3⁶	3⁷ Shot wide	3¹ 3⁵	4⁰ 147° ✓
3⁶	4¹ 147	3²	2⁸	2⁹	3³	3⁶	3⁷	3⁸	3⁶	3⁹	3³ Shot wide 3⁷	4¹ 148° ✓
3⁶	4⁰ 152	3¹	2⁷	3²	3⁵	3⁹	4²	4⁴	3⁸	3⁵	3⁴ Shot wide 3⁵	4³ 147° ✓
3⁶	4⁵ 195	3⁹	3²	3⁴	3⁷	3³	3⁴	3⁵	3⁵	3⁰	2⁹ 3³	4² 145° ✓
3⁷	4⁴ 195	3⁵	3¹	3³	3³	3²	3¹	3¹	2⁹	2⁹	2⁸ 3⁵	4¹ 196° ✓
3⁷	4⁴ 195	3⁷	3³	3⁴	3²	3¹	2⁹	2⁷	2⁷	2⁶	2⁷ 3²	4¹ 150°
3⁷	4⁶ 143	3⁸	3⁵	3⁵	3⁶	3³	3⁴	3²	2⁸	2⁶	2⁶ 2⁹	3⁹ 152
3⁷	4⁴ 146	3⁸	3³	3⁴	3⁴	3⁶	3⁸	3¹	2⁸	2⁸	2⁸ 3²	4¹ 148
3⁶	4³ 144	3⁶	3¹	3³	3²	3⁶	3⁷	3²	2⁹	2⁸	2² 3¹	4¹ 151 ✓

June 21, 1930

222+07

+04

221+98

+91

+87

+89

+80

+74

Floor at ℄

	125°	90°	67½°	45°	22½°	℄	22½°	45°	67½°	90°	125°	
3⅝	4⅜ 149°	4⅝	3⅞	4⅛	4⅛	3⅝	3⅜	3⅜	3⅞	3⅞	3⅝	4⅞ 148 ✓
3⅝	4⅞ 147	3⅝	3⅜	3⅞	3⅞	3⅛	3⅝	3⅞	3⅛	3⅛	3⅞	4⅜ 148° ✓
3⅝	4⅞ 146	3⅞	3°	3⅛	3⅞	3⅜	3⅝	3⅛	3⅜	3⅜	3⅝	4⅜ 147° ✓
3⅝	4⅜ 145	3⅜	3°	3⅛	3⅞	3⅝	3⅞	3⅞	3⅛	3⅞	3⅝	4⅜ 146°
3⅝	4⅜ 145°	3⅜	3⅞	3⅛	3⅜	3⅜	3⅝	3⅞	3°	3°	3⅝	4⅜ 144° ✓
3½	4⅞ 145	3⅞	3½	3⅜	3⅜	3⅝	3½	3⅞	3⅞	3⅞	4⅛	4⅞ 144 ✓
3⅝	4½ 146	4⅛	3⅜	3⅞	3⅞	3⅞	3⅛	3⅛	3°	3⅛	3⅛	4° 4⅜ 142 ✓
3⅝	4⅝ 142	4°	3⅞	3⅛	3⅞	3⅛	3⅛	2⅞	2⅞	2⅝	2⅞	3⅛ 4⅞ 144 ✓

Shot wide

Shot wide

Shot wide

Cut wide for bypass

June 21, 1930

Floor at 4

	125	90	67½	45	22½	0	22½	45	67½	90	125	
221+70	3⁶	4⁴ 140	3⁹	3⁴	3³	3²	3⁸	3²	3¹	3²	2⁹	2⁸	3⁵ 4³ 145 ✓
+65	3⁶	4⁵ 143°	3⁸	3³	3²	3²	3⁸	3⁸	3²	3²	3¹	2⁹	3⁹ 4⁴ 144° ✓
+61	3⁶	4⁴ 145	3⁵	3¹	3⁰	3⁵	3⁹	3⁷	3⁵	3⁶	3¹	2⁹	3⁶ 4⁹ 144° ✓
+58	3⁶	4³ 143	3⁹	3⁰	3¹	3⁹	3³	3²	3⁴	3²	3¹	3¹	3³ 4³ 140° ✓
+56	3⁶	4³ 144	3⁵	2⁹	3⁰	3⁴	3³	3⁸	3⁸	3⁴	3²	3¹	3⁴ 4¹ 143
+53	3⁴	4³ 141	3⁸	3²	3¹	3³	3¹	3¹	3²	3²	3²	3¹	3⁹ 3⁹ 143°
+48	3⁹	4³ 144	4¹	3³	3³	3⁹	3⁶	3⁸	3³	3¹	3⁰	3⁰	3² 4¹ 142 ✓
+46	3⁴	4⁵ 141	4²	3⁴	3³	3⁶	3⁷	3⁸	3⁴	8²	3⁰	2⁹	3⁵ 4⁹ 142 ✓

Cut wide for bypass

Trimmed wide

Shot wide

Shot wide

June 24, 1930

Elliott Notes
Jacobszon Rule
Bailey - Instr.

	Floor of ¢	125	90	67½	45	22½	¢	22½	45	67½	90	125	
221+93													
	3 4	Shot wide 4 3 (140)	4 1	3 3	3 3	3 6	3 8	3 7	3 4	3 4	3 1	3 2	3 9	4 0 (141°)	✓
+38	3 4	Shot wide 4 2 (144)	3 8	3 3	3 1	3 9	3 5	3 8	3 9	4 0	3 3	3 2	3 7	4 2 (140°)	✓
+35	3 3	Shot and Trimmed wide. 4 1 (142)	3 6	2 9	2 9	3 0	3 3	3 2	3 5	3 5	3 2	3 1	3 8	4 2 (142)	✓
+31	3 3	4 4 (187°)	4 0	3 2	3 5	3 8	4 0	4 4	4 0	3 6	3 2	3 0	3 6	4 2 (142°)	✓
+28	2 2	4 1 (137°)	4 0	3 1	3 2	3 9	3 7	3 6	3 8	3 1	3 0	3 1	3 6	4 0 (140°)	✓
+20	3 2	Shot wide 4 3 (142°)	4 2	3 5	3 5	3 6	3 4	3 4	3 5	3 3	2 9	2 5	3 2	3 8 (145)	✓
+18	3 2	Shot wide 4 3 (138)	4 1	3 5	3 9	3 6	3 4	3 8	3 6	3 2	2 9	2 9	3 6	3 7 (144)	✓
+15	3 2	4 3 (137)	3 9	3 3	3 4	3 1	3 2	3 4	3 0	2 9	2 7	2 8	3 4	3 9 (145)	✓

Slant

June 24, 1930

	Floor at ¼	125	90	67½	45	22½	¼	22½	45	67½	90	125	
2 221+08	3 3	4 2 140°	3 9	3 9	3 4	3 3	3 4	3 3	3 2	3 1	2 8	2 9	3 6	4 2 145
+03	3 4	4 2 143°	3 1	3 0	3 2	3 0	2 0	3 2	3 3	3 3	3 2	3 2	4 0	4 4 140°
221 +00	3 2	4 0 140°	3 6	3 0	3 1	3 2	3 1	3 0	3 1	3 1	3 0	2 8	3 6	4 2 140
220+96	3 4	4 1 145°	3 8	3 1	3 0	3 2	3 1	3 2	3 4	3 2	3 4	3 1	4 0	4 3 143°
+93	3 4	4 1 143	3 2	3 0	2 8	3 2	3 4	3 1	3 1	3 2	3 2	3 2	3 8	4 2 140°
+90 5	3 5	4 2 142	3 7	2 8	2 9	3 3	3 4	3 8	3 5	3 5	3 1	3 1	4 3	4 4 140°
+89	3 5	4 1 145	3 5	2 8	2 9	3 0	3 3	3 3	3 5	3 1	2 9	3 1	3 8	4 3 144
+85	3 4	4 0 145	3 4	2 8	2 8	2 9	3 3	3 2	3 5	3 3	3 0	3 0	3 8	4 4 140

June 24, 1930

	Floor at 4'	125°	90	67½	45	22½	0	22½	45	67½	90	125°	
220+79	3.3	4.0	3.2	2.7	2.9	3.0	3.2	3.7	3.5	3.5	3.3	3.3	3.9	4.1
		147°												141
+71	3.3	4.2	3.7	2.9	2.9	3.0	3.2	3.1	3.1	2.8	2.8	2.9	3.1	4.1
		143°												140
+69	3.3	4.1	4.0	3.1	3.0	3.0	3.1	3.3	2.9	3.0	2.8	3.0	3.7	4.0
		143												140°
+65	3.3	4.3	3.9	3.7	3.2	3.0	2.8	2.9	3.1	2.8	3.0	3.3	3.7	4.2
		142												140
+61	3.4	4.1	3.4	2.8	2.6	3.0	3.1	2.6	3.1	3.1	3.1	3.2	3.9	4.5
		146												137
220+59 (This section against N. face of timber)	3.5	4.6	4.1	3.9	3.7	3.9	4.0	3.7	3.7	3.6	3.7	3.7	4.3	4.6
		138												137
Timber														
219+95 (This section against S. face of timber)	3.9	4.8	4.7	3.6	3.8	3.9	3.9	4.0	3.9	3.7	3.8	3.6	4.5	4.7
		144°												138
+94	3.9	4.7	3.6	3.0	2.8	3.0	3.4	3.2	3.1	2.8	2.9	2.7	3.6	4.2
		145												141
+92	3.8	4.5	3.7	2.9	2.8	2.7	2.8	2.4	2.5	2.6	2.7	2.9	3.7	4.3
		145												143

June 24, 1930

		Floor at 4'	125	90	67½	45	22½	0	22½	45	67½	90	125	
219+88.5		3.9	4.8 / 147	3.9	3.0	2.7	3.0	2.6	2.5	2.6	2.8	2.5	2.5	3.6	4.2 / 144
+86.5		3.9	4.6 / 144	3.7	3.3	3.3	3.4	3.1	3.1	3.1	3.1	2.7	2.8	3.4	4.5 / 148
219+86	This section against N. face of timber	3.9	4.8 / 137	4.3	3.7	3.8	4.0	3.8	3.6	3.6	3.7	3.8	3.6	4.9	4.8 / 149
↑ Timbered ↓															
218+30.5	This section against S. face of timber	3.6	4.8 / 143	4.6	3.8	4.0	4.0	4.0	3.8	4.2	3.9	3.9	3.6	4.3	4.8 / 145
+30		3.5	4.8 / 143	3.6	3.1	3.1	3.0	2.8	2.7	2.8	3.0	2.9	3.2	4.2	4.8 / 145 ✓
+27		3.8	4.8 / 143	Shot wide (3.8)	3.7	2.9	2.8	2.6	2.5	2.7	3.0	3.1	3.4	4.2	4.8 / 144 ✓
+19		3.9	4.6 / 146	3.4	2.7	2.9	2.5	2.9	2.4	2.6	2.7	3.1	3.3	4.1	4.8 / 143 ✓
+13		3.8	4.5 / 147	3.3	2.8	2.7	2.7	2.6	2.7	2.7	3.0	3.2	3.3	Shot wide (4.0 / 95°) (3.9 / 125)	4.7 / 140 ✓

June 24 1930

	Floor at 4	125	90	67½	45	22½	4	22½	45	67½	90	125	
+10	38	43 150	32	26	26	25	27	29	29	28	29	35	46	48 140
+07	38	45 147	35	29	29	29	31	28	25	25	27	27	38 100°	49 125°	45 141°
+03	38	47 144	38	35	34	33	30	28	25	27	28	31	37	44 145
218 +00	38	48 145	42	39	33	30	28	27	27	26	25	26	31	41 150
217 +88	35	46 138	39	37	29	28	28	25	23	23	21	27	37	42 140
+85	35	49 133	46	35	31	28	28	27	26	27	28	31	42	48 135
+82	35	43 140	37	30	28	28	27	27	28	29	30	35	41	47 140
+77	35	48 143	38	31	32	31	32	32	33	31	35	39	41	47 142

Trimmed wide for bypass.

Shot wide

June 24, 1930

	Floor at 4	125	90	67½	45	22½	0	22½	45	67½	90	125	
217+74	33	39	33	28	29	33	34	32	32	31	33	35	41	44
		141												140
+71	35	43	38	30	30	31	33	32	32	29	29	29	36	45
		139												138
+67	36	41	33	28	29	30	32	39	36	33	32	32	37	42
		147												145
+63	36	41	35	31	32	33	35	43	40	38	32	38	42	49
		147												140
+58	37	41	37	32	31	32	36	45	39	39	32	32	37	49
		150												142
+54	38	42	37	28	30	31	37	37	33	28	30	30	37	46
		148												142
+50	38	42	36	31	27	28	30	31	27	25	27	28	36	45
		146												145
+40	39	45	38	30	26	29	27	29	25	25	26	26	39	46
		148												143

June 27, 1930

Elliott Notes
Bailey Instr.
Soper Ruler

	Floor at ℄	125	90	67½	45	22½	℄	22½	45	67½	90	125		
217+37	42	47	35	27	26	27	25	24	27	28	25	28	37	43
		145												145
+32	40	46	39	32	31	31	30	27	28	26	27	32	36	47
		145												142
+27.5	40	48	38	30	29	29	26	25	25	28	32	33	41	48
		146												146
+22	40	45	33	27	28	30	32	39	39	34	35	36	41	48
		152												142
+18	39	47	36	29	30	33	33	39	36	39	36	33	38	45
		146												142
+10	38	41	33	28	27	29	28	32	29	28	28	27	35	41
		148												145

July 9, 1930

Elliott Notes
Bailey Instr.
Soper Ruler.

Station		Lt. 125°	90°	67½°	45°	22½°	0	Rt 22½°	45°	67½°	90°	125°	
217+05	3.7	4.3 / 150°	3.6	3.0	2.8	2.7	2.6	2.7	2.7	2.9	2.8	2.9	3.6	4.3 / 149°	✓
											Shot wide. ↓				
+02	3.7	4.3 / 150°	3.8	2.8	2.7	2.7	2.8	3.1	3.5	3.0	3.1	3.2	3.7	4.2 / 145°	✓
216 +99	3.7	4.9 / 145	3.6	2.9	2.9	3.3	3.4	3.7	4.1	3.6	3.3	3.2	3.6	4.3 / 144°	✓
+98.5 (at North face of timber)	3.8	4.7 / 143	4.4	3.5	3.7	3.7	3.9	3.7	4.3	3.7	3.7	3.6	4.2	4.4 / 143	
Timber +70.3 (at South face of timber)	3.6	4.7 / 142	4.4	3.4	3.7	3.7	4.0	4.3	4.2	3.8	3.8	3.6	4.5	4.6 / 140°	
+70.0	3.6	4.9 / 140	3.4	3.3	3.4	3.4	3.9	4.3	4.0	3.1	3.0	3.1	3.7	4.6 / 140	✓
+65	3.6	4.5 / 141	4.0	3.4	3.3	3.1	3.2	4.0	3.1	2.8	2.8	2.8	3.8	4.4 / 145	✓
+59.5	3.7	4.8 / 138	4.0	3.4	3.0	3.2	3.3	3.7	3.2	3.0	3.0	3.2	3.9	4.3 / 145	✓

July 9 1930

	Floor at ⊄	125	90	67½	45	22½	⊄	22½	45	67½	90	125	
216 +58	36	46 141	43	33	30	28	28	30	28	28	29	30	37	44 142	✓
+55	36	39 141	36	33	29	28	29	31	29	34	29	30	37	44 142	
+52	35	42 142	36	31	27	27	29	32	30	31	34	34	44	45 136	
+50	33	39 143	34	27	26	26	27	31	30	30	30	32	44	46 135	✓
+40.	35	43 144	37	30	28	28	29	31	30	29	30	33 Shot wide	40	44 140	✓
+36	36	43 140	37	30	30	30	33	32	29	29	31	38	46 140		✓
+33	36	44 142	36	33 Shot wide	32	35	36	34	36	29	33	30 Shot wide	42	46 137	✓
+29	38	48 140	38	31	32	32	34	33	33	33	33	31	40	47 141	✓

July 9, 1930

	Floor at ¢		Lt. 125	90	67½	45	22½	¢	Rt. 22½	45	67½	90	125		
216+26	3^{7}	4^{6} 143	3^{9}	3^{2}	3^{5}	3^{4}	3^{7}	4^{1}	3^{4}	3^{3}	3^{3}	3^{2}	3^{7}	3^{5} 140	✓
+23	3^{5}	4^{3} 140	4^{0}	3^{1}	3^{1}	3^{5}	3^{4}	3^{9}	3^{8}	3^{8}	3^{3}	2^{9}	3^{4}	4^{2} 142	✓
+17	3^{5}	4^{1} 143	3^{7}	3^{0}	3^{1}	3^{2}	3^{6}	4^{2}	3^{7}	3^{3}	3^{1}	3^{1}	3^{5}	4^{2} 142	✓
+14	3^{5}	4^{3} 140°	3^{6}	3^{2}	3^{1}	3^{4}	3^{4}	4^{2}	4^{4}	4^{0}	3^{2}	3^{1}	3^{7}	4^{2} 138	✓
+12	3^{4}	4^{5} 140	4^{4}	3^{5}	3^{6}	3^{6}	3^{8}	4^{7}	4^{0}	3^{7}	3^{3}	3^{2}	4^{0}	4^{1} 140°	✓
+09	3^{9}	Shot wide 4^{3} 136	4^{6}	3^{5}	3^{6}	3^{8}	4^{1}	4^{2}	4^{2}	3^{9}	3^{6}	3^{5}	4^{2}	4^{3} 135°	✓
+05	3^{3}	4^{3} 137	4^{3}	3^{8}	3^{5}	3^{5}	3^{5}	4^{6}	3^{9}	3^{4}	3^{4}	3^{3}	3^{8}	4^{1} 140	✓
216+02	3^{5}	4^{1} 144	3^{6}	3^{1}	3^{0}	2^{8}	3^{1}	4^{0}	3^{6}	3^{1}	3^{1}	3^{2}	3^{7}	4^{2} 140	✓

July 9, 1930

216+00

215+95

+91

+89

+85

+81

+75

+72

Elbow at 4

		125	90	67½	45	22½	0	22½	45	67½	90	125	
34	4-3 136	38	31	30	32	33	40	32	36	36	31	42	41 147 ✓
36	4-3 140	39	31	30	34	34	40	35	30	31	32	41	44 140 ✓
37	4-3 143	39	35	35	33	31	37	38	31	32	32	37	49 140 ✓
38	4-4 149	38	Shot wide 33	34	31	32	32	38	Shot wide 32	32	34	36	49 144 ✓
39	4-5 145	37	Shot 33	29	27	31	34	32	26	27	28	38	45 144 ✓
38	4-6 144	38	31	30	28	27	31	31	29	29	30	37	49 143 ✓
38	4-6 145	36	34	32	26	25	31	31	30	30	34	44	47 140
39	4-3 145	34	26	25	24	24	29	27	26	27	32	41	46 144

July 9, 1930

Elliott Notes
Bailey Instr
Soper Ruler

215 + 67

+ 61

+ 58

+ 55

+ 50

+ 46

+ 40

+ 33 (This section at face of bore)

Floor at 4

	125	90	67½	45	22½	4	22½	45	67½	90	125	
2.9	4.9 147	3.6	2.5	2.2	2.1	2.3	2.7	2.7	2.5	2.6	3.1	4.0	4.8 140	
3.7	4.6 142	3.7	3.2	2.7	2.5	2.5	2.7	2.5	2.4	2.7	3.3	4.4	4.8 141	✓
3.7	4.3 146	3.3	2.8	2.9	2.8	2.6	2.6	2.5	2.8	3.1	Shot wide 3.7	4.7	4.9 138	✓
3.6	4.3 136	3.3	2.8	2.5	2.7	2.6	2.6	2.6	2.5	2.8	3.1	4.2	4.5 139	✓
3.2	3.7 140	3.6	2.9	2.8	2.7	2.7	2.7	2.6	2.7	3.1	Shot wide 3.6	4.1 125		✓
2.6		3.5 125	3.5	2.8	2.6	2.4	2.3	2.6	3.2	3.4	Shot 3.8	4.0 125		✓
1.4			3.0 90°	3.1	3.0	2.9	2.7	2.7	2.9	2.7	2.8	2.8 100°		✓
2.0		2.7 130	2.0	2.1	2.0	2.0	1.5	2.1	2.1	2.1	2.3	3.0 130°		✓

← Loose Muck on Floor →

July 15, 1930

215 + 27

+22

+20

+17.5

+16.5

+12

215 + 05

215 + 00

Floor at 4

	125	90	67½	45	22½	0	22½	45	67½	90	125	
4.4	5.1	3.9	2.7	2.5	2.5	2.5	2.6	2.6	2.7	2.9	3.1	3.7	4.6
	150	Shot											152
4.7	4.5	3.7	2.7	2.5	2.3	2.2	1.7	2.6	2.8	3.0	Shot 3.8	4.6	5.0
	152												140
4.2	4.3	3.5	2.6	2.3	2.1	2.0	1.5	2.2	2.3	2.5	3.0	Shot 4.5	5.1
	151												145
4.3	4.5	3.2	2.3	2.0	2.0	1.5	1.5	2.2	2.6	2.8	Shot 3.4	4.4	5.0
	146												145
4.5	4.5	3.8	2.3	2.0	2.1	1.5	1.3	2.2	2.6	2.7	Shot 3.5	4.5	5.0
	146												145
4.0	Shot 5.0	2.8	1.6	1.5	1.4	1.5	1.5	1.7	2.0	2.8	Shot 3.2	4.1	4.6
	150												150
4.5	Shot 5.2	3.6	2.8	2.6	2.5	3.3	3.1	2.9	2.8	3.1	3.0	3.4	4.5
	147												148

July 13, 1930

Elliott Notes
Bailey Instr
Soper Ruler

215+00

+95.5

+92

+88½

214+84

214+

Elevations

125 90 67½ 45 22½ 0 22½ 45 67½ 90 125

25

Top of shot hole

4.5 4.7 3.3 2.5 2.5 2.6 3.3 3.3 3.7 3.2 2.9 3.0 3.8 4.8 ✓
198 155

4.5 4.8 3.4 2.9 2.7 2.6 2.9 3.0 2.9 3.1 3.0 2.9 3.6 4.8 ✓
151 151.0

4.8 5.2 3.5 2.7 2.6 2.5 2.8 3.2 3.1 2.9 2.9 2.9 3.5 5.0 ✓
152 157

Shot

4.5 4.9 3.6 2.6 2.6 2.8 3.1 3.5 3.9 3.1 3.0 3.½ 3.1 4.7 ✓
154 156

4.6 5.0 3.9 2.9 2.5 2.7 3.0 3.5 3.4 2.8 2.7 2.7 3.0 4.9 ✓
150 156

July 13, 1930 Elliott Notes
Bailey Instr
Soper Ruler.

214 +79

+76

+70

+66 5/8

+62 5/8

+60

+50

214 + 43

Floor at ⊕

	Shot	125	90	67½	45	22½	⊕	22½	45	67½	90	125	
4 4/8		5 2/8	3 8/8	3 2/8	2 7/8	2 1/8	2 8/8	2 9/8	2 8/8	2 4/8	2 4/8	2 7/8	3 2/8	4 6/8	✓
		147												150	
	Shot														
4 4/8		5 0/8	3 5/8	2 7/8	2 2/8	2 7/8	2 8/8	3 0/8	2 6/8	2 5/8	2 5/8	2 3/8	3 0/8	4 5/8	✓
		149												150	
						Top Top Hole									
4 3/8		5 1/8	3 1/8	2 9/8	2 7/8	2 6/8	3 0/8	2 5/8	2 3/8	2 3/8	2 2/8	2 2/8	2 8/8	4 3/8	✓
		145												150	
	Shot														
4 1/8		5 1/8	4 6/8	2 8/8	2 5/8	2 4/8	2 4/8	1 8/8	2 0/8	1 8/8	2 0/8	2 2/8	3 1/8	4 4/8	✓
		145												152	
	Shot														
4 3/8		5 5/8	4 3/8	3 1/8	2 7/8	2 6/8	2 3/8	2 2/8	2 2/8	2 1/8	2 1/8	2 5/8	3 1/8	4 8/8	✓
		142												149	
4 2/8	5 2/8	4 0/8	3 5/8	2 9/8	2 8/8	2 2/8	2 9/8	2 9/8	2 8/8	2 6/8	2 6/8	2 7/8	3 3/8	4 7/8	✓
⊕	145	125	100	90										144	
							Shot wide								
4 2/8		4 9/8	3 8/8	2 9/8	2 6/8	2 1/8	2 2/8	2 8/8	2 7/8	2 8/8	2 8/8	2 8/8	3 5/8	4 4/8	✓
		145												150	
4 2/8		4 8/8	3 3/8	2 8/8	2 6/8	2 5/8	2 5/8	2 5/8	2 7/8	2 9/8	2 6/8	2 7/8	3 9/8	4 7/8	✓
		150												151	

July 12, 1980.

214 + 40

+38

+34⅝

+32

+24⅝

+21

+15⅝

214 +12⅝

Floor at 4

	125	90	67½	45	22½	0	22½	45	67½	90	125	Shot
4⅜	5⅜	3⅞	2⅝	2⅞	2⅝	2⅜	2⅜	2⅜	2⅛	2⅜	2⅝	3⅞	4⅝	4⅞ ✓
	145												138	141
4⅜	5⅜	4⅞	4⅜	3⅛	2⅝	2⅝	2⅛	2⅜	2⅜	2⅝	2⅝	3⅝	4⅝ ✓
	145	125	115											150
4⅛	4⅞	3⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	3⅝	4⅞ ✓
	145													148
4⅛	Shot 4⅝	4⅞	3⅜	2⅝	2⅝	2⅝	2⅞	2⅞	2⅝	2⅝	2⅝	Shot 4½	4⅝ ✓
	152	136												145
3⅞	Shot 4⅝	4⅛	3⅜	3⅜	2⅝	2⅝	2⅝	2⅞	2⅝	2⅝	2⅝	2⅝	3⅜	4⅜ ✓
	149	125	120											150
4⅜	Shot 4⅛	3⅝	2⅞	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	Shot 3½	3⅝	4⅝ ✓
	150													145
4⅜	4⅜	Shot 4½	3⅜	2⅞	2⅞	2⅞	2⅞	2⅝	2⅝	2⅝	2⅝	3⅜	4⅛ ✓
	146	127												150
4⅛	4⅝	3⅜	2⅝	2⅞	2⅝	2⅝	2⅞	2⅝	2⅝	2⅝	3⅜	Shot 4½	4⅝ ✓
	150													146

July 12, 1930

Elliott Notes
Bailey Instr.
Soper Ruler

+09

+05.5

219 +03.5

214 +00

+97

+94

+91

213 +84.5

Floor at 4

	125	90	67½	45	22½	0	22½	45	67½	90	125	
4°	4.8	2.9	2.2	2.1	2.2	2.2	2.2	2.3	2.8	2.8	3.0	4.1	4.7 ✓
	150												145
4°	4.6	3.1	2.5	2.3	2.4	2.3	2.4	2.6	2.8	3.1	Shot 3.6	3.8	3.8 ✓ 4.7
	149										90	105	125 143
3.9	4.5	2.3	2.5	2.5	2.5	2.7	2.8	2.8	3.0	3.1	3.0	3.6	4.6 ✓
	144												144
3.9	4.6	3.4	2.7	2.7	2.8	2.9	2.6	2.8	3.0	2.8	2.7	3.3	4.5
	148												150
3.9	4.4	3.3	2.8	2.6	2.8	2.6	2.5	2.5	2.7	2.6	2.9	3.6	4.3
	149												150
3.9	4.5	3.5	2.5	2.5	2.4	2.4	2.4	2.3	2.5	2.6	2.7	3.4	4.3 ✓
	148												150
3.8	Shot 4.8	4.6	3.0	2.7	2.6	2.5	2.6	2.5	2.9	2.7	2.8	3.3	Shot 4.7 ✓
	193												143
4.2	Shot 5.3	4.4	3.3	3.1	3.2	2.9	3.2	2.8	2.5	2.4	2.9	3.0	Shot 4.6 ✓
	142												152

July 12, 1930

	125	90	67½	45	22½	0	22½	45	67½	90	125	
213 +80	3.7	4.7	4.1	3.3	3.3	3.5	3.8	3.1	2.9	2.5	2.5	2.7	3.2	4.2	✓
		142												146	
							Top of shot hole								
+78	3.8	4.7	4.2	3.2	3.1	3.2	3.4	3.5	2.7	2.5	2.3	2.6	3.0	4.2	✓
		145												151	
+76	3.6	4.5	3.7	3.0	3.0	3.3	3.7	3.7	2.9	2.3	2.2	2.3	2.7	3.9	✓
		140												150	
+73	3.6	4.3	3.7	2.9	2.9	3.1	3.2	3.4	3.2	2.7	2.6	2.6	3.3	4.2	✓ ✓
		143												149	
												Shot			
+67	3.6	4.2	3.6	3.0	2.8	3.0	3.2	3.6	3.0	2.9	3.0	3.3	3.8	4.0	4.3 ✓
		143										90	95	125	145
+62	3.6	4.1	3.3	2.9	3.0	3.2	3.1	3.7	3.4	3.2	3.0	3.3	4.2	4.3	✓
		141												145	
+59	3.7	4.2	3.1	2.9	2.8	2.8	3.2	3.7	3.6	2.9	3.1	3.3	4.6	4.7	✓
		148												140	
213 +56	3.7	4.2	3.2	2.7	2.8	2.7	2.8	3.6	3.4	3.4	3.3	3.3	3.8	4.3	✓
		146												145	

July 12, 1930

213 +50

+49

+40

+36.5

+34

+29

+26

213 +22

Floor at 4

	125	90	67½	45	22½	0	22½	45	67½	90	125	
Shot												
37	4.4 / 147	4.1 / 134	3.1	2.7	2.6	2.5	3.1	3.7	3.1	2.8	2.7	3.0	3.4	4.3 / 142	✓
Shot															
39	4.7 / 145	3.6	2.6	2.7	2.9	2.9	3.5	3.5	2.8	2.7	2.8	3.8	4.6 / 145		✓
38	4.4 / 143	3.9	2.8	2.4	2.8	3.1	3.6	2.9	2.7	2.6	2.7	3.2	4.3 / 142		-
37	4.3 / 148	3.0	2.5	2.5	2.7	3.0	2.8	2.8	2.8	2.8	2.8	3.5	4.3 / 143		
36	4.2 / 145	3.1	2.7	2.7	2.9	3.1	3.3	3.1	2.8	2.7	2.6	3.4	4.1 / 145		
36	4.0 / 148	3.1	2.6	2.6	2.8	2.9	3.2	3.2	3.1	2.9	3.0	3.7	4.2 / 145		
35	3.9 / 150	3.0	2.5	2.5	2.6	2.9	2.9	3.0	3.1	3.1	3.2	3.9	4.3 / 145		
36	3.9 / 150	3.1	2.7	2.6	2.7	2.8	3.1	3.0	2.8	2.8	3.0	4.3	4.3 / 145		-

July 12, 1930

213 +19

+18

+16

+11.5

+08

+06.5

+03

213 +00

Floor at 4

	125	90	67½	45	22½	0	22½	45	67½	90	125	
36	4.0	3.3	2.8	2.7	2.7	3.3	3.4	3.3	3.4	3.6	3.7	4.4	4.7	✓
	147												142	
											shot			
37	4.2	3.2	2.7	2.8	2.8	3.3	3.5	3.0	3.1	3.4	3.6	4.8	4.7	✓
	149												140	
36	4.4	3.4	2.8	2.9	2.9	3.4	3.5	3.5	3.0	3.1	3.2	4.2	4.5	✓
	144												140	
	cut for bypass													
36	4.8	4.0	2.9	2.4	2.4	2.7	3.0	2.9	3.1	3.0		shot		
	137										3.5	4.6	4.5	✓
													140	
36	4.3	3.1	2.7	2.6	2.7	2.8	3.0	3.0	3.0	3.2	3.2	4.1	4.5	✓
	143												140	
												shot		
36	4.2	3.1	2.9	2.9	2.8	2.9	3.0	3.2	3.3	3.9	3.7	3.3	4.5	4.5	✓
	141											105	125	142	
36	4.1	3.3	3.2	2.8	3.0	2.8	3.0	2.8	2.8	3.0	3.0	3.5	4.2	✓
	145												144	
36	3.9	3.2	3.0	3.1	3.1	3.0	3.1	2.8	2.9	2.9	2.8	3.4	4.2	
	141												144	

June 27, 1930

Elliott Notes
Bailey Instr.
Soper Ruler

Floor at ℄

Sta	125	90	67½	45	22½	℄	22½	45	67½	90	125	
212+95	35	40 150	33	29	28	32	31	28	29	30	28	23 125 / 44 145°
						Shot wide Top of drill hole						
+93	35	39 152	33	28	28	27	33	34	32	31	29	29 38 / 43 143
+83	37	43 143	38	29	28	29	32	31	34	33	29	29 40 / 43 146
+80	37	42 144	39	31	31	30	33	31	33	32	31	31 35 / 42 145
+70	35	42 145	40	30	30	32	31	28	28	28	26	26 32 / 38 145
+66	35	44 143	39	32	29	29	27	27	23	23	23	25 31 / 38 147
						Top of drill hole						
+65	35	44 141	40	31	29	30	31	35	29	23	29	23 30 / 39 145
+60	34	41 144	39	31	29	30	31	31	30	26	26	27 31 / 38 146

June 27, 1930

212 +56

+55

+50

+47.5

+45

+41

+37

+34

Floor at ¢

	125	90	67½	45	22½	¢	22½	45	67½	90	125	
3.5	4.3 147	3.6	2.9	2.8	2.7	2.1	2.8	2.7	2.9	3.0	3.2	4.2	4.3 142	✓
									In drill hole ↓					
3.9	4.4 141	3.7	3.1	3.1	2.9	2.8	2.9	2.9	3.2	3.6	3.3	4.1	4.2 140	✓
3.9	4.0 145	3.5	2.9	2.8	2.7	2.8	2.5	2.8	3.0	2.9	3.0	4.0	4.3 140	✓
3.9	4.1 143	3.6	2.9	2.8	2.8	2.7	3.1	3.1	3.0	2.8	2.9	3.6	4.0 144	
3.5	4.1 153	3.2	2.8	2.5	2.6	2.8	3.2	2.9	3.2	3.1	3.2	3.8	4.2 145	
									In shot hole					
3.5	4.2 145	3.9	2.6	2.5	2.9	2.6	2.6	3.0	3.0	3.1	3.2	3.9	4.3 143	✓
												In Shot Hole		
3.6	4.3 150	3.7	2.8	2.7	2.5	2.5	2.5	2.7	3.2	3.2	3.5	3.9	4.3 143	✓
												Shot		
3.5	4.3 147	3.1	2.8	2.7	2.6	2.6	2.9	2.8	3.0	3.1	3.3	4.5	4.7 138	✓

June 27, 1930

212 +30

+28

+22

+20

+16

+11

+05.5

+02.5

212 +00

Floor at ℄ 125 90 67½ 45 22½ ℄ 22½ 45 67½ 90 125

3⁷ 4⁵ 3⁵ 2⁸ 2⁶ 2⁴ 2⁴ 2⁹ 2⁷ 2⁸ 3⁰ 3³ 4³ 4⁸ ✓
149 140 Cut wide

3⁷ 4⁶ 3⁵ 2⁷ 2⁶ 2⁶ 2⁶ 3¹ 3² 3¹ 3¹ 3³ 4² 4⁷ ✓
148 142 Cut wide

3⁷ 4⁶ 3² 2⁷ 2⁵ 2⁸ 3⁰ 3² 3⁷ 2⁹ 3¹ 3¹ 4² 4⁸ ✓
147 140

3⁷ 4⁹ 3³ 2⁶ 2⁵ 2⁶ 2⁵ 3² 3² 3² 2⁹ 3² 4¹ 4⁸ ✓
147 140

Trimmed wide for by-pass

3⁷ 4³ 3³ 2⁸ 2⁷ 3⁰ 2⁹ 3¹ 3¹ 2⁹ 3² 3⁹ 4¹ 4⁶ ✓
149 140

3⁷ 4⁷ 4¹ 3³ 2⁹ 2⁹ 3¹ 2³ 2¹ 2¹ 2⁵ 2⁷ 3⁸ 4⁶ ✓
140 143

3⁷ 4⁵ 4⁰ 3⁶ 3³ 3² 3⁹ 3³ 2⁸ 2⁶ 2⁷ 2⁸ 3⁴ 4⁴ ✓
138 144

3⁸ 4⁸ 4⁰ 3³ 3⁷ 3⁰ 2⁸ 3⁵ 3² 2⁶ 2³ 2⁶ 2⁷ 3³ 4⁹ ✓
℄ 144 125 90 67½ 45 30 22½ 148

Trimmed wide

3⁹ 4⁵ 4⁹ 3⁵ 3⁹ 2⁸ 2⁹ 2⁷ 2⁵ 2⁶ 2⁶ 2⁷ 3⁵ 4⁵ ✓
143 147

July 12, 1930

Elliott Notes
Bailey Inst.
Soper Ruler

	Floats	125	90	67½	45	22½	⊕	22½	45	67½	90	125		
211+93	3⁶	4⁶ 141	4²	3²	3³	3⁵	3²	2⁸	2⁷	3²	2⁹	2⁹	2¹ 4² 150	✓
+87	3⁶	Shot (4³ 4⁰ 144)	3²	3⁰	2⁹	3²	3⁵	2⁹	2⁸	2⁷	2⁶	3¹	3⁹ 147	✓
+79	3⁶	4¹ 148	3⁶	3³	3³	2⁹	2⁷	3⁰	2⁷	2⁷	2⁹	2⁹	3² 4⁰ 148	✓
+77	3⁶	4¹ 148	3⁴	3³	3³	2⁸	2⁹	2³	2⁷	2¹	2⁸	2⁹	3⁴ 4⁰ 144	✓
+70	3⁵	3⁸ 153	2⁹	3¹	3¹	3⁻	2⁸	3¹	3⁰	3³	3²	3¹	3⁴ 4² 144	✓
+67⁵	3⁴	3⁷ 151	2⁸	2⁷	3⁰	3¹	3⁰	2⁹	2⁹	3⁰	Shot (3⁴ 3⁶ 3⁹)		4² 141	✓
211 +64⁵	3⁴	3⁷ 155	3²	2⁸	3⁰	3⁰	2⁸	2⁹	2⁹	3¹	3⁰	3¹	3⁷ 4¹ 141	✓
+61⁵	3⁴	3⁷ 151	2⁸	2⁶	2⁷	2⁹	3⁰	3⁰	3¹	3⁴	3²	2²	4¹ Shot (4³ 136)	✓

July 12, 1930

Floor at	125	90	67½	45	22½	0	22½	45	67½	90	125	
211 + 58												
3⁵	4² 4⁰ 147 Shot	3⁰	3⁰	3¹	3⁰	3¹	3⁴	3⁵	3²	3³	4³	4⁴ 136 Shot
+53												
3⁵	4⁰ 4⁰ 145	3²	2⁹	3⁰	2⁹	3⁰	3³	3²	3²	3¹	4⁹ Shot	3⁷ 145
+50												
3⁵	4⁰ 3⁷ 145	3²	3¹	2⁹	3⁰	3¹	2³	3³	3²	3²	4⁰	3⁸ 147
+46												
3⁵	Shot 4⁰ 3⁸ 145 120	3²	3¹	3⁰	2⁷	3¹	3¹	3⁹	3³	3⁹	3⁸ Shot	3⁹ 144
+40												
3⁴	3⁸ 3² 152	2⁸	2⁶	2⁷	2⁸	3² Shot	3³	3⁴	3⁹	3⁵	3⁸	3⁹ 145
+34												
3⁹	3⁸ 3² 146	2⁷	2⁸	2⁸	2⁹	2⁵	2⁸	3⁰	3⁰	3¹	4¹ Shot	4¹ 134
+28												
3⁹	3⁸ 3⁵ 144	3²	3⁵	3⁴	2⁸	2⁸	2⁷	2⁹	2⁷	2⁸	3²	3⁶ 144
211 +25												
3⁴	Shot Hole 4¹ 3⁷ 140	3⁴	3⁵	3³	3¹	3¹	2⁹	2⁹	2⁸	2⁷	3²	3⁶ 150

July 12, 1930

211+22

+19.5

+10

+03

211+00

210+99

+95

+89.5

Floor of #

	125	50	67½	45	22½	0	22½	45	67½	90	125	
3	3.8	3.5	3.1	3.4	3.5	3.3	3.5	3.4	3.0	2.9	2.9	3.3	3.6	✓
	146												150	
			Shot			Shot hole								
3	3.9	4.1	3.3	3.5	3.4	3.3	3.3	3.3	3.4	3.2	3.0	3.6	3.7	✓
	146												147	
3	3.7	3.6	3.1	3.1	3.4	3.5	3.4	3.4	3.3	2.8	3.1	3.5	3.9	✓
	151												145	
3	3.9	3.6	2.8	2.8	3.2	3.4	3.5	3.4	3.3	3.0	2.9	3.5	3.7	✓
	145												145	
												Shot		
3	3.9	3.6	3.0	2.7	3.1	3.3	3.5	3.5	3.5	3.1	3.2	3.8	3.8	✓
	145												145	
						Top of shot hole								
3	3.9	3.2	3.0	3.0	3.1	3.3	4.2	3.4	3.4	3.1	3.1	4.0	3.9	✓
	144												144	
		Shot												
3	4.0	3.8	2.7	3.0	3.4	3.4	3.2	3.5	3.1	3.3	3.2	3.7	4.0	✓
	139	120											144	
3	4.4	4.2	3.5	3.0	2.9	3.1	3.0	3.0	2.9	2.8	3.0	3.8	4.4	✓
	144												137	

July 12, 1930

Floor at 4

Sta	125	90	67½	45	22½	0	22½	45	67½	90	125	
210+84	4.1	4.2	3.7	3.7	3.1	3.5	3.1	3.0	2.8	2.8	2.7	3.4	4.1	✓
	138					Top of shot hole							144	
+80	3.4	4.2	3.9	3.3	2.9	3.0	3.0	2.8	2.7	2.8	2.7	2.7	3.8	3.9	
		140	120											142	✓
+75	3.3	4.1	3.4	3.5	2.2	3.0	3.0	3.0	3.1	2.8	3.0	2.8	3.5	4.0	✓
		145												140	
+69	3.3	3.8	3.6	3.1	3.1	3.0	2.8	3.1	3.2	3.3	3.4	Shot 3.6	3.8	4.2	✓
		145												140	
+64	3.3	3.8	3.2	2.9	2.3	2.3	2.4	2.4	3.1	3.4	3.9	3.7	Shot 4.4	4.3	✓
		147												137	
+61	3.5	3.7	2.7	2.0	2.0	2.1	2.3	2.5	3.0	3.5	3.6	3.7	4.6	4.4	✓
		150												139	
+59	3.5	3.6	2.7	2.2	2.2	2.2	2.5	2.8	3.2	3.5	3.9	4.2	4.8	4.5	✓
		150												140	
210+58½	3.5	3.6	2.7	2.5	2.7	2.2	2.5	2.8	3.2	Top shot 3.9	3.9	4.2	Shot 4.8	4.5	✓
		150												140	

July 12, 1930 Elliott Notes
Bailey Instr
Soper Ruler

Floor at 4

Sta.		125	90	67½	45	22½	0	22½	45	67½	90	125	
210 + 55	3+	3.7 / 198	3.0	2.6	2.2	2.7	2.8	2.9	3.5	3.5	3.3	3.4	4.0	4.2 / 142
+50	3+	3.7 / 150	3.0	2.5	2.2	2.2	2.5	2.6	3.0	3.1	3.2	Shot 3.4	4.1	4.2 / 141
		July 13.												
+40	3+	4.1 / 143	3.5	2.7	2.6	2.5	2.9	2.7	2.9	3.1	3.0	3.0	3.3	4.0 / 142
+28	3+	3.2 / 146	3.0	3.0	2.5	2.4	2.6	2.7	2.8	3.0	2.8	2.9	3.3	3.9 / 141
+23	3+	4.2 / 145	3.2	2.9	2.7	2.7	2.5	2.6	2.8	3.0	3.0	3.0	3.8	4.2 / 144
+16	3+	Shot 5.0 / 140	4.4	3.7	3.5	3.3	2.8	2.8	2.7	3.0	2.9	3.0	3.8	4.4 / 146
+10	3+	Shot 4.3 / 146	3.8	3.2	3.0	3.1	3.3	2.9	2.8	2.7	2.8	2.9	3.4	4.3 / 149
210 +03	3+	4.4 / 143	3.4	3.0	2.8	3.0	3.0	2.9	2.9	3.1	3.0	3.0	3.6	4.0 / 145

July 13, 1930 Elliott Notes
Bailey Instr
Soper Ruler

Elevation ∠

	125	90	67½	45	22½	0	22½	45	67½	90	125	
210+00												
37	4.5 / 144	4.2	3.1	2.9	2.9	2.7	2.7	2.8	2.8	3.0	3.1	3.5	4.3 / 146	✓
209+95	Shot													
38	4.3 / 145	4.1	3.0	2.9	2.6	2.6	3.0	2.9	2.8	3.0	Top Hole 3.6	4.2	4.2 / 144	✓
+90														
38	4.1 / 150	3.6	3.0	2.7	2.8	2.7	2.9	2.9	3.0	2.9	3.1	3.7	4.1 / 152	✓
+80														
37	4.3 / 150	3.4	3.1	2.9	2.8	2.7	3.1	3.2	3.3	3.2	3.2	3.5	4.1 / 150	
+70														
37	4.6 / 147	3.9	3.1	2.9	2.7	2.8	3.1	2.9	2.9	3.1	3.1	3.9	4.5 / 148	✓
+66.5	Shot													
38	4.8 / 146	4.1	2.9	2.8	2.7	2.8	2.9	2.8	2.8	3.0	3.1	3.6	4.4 / 147	✓
+59														
38	4.6 / 147	3.8	3.1	2.8	2.8	2.7	2.8	2.6	2.9	3.0	2.9	3.2	4.0 / 153	✓
+52														
39	4.4 / 145	3.8	3.1	3.1	3.1	2.9	2.6	2.5	2.6	2.7	2.7	3.4	4.2 / 153	✓

July 14, 1930 — Elliott, Bailey, Soper — Notes: Instr Ruler

41

	Floor at ⊄	125	90	67½	45	22½	⊄	22½	45	67½	90	125	
209+51	4.0	4.5	3.8	3.7	3.2	3.2	3.3	3.1	2.7	2.7	2.9	3.0	3.2	4.2	✓
		147	Top of shot											151	
+50	3.8	4.4	3.6	3.0	3.2	3.3	3.2	2.9	2.8	2.9	3.0	2.8	3.3	4.0	✓
		150												150	
							Top Hole								
+46	3.9	4.5	3.6	3.2	3.1	2.9	2.8	2.8	2.8	2.8	2.8	2.8	3.3	4.1	✓ 300
		145												150	
		shot + cut for by pass													
+40	3.7	4.7	4.1	3.2	3.2	3.1	3.1	3.3	3.1	3.3	3.3	3.1	3.5	4.2	✓
		142												145	
+37	3.8	4.2	3.1	2.8	3.0	3.0	2.8	2.7	2.8	2.9	3.2	3.0	3.6	4.4	✓
		147												145	
							Top Hole							Shot	
+30	3.8	4.0	3.1	2.7	2.8	3.1	3.0	3.2	2.9	3.3	3.3	3.2	4.1	4.8	✓
		150												140	
+22½	3.8	4.3	3.3	2.8	2.7	2.9	2.8	2.4	2.6	3.0	3.0	2.9	3.6	4.4	✓
		146												145	
209+20.5	3.8	4.3	3.3	2.7	2.7	2.9	3.0	2.5	2.6	3.0	2.8	2.7	3.3	4.3	✓
		145												146	

July 14, 1930

Station	Floor at ℄	Lt. 125	90	67½	45	22½	℄	Rt. 22½	45	67½	90	125		
209+19⅝	3.8	4.1 / 143	3.6	2.7	2.8	2.9	3.1	3.6 ↑ Top of shot	3.1	3.2	2.6	2.9	3.4	4.3 / 145	✓
+16	3.9	4.1 / 145	3.8	3.0	3.1	3.0	3.1	3.1	2.8	3.3	3.2	2.8	3.0	4.1 / 149	✓
+12	3.6	4.1 / 140	3.7	3.2	3.4	3.3	3.4	3.4	3.3	3.4	3.1	2.8	2.9	3.8 / 149	✓
+10	3.6	Shot ↓ 4.4 / 140	4.0	3.3	3.5	3.6	3.6	3.4	3.3	3.3	3.0	2.9	2.8	3.7 / 150	✓
+09⅝	3.5	Shot 4.1 / 142	4.1 / 123	3.3 / 90	3.3 / 67½	3.8 / 45	3.7 / 22½	Top of Shot Hole ↓ 4.3 / 12°	3.7	3.5	3.4	3.0	2.7	2.9	3.6 / 146	✓
+05⅝	3.5	4.2 / 142	4.0	3.2	3.4	3.8	3.7	3.4	3.5	3.4	3.0	2.6	3.2	3.9 / 147	✓
+04	3.5	4.2 / 141	3.7	3.2	3.3	3.1	3.9	Top of shot ↓ 3.8	3.5	3.4	3.0	2.7	3.3	4.0 / 146	✓
209+00	3.5	4.0 / 141	3.9	3.1	3.1	3.5	3.1	3.6	3.7	3.5	2.9	2.9	3.4	3.8 / 149	✓

July 14, 1930

Floor of 4

		125	90	67½	45	22½	0	22½	45	67½	90	125	
208 + 98	3f	4.0 141	3.7	2.9	3.2	3.7	3.8	3.8	3.7	3.4	2.9	2.7	3.6	4.0 142	✓
+95	3f	4.2 143	3.3	2.8	3.2	3.7	3.5	3.9	3.8	3.6	3.3	3.1	3.6	4.1 143	✓
+92.5	3f	Shot 4.3 3.8 144	2.8	3.3	3.6	3.5	Top of shot hole 3.5	3.6	3.6	3.9	3.5	3.9	4.2 140		✓
+91	3f	4.3 4.1 142	3.1	3.4	3.5	3.5	3.5	3.7	Shot 3.6	3.3	3.2	Shot 4.2	4.2 142		✓
+88.5	3f	Shot 4.1 3.8 190	3.0	3.1	3.3	Loose slab about six inches thick 3.3	3.3	3.9	3.9	3.3	3.2	4.1	Shot 3.9 199		✓
+87	3f	4.0 142	3.7	3.0	3.1	3.4	3.3	3.3	3.7	3.9	3.9	3.3	4.1	3.8 146	✓
+86.5	3f	4.2 141	3.8	3.3	Shot 3.5	3.8	3.6	Top of shot Hole 4.0	3.7	3.6	3.5	3.0	2.8	4.0 143	✓
208 +82	3f	4.2 138	4.3	3.1	3.4	3.7	4.0	Top of shot 3.8	5.6	3.4	3.4	3.1	3.7	3.8 150	✓

July 19, 1930

2. 208 + 79

+77.5

+77

+72.5

+63.5

+58

+55

208 + 47

Floor at El

Bootleg Hole Shot out
1.5 above this Elev

44

	125	90	67½	45	22½	0	22½	45	67½	90	125	
34	4.0 / 136	3.7	3.3	3.4	3.5	3.8	2.9	3.6	3.4	3.4 Shot	3.8	3.5	3.7 / 146	✓

4" Bootleg Hole Shot out
1.1 above this elev.

34	4.0 / 140	3.6	3.3	3.4	3.4	3.7	3.3	3.6	3.5	3.0	3.0	3.5	3.8 / 147	✓

Top of shot hole

34	4.1 / 140	3.6	3.1	3.3	3.6	3.6	4.2	3.6	3.5	3.1	2.9	3.6	3.7 / 150	✓
34	4.2 / 142	4.2	3.2	3.5	3.6	3.8	4.0	2.8	3.3	2.9	2.8	3.1	3.9 / 145	✓
35	4.1 / 142	3.7	3.1	3.1	3.1	3.3	3.2	2.8	2.9	2.7	2.6	3.3	4.0 / 145	✓
37	4.6 / 139	4.3 Shot	3.6	3.3	3.1	2.8	2.8	2.8	2.6	2.7	2.9	3.4	4.0 / 147	✓
36	4.3 / 145	3.7	3.1	3.0	3.1	2.9	2.7	2.7	2.7	2.7	2.9	3.3	4.1 / 150	✓
37	4.5 / 147	3.6	2.8	2.9	3.0	3.1	3.1	2.8	2.9	2.9	2.9	3.4	4.3 / 145	✓

July 14, 1930

Station	Floor at ℄		125	90	67½	45	22½	℄	22½	45	67½	90	125		
208 +42.5	3^{6}	4^{5} / 145	3^{6}	3^{0}	3^{2}	3^{6}	3^{7}	3^{4}	2^{9}	2^{8}	2^{9}	2^{7}	3^{3}	4^{3} / 145	✓
+39.5	3^{9}	4^{8} / 145	3^{7}	3^{1}	3^{3}	3^{2}	3^{7}	3^{5}	3^{2}	2^{9}	2^{9}	2^{8}	3^{4}	4^{4} / 145	✓
+35	3^{9}	4^{4} / 148	3^{5}	2^{9}	3^{0}	3^{3}	3^{4}	3^{7}	3^{6}	3^{2}	3^{1}	3^{6}	3^{8}	4^{6} / 145	✓
+33	3^{8}	4^{5} / 146	3^{8}	3^{2} (Shot)	3^{4} (Shot)	3^{1}	3^{2}	3^{6}	3^{3}	3^{2}	3^{2}	3^{1}	3^{8}	4^{5} / 145	✓
+28	3^{9}	4^{8} / 142	3^{5}	2^{9}	3^{3}	2^{7}	2^{9}	3^{4}	3^{3}	3^{1}	3^{1}	3^{2}	3^{2}	4^{3} / 145	✓
+24	3^{9}	4^{6} / 141	4^{0}	3^{4}	3^{2}	2^{8}	2^{7}	3^{0}	2^{9}	3^{1}	3^{2}	3^{1}	3^{8}	4^{6} / 141	✓
+21	3^{8}	4^{6} / 141	3^{5}	3^{2}	3^{3}	3^{4}	3^{0}	3^{0}	3^{3} (Shot)	3^{3} (Shot)	3^{5} (Shot)	3^{9} (Shot)	4^{0} (Shot)	4^{7} / 140	✓
208 +20	3^{8}	4^{3} / 148	3^{7}	3^{2}	3^{7}	3^{5}	3^{0}	3^{1}	3^{1}	3^{4}	3^{3}	3^{4}	4^{1}	4^{7} / 140	✓

July 14, 1930

Floor of 6

		125	90	67½	45	22½	0	22½	45	67½	90	125	
2	208 +13	3.7	4.2 / 150	3.5	3.1	3.2	3.0	2.7	2.7	2.7	3.2	3.5	3.7	4.2	4.6 / 140
	+10	3.7	4.3 / 142	3.4	3.0	2.8	3.0	2.9	2.8	3.1	3.3	3.6	3.6	4.4	4.6 / 140
	+06	3.7	4.6 / 142	3.8	2.9	2.9	3.0	3.0	3.0	3.1	3.3	3.3	3.2	3.9	4.3 / 144 ✓
	+03	3.7	4.7 / 142	3.9	3.7	3.2	3.3	3.2	3.5	3.1	3.2	3.2	3.2	3.6	4.1 / 144 ✓
	208 +01	Shot 3.7	4.8 / 140	5.0	4.1	4.1	3.7	3.5	3.4	3.1	3.2	3.1	3.0	3.6	4.0 / 146 ✓
	207 +96						Top of shot hole ↓								
		3.8	4.5 / 140	3.8	3.1	3.6	3.5	3.6	3.4	4.0 / 10°	3.5 / 22½	3.2 / 45	3.3 / 67½	3.3 / 90	3.7 / 125	4.1 / 150 ✓
	+95	Shot ↓ 3.8	4.5 / 144	3.9	3.1	3.3	3.5	3.5	3.4	4.0 / 10°	3.7	3.2	3.4	3.3	3.9	4.3 / 150 ✓
2	207 +94										Shot ↓					
		3.8	4.2 / 148	3.8	3.5	3.3	3.8	3.1	3.5	3.7	4.4 / 60°	3.3	3.2	3.7	4.3 / 150 ✓

July 14, 1930 — Elliott Notes
Bailey Instr.
Soper Ruler

207 + 93

+89

+80

+79⅝

+69⅝

+64⅝

+58⅝

207 +56

125 90 67½ 45 22½ 0 22½ 45 67½ 90 125

3⅜ 4⅜ 4⁰ 3⅜ (3¼ 3⅞ 3⅞ 3⅞ 3⅝ 4⁰ 4⅜) 3⅛ 3⅜ 4⅛ ✓
150 150

Shot

3⅜ 4⅛ 3⅝ 3⅜ (3¼ 3⅜ 3⅜ 3⅛ 3⅜ 3⅝ 3⅝) 3⅛ 3⅞ 4¼ ✓
150 198

Trimmed to this

3⅞ (4⅛ 3⅜ 3¼ 3⅜ 3¼ 3⅜ 3⅝ 3¼ 3¼ 3⅜ 3⅛ 3⅞ 3⅝) ✓
146 146

Trimmed

3⅞ (4⅝ 4⅜ 3⅜ 3¼ 3⅝ 3⅛ 3⅝ 3⅜ 3¼ 3⅝ 3¼ 4⅛ 4⅜) ✓
138 145

Trimmed

3⅜ (4⅝ 4¼ 3⅝ 3⅝ 3⅜ 3¼ 3⅝ 3⅝ 3¼ 3¼ 3⅜ 4¼ 4⅝) ✓
145 145

Trimmed

3⅜ (4⅜ 4⅛ 3⅛ 3⅛ 3⅛ 3¼ 3¼ 3⅜ 3¼ 3⁰ 3¼ 4⅜ 4⅝) ✓
145 143

Trimmed

3⅞ (4⅛ 3⅝ 2⅞ 2⅜ 2⅞ 2⅞ 3¼ 3¼ 2⅞ 3⅛ 3⅛ 4¼ 4⅜) ✓
148 142

Trimmed Shot

4¼ (4⅝ 3¼ 2⅜ 2⅞ 2⅝ 2⅝ 3⁰ 2⅜ 2⅞ 3⁰ 3⅜ 4⅝ 4⅞) ✓
147 144

July 19, 1930

	Floor at 4'	12.5	90	67½	45	22½	0	22½	45	67½	90	12.5	
2	3.8	4.6	3.6	2.9	2.6	2.7	2.8	2.9	2.9	3.0	3.4 ↑ Shot	3.6	3.8	4.6	✓
		147												143	
	3.9	4.5	3.3	2.9	2.8	2.8	2.8	3.1	3.0	2.9	3.2	3.2	4.5 Shot ↓	4.8	✓
		147												140	
	3.9	4.5	3.5	3.0	3.0	2.9	3.0	3.0	3.2	3.1	3.1	3.2 Shot ↓	4.0	4.6	✓
		147												140	
	3.9	4.6	3.8	3.1	3.0	3.3	3.9	3.9	3.6	3.4 Shot	3.2	3.1	4.0	4.2	✓
		145												142	
	3.6	4.4	3.7	3.1	3.1	3.3	3.2	3.3 Top shot hole ↓	3.3	3.2	3.1	3.0	3.8	4.0	✓
		145												145	
	3.6	4.6	3.5	3.0	3.4 Shot ↓	3.3	3.2	3.7 Shot Hole ↓	3.1	3.2	3.2	3.3	3.8	4.1	✓
		148												146	
	3.7	4.6	3.9	3.1	3.0	3.3	3.4	3.3	3.3	3.3	3.2	3.2	3.2	4.1	✓
		142												145	
	3.7	4.6	3.8	3.1	3.1	3.2	3.6	3.5	3.3	3.3	3.1	3.0	3.9	4.4	
		141												142	

207 + 52.5

+ 47

+ 44

+ 38

+ 34

+ 30

+ 27

207 + 25.5

July 14, 1930

Elevation

	125	90	67½	45	22½	0	22½	45	67½	90	125	
207+15	4⁷	3⁹	3¹	2⁹	3⁰	3²	3¹	3¹	3¹	3¹	3¹	3⁸	4⁶	
	146												149	
+10	4⁵	3⁹	3¹	3²	3¹	3⁰	3¹	3¹	3⁰	3¹	3²	3⁹	4⁹	✓
	144												150	
+06	4⁵	3⁹	3¹	3¹	3¹	2⁸	3⁰	3³	3¹	3¹	3⁹	3⁸	4⁷	✓ ✓
	144												148	
+05			Shot ↓						Shot Holes ↓					✓ ✓
	4⁶	3⁷	3²	3¹	3¹	2⁹	3⁰	3¹	3⁰	3⁰	3²	3⁹	3⁹	4⁶
	142											115	125	150
207 +00									Shot ↓					✓
	4⁹	3⁵	3⁰	3¹	3³	3⁰	3²	3⁸	3⁹	3²	3¹	3²	4⁵	
	147												145	
206 +95							Shot ↓							✓
	4⁴	3⁷	3¹	3²	3²	3³	3⁴	3¹	3⁴	3³	3³	3⁸	4⁴	
	145												145	
+93				Shot ↓					Shot ↓					✓
	4⁶	3⁶	3⁰	3⁹	3³	3²	3²	3³	3⁴	3⁵	3³	3⁷	4⁴	
	147												143	
206 +92	4⁶	3⁹	3²	3¹	3³	3¹	3¹	3²	3⁵	3⁹	3³	3⁷	4⁵	✓
	148												145	

July 19, 1930

206 +90⁵

+90

+87

+86⁵

+84

+83⁵

+81

206 +79⁵

Floor at 0

	12½	90	67½	45	22½	0	22½	45	67½	90	112½	
4⁰	4⁵ 129	3⁸	3¹	3¹	3⁹ Shot	3⁴	3⁴	3⁵	4² Shot	3³	3³	4⁰	4⁶ 145	✓
4⁰	4⁵ 148	3⁷	3¹	3²	3⁸	3⁴	3⁹ Shot	3⁸	4⁰	3⁴	3³	4¹	4⁶ 148	✓
4⁰	4⁵ 146	3⁶	3²	3²	3⁴ Shot	3⁴	3⁵	3³	3⁶	3⁷ Shot	3⁴	4¹	4⁶ 146	✓
4⁰	4⁵ 147	3⁶	3¹	3¹	3³ Shot	3³	4⁰ Shot	3⁴	3⁶	3⁷	3⁴	4²	4⁷ 145	✓
4⁰	4⁵ 145	3⁸	3²	3²	3²	3⁴	3⁴	3⁵	3⁷	3⁴	3³	4⁵ Shot	4⁸ 145	✓
4⁰	4⁵ 142	3⁹	3⁴	3⁷	3²	3⁵	3⁸ Shot	3⁶	3⁷	3⁵	3⁵	4⁵	4⁷ Shot 142	✓
4⁰	4⁵ 143	3⁷	3⁶	3⁰	3⁰	3³	3¹	3⁶	3⁸	3⁶	3⁶	4⁴	4⁹ 140	✓
4⁰	3⁷ 145	3⁹	3⁰	3⁴	3⁵ Shot	3³	3¹	3⁴	3⁶	3⁴	3⁴	4⁴	4⁷ 145	✓

July 14, 1930

Elliott Notes
Bailey Instr.
Soper Ruler.

206+74

+72

+69

+65

+63

+59

+54

206 +50

Floor at 4'

	125	90	67½	45	22½	0	22½	45	67½	90	125	
4⁰	4⁸	4⁰	3¹	3¹	3⁴	3³	3⁵	3⁵	3³	3³	3⁵	4³	4⁶	–
	145				Shot ↑		↗						145	
4¹	4⁸	4¹	3¹	2⁹	3¹	3²	3¹	3³	3²	3²	3³	4⁴	4⁷	✓
	146												145	
4¹	4⁸	4¹	3¹	3²	3⁵	3⁵	3³	3⁴	3³	3²	3²	4³	4⁷	✓
	144						Shot ↓						140	
4¹	4⁸	3⁸	3³	3⁵	3⁵	3²	3¹	3¹	3¹	3¹	3²	4³	4⁷	–
	144												144	
4¹	4⁸	4⁰	3⁴	3⁶	3³	3²	3⁵	3¹	3⁰	2⁹	3¹	4²	5⁰	✓
	144			Shot ↓			Shot ↓						144	
4²	4⁹	4⁰	3⁹	3¹	3¹	3¹	3²	3³	3¹	3¹	3²	4²	5⁰	✓
	145												144	
4²	4³	4⁰	3¹	3¹	2²	3⁴	3²	3²	3²	3²	3³	4³	5¹	
	145												140	
4²	4⁷	3⁹	3⁰	3⁰	2⁸	2⁷	3¹	3²	3²	3¹	3²	4⁰	4⁸	✓
	148												144	

July 14, 1930

206 + 47

+40 5

+35 5

+32

+28

+25

+18 5

206 +14

52

Floor + ft.	125	90	67½	45	22½	0	22½	45	67½	90	125	
4 1	4 7	3 8	3 0	3 0	2 8	2 8	2 9	3 6	3 6	3 3	3 2	3 8	4 7	✓
	145												145	
4 2	4 6	3 7	3 1	3 1	3 2	3 4	3 6	3 1	3 1	3 0	3 2	3 8	4 8	✓
	147												145	
	Shot													
4 0	4 7	3 6	3 2	3 2	3 8	4 0	3 8	3 5	3 1	3 1	3 2	3 6	4 7	✓
	145												144	
4 0	4 4	3 8	3 1	3 0	3 1	3 4	3 4	3 8	3 3	3 2	3 2	3 8	4 5	✓
	148												146	
4 0	4 5	3 4	3 2	3 2	3 2	3 6	3 3	3 8	3 7	3 2	3 0	3 7	4 5	✓
	147												146	
	Top of drill Hole													
4 0	4 5	3 5	3 1	3 3	4 0	4 0	4 1	3 8	3 6	3 3	3 0	3 4	4 6	✓
	147												145	
	Shot													
4 0	4 5	3 2	3 0	3 1	3 3	3 9	4 0	4 0	3 5	3 2	3 2	3 8	4 6	✓
	147												145	
	Top shot													
4 1	4 5	3 7	3 1	3 2	4 0	3 9	3 9	3 7	3 5	3 1	3 1	3 7	4 6	✓
	145												144	

July 14, 1930 Elliott Notes
Bailey Instr.
Soper Ruler.

206 + 10

+08

+03

206 +01

July 16, 1930 Same Crew.

205 +97

+95

205 +93.5

Floor of Gr

	125	90	67½	45	22½	Gr	22½	45	67½	90	125	
4.2	4.2	3.5	3.1	3.1	3.3	3.3	3.3	3.5	3.4	3.2	3.3	3.8	4.7	✓
	147												148	
							Drill holes							
4.2	4.8	3.6	3.2	3.1	3.2	3.2	3.4	3.4	3.3	3.0	3.1	3.6	4.7	✓
	146												148	
							Shot							
4.2	4.6	3.1	3.1	3.2	3.4	3.9	3.5	3.7	3.4	3.0	3.3	3.8	4.7	✓
	147												149	
							Top drill Hole							
4.1	4.4	3.6	3.0	2.9	3.3	3.8	3.8	4.1	4.0	3.3	3.2	4.1	4.7	✓
	147												146	
							Top drill hole							
3.9	4.1	3.6	3.1	3.1	3.4	3.7	3.4	3.7	3.6	2.9	2.9	3.5	4.3	✓
	145												146	
3.9	4.3	3.5	3.0	3.0	3.4	3.5	4.0	3.7	3.2	3.0	3.1	3.6	4.4	✓
	146												148	
3.9	4.3	3.6	3.0	3.5	3.3	3.4	3.8	4.0	3.2	3.1	3.0	3.7	4.4	✓ 400
	145												145	

July 16, 1930

205 +90

+85

+80

+78

+77

+75

+74

205 +70

Lt. Rt. 5-4

Floor at ¢

	125	90	67½	45	22½	¢	22½	45	67½	90	125	
39	4⁴	3⁹	3²	3¹	3¹	4⁰	3⁷	3⁵	3⁶	3³	3²	3⁸ 4⁹
	146											145
					Top drill hole							
37	4²	3⁹	3¹	3¹	3²	2⁹	3²	3⁹	3⁷	3¹	3¹	3⁷ 4⁴
	144											144
38	4³	3⁷	3⁷	3²	3¹	3⁰	3²	3⁹	3³	3¹	3¹	3⁹ 4⁴
	148											144
								Shot				
38	4³	4⁰	3³	3³	3³	3³	3¹	3³	3⁸	3³	3¹	3⁷ 4⁴
	145											144
38	4³	3⁸	3¹	3³	3⁴	3³	3⁰	3³	3⁴	3³	3²	3⁹ 4⁴
	145											144
							Shot					
38	4⁵	3⁹	3²	3²	3⁴	3⁴	3¹	3²	3⁵	3⁹	3²	4⁰ 4⁸
	145											144
								Shot				
38	4⁴	4⁰	3²	3³	3⁶	3⁷	3⁴	3⁷	3⁴	3³	3⁰	3⁸ 4²
	142											144
				Shot								
40	4⁷	4⁰	3³	3⁵	3⁸	3⁹	3³	3⁹	3²	3⁰	2⁹	3⁷ 4⁵
	143											145

July 16, 1930

Floor at 0:

		125	90	67½	45	22½	0	22½	45	67½	90	125	
205 + 67	37	45 / 143	39	32	33	34	35	36 ↑ Shot	35	34	31	29	37	45 / 141	
+62½	39	43 / 146	39	30	31	32	36	35 ↓ Drill Hole	41	34	32	31	39	45 / 142	✓
+60	40	45 / 148	39	31	32	32	33	32 ↑	38	29	32	31	38	46 / 144	✓
+58	39	45 / 144	39	31	30	32	32	31 ↓ Drill Hole	33	36	33	31	40	46 / 148	✓
+57½	39	45 / 143	37	31	30	32	32	40 ↓ Top of shot	33	36	33	31	40	46 / 145	✓
+56	40	47 / 141	39	32	33	32	33	31	37	39	33	33	39	47 / 141	✓
+53½	40	45 / 145	40	32	32	35	34	33	29	33	32	32	45	46 / 145	✓
205 +51	40	44 / 144	40	31	33	39	40	40 ↓ Drill Hole	42	38	31	32	42	44 / 148	✓

July 16, 1930 — Elliott Notes — Bailey Instr. — Soper Ruler

205+47.5

+35.5

+34.5 (at N. face of timber)

Timber.

205+25 Portal (Entrance)

Elbow at 4

	125	90	67½	45	22½	E	22½	45	67½	90	125	
4.0	4.3	3.1	3.1	3.2	3.3	3.1	3.2	3.6	3.7	3.3	3.1	3.9	4.5	–
	148						↑ Drill Hole						147	
3.7	4.8	4.1	3.0	3.3	3.5	3.3	3.2	3.2	3.3	3.9	3.9	4.3	4.7	–
	140												140	
3.8	5.1	4.6	3.9	4.1	3.8	4.0	3.8	3.9	3.7	3.7	3.6	4.3	4.9	
	135												135	

60

L E R

IMPROVED TABLES
AND
INFORMATION

DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder stake for any width roadway, slope 1½ to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. The number in body of table in same row and column gives distance from side stake to slope stake. If ground is not level estimate the difference in elevation between the side stake and slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point, and line of sight should cut target. If it does not make the slight adjustment necessary.

TABLE No. 9.

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

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

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

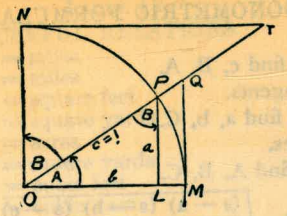


TABLE II

TRIGONOMETRIC FORMULÆ.

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

$R = OB = c = 1$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

TABLE II—Continued
TRIGONOMETRIC FORMULAE (continued)

In any triangle:

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

Use Law of Tangents.

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

Use Law of Sines.

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

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

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

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

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

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

Area of a triangle:

Area $= \tfrac{1}{2}$ ab Sin C

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	
1/16	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219	1/16
1/8	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271	1/8
3/16	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323	3/16
1/4	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375	1/4
5/16	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427	5/16
3/8	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479	3/8
7/16	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531	7/16
1/2	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583	1/2
9/16	.0469	.1302	.2135	.2969	.3803	.4635	.5469	.6302	.7135	.7969	.8802	.9635	9/16
5/8	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688	5/8
11/16	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740	11/16
3/4	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792	3/4
13/16	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844	13/16
7/8	.0729	.1563	.2396	.3229	.4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896	7/8
15/16	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948	15/16
1	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	1.000	1
	0	1	2	3	4	5	6	7	8	9	10	11	

TABLE IV
USEFUL RELATIONS

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

360° = 21600′ = 1296000″

Radius = arc of 57.2957790°

Arc of 1° (radius = 1) = .017453292

Arc of 1′ (radius = 1) = .000290888

Arc of 1″ (radius = 1) = .000004848

$\pi = 3.141592654$	$\sqrt{\frac{1}{\pi}} = 0.564190$
$\frac{\pi}{4} = 0.785398163$	$\sqrt[3]{\frac{6}{\pi}} = 1.240700982$
$\frac{\pi}{6} = 0.523598776$	$\pi^2 = 9.869604401$
$\sqrt{\frac{4}{\pi}} = 1.128379167$	$\frac{1}{\pi^2} = 0.101321184$
$\frac{\pi}{6} = 0.523598776$	$\sqrt{\pi} = 1.772453851$
$\frac{4.\pi}{3} = 4.188790205$	$\frac{1}{\pi} = 0.3183099$

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

Curvature in feet = 0.667 (Dist. in miles)^2

Difference between arc and chord length, 0.05 feet in 11½ miles

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 ½ sin 2 a + 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

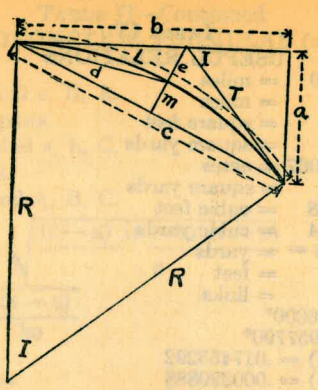


Table V

CURVE FORMULAE FOR SIMPLE CURVES

Compiled by J. Calvin Locke, C.E.

(1) $c = \sqrt{2Ra}$ (2) $c = \sqrt{a^2+b^2}$

(3) $c = \sqrt{2R\,(R-\sqrt{(R+b)\,(R-b)}} = \sqrt{2R(R-\sqrt{R^2-b^2})}$

(4) $c = 2\sqrt{m\,(2R-m)}$

(5) $c = 2R \sin \frac{1}{2} I$ (6) $c = 2T \cos \frac{1}{2} I$

(7) $e = R \operatorname{exsec} \frac{1}{2} I$

(8) $e = R \tan \frac{1}{2} I \tan \frac{1}{4} I$ (9) $e = T \tan \frac{1}{4} I$

(10) $b = \sqrt{a\,(2R-a)}$

(11) $b = \sqrt{\left(c+\frac{c^2}{2R}\right)\left(c-\frac{c^2}{2R}\right)} = \sqrt{c^2-\frac{c^4}{4R^2}}$

(12) $b = R \sin I$ (13) $b = a \cot \frac{1}{2} I$

(14) $R = \frac{a^2+b^2}{2a} = \frac{c^2}{2a}$ (15) $R = \frac{d^2}{2m} = \frac{c^2+4m^2}{8m}$

(16) $d = \sqrt{R\,(2R-\sqrt{(2R+c)\,(2R-c)}} = \sqrt{R(2R-\sqrt{4R^2-c^2})}$

(17) $d = \sqrt{2Rm}$ (18) $d = 2R \sin \frac{1}{4} I$ (19) $m = \frac{d^2}{2R}$

(20) $m = R \mp \sqrt{\left(R+\frac{c}{2}\right)\left(R-\frac{c}{2}\right)} = R \mp \sqrt{R^2-\frac{c^2}{4}}$

(21) $m = R \operatorname{vers} \frac{1}{2} I$ (22) $m = R \sin \frac{1}{2} I \tan \frac{1}{4} I$ (23) $m = \frac{1}{2} c \tan \frac{1}{4} I$

(24) $a = \frac{c^2}{2R}$ (25) $a = R - \sqrt{(R+b)\,(R-b)} = R - \sqrt{R^2-b^2}$

(26) $a = 2R\,(\sin^2 \frac{1}{2} I)^2$ (27) $a = R \operatorname{vers} I$ (28) $a = R \sin I \tan \frac{1}{2}$

(29) $a = b \tan \frac{1}{2} I$ (30) $a = T \sin I$ (31) $T = R \tan \frac{1}{2} I$

(32) $I = \frac{L}{R} \times 57.295780$ (33) $R = \frac{L}{I} \times 57.295780$

(34) $L = IR \times 0.01745329$ (35) $L = \frac{8d-c}{3}$

(36) Area Seg. $= \frac{LR - R^2 \operatorname{Sin} I}{2} = \frac{LR - Rb}{2}$

Table VI

SINES, COSINES, TANGENTS, COTANGENTS

deg.	sin 0′	tan 0′	sin 10′	tan 10′	sin 20′	tan 20′	sin 30′	tan 30′	sin 40′	tan 40′	sin 50′	tan 50′	deg.
0	0000	0000	0029	0029	0058	0058	0087	0087	0116	0116	0145	0145	89
1	175	0175	0204	0204	0233	0233	0262	262	291	291	320	320	88
2	349	349	378	378	407	407	436	437	465	466	494	495	87
3	523	524	552	553	581	582	610	612	640	641	669	706	86
4	698	699	727	729	756	758	785	787	814	816	843	864	85
5	872	875	901	904	929	934	958	963	987	992	1016	1022	84
6	1045	1051	1074	1080	1103	1110	1132	1139	1161	1169	190	198	83
7	219	228	248	257	279	287	305	317	334	346	363	376	82
8	392	405	421	435	449	465	478	495	507	524	536	554	81
9	564	584	593	614	622	644	650	673	679	703	708	733	80
10	736	763	765	793	794	823	822	853	851	883	880	914	79
11	908	944	937	974	965	2004	994	2035	2022	2065	2051	2095	78
12	2079	2126	2108	2156	2136	186	2164	217	193	247	221	278	77
13	250	309	278	339	306	370	334	401	363	432	391	462	76
14	419	493	447	524	476	555	504	586	532	617	560	648	75
15	588	679	616	711	644	742	672	773	700	805	728	836	74
16	756	867	784	899	812	931	840	962	868	994	896	3026	73
17	924	3057	952	3089	939	3121	3007	3153	3035	3185	3062	217	72
18	3090	249	3118	281	3145	314	173	346	201	378	228	411	71
19	256	443	283	476	311	508	338	541	365	574	393	607	70
20	420	640	448	673	475	706	502	739	529	772	557	805	69
21	584	839	611	872	638	906	665	939	692	973	719	4006	68
22	746	4040	773	4074	800	4108	827	4142	854	4176	881	210	67
23	907	245	934	279	961	314	987	348	4014	383	4041	417	66
24	4067	452	4094	487	4120	522	4147	557	173	592	200	628	65
25	226	663	253	699	279	734	305	770	331	806	358	841	64
26	384	877	410	913	436	950	4462	986	488	5022	514	5059	63
27	540	5095	566	5132	592	5169	617	5206	643	243	669	280	62
28	695	317	720	354	746	392	772	430	797	467	823	505	61
29	848	543	874	581	899	619	924	658	950	696	975	735	60
30	5000	774	5025	5812	5050	851	5075	890	5100	930	5125	969	59
31	150	6009	175	6048	200	6088	225	6128	250	6168	275	6208	58
32	299	249	324	289	348	330	5373	371	398	412	422	453	57
33	446	494	471	536	495	577	519	619	544	661	568	703	56
34	592	745	616	787	640	830	664	873	688	916	712	959	55
35	736	7002	760	7046	783	7089	807	7133	831	7177	854	7221	54
36	878	265	901	310	925	355	948	400	972	445	995	490	53
37	6018	536	6041	581	6065	627	6088	673	6111	720	6134	766	52
38	157	813	180	860	202	907	225	954	248	8002	271	8050	51
39	293	8098	316	8146	338	8195	361	8243	383	292	406	342	50
40	428	391	450	441	472	491	494	541	517	591	539	642	49
41	561	693	583	744	604	796	626	847	648	899	670	952	48
42	691	9004	713	9057	734	9110	756	9163	777	9217	799	9271	47
43	820	325	841	380	862	435	884	490	905	545	926	601	46
44	947	657	967	713	988	770	7009	827	7030	884	7050	942	45
45	7071	1.0000	7092	1.0058	7112	1.0117	133	1.0176	153	1.0235	173	1.0295	44
deg.	60′ cos	60′ cot	50′ cos	50′ cot	40′ cos	40′ cot	30′ cos	30′ cot	20′ cos	20 cot	10′ cos	10′ cot	deg.

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

deg.	sin 0′	tan 0′	sin 10′	tan 10′	sin 20′	tan 20′	sin 30′	tan 30′	sin 40′	tan 40′	sin 50′	tan 50′	deg.
46	7193	1.0355	7214	1.0416	7234	1.0477	7254	1.0533	7274	1.0599	7294	1.0661	43
47	314	.0724	333	.0786	353	.0850	373	.0913	392	.0977	412	.1041	42
48	431	.1106	451	.1171	470	.1237	490	.1303	509	.1369	528	.1436	41
49	547	.1504	566	.1571	585	.1640	604	.1708	623	.1778	642	.1847	40
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	1.2203	7753	1.2276	39
51	771	2349	790	.2423	808	.2497	826	.2572	844	.2647	862	.2723	38
52	880	.2799	898	.2876	916	.2954	934	.3032	951	.3111	969	.3190	37
53	986	.3270	8004	.3351	8021	.3452	8039	.3514	8056	.3597	8073	.3680	36
54	8090	.3764	107	.3848	124	.3934	141	.4019	158	.4106	175	.4193	35
55	192	4281	208	.4370	225	.4460	241	.4550	258	.4641	274	.4733	34
56	290	.4826	307	.4919	323	.5013	339	.5108	355	.5204	371	.5301	33
57	387	.5399	403	.5497	418	.5597	434	.5697	450	.5798	465	.5900	32
58	480	.6003	496	.6107	511	.6212	526	.6319	542	.6426	557	.6534	31
59	572	.6643	587	.6753	601	.6864	616	.6977	631	.7090	646	.7205	30
60	660	1.7321	8675	1.7437	8689	1.7556	8704	1.7675	8718	1.7797	8732	1.7917	29
61	746	.8040	760	.8165	774	.8291	788	.8418	802	.8546	816	.8676	28
62	829	.8807	843	.8940	857	.9074	870	.9210	884	.9347	897	.9486	27
63	910	.9626	923	.9768	936	.9912	949	2.0057	962	2.0204	975	2.0353	26
64	988	2.0503	9001	2.0655	9013	2.0809	9026	.0965	9038	.1123	9051	.1283	25
65	9063	.1445	075	.1609	088	.1775	100	.1943	112	.2113	124	.2286	24
66	135	.2460	147	.2637	159	.2817	171	.2998	182	.3183	194	.3369	23
67	205	.3559	216	.3750	228	.3945	239	.4142	250	.4342	261	.4545	22
68	272	.4751	283	.4960	293	.5172	304	.5386	315	.5605	325	.5826	21
69	336	.6051	346	.6279	356	.6511	367	.6746	377	.6985	387	.7228	20
70	397	2.7475	9407	2.7725	9417	2.7980	9426	2.8239	9436	2.8502	9446	2.8770	19
71	455	.9042	465	.9319	474	.9600	483	.9887	492	3.0178	502	3.0475	18
72	511	3.0777	520	3.1084	528	3.1397	537	3.1716	546	.2041	555	.2371	17
73	563	.2709	572	.3052	580	.3402	588	.3759	596	.4124	605	.4495	16
74	613	.4874	621	.5261	628	.5656	636	.6059	644	.6470	652	.6891	15
75	659	.7321	667	.7760	674	.8208	681	.8657	689	.9136	696	.9617	14
76	703	4.0108	710	4.0611	717	4.1126	724	4.1653	730	4.2193	737	4.2747	13
77	744	.3315	750	.3897	757	.4494	763	.5107	769	.5736	775	.6382	12
78	781	.7046	787	.7729	793	.8430	799	.9152	805	.9894	811	5.0658	11
79	816	.1446	822	5.2257	827	5.3093	833	5.3955	838	5.4845	843	.5764	10
80	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	9995	31.242	9996	34.368	997	38.189	997	42.964	9998	49.104	1
89	9998	57.290	9999	68.750	9999	85.940	9999	114.58	1.000	171.88	1.000	343.77	0
deg.	60′ cos	60′ cot	50′ cos	50′ cot	40′ cos	40′ cot	30′ cos	30′ cot	20′ cos	30′ cot	10′ cos	10′ cot	deg.

TABLE VII
RODS IN FEET AND INCHES

Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches
1	16—6	21	346—6	41	676—6	61	1006—6	81	1336—6
2	33—0	22	363—0	42	693—0	62	1023—0	82	1353—0
3	49—6	23	379—6	43	709—6	63	1039—6	83	1369—6
4	66—0	24	396—0	44	726—0	64	1056—0	84	1386—0
5	82—6	25	412—6	45	742—6	65	1072—6	85	1402—6
6	99—0	26	429—0	46	759—0	66	1089—0	86	1419—0
7	115—6	27	445—6	47	775—6	67	1105—6	87	1435—6
8	132—0	28	462—0	48	792—0	68	1122—0	88	1452—0
9	148—6	29	478—6	49	808—6	69	1138—6	89	1468—6
10	165—0	30	495—0	50	825—0	70	1155—0	90	1485—0
11	181—6	31	511—6	51	841—6	71	1171—6	91	1501—6
12	198—0	32	528—0	52	858—0	72	1188—0	92	1518—0
13	214—6	33	544—6	53	874—6	73	1204—6	93	1534—6
14	231—0	34	561—0	54	891—0	74	1221—0	94	1551—0
15	247—6	35	577—6	55	907—6	75	1237—6	95	1567—6
16	264—0	36	594—0	56	924—0	76	1254—0	96	1584—0
17	280—6	37	610—6	57	940—6	77	1270—6	97	1600—6
18	297—0	38	627—0	58	957—0	78	1287—0	98	1617—0
19	313—6	39	643—6	59	973—6	79	1303—6	99	1633—6
20	330—0	40	660—0	60	990—0	80	1320—0	100	1650—0

TABLE VIII
LINKS IN FEET AND INCHES

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

I	T	E	I=70°	I	T	E	I=80°	I	T	E	I=90°
61°	3375.0	920.2	+	71°	4086.9	1308.2	+	81°	4893.6	1805.3	+
10′	3386.3	925.9	5° C.	10′	4099.5	1315.6	5° C.	10′	4908.0	1814.7	5° C.
20′	3397.5	931.6	T	20′	4112.1	1322.9	T	20′	4922.5	1824.1	T
30′	3408.8	937.3	.25	30′	4124.8	1330.3	.30	30′	4937.0	1833.5	.36
40′	3420.1	943.1	E	40′	4137.4	1337.7	E	40′	4951.5	1843.1	E
50′	3431.4	948.9		50′	4150.1	1345.1		50′	4966.1	1852.6	
62°	3442.7	954.8	.080	72°	4162.8	1352.6	.110	82°	4980.7	1862.2	.149
10′	3454.1	960.6		10′	4175.6	1360.1		10′	4995.4	1871.8	
20′	3465.4	966.5		20′	4188.5	1367.6		20′	5010.0	1881.5	
30′	3476.8	972.4		30′	4201.2	1375.2		30′	5024.8	1891.2	
40′	3488.3	978.3		40′	4214.0	1382.8		40′	5039.5	1900.9	
50′	3499.7	984.3		50′	4226.8	1390.4		50′	5054.3	1910.7	
63°	3511.1	990.2	10° C.	73°	4239.7	1398.0	10° C.	83°	5069.2	1920.5	10° C.
10′	3522.6	996.2	T	10′	4252.6	1405.7	T	10′	5084.0	1930.4	T
20′	3534.1	1002.3	.51	20′	4265.6	1413.5	.61	20′	5099.0	1940.3	.72
30′	3545.6	1008.3	E	30′	4278.5	1421.2	E	30′	5113.9	1950.3	E
40′	3557.2	1014.4		40′	4291.5	1429.0		40′	5128.9	1960.2	
50′	3568.7	1020.5	.159	50′	4304.6	1436.8	.220	50′	5143.9	1970.3	.299
64°	3580.3	1026.6		74°	4317.6	1444.6		84°	5159.0	1980.4	
10′	3591.9	1032.8		10′	4330.7	1452.5		10′	5174.1	1990.5	
20′	3603.5	1039.0		20′	4343.8	1460.4		20′	5189.3	2000.6	
30′	3615.1	1045.2		30′	4356.9	1468.4		30′	5204.4	2010.8	
40′	3626.8	1051.4		40′	4370.1	1476.4		40′	5219.7	2021.1	
50′	3638.5	1057.7	15° C.	50′	4383.3	1484.4	15° C.	50′	5234.9	2031.4	15° C.
65°	3650.2	1063.9	T	75°	4396.5	1492.4	T	85°	5250.3	2041.7	T
10′	3661.9	1070.2	.76	10′	4409.8	1500.5	.91	10′	5265.6	2052.1	1.09
20′	3673.7	1076.6	E	20′	4423.1	1508.6	E	20′	5281.0	2062.5	E
30′	3685.4	1082.9		30′	4436.4	1516.7		30′	5296.4	2073.0	
40′	3697.2	1089.3	.240	40′	4449.7	1524.9	.332	40′	5311.9	2083.5	.450
50′	3709.0	1095.7		50′	4463.1	1533.1		50′	5327.4	2094.1	
66°	3720.9	1102.2		76°	4476.5	1541.4		86°	5343.0	2104.7	
10′	3732.7	1108.6		10′	4489.9	1549.7		10′	5358.6	2115.3	
20′	3744.6	1115.1		20′	4503.4	1558.0		20′	5374.2	2126.0	
30′	3756.5	1121.7		30′	4516.9	1566.3		30′	5389.9	2136.7	
40′	3768.5	1128.2	20° C.	40′	4530.4	1574.7	20° C.	40′	5405.6	2147.5	20° C.
50′	3780.4	1134.8	T	50′	4544.0	1583.1	T	50′	5421.4	2158.4	T
			1.02				1.22				1.45
67°	3792.4	1141.4	E	77°	4557.6	1591.6	E	87°	5437.2	2169.2	E
10′	3804.4	1148.0	.321	10′	4571.2	1600.1	.445	10′	5453.1	2180.2	.603
20′	3816.4	1154.7		20′	4584.8	1608.6		20′	5469.0	2191.1	
30′	3828.4	1161.3		30′	4598.5	1617.1		30′	5484.9	2202.2	
40′	3840.5	1168.1		40′	4612.2	1625.7		40′	5500.9	2213.2	
50′	3852.6	1174.8		50′	4626.0	1634.4		50′	5517.0	2224.3	
68°	3864.7	1181.6		78°	4639.8	1643.0		88°	5533.1	2235.5	
10′	3876.8	1188.4		10	4653.6	1651.7		10′	5549.2	2246.7	
20′	3889.0	1195.2	25° C.	20′	4667.4	1660.5	25° C.	20′	5565.4	2258.0	25° C.
30	3901.2	1202.0	T	30′	4681.3	1669.2	T	30′	5581.6	2269.3	T
40′	3913.4	1208.9	1.28	40′	4695.2	1678.1	1.53	40′	5597.8	2280.6	1.83
50′	3925.6	1215.8	E	50′	4709.2	1686.9	E	50′	5614.2	2292.0	E
69°	3937.9	1222.7	.403	79°	4723.2	1695.8	.558	89°	5630.5	2303.5	.756
10′	3950.2	1229.7		10′	4737.2	1704.7		10′	5646.9	2315.0	
20′	3962.5	1236.7		20′	4751.2	1713.7		20′	5663.4	2326.6	
30′	3974.8	1243.7		30	4765.3	1722.7		30	5679.9	2338.2	
40′	3987.2	1250.8		40′	4779.4	1731.7		40′	5696.4	2349.8	
50′	3999.5	1257.9		50′	4793.6	1740.8		50′	5713.0	2361.5	
70°	4011.9	1265.0	30° C.	80°	4807.7	1749.9	30° C.	90°	5729.7	2373.3	30° C.
10′	4024.4	1272.1	T	10′	4822.0	1759.0	T	10′	5746.3	2385.1	T
20′	4036.8	1279.3	1.54	20′	4836.2	1768.2	1.84	20′	5763.1	2397.0	2.20
30′	4049.3	1286.5	E	30′	4850.5	1777.4	E	30′	5779.9	2408.9	E
40′	4061.8	1293.6	.485	40′	4864.8	1786.7	.671	40′	5796.7	2420.9	.910
50′	4074.4	1300.9		50′	4879.2	1796.0		50′	5813.6	2432.9	

$T = R \tan \frac{1}{2} I$ $E = R \operatorname{exsec} \frac{1}{2} I$

I	T	E	I=100°	I	T	E	I=110°	I	T	E	I=120°
91°	5830.5	2444.9	+	101°	6950.6	3278.1	+	111°	8336.7	4386.1	+
10′	5847.5	2457.1	5° C.	10′	6971.3	3294.1	5° C.	10′	8362.7	4407.6	5° C.
20′	5864.6	2469.3	T	20′	6992.0	3310.1	T	20′	8388.9	4429.2	T
30′	5881.7	2481.5	.43	30′	7012.7	3326.1	.51	30′	8415.1	4450.9	.62
40′	5898.8	2493.8	E	40′	7033.6	3342.3	E	40′	8441.5	4472.7	E
50′	5916.0	2506.1		50′	7054.5	3358.5		50′	8468.0	4494.6	
92°	5933.2	2518.5	.200	102°	7075.5	3374.9	.268	112°	8494.6	4516.6	.360
10′	5950.5	2531.0		10′	7096.6	3391.2		10′	8521.3	4538.8	
20′	5967.9	2543.5		20′	7117.8	3407.7		20′	8548.1	4561.1	
30′	5985.3	2556.0		30′	7139.0	3424.3		30′	8575.0	4583.4	
40′	6002.7	2568.6		40′	7160.3	3440.9		40′	8602.1	4606.0	
50′	6020.2	2581.3		50′	7181.7	3457.6		50′	8629.3	4628.6	
93°	6037.8	2594.0	10° C.	103°	7203.2	3474.4	10° C.	113°	8656.6	4651.3	10° C.
10′	6055.4	2606.8	T	10′	7224.7	3491.3	T	10′	8684.0	4674.2	T
20′	6073.1	2619.7	.86	20′	7246.3	3508.2	.103	20′	8711.5	4697.2	1.25
30′	6090.8	2632.6	E	30′	7268.0	3525.2	E	30′	8739.2	4720.3	E
40′	6108.6	2645.5		40′	7289.8	3542.4		40′	8767.0	4743.6	
50′	6126.4	2658.5	.401	50′	7311.7	3559.6	.536	50′	8794.9	4766.9	.721
94°	6144.3	2671.6		104°	7333.6	3576.8		114°	8822.9	4790.4	
10′	6162.2	2684.7		10′	7355.6	3594.2		10′	8851.0	4814.1	
20′	6180.2	2697.9		20′	7377.8	3611.7		20′	8879.3	4837.8	
30′	6198.3	2711.2		30′	7399.9	3629.2		30′	8907.7	4861.7	
40′	6216.4	2724.5		40′	7422.2	3646.8		40′	8936.3	4885.7	
50′	6234.6	2737.9	15° C.	50′	7444.6	3664.5	15° C.	50′	8965.0	4909.9	15° C.
95°	6252.8	2751.3	T	105°	7467.0	3682.3	T	115°	8993.8	4934.1	T
10′	6271.1	2764.8	1.30	10′	7489.6	3700.2	1.56	10′	9022.7	4958.6	1.93
20′	6289.4	2778.3	E	20′	7512.2	3718.2	E	20′	9051.7	4983.1	E
30′	6307.9	2792.0		30′	7534.9	3736.2		30′	9080.9	5007.8	
40′	6320.3	2805.6	.604	40′	7557.7	3754.4	.806	40′	9110.3	5032.6	1.09
50′	6344.8	2819.4		50′	7580.5	3772.6		50′	9139.8	5057.6	
96°	6363.4	2833.2		106°	7603.5	3791.0		116°	9169.4	5082.7	
10′	6382.1	2847.0		10′	7626.6	3809.4		10′	9199.1	5107.9	
20′	6400.8	2861.0		20′	7649.7	3827.9		20′	9229.0	5133.3	
30′	6419.5	2875.0		30′	7672.9	3846.5		30′	9259.0	5158.8	
40′	6438.4	2889.0	20° C.	40′	7696.3	3865.2	20° C.	40′	9289.2	5184.5	20° C.
50′	6457.3	2903.1	T	50′	7719.7	3884.0	T	50′	9319.5	5210.3	T
			1.74				2.08				2.52
97°	6476.2	2917.3	E	107°	7743.2	3902.9	E	117°	9349.9	5236.2	E
10′	6495.2	2931.6	.809	10′	7766.8	3921.9	1.08	10′	9380.5	5262.3	1.46
20′	6514.3	2945.9		20′	7790.5	3940.9		20′	9411.3	5288.6	
30′	6533.4	2960.3		30′	7814.3	3960.1		30′	9442.2	5315.0	
40′	6552.6	2974.7		40′	7838.1	3979.4		40′	9473.2	5341.5	
50′	6571.9	2989.2		50′	7862.1	3998.7		50′	9504.4	5368.2	
98°	6591.2	3003.8		108°	7886.2	4018.2		118°	9535.7	5395.1	
10′	6610.6	3018.4		10′	7910.4	4037.8		10′	9567.2	5422.1	
20	6630.1	3033.1	25° C.	20′	7934.6	4057.4	25° C.	20′	9598.9	5449.2	25° C.
30′	6649.6	3047.9	T	30′	7959.0	4077.2	T	30′	9630.7	5476.5	T
40′	6669.2	3062.8	2.18	40′	7983.5	4097.1	2.61	40′	9662.6	5504.0	3.16
50	6688.8	3077.7	E	50′	8008.0	4117.0	E	50′	9694.7	5531.7	E
99°	6708.6	3092.7	1.02	109°	8032.7	4137.1	1.36	119°	9727.0	5559.4	1.83
10′	6728.4	3107.7		10′	8057.4	4157.3		10′	9759.4	5587.4	
20′	6748.2	3122.9		20′	8082.3	4177.5		20′	9792.0	5615.5	
30′	6768.1	3138.1		30′	8107.3	4197.9		30′	9824.8	5643.8	
40′	6788.1	3153.3		40′	8132.3	4218.4		40′	9857.7	5672.3	
50′	6808.2	3168.7		50′	8157.5	4239.0		50′	9890.8	5700.9	
100°	6828.3	3184.1	30° C.	110°	8182.8	4259.7	30° C.	120°	9924.0	5729.7	30° C.
10′	6848.5	3199.6	T	10′	8208.2	4280.5	T	10′	9957.5	5758.6	T
20′	6868.8	3215.1	2.62	20′	8233.7	4301.4	3.14	20′	9991.0	5787.7	3.81
30′	6889.2	3230.8	E	30′	8259.3	4322.4	E	30′	10025.0	5817.0	E
40′	6909.6	3246.5	1.22	40′	8285.0	4343.6	1.63	40′	10059.0	5846.5	2.20
50′	6930.1	3262.3		50′	8310.8	4364.8		50′	10093.0	5876.1	

$T = R \tan \frac{1}{2} I$ $E = R \operatorname{exsec} \frac{1}{2} I$

Table X.

MIDDLE ORDINATES OF RAILS

Length of Rail (feet)

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

Table XI.

SHORT RADIUS CURVES

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

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

Table XII.

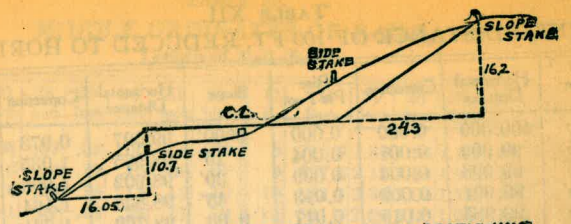
INCLINED DISTANCE OF 100 FT. REDUCED TO HORIZONTAL

Slope	Horizontal Distance	Correction	Rise Per Foot	Slope	Horizontal Distance	Correction	Rise Per Foot
0°00′	100.000	0.000	0.000	8°00′	99.027	0.973	0.139
15′	99.999	0.001	0.004	15′	98.965	1.035	0.143
30′	99.996	0.004	0.009	30′	98.902	1.098	0.148
45′	99.991	0.009	0.013	45′	98.836	1.164	0.152
1 00	99.985	0.015	0.017	9 00	98.769	1.231	0.156
15	99.976	0.024	0.022	15	98.700	1.300	0.161
30	99.966	0.034	0.026	30	98.629	1.371	0.165
45	99.953	0.047	0.031	45	98.556	1.444	0.169
2 00	99.939	0.061	0.035	10 00	98.481	1.519	0.174
15	99.923	0.077	0.039	15	98.404	1.596	0.178
30	99.905	0.095	0.044	30	98.325	1.675	0.182
45	99.885	0.115	0.048	45	98.245	1.755	0.187
3 00	99.863	0.137	0.052	11 00	98.163	1.837	0.191
15	99.839	0.161	0.057	15	98.079	1.921	0.195
30	99.813	0.187	0.061	30	97.992	2.008	0.199
45	99.786	0.214	0.065	45	97.905	2.095	0.204
4 00	99.756	0.244	0.070	12 00	97.815	2.185	0.208
15	99.725	0.275	0.074	15	97.723	2.277	0.212
30	99.692	0.308	0.078	30	97.630	2.370	0.216
45	99.657	0.343	0.083	45	97.534	2.466	0.221
5 00	99.619	0.381	0.087	13 00	97.437	2.563	0.225
15	99.580	0.420	0.092	15	97.338	2.662	0.229
30	99.540	0.460	0.096	30	97.237	2.763	0.233
45	99.497	0.503	0.100	45	97.134	2.866	0.238
6 00	99.452	0.548	0.105	14 00	97.030	2.970	0.242
15	99.406	0.594	0.109	15	96.923	3.077	0.246
30	99.357	0.643	0.113	30	96.815	3.185	0.250
45	99.307	0.693	0.118	45	96.705	3.295	0.255
7 00	99.255	0.745	0.122	15 00	96.593	3.407	0.259
15	99.200	0.800	0.126	15	96.479	3.521	0.263
30	99.144	0.856	0.131	30	96.363	3.637	0.267
45	99.087	0.913	0.135	45	96.246	3.754	0.271

Table XIII.

MINUTES IN DECIMALS OF A DEGREE.

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



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

SLOPE 1½ TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0 00	0 15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.50	1 65	1 80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	1
2	3.00	3.15	3.30	3 45	3.60	3 75	3.90	4.05	4.20	4 35	2
3	4.50	4 65	4.80	4.95	5 10	5 25	5 40	5.55	5.70	5.85	3
4	6.00	6 15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	4
5	7 50	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85	5
6	9 00	9 15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	6
7	10.50	10 65	10.80	10.95	11.10	11.25	11.40	11.55	11 70	11.85	7
8	12.00	12 15	12.30	12.45	12.60	12.75	12.90	13 05	13.20	13.35	8
9	13 50	13 65	13 80	13 95	14.10	14.25	14.40	14 55	14.70	14.85	9
10	15.00	15 15	15 30	15 45	15.60	15.75	15.90	16.05	16.20	16 35	10
11	16 50	16 65	16 80	16.95	17 10	17.25	17.40	17.55	17.70	17.85	11
12	18 00	18.15	18.30	18 45	18.60	18 75	18.90	19.05	19.20	19 35	12
13	19 50	19 65	19.80	19.95	20.10	20.25	20 40	20.55	20.70	20.85	13
14	21.00	21 15	21.30	21.45	21 60	21.75	21.90	22 05	22 20	22 35	14
15	22 50	22 65	22 80	22 95	23.10	23.25	23.40	23.55	23.70	23.85	15
16	24.00	24 15	24 30	24 45	24.60	24.75	24 90	25 05	25.20	25.35	16
17	25.50	25 65	25.80	25 95	26.10	26 25	26 40	26.55	26.70	26.85	17
18	27.00	27 15	27.30	27 45	27.60	27.75	27.90	28.05	28 20	28.35	18
19	28 50	28 65	28 80	28.95	29.10	29.25	29 40	29.55	29.70	29.85	19
20	30 00	30 15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	20
21	31 50	31 65	31.80	31.95	32 10	32 25	32.40	32.55	32 70	32 85	21
22	33 00	33 15	33 30	33 45	33.60	33 75	33.90	34.05	34.20	34.35	22
23	34 50	34 65	34.80	34.95	35.10	35 25	35 40	35.55	35.70	35 85	23
24	36 00	36 15	36.30	36 45	36.60	36.75	36.90	37.05	37 20	37.35	24
25	37.50	37.65	37 80	37.95	38.10	38.25	38.40	38.55	38.70	38.85	25
26	39 00	39 15	39 30	39 45	39 60	39.75	39.90	40.05	40.20	40.35	26
27	40 50	40 65	40 80	40.95	41.10	41.25	41 40	41.55	41.70	41.85	27
28	42 00	42 15	42.30	42.45	42.60	42 75	42.90	43.05	43.20	43.35	28
29	43 50	43 65	43.80	43 95	44.10	44 25	44 40	44.55	44.70	44 85	29
30	45 00	45 15	45.30	45 45	45.60	45.75	45 90	46.05	46 20	46.35	30
31	46.50	46.65	46.80	46 95	47.10	47.25	47.40	47.55	47.70	47.85	31
32	48 00	48.15	48.30	48 45	48.60	48 75	48.90	49.05	49 20	49.35	32
33	49.50	49 65	49.80	49.95	50.10	50.25	50.40	50.55	50 70	50.85	33
34	51 00	51.15	51.30	51.45	51.60	51.75	51 90	52.05	52.20	52.35	34
35	52 50	52.65	52.80	52.95	53.10	53.25	53.40	53.55	53.70	53.85	35
36	54 00	54 15	54.30	54 45	54.60	54.75	54.90	55.05	55.20	55.35	36
37	55 50	55 65	55.80	55 95	56.10	56.25	56.40	56.55	56.70	56.85	37
38	57 00	57.15	57 30	57 45	57.60	57 75	57.90	58.05	58.20	58 35	38
39	58 50	58.65	58 80	58 95	59.10	59 25	59.40	59 55	59.70	59.85	39
40	60 00	60 15	60 30	60 45	60 60	60.75	60 90	61.05	61 20	61.35	40
41	61.50	61 65	61 80	61 95	62 10	62 25	62.40	62 55	62 70	62.85	41
42	63 00	63.15	63 30	63 45	63 60	63 75	63 90	64 05	64 20	64.35	42
43	64.50	64 65	64 80	64.95	65.10	65 25	65 40	65.55	65.70	65.85	43
44	66 00	66 15	66 30	66.45	66.60	66 75	66.90	67.05	67.20	67.35	44
45	67 50	67 65	67 80	67 95	68.10	68.25	68.40	68.55	68.70	68.85	45
46	69 00	69 15	69 30	69.45	69.60	69 75	69.90	70.05	70.20	70.35	46
47	70 50	70 65	70 80	70 95	71.10	71.25	71 40	71.55	71.70	71.85	47
48	72.00	72 15	72.30	72.45	72.60	72.75	72.90	73 05	73.20	73 35	48
49	73 50	73 65	73.80	73.95	74.10	74.25	74.40	74.55	74.70	74.85	49
50	75.00	75.15	75.30	75.45	75.60	75.75	75.90	76.05	76.20	76.35	50

Computed by L. Leland Locke.

223+90
+59
36
280
10
276
602 -15

223+39
220+59
280

219+86
217+10