

Preliminary Cross-Section
Hudson-Cedar Falls Road

FIELD BOOK

51

51

KEUFFEL & ESSER CO.

DRAWING MATERIALS AND SURVEYING INSTRUMENTS. NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

TABLES FOR EXCAVATIONS AND EMBANKMENTS.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
ROADWAY 18 FEET WIDE. SIDE SLOPES 1 TO 1.
FOR SINGLE TRACK EXCAVATION.

"Copyright, 1895, by Keuffel & Esser Co."

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

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

For Keith's Railroad Curve Tables see end of book.

*Finder Please Return to
County Engineer's Office
Court House
Waterloo Iowa*

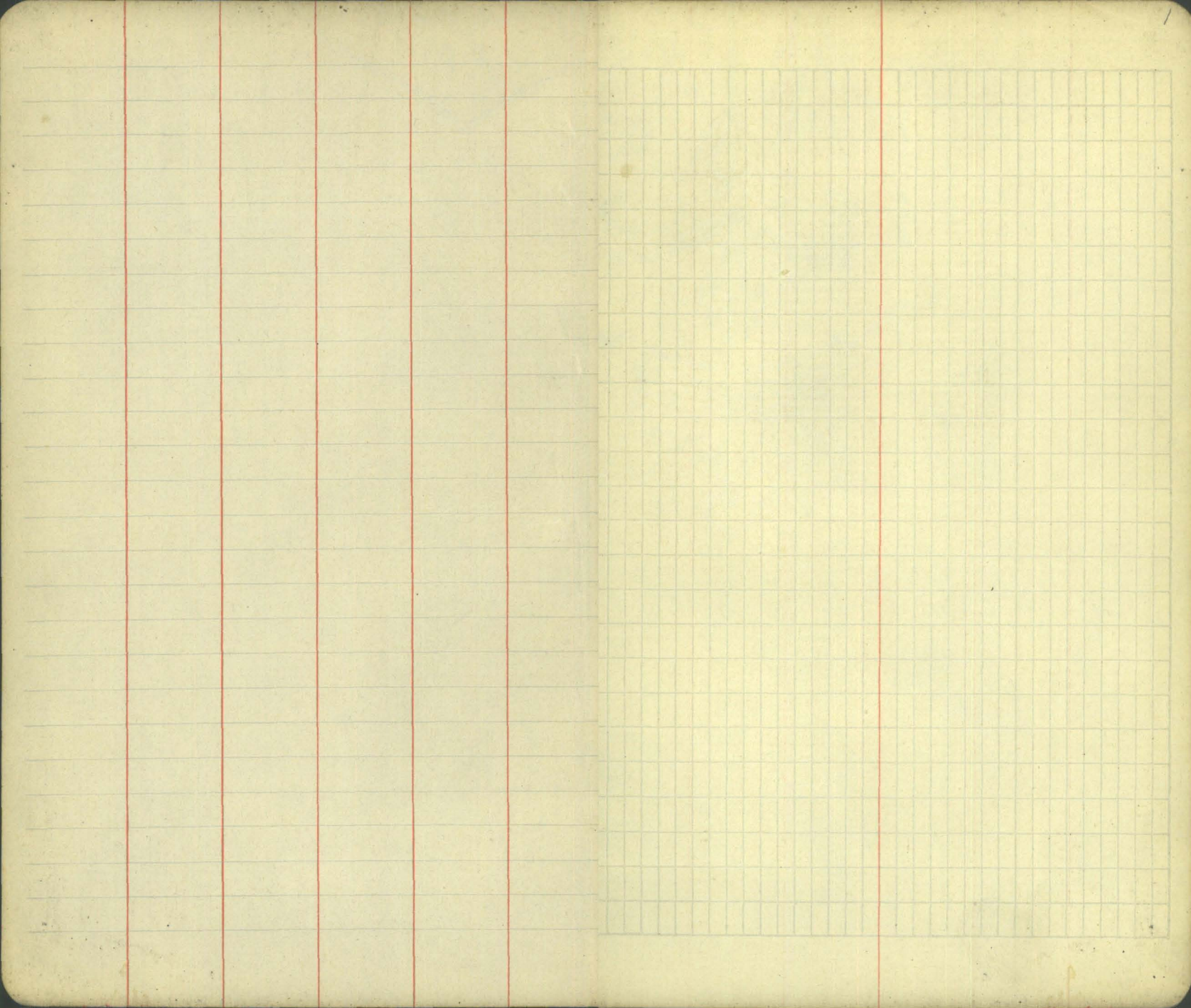
**BLACK HAWK COUNTY
ENGINEER'S OFFICE
COURT HOUSE
WATERLOO, IOWA 50703**

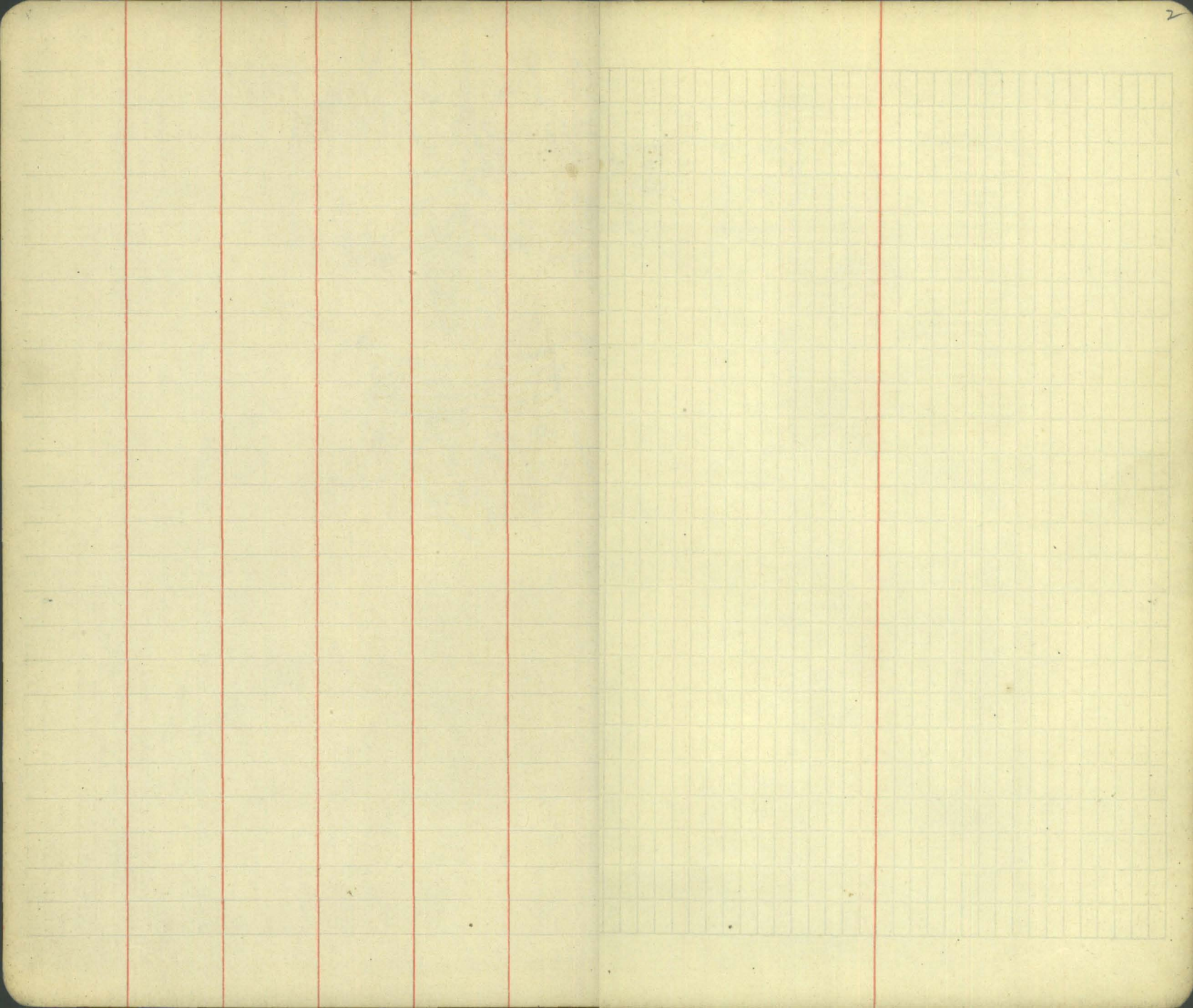
Index

1925 Hudson-Cedar Falls Road	Pages
B.M. Levels	3-13 ✓
B.M. Adjustments	18-20 ✓
Prel. X-Sec.	22-57 ✓

Ties to Corners - Sec. 13-24 T89N, R12W 58 ✓

WATERLOO, IOWA 50703
COURT HOUSE
ENGINEER'S OFFICE
BLACK HAWK COUNTY





Point B.S. H.I. F.S. Elev

B.M.#1 3.47 891.92 888.45

8.09 894.49 5.52 886.40

10.27 901.97 2.78 891.71

B.M.#2 10.51 912.12 0.37 901.61

11.40 923.14 0.38 911.74

12.80 935.58 0.36 922.78

8.68 944.15 0.11 935.77

B.M.#3 11.49 964.55 1.09 943.06

10.76 964.68 0.63 953.22

B.M.#4 0.65 958.07 2.26 957.92

949.27 11.78 946.29

T.P.7 3.50 949.67 11.90 946.17

T.P.8 3.40 946.39 946.27

Check

T.P.8 3.40 949.79 946.39

T.P.7 11.82 949.67 946.27

B.M.#4 0.69 958.11 946.29

957.92 946.17 946.39

957.42 Correct 957.42

T.P.8 0.11 946.50 946.39

B.M.#5 8.46 945.27 9.69 936.81

7.92 952.27 0.92 944.35

0.51 939.92 12.86 939.41

0.33 927.22 13.03 926.89

1.87 918.13 10.96 916.26

B.M.#6 4.87 918.67 4.33 913.80

Cold Cloudy Dec. 29, 1924 Tarbell Cavanaugh Rod

Nail H.L. Pole East at Diag. Intersection.

Nail H.L. Pole #5672 West 357+80

Nail H.L. Guy Pole #5681 East of Rd 344+20

Nail Cottonwood East

Third tree North

332+70

X West H.W. Culvert

321+62

X West H.W. Culvert

306+88

		918.67		
	12.27	930.67	0.27	918.40
	5.28	935.57	0.38	930.29
B.M.#7	9.88	937.32	8.13	927.44
	12.63	949.55	0.40	936.92
B.M.#8	8.89	947.01	11.43	938.12
	0.58	934.57	13.02	933.99
	9.62	941.67	2.52	932.05
B.M.#9	0.72	938.62	3.77	937.90
	0.70	927.10	12.22	926.40
	3.22	919.35	10.97	916.13
	4.12	917.87	5.60	913.75
B.M.#10	6.44	922.23	2.08	915.79
	10.75	932.27	0.71	921.52
	10.91	941.34	1.84	930.43
B.M.#11	2.60	936.60	7.34	934.00
	11.64	941.39	6.35	930.25
	12.69	954.42	0.16	941.73
	9.13	963.30	0.25	954.17
B.M.#12	4.94	963.27	4.97	958.33
	4.86	956.86	11.27	952.00
	11.08	964.90	3.04	953.82
B.M.#13	0.53	963.33	2.10	962.80
	1.06	953.41	10.98	952.35
	10.64	963.00	1.05	952.36
B.M.#14	2.02	962.30	2.72	960.28

Cold
Cloudy. Dec. 30, 1924

Tarbell $\nwarrow$ 4
Cavanaugh Rod

x West H.W. Culvert

296+15

Nail Cottonwood West side of Rd. 287+40
350' South of intersection Third Tree North of Culvert

Nail H. Maple
In Farm Yard

House
Drive West side of Rd.
272+90

x N.E. Wing Wall Paving Bridge

256+95

Nail H.L. Pole at double corner
238+50

West H.W. Culvert

220+73

Nail Box Elder in Farm Yard. West side of Rd.
400ft North of intersection 199+50

Soft Maple

Sta. 186+50

At S.E. corner of old Windmill.

		962.30		
	10.47	969.74	3.03	959.27
B.M.#15	1.40	963.04	8.10	961.64
	0.12	950.10	13.06	949.98
B.M.#16	12.53	953.52	9.11	940.99
	6.94	950.07	10.39	943.13
B.M.#17	9.49	952.37	7.19	942.88
	12.76	964.86	0.27	952.10
	0.08	951.87	13.07	951.79
B.M.#18	9.46	951.14	10.19	941.68
	10.72	961.70	0.16	950.98
	0.04	949.23	12.51	949.19
	0.18	936.45	12.96	936.27
B.M.#19	12.55	939.26	9.74	926.71
	11.61	950.83	0.04	939.22
	12.91	963.60	0.14	950.69
	4.56	967.78	0.38	963.22
	0.40	955.28	12.90	954.88
B.M.#20	9.01	951.53	12.76	942.52
	10.13	961.61	0.05	951.48
	0.18	948.69	13.10	943.51
B.M.#21	6.01	951.99	2.71	945.98
	0.44	940.27	12.16	939.83
B.M.#22	0.45	929.57	11.15	929.12
	0.28	916.94	12.91	916.66
	0.20	904.67	12.47	904.47

Cold

Cloudy Dec 31, 1924

Tarbell X

5

Cavanaugh Rod

Nail

Large Cottonwood East side of Rd Top of hill.

In front of Farm house 172+60.

X West H.W. Culvert 167+79

X East H.W. Culvert Sta. 154+72

X East H.W. Cul. Sta. 140+8

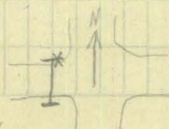
Nail

H.L. Pole West side Rd Sta. 124+46

1st pole North of Culvert First tree N. of Culvert

Nail X West. H.W. Cul. Sta. 105+23

Nail H.L. Pole West of Rd Sta. 94+10

X North H.W. Culvert West of Strayer Cor.
Sta. 87+50

	1.78	895.82	10.63	894.04		
B.M.*23	2.72	893.55	4.99	890.83	✓	Nail H.L. Pole with Danger Sign 300' North of Wood Br
	8.18	896.62	5.11	888.44		72+50 West side Rd.
	1.36	897.21	0.77	895.85		
B.M.*24	1.88	891.26	7.83	889.38	✓	Nail H.L. Pole 500' South Yellow Farm House
	3.27	888.80	5.73	885.53		52+90
	5.07	882.66	11.21	877.59		
B.M.*25	5.19	882.75	5.10	877.56	✓	Nail H.L. Pole 34+00 White Danger Sign on pole
	5.27	881.81	6.21	876.54		West side of Rd. 600' South Red Barn
B.M.*26	3.31	881.67	3.45	878.36	✓	x East H.W. Cul. Sta. 21+68
	8.02	884.29	5.40	876.27		
	4.72	883.98	5.03	879.26		
B.M.*27			3.51	880.47	✓	Nail Oak Tree South of Rd. Sta. 3+15
						Middle one of three oaks south of Rd.

Cloudy and Cold

7

Jan. 2 1925

B.M. 27 3.35 883.82 880.47

Nail in Oak Sta. 2+50

4.88 884.17 4.53 879.29

5.60 881.87 7.90 876.27

B.M. 26 3.41 881.77 3.51 878.36

878.36 East H.W. Culvert Sta. 21+69

5.60 882.28 5.09 876.68

B.M. 25 5.16 882.71 4.73 877.55

877.56 Nail H.L. Pole West side of Rd Sta. 34+00

9.43 887.96 4.18 878.53

5.87 891.09 2.74 885.22

B.M. 24 7.75 897.12 1.72 889.37

889.38 Nail H.L. Pole West of Rd Sta. 52+90

1.18 896.36 1.94 895.18

5.53 893.47 8.42 887.94

B.M. 23 4.58 895.40 2.65 890.82

890.83 Nail H.L. Pole West side of Rd Sta. 72+50

12.87 906.60 1.67 893.73

12.95 919.45 0.10 906.50

11.14 930.36 0.23 919.22

B.M. 22 11.38 940.45 1.29 929.07

929.12 N.E. Cor. H.W. Culvert Sta. 87+50

12.96 953.20 0.21 940.24

B.M. 21 9.40 955.32 7.28 945.92

945.91 Nail H.L. Pole Sta. 94+10

6.10 961.18 0.24 955.08

2.04 950.17 13.05 948.13

B.M. 20 12.60 955.07 7.70 942.47

942.5 Nail West H.W. Culvert Sta. 105+25

12.50 967.21 0.36 954.71

0.31 954.93 12.59 954.62

0.30 942.41 12.82 942.11

Trawling

Jan. 3 1925

94241

2.08 932.56 11.93 930.48

B.M. 19 10.86 937.54 5.88 926.68 926.71 Nail H.W. Pole Sta. 124+46

12.92 950.24 0.22 937.32

10.83 961.03 0.04 950.20

0.97 950.07 11.93 949.10

B.M. 18 10.50 952.14 8.43 941.64 941.68 East H.W. Culvert Sta. 140+8

12.33 964.39 0.08 952.06

0.11 957.02 7.48 956.91

1.59 948.29 10.32 946.70

B.M. 17 7.44 950.26 5.47 942.82 942.8 East H.W. Culvert Sta. 154+72

9.05 954.73 4.58 945.68

1.98 945.27 11.44 943.29

B.M. 16 11.65 952.58 4.34 940.93 940.94 West H.W. Culvert Sta. 167+79

11.35 963.93 0.00 952.58

B.M. 15 7.39 968.96 2.36 961.57 961.64 Nail Large Cottonwood Sta. 122+60

0.80 962.34 7.42 961.54

B.M. 14 1.43 961.62 2.15 960.19 960.28 Nail Soft Maple Sta. 186+50

12.56 963.04 11.14 950.48

B.M. 13 2.35 965.07 0.32 962.72 962.86 Nail Box Elder Sta. 199+50

4.57 959.14 10.50 954.57

4.32 956.48 6.98 952.16

9.80 964.10 2.18 954.30

B.M. 12 2.10 960.43 5.77 958.33 958.33 West H.W. Culvert Sta. 220+23

0.14 949.56 11.01 949.42

0.35 937.26 12.65 936.91

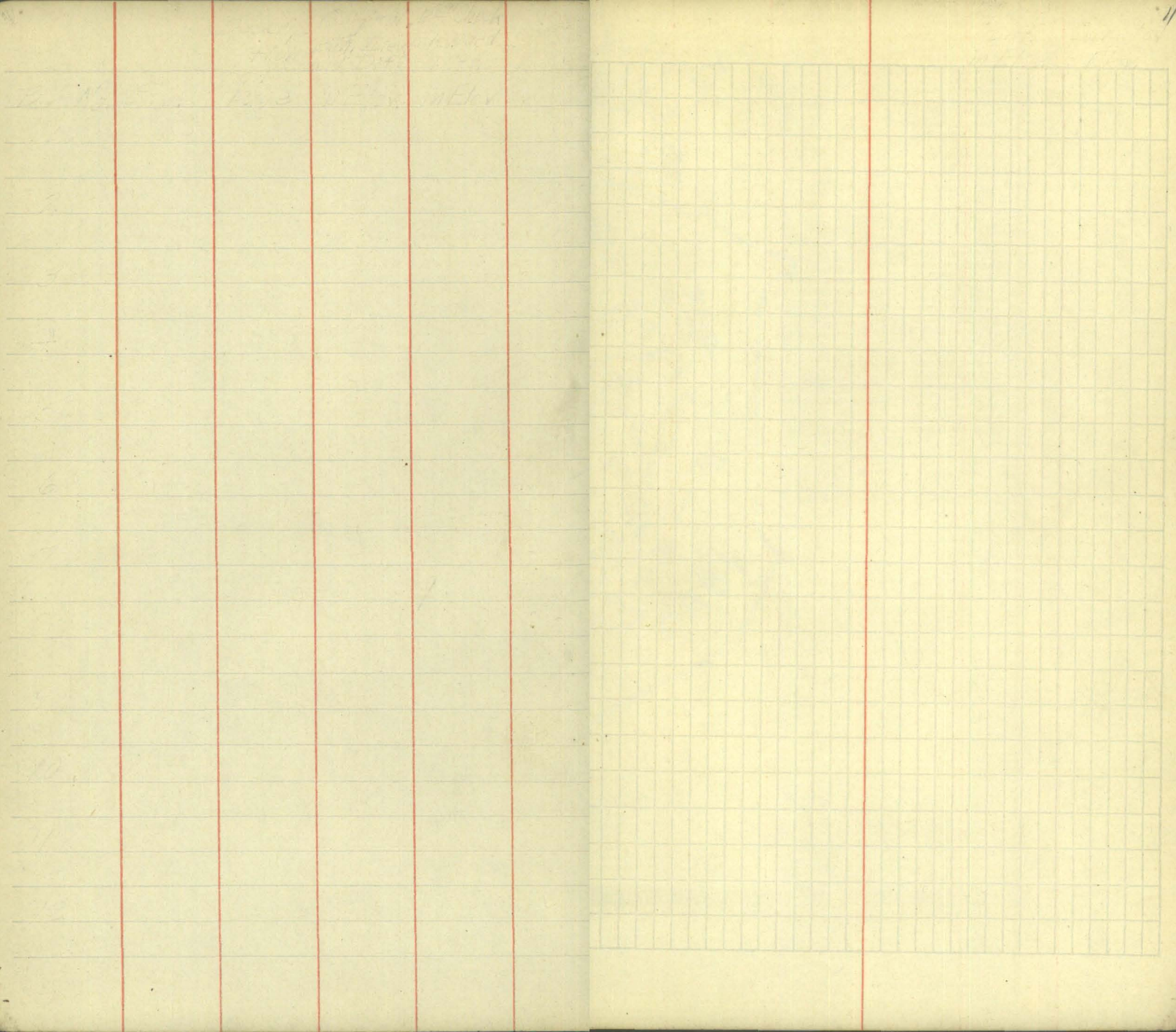
Thawing
Jan

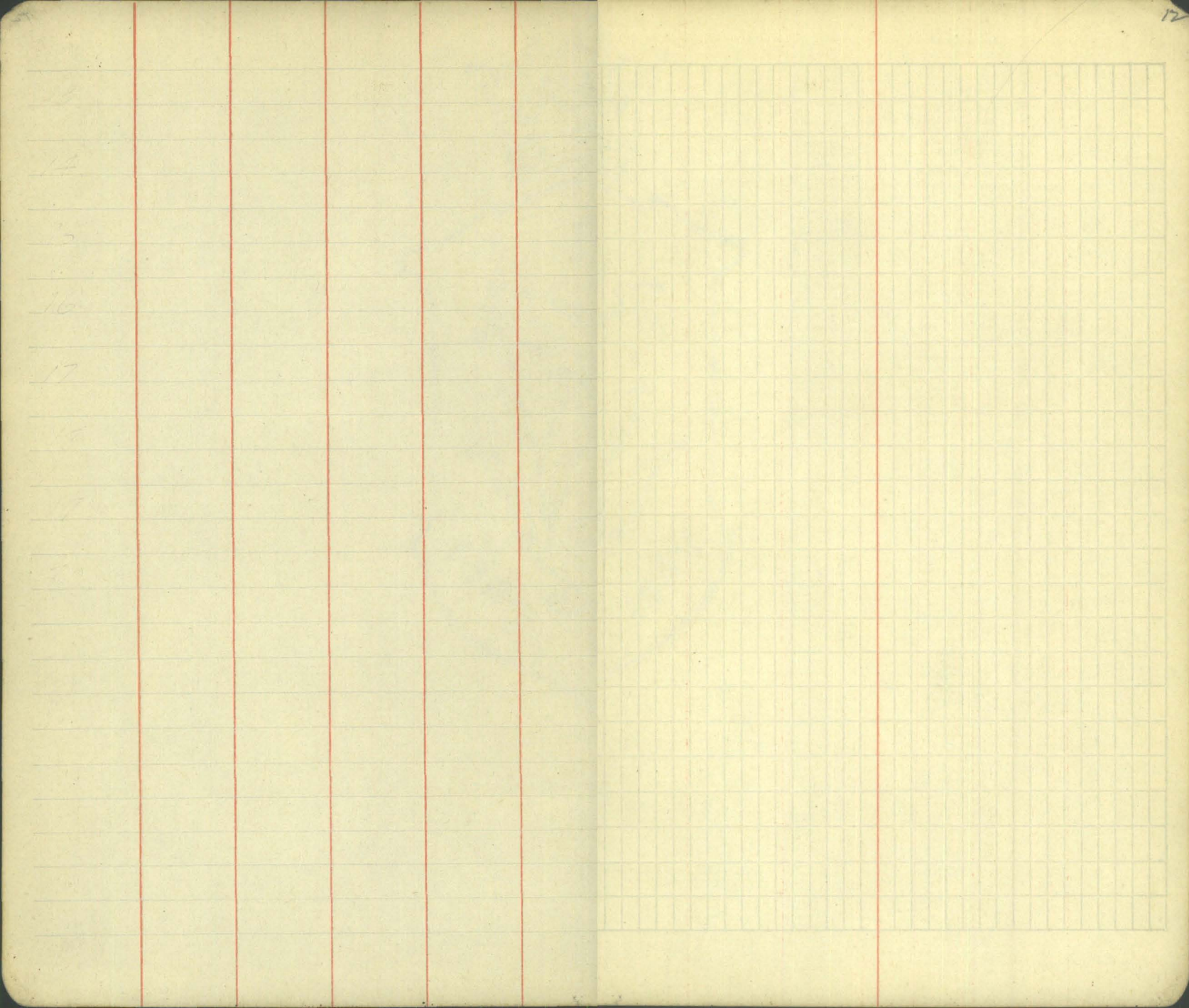
9

		937.26				
	8.49	938.54	7.21	930.05		
B.M. 11	7.30	941.43	4.41	934.13	934.01 Nail H. Pole on Corner of Elec. line	
	1.57	932.72	10.28	931.15		
	0.64	923.32	10.04	922.68		
B.M. 10	2.95	918.86	7.41	915.91	915.79x N.E. Wing Pony Br.	Sta 257+95
	9.78	925.10	3.54	915.32		
	10.98	934.73	1.35	923.75		
	5.88	939.46	1.15	933.58		
B.M. 9	1.14	939.19	1.41	938.05	937.90 Nail H. Maple in Yard	Station 273+90
	10.16	936.84	12.51	926.68		
	11.27	947.32	0.79	936.05		
B.M. 8	9.11	947.38	9.05	938.27	938.12 Nail in Cottonwood	Sta. 288+40
	0.08	934.69	12.77	934.61		
B.M. 7	8.22	935.81	7.10	927.59	927.44	Sta. 297+15
	0.56	923.62	12.75	923.06		
B.M. 6	10.04	924.01	9.65	913.97	913.80	Sta. 307+88
	12.48	936.39	0.10	923.91		
	12.30	948.44	0.25	936.14		
	4.29	952.23	0.50	947.94		
	1.39	944.22	9.40	942.83		
B.M. 5	10.69	947.68	7.23	936.99	936.81	Sta. 321+67
	7.00	951.70	2.98	944.70		
	9.26	958.73	2.23	949.47		Sta. 333+70
B.M. 4	8.11	965.70	1.14	957.59	957.42	
	0.14	955.67	10.17	955.53		

955.67

B.M.						
B.M. 3	0.36	943.53	12.50	943.17	943.06	Nail in Guy Pole Front of Steve Bonns
	0.16	931.80	11.89	931.64		
	0.48	920.28	12.00	919.80		
	1.75	910.51	11.52	908.76		
B.M. 2	1.42	903.14	8.79	901.72	901.61	
	2.41	895.63	9.92	893.22		
	5.60	892.33	8.90	886.73		
B.M. 1			3.79	888.54	888.45	





B.M. 23	4.75	895.58		890.83
	8.42	903.25	0.75	894.83
	9.13	911.66	0.72	902.53
	9.86	920.81	0.71	910.95
	10.79	931.60	0.00	920.81

B.M. 22	7.89	936.96	2.53	929.07
	10.99	946.41	1.54	935.42
	8.70	954.43	0.68	945.73

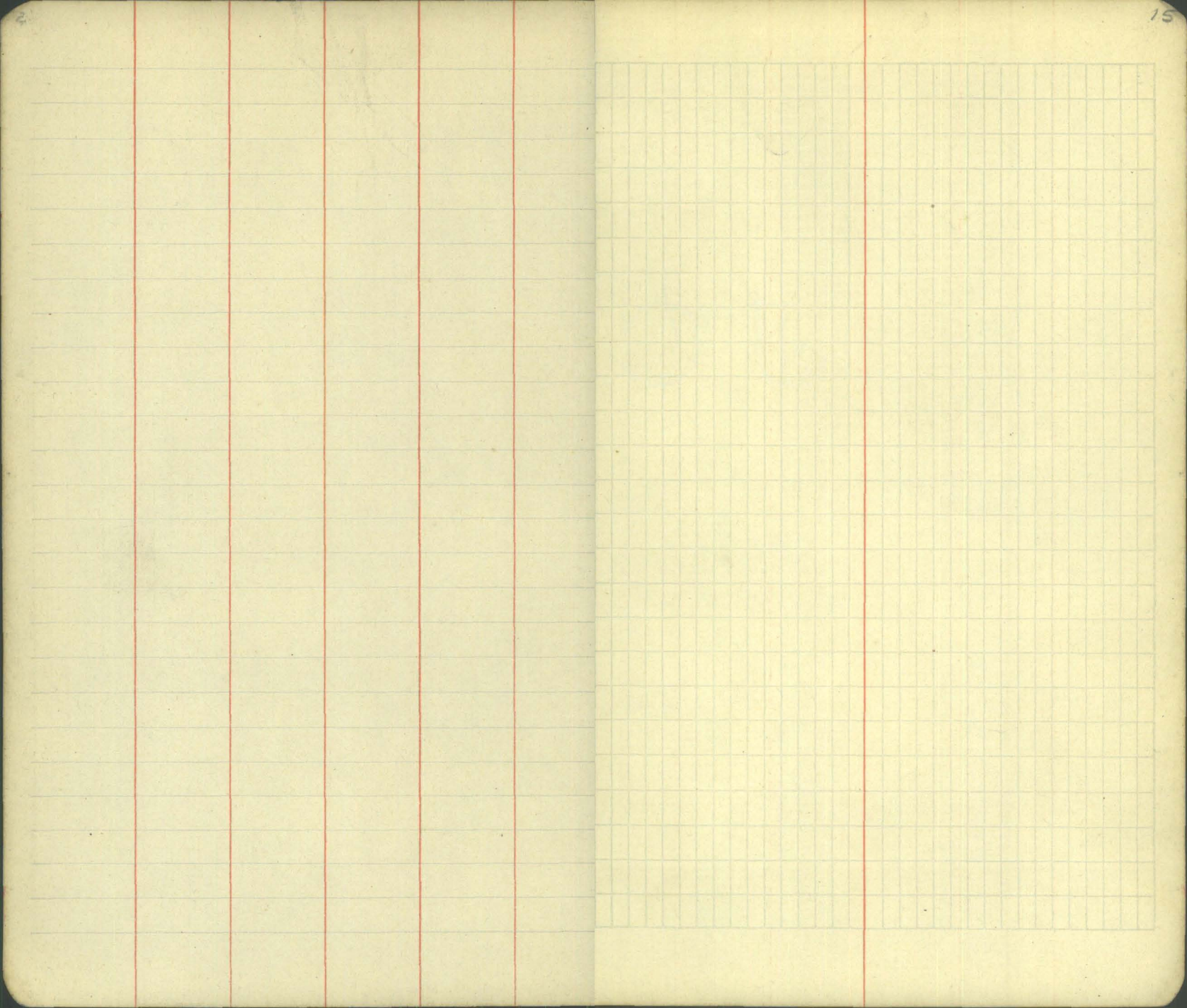
B.M. 21			8.48	945.95
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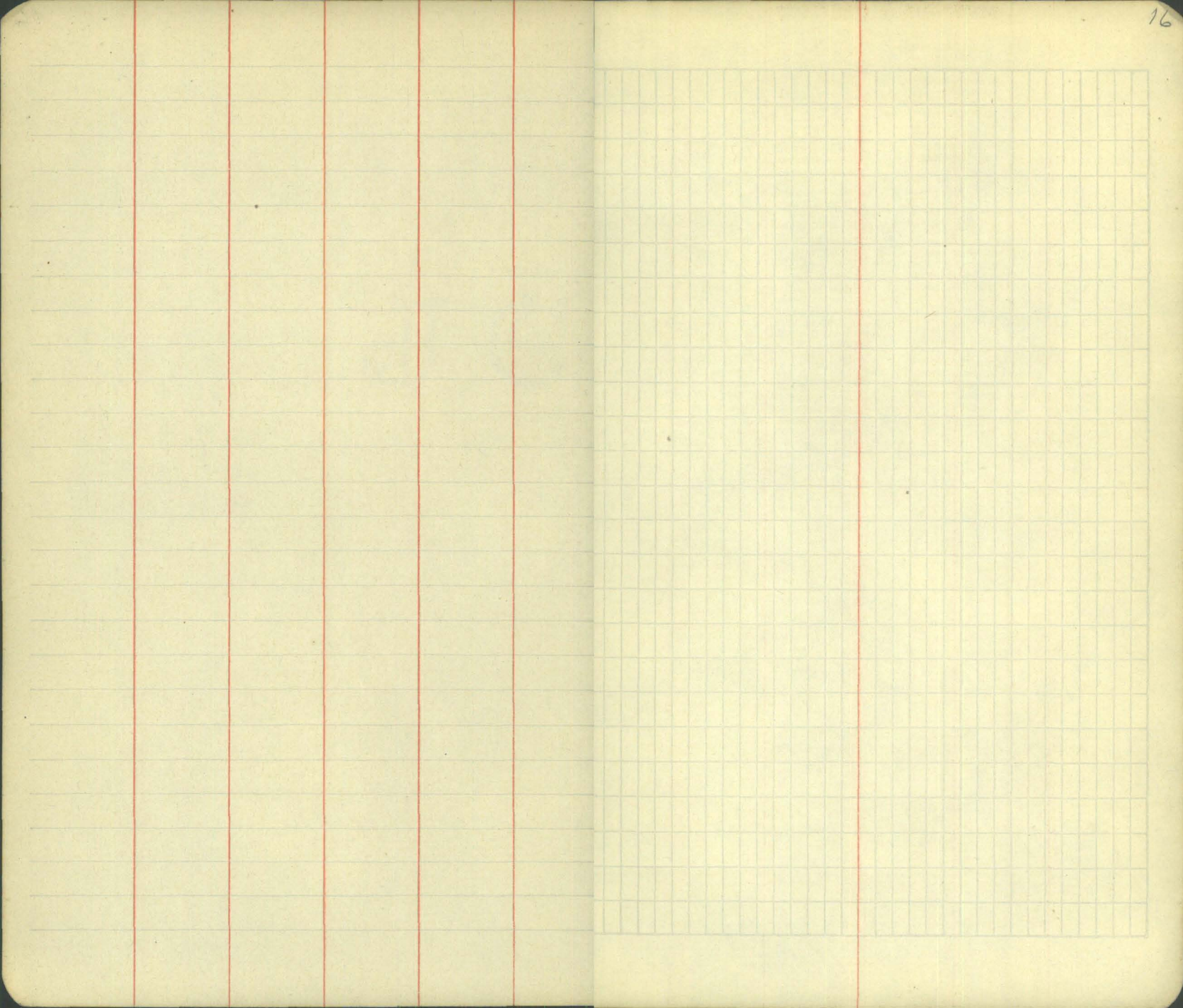
B.M. 21	8.46	954.38		945.92
	0.64	946.35	8.67	945.71
	1.63	937.04	10.94	935.41

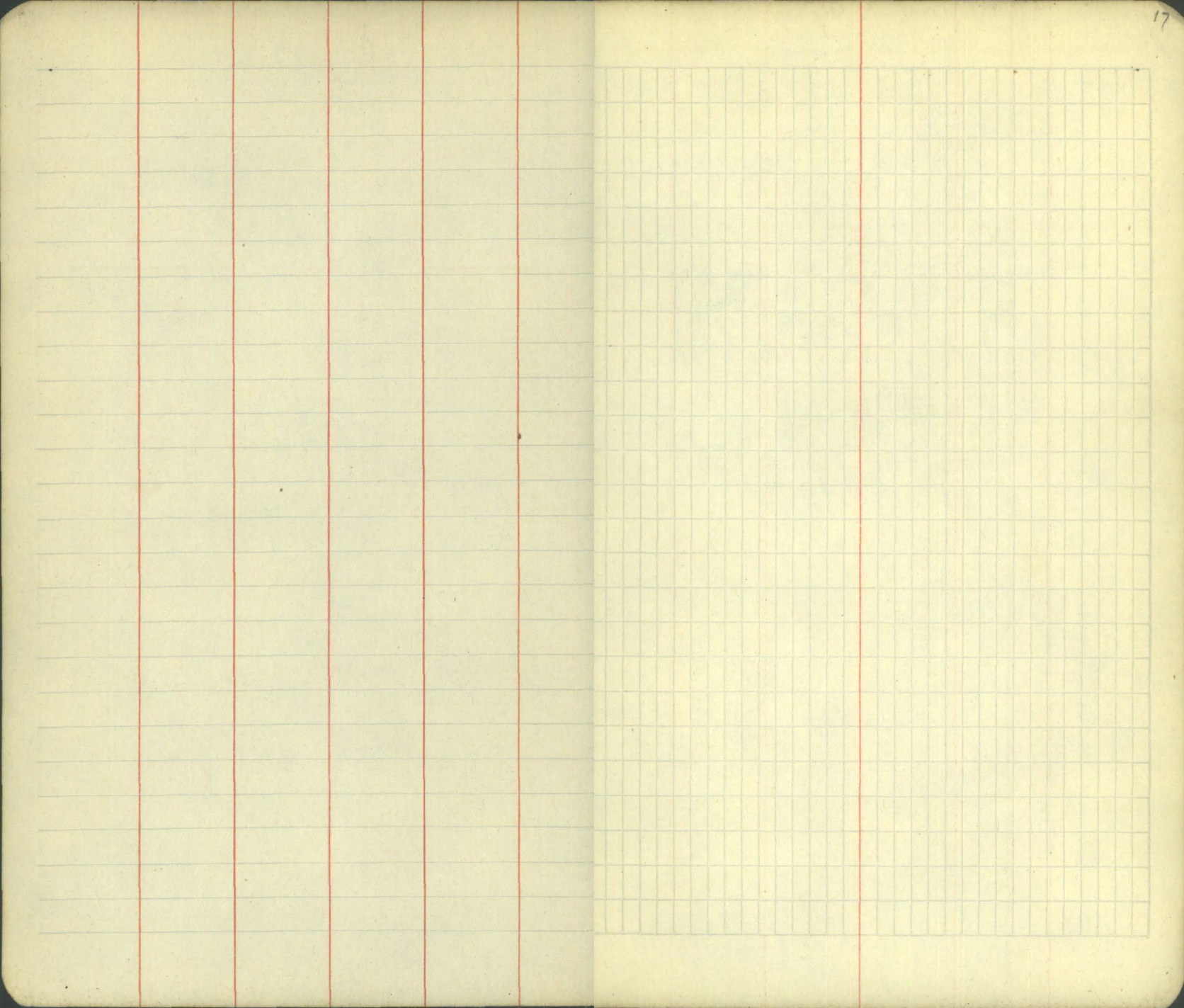
B.M. 22			7.97	929.07
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B.M. 20	5.32	947.79		942.47
	9.48	956.33	0.94	946.85
	12.51	968.04	0.80	955.53
	2.77	969.84	0.97	967.07
	1.32	958.57	12.59	957.25
	0.30	949.64	9.23	949.34
	1.10	939.66	11.08	938.56
	2.49	933.03	9.12	930.54

B.M. 19			6.32	926.71
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B.M. No	Sta.	Original	1 st Check	2 nd Check
		B.M. Elev. and Diff. in Elev.	Elev. and Diff. in Elev.	Elev. and Diff. in Elev.
1		888.45	888.54	
		+13.16	13.18	13.16
2	357+80	901.61	901.72	
		+41.45	41.45	41.44
3	344+20	943.06	943.17	
		+14.36	14.42	14.42
4	332+70	957.42	957.59	
		-20.61	20.60	20.59
5	321+62	936.81	936.99	
		-23.01	23.02	23.01
6	306+88	913.80	913.97	
		+13.64	13.62	13.63
7	296+15	927.44	927.59	
		+10.68	10.68	
8	287+40	938.12	938.27	
		-0.22	0.22	
9	272+90	937.90	938.05	
		-22.11	22.14	22.12
10	256+95	915.79	915.91	
		+18.21	18.22	
11	238+50	934.00	934.13	
		+24.33	24.20	24.26
12	220+73	958.33	958.33	

	Adjusted Diff. in Elev.	Corrected Elev.
#1		888.45
	+13.16	
#2		901.61
	+41.44	
#3		943.05
	+14.41	
#4		957.46
	-20.60	
#5		936.86
	-23.01	
#6		913.85
	+13.63	
#7		927.48
	+10.68	
#8		938.16
	-0.22	
#9		937.94
	-22.12	
#10		915.82
	+18.22	
#11		934.04
	+24.26	
#12		958.30

B.M. No. Sta.

12	220+73	958.33	958.33		
		+ 4.47	4.39	4.57	
13	199+50	962.80	962.72		
		- 2.52	2.53		
14	186+50	960.28	960.19		
		+ 1.36	1.38		
15	172+60	961.64	961.57		
		- 20.65	20.64	20.64	
16	167+79	940.99	940.93		
		+ 1.89	1.89		
17	154+72	942.88	942.82		
		- 1.20	1.18		
18	140+8	941.68	941.64		
		- 14.97	14.96	14.96	
19	124+46	926.71	926.68	926.71	
		+ 15.81	15.79	15.76	
20	105+23	942.52	942.47	942.47	
		+ 3.46	3.45	3.44	
21	94+10	945.98	945.92	945.95	945.92
		- 16.86	16.85	16.88	16.85
22	87+50	929.12	929.07	929.07	929.07
		- 38.29	38.25	38.24	
23	72+50	890.83	890.82	890.83	

 Adj.
Diff
in Elev.

 Corrected
Elev.

#12	958.30
+ 4.49	
#13	962.79
- 2.53	
#14	960.26
+ 1.37	
#15	961.63
- 20.64	
#16	940.99
+ 1.89	
#17	942.88
- 1.19	
#18	941.69
- 14.96	
#19	926.73
+ 15.79	
#20	942.52
+ 3.44	
#21	945.96
- 16.86	
#22	929.10
- 38.26	
#23	890.84

B.M. No. Sta.

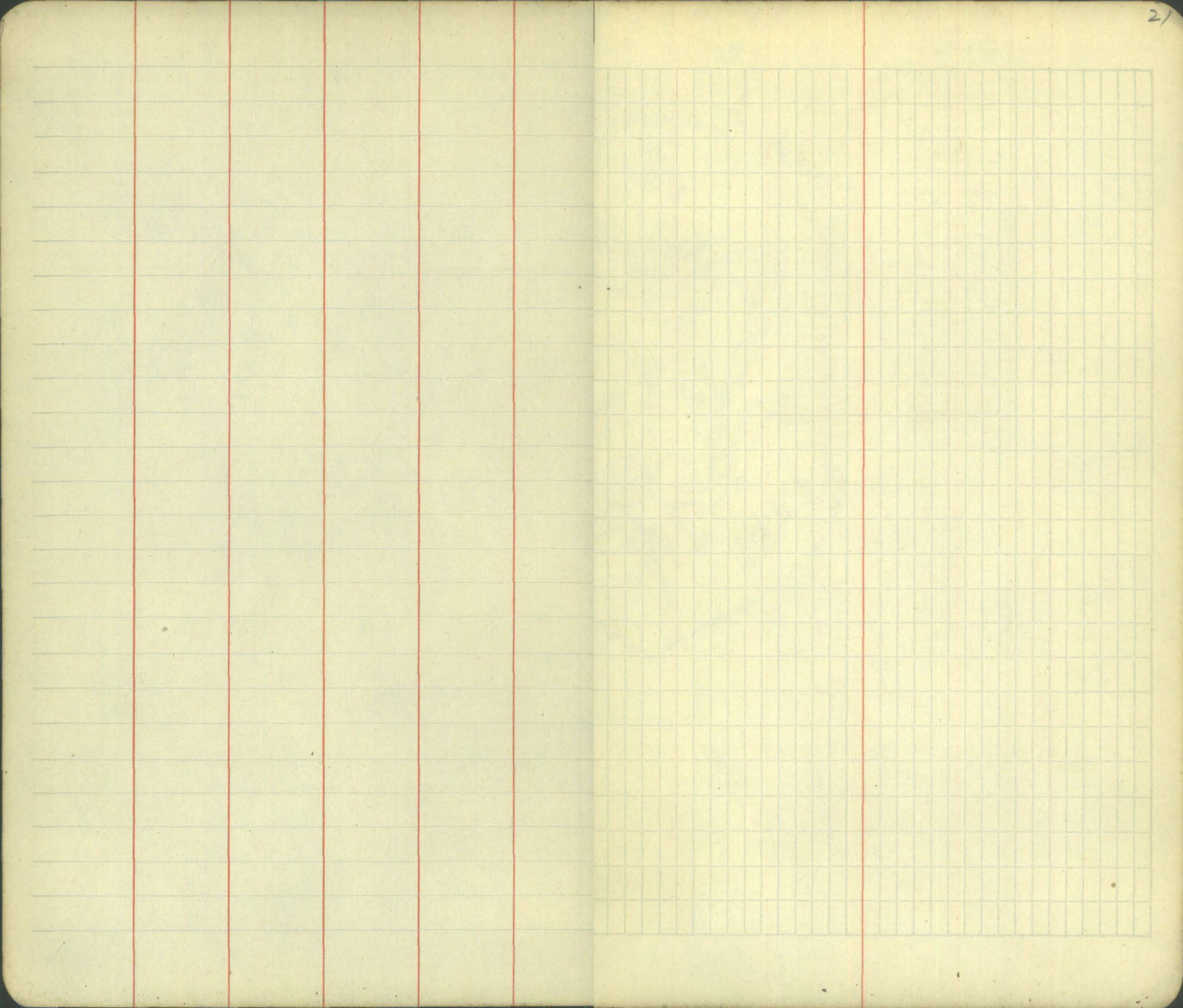
23	72+50	890.83	890.82	
		-1.45	1.45	
24	52+90	889.38	889.37	
		-11.82	11.82	
25	34+00	877.56	877.55	
		+0.80	0.81	0.81
26	21+69	878.36	878.36	
		+2.11	2.11	
27	3+15	880.47	880.47	
28	A2+30			

 Adj.
Diff
in Elev.

 Corrected
Elev.

20

#23	890.84
-1.45	
#24	889.39
-11.82	
#25	877.57
+0.81	
#26	878.38
+2.11	
#27	880.49
#28	881.11



Jan. 8 1925 Fair Weather Tape - Caranough

7450

7

6

5

4

B.M. #27 3.80 884.29 4.13 880.49

3

2

1

0+16

0

Center Br. over Black Hawk

B.M. #27 4.13 884.62 0 880.43

217'

77.1 76.6 76.8 78.3 78.4 78.0 77.1 77.1 77.8 77.2 77.8
7.2 7.7 7.5 6.0 6.2 6.2 7.2 7.2 6.5 6.5 6.5
35 31 26 21 59 11 15 19 23 27 30 34

78.6 78.3 77.6 76.9 77.1 78.3 78.2 76.9 77.2 78.3 78.6
5.7 6.0 6.2 7.4 7.2 6.0 7.0 6.1 6.9 7.4 7.1 6.0 5.7
33 29 26 22 19 14 5.7 20 23 27 29 31 33 f

80.1 76.9 76.7 77.2 78.4 78.7 78.3 77.8 78.0 79.6 79.8
f 8.2 7.4 7.6 7.1 5.7 7.8 5.6 6.0 6.5 6.3 4.7 4.5 f
32 28 23 19 16 5.4 18 23 27 30 32 33 f

79.1 79.0 76.9 76.7 77.0 78.5 78.8 78.7 76.8 76.6 77.1 78.5
f 5.2 5.3 7.4 7.6 7.3 5.8 7.7 5.5 5.6 7.5 7.7 7.2 5.9 f
34 30 26 24 20 15 5.6 14 21 24 28 31 33 f

79.9 76.8 76.5 77.1 79.1 79.1 79.3 79.1 77.8 77.5 77.6 78.7 78.8
4.4 7.5 7.8 7.2 5.2 7.2 5.2 5.0 5.2 6.5 6.8 6.7 5.6 4.5
33 27 25 20 14 5.1 12 14 16 20 25 28 31 33

78.6 78.3 76.5 76.2 76.6 78.9 79.4 77.3 76.7 76.7 78.7
6.0 6.3 8.1 8.4 8.0 5.7 7.6 5.2 7.3 7.9 7.2 5.9
33 30 27 25 21 14 5.0 14 19 24 28 33

75.4 73.5 73.5 74.2 78.9 78.8 74.2 73.5 73.3 74.1 75.1
f 9.2 11.1 11.1 10.4 5.7 7.4 5.8 10.4 11.1 11.3 10.5 7.5 f
34 33 30 26 22 12 5.2 12.6 f 21 25 28 30 33

76.2 73.5 73.3 74.1 79.3 78.5 79.0 74.4 73.8 74.5 75.9
8.4 11.1 11.3 10.5 5.3 7.5 5.6 10.2 10.8 10.1 8.7 8.7
34 30 28 23 12 5.1 10 20 24 28 32 34

75.5 75.4 74.7 75.1 77.5 81.6 81.6 78.2 76.5 75.8 76.1 76.3
7.1 8.2 9.9 9.5 7.1 3.0 8.6 3.0 6.4 8.1 8.8 8.5 8.3
33 32 26 22 15 7 3.0 8 13 18 23 27 33

79.2 82.6 82.4 78.7
5.4 7.0 8.4 5.9
9 8 22 10

82.5
2.1

27

26

25

24

23

22

B.M. #26	3.46	881.84	3.33	878.39
----------	------	--------	------	--------

21+69	Co/V ₁	5.2 X 3.2	R.C.B.
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21

20

19

18

17+71 ♀ Culr 6.3 x 3.6
881.72

Handwritten mathematical calculations, likely a ledger or account book, showing various entries and sub-totals. The entries are organized into columns and rows, with some entries marked with checkmarks (✓) or plus signs (+). The calculations involve numbers, possibly representing currency or measurements, and include some text labels like "f" and "33".

39

38

37

36

35

B.M. #25 5.29 882.86 5.30 877.57

34

33

32

31

30

T.P. 6.01 882.87 4.98 876.86

29

28

881.84

8	77.7	77.0	76.1	76.8	77.5	77.4	75.3	75.9	76.8	77.2	77.2
1	5.2	5.9	6.8	6.6	5.4	77.9	5.5	7.6	7.9	6.1	5.7
3	30	25	20	16	13	5.0	12	17	21	24	28.5
17.4	77.4	77.3	76.1	75.7	75.8	77.4	77.3	75.2	75.3	76.5	77.3
5.5	5.3	5.8	6.8	7.2	7.1	77.9	5.6	7.7	7.6	6.4	5.1
34	30	24	21	18	16	12.50	13	17	20	23	29
77.4	77.2	77.4	75.5	75.3	77.2	77.3	75.1	75.2	76.4	77.8	77.9
5.5	5.2	5.5	7.4	7.6	5.7	77.6	5.6	7.8	7.7	6.5	5.1
33	30	26	21	16	12	5.3	12	16	19	23	29
8	77.2	76.4	75.4	75.2	76.8	76.9	74.9	74.9	75.8	77.4	76.8
6.0	5.7	6.1	7.5	7.7	6.1	77.4	6.0	8.0	8.9	7.1	5.5
34	30	25	21	16	12	5.5	13	16	18	22	29.3
76.7	76.9	76.6	75.7	75.4	75.1	77.1	76.9	75.0	75.4	76.0	76.4
6.7	6.3	7.2	7.5	7.8	5.8	77.5	6.0	7.9	7.5	6.9	6.5
34	30	27	22	17	12	5.4	13	16	22	24	27
76.4	76.7	76.6	75.7	75.3	75.0	77.0	76.8	75.0	75.5	76.3	77.2
6.5	6.2	6.3	7.2	7.6	7.9	77.4	6.1	7.9	7.4	6.6	5.7
33	30	25	21	17	15	5.5	13	18	21	23	30
8	77.0	76.6	75.6	75.2	77.2	77.2	75.4	75.8	76.6	77.4	77.4
6.9	5.7	6.3	7.3	7.7	7.6	77.7	5.8	7.5	7.1	6.3	5.5
33	29	23	21	17	14	11	14	18	22	25	32
8	77.8	76.8	75.7	75.3	75.2	77.4	77.6	75.6	75.9	76.1	76.0
6	5.1	6.1	7.2	7.6	7.7	77.1	5.3	7.3	7.0	6.8	6.9
33	29	22	20	18	15	10	14	18	21	23	25
8	77.1	76.9	75.7	75.1	77.1	77.1	77.8	77.3	75.6	75.9	75.7
6	5.8	6.0	7.6	8.0	7.8	77.9	5.1	5.6	7.3	7.0	7.2
33	27	23	19	17	15	11	5.0	5	14	19	23
76.9	76.3	75.0	74.8	74.8	76.3	76.6	77.3	76.7	75.4	75.5	75.9
6.1	6.6	7.9	8.1	8.1	7.6	6.3	6.2	7.5	7.4	7.1	7.0
28	22	20	17	14	12	5.6	14	18	22	27	28
8	75.7	75.4	75.9	75.6	75.4	75.5	75.7	74.2	74.6	74.8	74.9
6.5	6.1	6.9	7.9	8.2	7.5	6.3	6.1	7.6	7.4	7.0	6.9
33	27	22	19	17	14	12	5.8	15	19	21	25
5	76.0	75.3	74.1	73.8	74.0	75.4	76.0	75.7	74.9	75.0	74.8
6	5.8	6.5	7.7	8.0	7.8	6.4	6.1	7.5	7.1	6.6	7.2
33	27	22	19	17	14	11	5.8	15	19	21	25

51

50

49

T.P.

48

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46

45

44

43

42

41

40

5.81 891.09 5.38 885.28

11.66 890.66 3.86 879.00

882.86

88.2 86.9 85.1 84.4 86.0 86.3 85.9 84.1 84.6 85.7 86.2 86.0 85.9
 f 2.9 4.2 6.0 6.7 5.1 5.2 7.0 6.5 5.4 4.9 f 5.1 5.2
 33 26 21 17 14 11 15 19 22 26 29 33

86.9 86.3 84.6 84.3 85.6 86.5 83.9 84.4 85.4 85.6 86.3
 f 4.2 4.8 6.5 6.8 5.5 5.6 7.2 6.7 5.7 5.5 f 5.8
 33 27 23 19 14 11 14 19 21 25 33

85.0 85.3 86.0 84.3 84.4 86.1 85.7 85.7 84.0 84.2 84.8 84.7 85.9 85.8
 6.1 5.8 5.1 6.8 6.7 5.0 5.4 7.4 7.1 6.9 6.3 6.4 7.2 7.3
 33 31 28 22 19 15 10 13 16 18 20 26 30 33

5 86.4 85.3 84.0 84.1 84.3 85.4 85.2 83.5 83.6 84.6 84.2 83.5 83.3
 2 4.3 5.4 6.1 6.6 5.3 5.5 7.2 7.1 6.1 6.5 7.2 7.4
 3 31 26 23 22 18 14 10 14 19 20 26 30 33

86.1 85.7 84.2 83.9 85.4 85.2 83.1 83.0 85.6 85.5 83.7 83.1
 4.6 5.0 6.5 6.8 5.3 5.5 7.6 7.7 6.1 6.2 7.0 7.6
 33 27 22 18 13 11 16 19 20 26 30 33

87.1 86.4 84.1 83.9 85.4 85.2 83.5 83.6 84.3 84.3 83.6 83.6
 3.6 4.3 6.6 6.8 5.3 5.5 7.2 7.1 6.4 6.4 7.1 7.1
 33 26 22 19 13 11 17 19 21 26 30 33

85 85.2 87.3 84.4 84.0 85.8 85.5 83.5 83.8 84.6 84.7 84.1 85.1
 2.2 2.5 3.4 6.3 6.7 4.8 5.2 7.2 6.7 6.1 6.0 6.4 6.6
 33 30 22 19 17 12 13 17 20 24 27 31 33

87.2 86.9 85.8 84.2 85.8 84.1 82.4 82.3 83.6 83.7 83.0
 3.5 3.8 4.1 7.7 8.2 6.3 6.6 8.3 8.4 7.1 7.0 7.7
 33 30 24 18 16 12 12 15 20 24 26 33

84.0 84.1 83.3 84.0 80.1 81.7 81.8 79.7 80.3 81.6 82.0 81.5 81.1
 6.7 6.6 7.4 10.7 10.0 9.0 8.9 11.0 10.4 9.1 8.7 9.2 9.3
 33 29 25 20 17 13 12 16 19 22 26 31 33

80.5 81.1 80.5 78.4 78.7 79.8 77.6 78.0 79.1 78.3 79.5
 10.2 9.6 10.2 12.3 11.0 10.9 13.1 12.7 11.6 11.4 11.2
 33 29 24 17 13 12 16 20 22 27 33

84 79.5 79.7 77.9 77.4 75.7 78.3 76.2 76.6 72.6 78.0 78.0
 3.4 3.8 4.1 5.0 5.5 4.6 4.6 6.7 6.3 5.3 4.9 4.9
 33 30 26 23 21 17 13 12 20 23 27 33

85 77.4 77.6 76.9 76.8 77.8 77.5 75.4 75.3 76.7 77.3 77.3
 4.5 4.3 6.3 6.0 6.1 5.0 5.4 7.5 7.1 6.2 5.6 5.6
 33 29 25 24 22 18 14 12 17 19 23 28 33

61

60

59+21

T.P. W. C. 2.82

899.92

5.65

896.10

59

58

57+60

57

6.66

901.75

1.90

895.09

56

55

54

B.M. #24

53

7.60

896.99

1.71

889.38

889.3

52

891.09

4 92.3 96.1 94.3 96.1 99.2 94.1 96.0 96.1 92.3 92.5 93.4 92.7 93.4 93.2
 5 2.6 3.8 5.6 7.0 7.7 5.8 94.6 5.9 7.8 7.6 7.4 6.5 6.2 6.5 6.7
 33 31 25 21 19 16 12 5.3 13 17 20 23 26 28.5 31 33

59 95.6 95.0 93.4 96.1 99.2 95.0 94.4 96.3 92.3 93.3 95.4 92.9
 2 4.3 4.8 6.5 7.0 6.8 4.9 95.2 5.5 7.6 7.6 6.6 6.5 7.0
 3 30 27 23 20 16 12 7.7 11 16 23 25 28 33

79.8 91.9 90.0 96.0 96.1 95.9 96.0 96.0 89.9 89.7 88.2 85.7
 6.1 8.0 9.7 3.9 3.8 3.7 3.9 10.0 10.2 11.7 14.2
 12.5 31 10.5 9 7.5 4.0 8 9 9 29 129 229

75.7 96.2 95.7 94.5 95.5 94.2 96.2 95.7 93.1 92.3 92.2 92.6 91.7 91.1
 6.1 5.6 6.0 7.2 8.0 7.5 5.5 95.9 6.0 8.6 9.4 9.5 9.1 10.4 10.6
 33 30 28 25 19 13 9 5.9 9 14 18 23 27 30 33

92.2 95.9 97.5 97.2 96.4 96.5 95.9 94.6 94.0 95.3 95.2 94.2
 1.6 2.7 4.3 4.6 5.4 5.3 96.4 5.9 7.2 7.8 6.5 6.5 7.6
 31 25 22 10 16 12 5.3 11 15 17 23 27 30

98.0 97.3 95.9 94.7 94.5 96.6 96.7 96.5 96.3
 3.0 4.5 96.3 5.9 7.1 7.3 5.2 5.1 5.3 6.3
 Drive 34 20 4.9 12 16 19 24 27 28 33

99.0 98.0 95.1 94.8 95.0 94.3 93.4 93.3 95.3 96.0 96.2
 2.8 3.8 6.7 6.9 95.0 1.5 8.4 8.5 6.5 5.8 5.6
 33 28 24 12 6.7 13 16 19 23 27 32

92.5 92.5 91.5 90.6 90.0 91.4 91.3 89.5 89.7 90.7 90.6
 4.5 4.5 5.5 6.4 7.0 5.6 91.7 5.7 7.5 7.3 6.3 6.4
 33 31 28 23 16 14 5.3 12 16 21 27.5 33

91.2 91.2 90.4 89.5 88.4 89.0 87.4 87.6 86.5 88.4 87.9
 5.4 5.6 6.0 6.5 9.3 7.6 89.7 8.0 9.6 9.8 8.5 8.6 9.1
 33 32 28 21 17 13 7.3 12 15 19 22 27 33

90.8 92.0 89.2 91.7 86.2 88.0 87.7 85.8 86.1 86.9 87.1 86.8
 6.1 7.8 9.3 10.8 9.0 88.0 9.3 11.2 10.9 10.1 9.2 10.2
 33 30 24 22 17 13 9.0 11 15 18 21 26.6 33

89.5 88.3 87.1 85.9 85.5 87.0 86.8 84.8 85.3 86.0 86.3 85.8
 1.8 2.8 4.0 5.2 5.6 4.1 87.3 4.3 6.3 5.8 5.1 4.8 5.3
 33 29 24 21 18 14 3.9 11 15 19 21 26 33

88.7 86.6 85.5 86.0 86.6 86.8 86.3 84.1 84.9 85.9 85.1
 7.4 8.5 9.6 6.1 4.5 86.8 4.8 7.0 6.2 5.2 6.0
 33 25 18 11 14 4.3 11 16 20 26.5 33

69 + 61

 $69 + 54$ $69 + 38$

69+31

69

5.77 892.71 7.12 886.94

68

67

66

65

64

3.76	894.06	9.62	890.30
------	--------	------	--------

63

62

899.92

0.93 704.81

82

81

80

T.P.

79

10.91 705.74 0.45 894.83

78

77

76

75

74

F.L. 893.75
4'-6"F.L. 883.4
4'-3 1/2"

73

B.M. #23

4.44 895.28 1.89 890.82 890.8

72

71

704.00

892.71

3.1	02.7	01.4	01.9	01.5	02.3	02.2	01.4	01.1	01.6	02.4	02.4	01.9
2.6	3.0	4.3	3.8	4.2	3.4	90.5	3.5	4.3	4.6	4.1	3.3	3.8
33	27	22	18	16	13	3.2	12	15	18	23	27	29
79.3	99.4	98.9	98.0	98.3	99.1	99.1	98.1	98.3	98.1	98.5	99.0	98.7
6.4	4.3	6.8	7.7	7.4	6.6	99.5	6.6	7.6	7.4	6.6	6.2	6.7
33	28	22	19	15	13	6.2	13	16	19	22	27	30
96.3	96.0	96.3	96.7	95.6	96.5	96.3	96.5	95.3	96.2	95.7	96.4	97.0
9.4	9.7	9.4	10.2	10.1	9.2	10.1	9.2	10.4	10.3	9.8	9.3	8.7
33	27	23	19	15	13	8.8	13	16	20	22	23	27.6
72.6	72.2	73.6	73.8	72.7	73.6	73.7	72.5	72.9	73.1	73.7	73.8	73.8
1.7	2.1	1.7	2.5	2.6	1.7	94.2	1.6	2.8	2.4	2.1	1.6	1.5
33	26.5	22	19	15	13	1.1	14	16	22	24	27.8	33
91.9	91.6	91.6	91.2	90.3	91.6	92.2	90.8	91.2	91.9	91.9	91.9	91.9
3.4	3.7	3.7	4.1	3.0	92.6	3.1	4.5	4.1	3.6	3.4	3.4	3.3
33	27	22	15	13	2.7	14	17	22	23	27.6	33	33
90.5	90.5	90.5	90.2	90.3	91.1	91.1	89.7	89.9	90.4	90.7	90.6	90.6
4.8	4.8	4.8	5.1	5.3	4.2	91.5	4.2	5.6	5.4	4.9	4.6	4.7
33	26.5	22	20	16	13	3.8	14	17	22	24	28.5	33
89.7	89.6	89.1	89.2	90.4	90.7	90.1	88.9	89.3	89.8	89.9	89.9	89.9
5.5	5.7	6.2	6.1	4.9	90.7	5.2	6.5	6.0	5.5	5.4	5.4	5.4
33	27	22	19	16	14	4.6	13	16	22	29	33	33
89.5	89.6	89.5	89.8	89.7	89.8	89.6	88.6	88.6	89.1	89.3	89.2	89.2
5.8	5.7	5.5	6.5	6.6	5.5	90.2	5.7	6.7	6.7	6.2	6.0	6.1
33	27.5	23	20	17	14	5.1	13	15	21	23	29	33
89.5	89.4	89.6	89.3	89.2	89.2	89.3	88.0	88.0	89.2	89.1	88.9	88.9
5.8	5.9	6.7	7.1	5.9	90.2	6.0	7.3	7.3	6.3	6.2	6.2	6.2
33	27	21	16	13	5.8	13	16	20	23	30	33	33
89.4	89.3	89.7	89.3	89.0	89.5	89.0	89.5	89.5	89.5	89.2	89.3	89.3
5.9	6.0	7.6	8.0	6.3	89.5	6.3	7.8	7.8	6.3	6.1	6.0	6.0
33	27.5	23	18	17	13	5.8	13	16	19	23	30	33
89.3	89.1	89.8	89.2	89.3	89.0	89.9	89.9	89.0	89.7	89.7	89.9	89.9
3.4	3.6	3.9	5.5	6.4	4.7	88.8	4.8	5.8	5.7	4.0	4.0	3.8
33	28	24	20	18	14	3.9	13	16	18	22	29	33
98.3	98.1	98.5	98.1	98.5	98.3	98.3	98.3	98.5	98.4	98.0	98.2	98.2
4.4	4.6	5.2	6.6	6.9	6.5	98.4	5.1	5.5	7.1	7.3	4.7	4.5
33	28	25	21	19	16	4	12	16	18	26	29.5	33
86.0	87.2	86.9	85.3	85.4	87.5	87.2	84.8	84.6	84.7	86.9	87.1	86.7
6.7	5.5	5.8	7.4	7.3	5.2	87.5	5.5	7.9	8.1	8.0	5.8	6.0
33	28	24	21	18	15	5.2	10	17	19	21	27	33

B.M. #22 5.10 934.20 5.10 929.16 929.

+62

+56

+52

+38. & Twp. Rd

+28

+19

+15

87

86

85

84

83

8.64 934.26 1.84 925.62

11.80 927.46 1.01 915.66

11.86 916.67 904.81

30.6 29.3 28.6 28.3 28.1 28.3 28.5 28.2 27.1 27.0 27.9 27.8
3.7 5.0 5.7 6.0 5.2 6.0 5.8 6.1 7.2 7.3 6.4 6.5
34 30 28 21 17 5.5 14 16 20 22 27 29 33

27.6 27.4 28.7 29.1 28.5 28.3 27.1 26.7
6.7 6.9 5.4 5.2 5.8 28.5 6.0 7.2 7.0
34 26 22 19 17 5.8 20 25 32

28.6 28.3 27.8 27.3
5.7 5.7 6.5 7.0
33 19 25 34

34.0 33.1 30.7 29.3 28.4 26.9 26.6 26.4 27.2 30.8
0.3 1.2 3.6 5.0 5.9 7.6 7.4 7.7 8.1 6.6 3.5
168 150 100 50 20 6.7 26 50 100 200 300

28.1 28.3 28.1 27.4 27.2 26.5
6.2 6.0 6.2 6.9 7.1 7.8
34 30 23 17 7.1 33

26.0 26.7 26.6 26.4 26.1 25.1 24.7
8.3 7.6 7.7 7.5 8.3 9.2 9.0
26 23 15 13 22 29 34

27.4 26.7 25.5 25.6 26.4 26.5 25.9 25.7 25.2 24.7
6.9 7.6 8.8 8.7 7.9 8.1 8.4 8.6 9.5 9.6
33 29 24 22 18 16 7.8 15 21 24 34

27.1 27.2 26.8 25.6 25.8 26.4 25.0 24.1 24.0 24.2
0.4 0.3 0.7 1.7 2.1 2.1 2.5 2.5 3.4 3.5 3.3
33 30 28 20 19 13 2.0 13 17 26 31

25.5 24.3 21.4 20.4 20.8 20.6 20.0 20.7 21.3
3.0 3.8 6.1 7.1 6.7 7.2 6.9 7.5 6.8 6.2
33 27 18 17 12 6.3 12 16 27 30

18.1 15.0 12.5 15.5 15.0 14.8 15.9 15.0 14.5 14.6 15.0 15.8 12.0 12.7 12.0 12.0
7.4 9.5 10.0 12.0 12.5 12.7 11.6 15.7 12.5 13.0 12.9 12.5 11.7 10.8 9.8 10.5
33 27 25 21 14 14 13 11.8 14 16 17 18 23 24 28 30 33

11.9 11.1 10.1 09.8 09.8 10.1 10.5 09.5 09.8 10.1 11.1 10.7 10.7
7 4.8 5.6 6.6 6.9 6.7 6.6 11.0 6.7 7.2 6.9 6.6 5.6 6.0 6.0
33 21 24 23 17 14 12.7 12 15 18 24 27 29 33

06.7 05.9 05.3 05.0 06.2 06.5 06.1 05.8 04.8 05.8 06.1 06.7 06.1
10.0 10.8 11.7 11.7 10.5 10.7 10.6 10.9 11.9 11.5 10.5 10.0 10.6
33 26.5 24 21 15 11 10.7 12 15 17 23 24 28 30 33

12.25 961.91

T. P. Nail 16Pole

0.80 949.66

97

96

95+01

Cul 41

94+96

94

B. M. #21

4.50

950.46

9.21

945.93

945.96

93

92

91+85

91

11.29

955.14

0.15

943.85

90

89

10.98

944.00

1.18

933.02

88

934.20

50.7	50.9	47.9	47.4	47.8	48.0	48.5	48.5	46.1	46.7	49.8	50.2	50.2
10.2	0.4	2.6	3.1	3.2	2.5	2.0	2.2	3.8	3.8	0.7	0.3	0.3
37	28	23	20	18	14	20	13	16	18	22	31	33

43.3	42.6	42.9	42.9	41.1	42.9	41.7	42.0	40.1	41.6	41.5
7.2	7.9	7.6	6.6	6.6	6.6	6.8	8.5	8.7	8.9	9.0
37	23	17	14	6.4	12	17	19	24	30	33

4.0	48.0	41.9	40.2	39.6	44.3	43.2	43.2	43.9	39.6	39.8	37.8	34.0
5	7.5	8.6	10.3	10.9	6.2	7.3	43.0	7.3	6.6	10.9	11.2	16.5
50	30.5	28	20	13.6	13.6	12.6	7.5	6	7	7	17	100

43.0	42.0	40.3	41.7	42.2	43.2	43.0	43.9	39.6	39.5	38.4	37.3
7.3	8.5	10.2	8.8	8.3	7.3	43.0	7.6	10.9	11.0	12.1	13.2
30	27	21	17	15	12	7.5	6	14	19	28	33

45.8	45.1	43.6	42.5	42.5	43.4	43.1	42.5	41.1	40.5	40.1	39.7
4.7	3.4	6.9	8.1	8.1	7.7	43.1	8.8	9.4	10.0	10.4	10.8
33	29	23	21	18	16	7.4	10	15	22	27	33

47.1	48.4	47.9	46.5	46.6	45.9	45.0	45.1	46.6	46.8	46.0	46.1
6.0	6.7	7.2	9.6	8.5	46.6	9.2	10.1	10.0	8.5	8.3	9.1
34	30	25	19	16	8.5	12	15	17	20	26	29

54.7	54.4	50.1	51.1	51.5	51.0	50.7	50.7	52.4	52.2	54.6	54.7
0.4	0.7	5.0	4.2	5.6	4.1	4.4	4.7	2.7	0.9	0.5	0.4
33	24	19	16	3.6	13	14	16	20	21	27	33

54.5	53.8	50.1	50.1	50.7	51.1	50.3	52.5	54.3	54.7	54.8
0.6	1.3	5.0	5.0	4.4	4.0	4.8	2.6	0.8	0.7	0.3
34	24	20	19	16	12	14	20	21	27	33

48.1	46.8	44.3	44.4	45.0	45.7	44.7	44.7	46.1	48.3	48.7	48.4
7.0	8.3	10.8	10.7	10.1	45.7	9.4	10.4	10.4	9.2	6.8	6.4
34	25	21	19	17	9.4	10	13	13	20	27	31

46.2	39.6	37.2	38.7	38.5	39.7	39.5	38.0	38.5	39.4	39.6	38.6	40.4
3.8	4.4	5.0	5.3	5.5	4.5	4.5	6.2	5.5	4.5	4.5	4.4	3.8
34	27	27	23	21	17	4.2	11	14	18	20	26	30

6.9	36.3	36.0	34.9	33.4	33.3	35.2	35.0	34.0	34.1	34.4	33.8	33.6
1	7.2	8.0	9.1	10.6	10.7	8.8	9.2	10.0	9.7	9.6	10.2	10.4
33	31.6	26	23	22	20	17	11	14	17	19	25.6	33

32.4	32.0	29.7	29.8	30.5	30.2	30.0	28.9	29.0	29.4	31.0	30.9
1.8	2.2	4.5	4.4	3.7	4.0	4.2	5.3	5.2	4.5	3.8	3.2
34	31	24	18	16	10	10	14	19	22	24	26.2

108

12.62 959.52 2.62 946.90

107

106

105+23 6 1/4 3x3x24 R.C.B.

105
B.M.#20 5.00 947.52 6.89 942.52 942.52

104

103

102

T.P. 3.35 949.41 12.47 946.06

101

1.27 958.53 12.65 957.26

100

99 10.76 969.91 2.76 959.15

98

961.91

3 50.4 50.3 49.0 48.7 49.4 49.8 49.5 49.2 49.1 52.6 53.3 53.4
 2 9.1 9.2 10.5 10.8 10.1 11.1 10.0 10.3 10.4 6.9 6.2 6.1
 1 30 26 22 18 15 9.7 11 13 16 22 27 32

43.2 43.4 43.2 43.8 44.5 44.9 44.7 43.8 44.0 44.6 44.7 45.1
 43.3 44.1 43 3.7 3.8 44.9 44.7 43.8 44.0 44.6 44.7 45.1
 33 31 28 18 15 2.6 12 13 20 27 29 33

38.9 38.9 39.6 40.3 41.5 41.3 37.8 37.5 38.4 38.0
 8.6 8.6 7.8 7.8 6.0 4.6 6.2 7.7 8.9 9.1 9.5
 33 31 19 17 12 5.9 9 13 18 28 33

10 40.3 38.0 35.7 34.6 42.5 40.9 41.1 42.1 34.1 33.7 32.5 31.0 29.5
 5 7.2 9.5 11.8 12.9 5.6 6.6 6.4 5.4 13.4 13.8 15.0 16.5 18.1
 30 200 100 33 17 17 16 6.6 8 8.5 9 25 27 100 200

38.4 38.8 37.9 36.4 36.5 38.3 40.9 41.0 36.9 35.9 33.5
 9.2 9.1 11.1 11.0 9.2 6.7 4.0 6.5 10.6 11.0 12.0
 33 31 27 25 23 19 14 6.5 8 17 27.5 33

44.9 43.5 40.0 40.8 40.3 41.9 41.0 39.9 39.2 39.4
 4.5 5.9 12.4 8.6 7.1 4.4 7.5 8.4 9.6 10.2 10.0
 33 31 27 22 18 15 7.0 11 14 27 30 33

47.1 46.7 46.9 46.8 46.0 44.7 44.2 44.4 41.6 40.9
 2.7 4.7 6.6 7.4 4.7 4.5 5.2 7.0 7.8 8.5
 33 31 26 22 19 16 4.9 10 15 26 33

45.5 45.3 44.5 44.7 46.1 45.6 43.4 40.6
 3.9 4.1 4.7 4.7 3.3 3.8 6.0 8.8
 33 30 23 20 15 3.5 9 5 25 33

47.9 48.5 49.1 49.8 49.5 48.9 48.9 51.3 51.6 51.7
 10.6 10.2 9.4 8.7 4.9 9.0 9.6 9.6 7.2 6.9 6.8
 33 31 24 16 8.6 8 11 14 16 27 33

59.4 60.0 59.5 56.1 55.9 56.7 56.9 56.7 64.8 65.1 65.2
 10.5 9.9 10.4 12.3 14.0 13.2 57.2 13.0 13.7 5.1 4.7
 33 31 24 18 17 13 12.9 9 15 24 28 33

62.8 62.9 61.1 60.7 60.6 61.2 60.7 60.2 60.0 63.9 64.3
 7.0 7.8 9.2 9.3 9.2 9.7 7.9 6.0 5.6
 33 26 22 19 16 8.7 12 14 16 22 30

59.7 59.7 56.9 55.9 54.1 54.4 54.2 54.9 54.4 54.4 52.6 59.4 58.8
 7.2 8.0 7.9 7.5 55.2 7.0 7.5 7.5 4.7 2.6 2.5 3.1
 33 31 24 18 16 13 6.7 13 14 17 22 23 30 33

12.36 938.58

119

118

117

116

T.P. 1.57 950.94 12.33 949.37

115

114

T.P. 1.19 961.70

113

112

111+42

111

110

109

12.92 971.89 0.55 958.97

959.52

42.6 42.3 41.5 41.2 41.8 41.2 40.1 39.8 40.2 40.1 39.7 39.7
 8.3 8.6 9.4 9.2 9.1 41.8 9.7 10.8 11.1 10.7 10.8 11.2 11.3
 33 23 20 17 13 9.1 14 16 21 22 27 30 33

43.0 43.2 42.0 42.2 43.1 43.9 43.2 41.9 41.9 41.6 41.6
 7.9 7.7 8.9 8.7 7.2 43.9 43.2 41.9 41.9 41.6 41.6
 33 23 19 18 14 7.0 7.5 17 27 30 33

45.6 45.2 44.4 44.2 45.7 45.4 44.1 44.1 45.0 44.9 44.9
 5.3 5.7 6.2 6.7 5.2 45.4 44.1 44.1 45.0 44.9 44.9
 33 21 19 18 14 4.5 4.4 17 20 23 27 33

49.3 48.7 47.0 47.1 48.7 48.5 47.3 47.1 47.8 48.3 48.3 48.3
 11.6 2.0 3.9 3.8 2.2 49.3 48.5 47.3 47.1 47.8 48.3 48.3
 33 23 18 17 14 1.9 1.9 16 18 21 22 27 33

54.3 54.0 52.5 51.3 51.2 52.7 52.3 51.7 51.5 52.4 52.5 53.1
 7.4 7.7 9.2 10.4 11.5 52.7 52.3 51.7 51.5 52.4 52.5 53.1
 33 3 21 19 17 15 8.6 13 16 20 22 26.5 33

58.7 58.3 55.9 56.1 57.1 57.3 57.1 56.1 55.9 54.3 60.0 60.1
 13.0 3.4 5.8 5.6 4.0 57.3 57.1 56.1 55.9 54.3 60.0 60.1
 33 24 18 16 14 4.4 12 15 16 21 27 33

64.3 64.2 64.3 60.8 61.1 61.6 62.2 61.8 61.2 66.0 66.6 66.1
 7.6 7.7 7.6 11.1 10.8 10.3 62.2 61.8 61.2 66.0 66.6 66.1
 33 31 26 14 17 12 9.7 12 15 21 27 33

67.5 67.3 67.1 65.5 65.0 65.9 66.3 66.0 64.9 65.3 67.2 66.6 67.6
 4.4 4.0 4.8 6.4 6.9 6.0 66.3 66.0 64.9 65.3 67.2 66.6 67.6
 33 31 23 19 16 14 5.6 12 15 17 22 27 33

68.5 68.5 68.3 66.6 66.0 67.0 67.4 66.9 66.0 65.6 67.4 67.9 67.9
 3.4 3.4 3.6 5.3 5.9 5.9 67.4 66.9 66.0 65.6 67.4 67.9 67.9
 33 30 23 19 16 14 4.5 12 15 19 21 26 33

69.1 69.1 68.9 66.1 66.1 66.9 67.1 66.7 65.8 65.4 68.3 68.5 68.4
 2.8 2.9 3.0 5.8 5.8 5.0 67.1 66.7 65.8 65.4 68.3 68.5 68.4
 33 30 23 19 16 14 4.8 12 14 17 20 26 33

66.2 65.8 64.2 61.3 61.4 61.7 62.3 61.9 62.1 64.4 66.1 66.6 67.3
 1.7 5.7 6.1 11.1 10.6 10.5 10.2 9.6 10.0 9.8 12.5 5.8 5.3 4.6
 33 21 24 20 18 14 9.2 12 15 20 24 25 33

58.0 58.7 58.4 54.3 54.2 54.7 55.3 55.3 54.6 58.1 58.9 58.9
 0.5 0.8 1.1 5.2 5.3 4.8 55.3 55.3 54.6 58.1 58.9 58.9
 33 31 28 21 18 15 4.0 11 12 15 23 26 33

T.P. Post 11.58 956.91 0.09 945.33
129

128
12.15 945.42 0.56 933.27

127

126
125
B.M. #19 7.10 933.83 3.74 926.72
124+36 6.4 X 3.0 X 16.8

124

123

122

121

120
1.10 939.68 938.58

929.2 cut
5.95
923.25
926.7
2.5
929.2
5.5
923.7
43.6 43.5 38.5 32.9 39.8 40.5 40.1 39.3 39.9 42.3 43.1 42.9
1.8 1.4 6.9 6.5 5.6 4.9 5.3 6.1 5.5 3.1 2.3 2.5
33 25 19 17 15 13 15 17 22 26.5 33
37.9 37.4 33.8 34.2 34.9 34.9 34.9 34.6 34.5 36.8 31.6 37.4
7.5 8.0 11.6 11.2 10.5 10.3 10.5 10.8 10.9 8.6 7.8 8.0
32 25 19 16 14 12 14 18 22 26 33
31.1 30.6 30.1 30.1 30.7 31.1 30.9 29.2 29.7 30.4 31.0 30.9 31.3
2.7 3.2 3.7 3.7 3.1 2.7 2.9 4.6 4.1 3.4 2.8 2.9 2.5
32 24 23 17 14 11 15 18 22 26 29 33
26.2 26.7 27.1 27.7 28.0 27.9 26.4 26.6 26.2 25.9
7.8 7.1 6.7 6.1 5.8 5.9 7.4 7.2 6.6 6.7
33 23 16 14 11 15 21 28 33
25.4 25.1 25.1 26.0 26.2 26.1 25.0 24.7 24.5 23.7 23.8
8.4 8.2 8.7 7.8 7.6 7.7 8.5 8.1 9.3 10.1 9.0
32.5 26 17 13 12 12 15 19 26 29 33
25.7 25.3 24.7 22.8 27.0 26.6 26.2 26.6 26.7 23.5 23.1 22.2 21.3 21.2
5.4 5.4 5.8 7.7 3.5 3.9 26.2 37 3.8 7.0 1.4 8.3 8.7 9.3
28.2 100 33 14 12 11 4.3 5 10 6 27 10 20 30
923.35 cut 4"
923.0 cut 3"
25.0 24.3 25.0 26.5 26.2 25.0 24.3 23.3
5.5 5.7 5.5 4.2 4.3 5.5 6.2 7.2
33 24 18 14 9 11 27 34
27.6 27.3 26.7 26.7 27.7 27.7 27.5 26.4 26.3 26.5 26.5
2.9 3.2 3.3 3.8 2.8 3.0 3.1 4.2 4.0 4.0
33 29 26 17 15 10 15 19 27 33
32.8 31.5 29.5 29.4 30.2 30.0 28.6 28.8 30.5 31.0 30.3
6.4 8.2 10.2 1.3 9.5 39.6 11.1 10.9 9.2 8.7 9.2
33 24 20 17 14 9.1 12 15 17 21 28
37.2 36.3 33.4 32.5 33.9 32.3 32.7 33.3 35.4 35.1 34.9
2.2 3.4 6.3 7.2 5.8 5.9 7.0 6.4 4.3 4.5 4.8
33 29 21 16 12 13 16 18 23 27 33
71.6 40.5 36.8 36.2 32.9 38.6 38.4 36.7 37.0 37.5 37.0 38.9 38.9
11.9 10.8 2.9 3.0 1.4 1.3 3.0 2.7 2.2 0.7 0.8 0.8
33 23 19 17 14 14 14 17 18 20 23 27 33
939.7

Jan. 12, 192

3x3x28 R.C. B.

140.

6.44.

94.6

138

135

952.82

950.32

134

133

132 + 42

132.

962.48

956.28

131

130

956.91

$\frac{38.5}{96}$	$\frac{38.1}{10.0}$	$\frac{37.3}{10.8}$	$\frac{42.4}{5.9}$	$\frac{41.0}{7.1}$	$\frac{40.6}{40.7}$	$\frac{41.6}{6.5}$	$\frac{36.5}{11.6}$	$\frac{36.9}{11.2}$	$\frac{35.1}{13.0}$	$\frac{33.0}{15.0}$
$\frac{59}{17}$	$\frac{14}{14}$	$\frac{14}{13}$	$\frac{7.4}{15}$	$\frac{16}{16}$	$\frac{26}{26}$	$\frac{100}{100}$	$\frac{200}{200}$			

39.6	39.038.9	40.4	40.2	39.8	38.0	37.9	38.6	38.7	38.2	37.3
85	91	91	77	83	101	101	95	94	99	108
32	14	16	12	15	20	21	23	26	29	33

41.5	40.1	39.9	40.0	40.2	40.1	38.6	38.7	39.2	38.5	38.4	37.9	37.6
66	8.0	8.2	8.1	8.2	8.2	9.5	9.4	8.9	9.6	9.7	10.2	10.5
32	26	20	12	7.9	13	15	17	18	25	27	29	35

[illegible]

46.2	45.3	42.9	41.6	44.0
+ 66	75	99	102	88
- 33	23	18	17	14
				87

433	42.5	42.2	42.8	43.3	431	42.5	44.
+ 95	10.3	106	100	95	97	103	105
- 13	15	19	20	25	27	28	33

50.0 48.9 45.9 40.7 46.7 46.8 45.8 45.7 46.9 47.4 46.9 46.3 46.4
 28 39 71 71 6 47 6.0 7.0 71 58 54 61 65 67
 23 24 20 18 15 57 12 15 17 21 25 27 29 33

52.8	51.9	49.1	48.8	54.2	49.8	48.6	48.4	49.5	49.8	49.5	48.9	48.6
0.0	0.4	3.2	4.0	2.6	5.3	3.0	4.2	4.4	3.9	3.0	3.3	3.9
33	24	19	18	15	25	13	14	19	22	24	27	28

55.5	54.9	52.0	52.0	53.2	52.9	52.5	52.4	53.2	53.4	52.9
7.0	7.6	10.5	10.5	4.3	53.5	9.6	10.0	10.1	9.3	9.6
33	26	20	19	16	9.0	12	17	19	21	23

60.5	59.8	57.2	51.0	58.0		57.9	57.1	57.0	57.3	58.1	58.1	57.8	57.3
2.9	2.6	5.3	5.5	4.5	5.8	4.6	5.4	5.5	5.2	4.4	4.4	4.7	5.2
33	26	20	18	16	4.3	12	14	16	19	21	28	30	33

$$\begin{array}{r} 61.3 \\ 1.7 \\ \hline 33 \end{array}$$

$$\begin{array}{r} 61.1 \\ 1.4 \\ \hline 38 \end{array}$$

$$\begin{array}{r} 58.6 \\ 3.9 \\ \hline 41 \end{array}$$

$$\begin{array}{r} 58.6 \\ 3.9 \\ \hline 41 \end{array}$$

$$\begin{array}{r} 55.5 \\ 3.0 \\ \hline 47 \end{array}$$

$$\begin{array}{r} 59.6 \\ 60.2 \\ 2.9 \\ \hline 7.3 \end{array}$$

$$\begin{array}{r} 58.9 \\ 3.6 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 58.5 \\ 4.0 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 59.0 \\ 3.5 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 59.0 \\ 3.5 \\ \hline 19 \end{array}$$

$$\begin{array}{r} 59.6 \\ 2.9 \\ \hline 21 \end{array}$$

$$\begin{array}{r} 59.2 \\ 3.1 \\ \hline 28 \end{array}$$

$$\begin{array}{r} 59.2 \\ 3.3 \\ \hline 30 \end{array}$$

604 59.9 56.8 56.6 57.6 58.5 57.9 57.1 57.2 59.1 59.8 59.2
2.4 2.6 5.7 5.4 4.9 4.6 5.4 5.3 3.4 3.7 3.3
23 23 21 20 19 40 12 15 10 22 28 22

54.5	54.2	51.0	51.1	51.5	51.9	51.3	51.3	53.6	54.7	54.5
2.4	2.7	5.9	5.8	5.4	5.0	5.6	5.6	3.3	2.2	2.4
23	27	27	19	17	11	14	17	21	28	33

42.5	42.5	44.7	44.8	45.9	46.0	45.7	45.5	47.8	48.5	48.7
84	84	120	120	110	109	112	115	91	84	82
23	26	20	18	12	12	13	17	24	21	23

956.9

145+37

Drive Rt.

145

7.23 966.39 1.50 959.16

144

143

L.P.

12.91 960.66 0.38 947.75

142

141

40 +78

+75

+68

+60

+51

+47

140 +43

948.13

5.1 64.9	64.8	62.6	62.5	63.7	63.9	63.8	63.8
3 1.5	1.6	3.8	3.9	2.7	2.5	2.6	2.6
3 29	24	20	18	15	18	29	33
64.4	64.5	61.1	61.7	61.2	62.1	61.1	61.1
2.0	1.9	5.3	4.7	4.2	4.3	5.3	5.3
33	25	18	17	15	12	15	17
59.5	57.3	58.0	53.9	53.8	54.7	54.4	53.7
3.2	3.4	2.7	6.8	6.9	6.0	6.3	7.9
33	28	23	18	17	18	12	14
49.4	49.3	47.6	47.5	50.4	48.4	47.8	47.7
11.3	10.9	13.1	13.2	10.3	12.3	12.9	13.0
33	33	19	17	15	12	15	18
43.4	43.5	43.9	41.9	41.4	43.8	43.6	42.9
4.7	4.9	4.2	6.5	6.7	4.3	4.5	5.2
33	26	24	11	17	13	13	15
40.9	40.7	40.5	39.7	39.5	40.7	40.3	39.8
7.2	7.4	7.6	8.4	8.5	7.4	7.8	8.3
33	29	23	20	17	13	11	18
39.9	39.2	38.9	39.5	40.5	39.8	39.6	39.2
8.1	8.9	7.2	8.6	7.6	40.2	8.3	8.9
33	28	24	19	15	7.9	16	18
39.7	38.7	38.9	40.6	40.2	39.5	39.2	39.7
9.4	9.4	9.2	7.5	7.9	8.6	8.9	8.7
34	28	26	16	7.9	27	33	33
41.5	41.2	40.8	39.6	39.6	39.6	39.6	39.6
6.9	6.9	7.3	8.5	8.5	8.5	8.5	8.5
33	25	20	7.8	27	34	34	34
47.1	44.3	42.2	39.2	39.4	41.1	41.1	41.1
1.0	3.8	5.9	40.2	39.9	39.9	39.9	39.9
300	200	100	7.9	100	200	200	200
41.1	41.1	40.8	40.6	40.1	39.7	39.1	38.8
7.0	7.0	7.3	7.5	8.0	8.4	8.7	8.7
33	24	21	19	8.0	24	27	33
38.8	38.4	40.0	40.4	39.7	39.1	38.8	38.8
9.3	9.1	8.1	7.1	7.9	8.4	9.3	9.3
33	24	19	15	7.9	24	27	33
40.1	39.8	38.5	38.3	39.2	40.4	39.8	38.9
8.3	8.3	8.9	7.7	7.7	8.3	9.2	9.0
33	28	26	21	13	7.8	22	25
948.13	948.13	948.13	948.13	948.13	948.13	948.13	948.13

155+80

C155

B M #17 9.04 95.92 4.69 942.83 942.1

154

153+72 C.V. 2x2x24.3 R.C.B.

153

152

T.P.

1.97 947.52 11.92 945.55

151

150

T.P. Nail in High Tension 9.46 956.93

749

148

147

146

966.39

7.5 51.4 51.4 47.4 47.9 48.0
 33 30 20 17 14 12 49.2 48.2 47.4 47.4 49.5 49.7 49.6 37
 3.3 3.7 4.5 2.4 2.5 2.3
 2.7 14 17 18 23 29 33

9 46.9 46.7 42.9 43.3 44.4 44.8 43.8 42.5 42.6 43.9 44.3 44.6 44.7
 f 3.0 5.2 7.0 8.6 7.5 4.8 8.1 7.4 8.3 8.2 7.0 7.3 7.2
 33 21 16 14 12 7.1 14 17 19 24 27 30 33
 (951.9)

41.3 41.3 40.9 39.9 40.4 41.1 41.5 40.0 39.7 38.9 38.9 39.4 39.2 38.6
 f 6.2 6.2 6.6 7.6 7.1 6.4 4.5 7.5 7.8 8.5 8.5 8.1 8.3 8.1
 33 30 20 16 12 10 6.0 15 16 21 23 25 28.5

3.6 42.5 41.7 39.7 38.5 43.0 41.8 41.7 41.6 42.8 38.1 38.0 37.1 34.3 31.4
 33 5.0 5.8 7.8 9.0 4.5 5.7 4.1 5.9 4.1 7.1 9.5 10.4 13.2 16.1
 200 100 30 12 12 11 5.8 13.5 14.5 14.5 30 100 200 300

41.7 41.1 41.0 40.8 41.6 41.9 41.5 40.4 40.4 40.1 39.6

5.8 6.4 6.5 6.1 5.8 5.8 6.0 7.1 7.1 7.4 7.3
 33 25 19 14 10 5.0 13 17 19 24 33

43.7 43.7 42.3 42.1 43.3 43.3 42.7 42.6 42.9 43.1 43.2 43.0
 f 3.8 3.7 5.3 5.4 4.8 4.8 4.8 4.7 4.6 4.4 4.2 4.5
 33 23 19 16 14 10 3.8 15 17 19 20 23 29 33
 (947.5)

47.3 46.7 45.7 45.4 46.2 46.9 46.1 45.5 45.5 46.3 47.0 47.1 47.3
 f 10.8 11.8 12.1 11.3 11.4 12.3 12.0 11.2 10.5 10.4 10.2
 33 25 21 18 15 10.6 15 17 20 23 29 31 33

51.9 51.5 49.4 49.5 50.7 50.7 49.8 48.9 48.8 51.1 52.4 52.8
 56.0 56.0 51.8 51.8 51.8 51.8 51.8 51.8 51.8 51.8 51.8 51.8
 33 25 21 18 16 16.8 14 17 19 21 27 32
 (957.5)

57.0 57.0 57.1 54.2 54.3 55.2 55.3 54.5 53.6 53.6 56.3 56.6 56.7
 f 9.4 9.4 9.3 12.2 12.1 11.3 11.9 12.8 12.8 10.7 9.8 9.1
 33 25 21 18 16 11.1 15 17 20 25 28.5 33

62.0 62.3 58.8 59.1 59.9 60.4 59.4 58.2 58.5 60.5 61.0 60.7
 f 4.4 4.1 7.6 7.3 6.5 6.0 7.0 8.2 7.9 5.9 5.8 5.7
 33 21 19 17 15 6.0 13 16 18 22 28 33

63.9 63.5 60.8 61.1 62.4 62.2 60.6 60.9 61.9 61.8 61.6
 f 2.3 2.3 2.2 2.3 4.0 4.0 5.8 5.5 4.5 4.0 4.8
 33 25 19 18 10 3.0 13 16 20 23 28 33

64.3 64.4 61.4 61.8 63.6 63.5 63.0 62.1 62.2 63.1 63.0 62.8
 f 2.2 2.0 5.0 4.6 7.8 7.9 3.4 4.2 3.2 3.4 3.6
 33 22 20 18 15 2.9 12 15 17 21 28 33
 (966.7)

176+70

176

175

174

173

B.M. #15

172

11.61

Drive Rt.

967.81

1.07

956.20

171

170

T.P.

12.28

957.27

1.33

944.99

169

168

167

166+78

B.M. #16

5.33

946.32

6.17

941.00

940.

947.17

25	66.1	65.3	63.8	64.0	64.6	65.7	67.8	63.5	63.5	65.3	65.5	65.5	39
3	1.7	2.5	4.0	3.8	3.2	3.2	3.2	4.3	4.3	2.5	2.3	f	
7	2.9	2.3	2.0	1.7	1.4	2.1	1.4	1.7	1.9	2.4	3.3	f	
1.8	66.8	64.5	62.4	63.6	64.5	64.6	63.1	63.3	64.8	65.0			
2	1.9	3.3	4.4	4.2	3.3	6.5	3.2	4.7	4.5	3.0	2.8	f	
3	3.0	2.3	1.9	1.6	1.4	2.3	1.4	1.7	2.0	2.4	3.3	f	
65.9	65.5	64.9	62.9	63.0	63.8	63.7	62.3	62.3	63.8	63.8			
1.9	2.3	2.9	4.4	4.8	4.0	4.6	4.1	5.5	5.5	4.2	4.0	f	
33	3.0	2.3	2.0	1.7	1.4	3.2	1.3	1.6	2.1	2.4	3.3	f	
65.0	64.8	63.8	62.3	62.4	63.0	63.7	62.8	61.6	61.3	62.2	62.6	62.2	
2.8	3.0	4.0	5.5	5.4	4.8	6.7	5.0	6.2	6.5	5.6	5.2	5.6	
33	3.0	2.4	2.1	1.8	1.5	4.1	1.2	1.5	1.8	2.0	2.2	2.3	
63.9	63.8	62.6	61.5	61.6	62.5	62.3	61.3	61.1	61.7	61.4			
3.9	4.0	5.2	6.3	6.3	5.3	6.2	5.6	6.3	6.7	5.8	6.4		
33	3.0	2.4	2.0	1.8	1.5	4.6	1.2	1.5	1.7	2.1	3.3		
62.9	62.6	62.3	59.2	58.9	60.2	61.1	61.7	62.0					
5.1	5.2	5.3	8.6	8.3	7.6	6.9	6.7	6.7	5.8				
33	2.9	2.3	1.8	1.7	1.4	6.9	1.2	2.4	3.3				
56.7	57.1	56.7	52.4	52.5	54.0	54.4	53.7	53.7	58.2	58.3	58.3		
0.6	0.2	1.6	4.8	4.8	3.3	54.6	2.9	3.6	3.6	4.0	4.0	4.0	
33	2.9	2.2	1.8	1.6	1.3	7.1	9	13	14	19	24	33	
50.4	50.4	49.5	47.5	47.4	48.3	49.1	48.7	48.2	48.1	50.7	51.4		
6.9	6.9	7.8	9.8	9.8	9.0	8.2	8.6	9.1	9.2	10.6	5.9		
33	2.7	2.3	1.8	1.6	1.4	8.2	1.2	1.2	1.4	1.9	3.0	3.3	
						(957.3)							
45.3	44.9	44.5	43.4	43.4	44.5	45.0	44.6	43.7	43.7	45.3		45.9	
1.0	1.4	1.8	2.9	2.9	1.8	1.7	1.7	2.6	2.6	1.0		0.4	
27	2.3	2.0	1.6	1.5	1.2	1.3	1.1	1.4	1.6	1.8	2.1	3.3	
71.7	41.7	41.3	40.8	39.9	40.2	41.1	41.8	41.4	40.8	40.9	41.1		
6.6	4.6	5.9	5.5	6.4	6.1	5.2	4.8	5.2	5.4	5.4	5.2		
33	3.1	2.6	2.1	1.8	1.4	4.5	1.2	1.4	2.2		3.3		
39.4	39.5	39.4	39.0	38.9	39.4	39.9	39.7	38.0	37.9	37.9	37.6		
6.4	6.4	6.9	7.3	7.4	6.9	6.4	6.6	8.3	8.4	8.4	8.7		
33	3.0	2.7	2.6	2.3	2.0	2.4	2.1	2.4	2.6	2.6	3.3		
41.2	39.6	39.0	38.8	38.5	41.0	39.7	39.6	39.7	40.9	36.4	37.0	35.5	31.3
5.1	6.7	7.3	8.0	9.8	5.3	6.6	6.9	5.6	6.4	9.3	10.6	33.3	31.3
20	100	3.0	1.5	1.5	1.5	1.5	1.5	12.9	13.8	13.8	27	100	300
						(946.3)							

186

185

184

No Col 45

183

182+50

5.23

962.50

8.59

957.27

182.

181

12" Corr. Culv.

26' Long

180

179

178

T.P.

17

130

965.86

3.25

964.56

967.81

7 59.5 59.3 56.5 57.4 58.0 57.7 56.3 56.1 57.8 58.0 40
 f 3.0 3.2 3.0 5.1 4.5 58.1 4.8 6.2 6.4 4.7 4.5
 28 23 17 16 13 3.8 13 17 19 24 33
 59.2 59.1 59.1 57.0 56.9 57.8 56.6 56.1 56.2 58.0 57.9
 3.3 3.4 3.4 5.5 5.6 4.6 5.6 4.7 6.4 4.5 4.6 f
 33 f 27 23 18 17 14 3.9 14 18 20 25 32
 7.3 57.1 57.7 57.2 55.4 55.2 56.1 56.1 54.6 54.6 56.5 56.4
 12 5.4 4.8 5.3 7.1 7.3 6.4 5.6 6.4 7.9 7.9 6.0 6.1
 3 29 f 26 22 17 15 12 5.8 14 18 20 24 33
 56.7 56.1 55.4 54.7 54.8 55.7 56.3 55.7 54.0 53.9 54.3 53.9
 6.1 6.4 7.1 7.8 7.7 6.3 6.8 6.5 8.6 8.2 8.6
 33 f 24 20 17 15 12 6.2 14 18 20 22 33
 8.0 57.9 56.8 54.3 54.7 56.4 56.2 55.0 54.3 56.6 56.4
 5 f 4.6 5.7 7.7 7.8 6.1 57.0 6.3 7.5 7.7 5.9 6.1
 25 21 17 16 12 5.5 14 17 19 25 33
 59.1 59.0 57.9 55.2 55.1 57.0 57.5 56.7 55.2 55.3 57.6 57.3
 3.4 3.5 4.6 7.3 7.4 5.5 5.9 5.8 7.3 7.2 4.9 5.2
 33 26 21 17 16 12 5.9 14 18 19 24 33
 58.5 58.4 55.7 54.9 56.6 57.2 56.4 54.2 54.5 55.9 57.2 57.1
 7.4 f 7.5 10.2 11.0 9.3 57.2 56.4 54.2 54.5 55.9 57.2 57.1
 33 f 25 19 16 13 8.7 15 19 22 25 24 33
 56.3 56.1 55.5 55.1 56.3 56.5 55.5 54.2 53.7 53.6 53.7
 9.6 9.8 10.4 10.8 9.6 10.4 11.7 12.2 12.3 12.2 12.2
 33 26 21 16 13 9.4 15 17 22 28 33
 55.5 54.8 56.2 56.6 55.5 53.7 53.6 57.4
 f 10.4 11.1 9.7 10.4 12.2 12.3 14.5
 26 12 11 9.3 14 15 33 100
 56.6 56.4 55.4 55.5 57.0 57.5 56.3 54.7 54.4 54.3 56.0 56.4
 9.3 f 9.3 10.5 10.4 8.9 9.6 11.2 11.5 11.6 9.9 9.6
 33 f 28 19 16 13 8.4 15 19 21 25 28 34
 12 60.2 59.9 59.2 58.0 57.8 58.6 59.2 58.5 57.2 57.3 57.9 60.1
 17 5.7 6.0 6.7 7.9 8.1 7.3 7.4 8.1 8.6 6.8 5.8 f
 33 30 f 27 22 18 14 12 6.7 16 19 22 28 34
 64.0 64.0 63.5 62.9 60.6 60.5 61.4 62.2 61.7 60.7 60.9 62.8 62.9
 1.9 1.9 7.5 3.0 5.3 5.4 4.5 62.2 61.7 60.7 60.9 62.8 62.9
 33 31 28 22 18 16 13.7 16 19 21 26 33 f
 65.8 65.5 65.3 63.4 63.6 64.1 63.3 64.3 63.2 63.2 65.1 65.1
 2.0 2.3 2.5 4.4 4.1 3.1 6.3 6.3 4.6 4.6 2.7 2.7 f
 33 30 24 20 17 14.5 15 18 20 25 33
 (967.8)

+85

+72

E. Turp Road

+61

+58

+49

193

T.P.

8.94

960.83

3.82

957.89

192

191

190 + 59

24" X

32' Concrete pipe

190

189

188

T.P.

Post 4.71

955.71

11.54

951.00

187

962.54

41

53.3	53.6	53.3	51.8
<u>7.5</u>	<u>7.2</u>	<u>7.5</u>	<u>9.0</u>
33	29	7.5	33

58.6	59.6	55.6	53.1	50.0	48.6	47.4
<u>2.2</u>	<u>1.2</u>	<u>5.2</u>	<u>5.2</u>	<u>10.8</u>	<u>12.2</u>	<u>13.4</u>
300	200	100	7.7	100	200	300

53.6	50.9	51.0
<u>7.2</u>	<u>7.9</u>	<u>9.8</u>
39	7.9	36

52.5	53.5	52.9	51.2	50.5
<u>8.3</u>	<u>7.3</u>	<u>7.9</u>	<u>9.6</u>	<u>10.3</u>
41	37	7.9	28	36

53.9	52.2	51.9	52.1	52.9	52.8	51.9	51.3	50.5	50.4	51.2	51.3
<u>6.4</u>	<u>8.6</u>	<u>8.9</u>	<u>8.7</u>	<u>7.9</u>	<u>8.9</u>	<u>9.5</u>	<u>10.3</u>	<u>10.4</u>	<u>9.6</u>	<u>9.5</u>	<u>9.5</u>
37	34	30	27	22	8.0	17	22	27	28	31	33

54.2	53.4	50.1	50.2	51.5	51.9	51.2	49.5	49.5	51.0	51.0
<u>6.6</u>	<u>7.4</u>	<u>10.7</u>	<u>10.6</u>	<u>9.3</u>	<u>8.9</u>	<u>9.6</u>	<u>11.3</u>	<u>11.3</u>	<u>9.8</u>	<u>9.8</u>
35	23	20	16	14	8.9	13	18	19	23	33

50.7	50.4	47.8	46.1	49.1	48.8	46.9	47.2	46.5	49.1	49.1
<u>5.0</u>	<u>5.3</u>	<u>7.9</u>	<u>7.6</u>	<u>6.4</u>	<u>4.5</u>	<u>6.9</u>	<u>8.8</u>	<u>8.5</u>	<u>7.2</u>	<u>6.6</u>
34	23	18	16	13	6.2	12	16	20	22	27

48.8	47.5	46.6	46.7	48.0	48.0	47.5	45.6	45.9	46.9	46.5
<u>6.9</u>	<u>5.2</u>	<u>9.1</u>	<u>9.0</u>	<u>7.7</u>	<u>8.2</u>	<u>10.1</u>	<u>9.8</u>	<u>9.8</u>	<u>10.2</u>	<u>10.2</u>
34	23	20	17	13	7.7	12	17	20	28	33

49.3	48.2	46.9	46.5	49.6	48.1	47.4	47.1	45.0	44.3	42.5
<u>6.4</u>	<u>7.5</u>	<u>8.8</u>	<u>9.2</u>	<u>7.1</u>	<u>8.3</u>	<u>8.6</u>	<u>10.7</u>	<u>11.4</u>	<u>13.2</u>	<u>13.2</u>
34	26	21	15	15	7.6	13	17	17	33	100

49.1	48.3	46.5	46.5	47.7	48.0	47.4	45.7	45.5	45.9	45.6
<u>6.6</u>	<u>7.4</u>	<u>8.2</u>	<u>8.2</u>	<u>8.0</u>	<u>8.3</u>	<u>10.0</u>	<u>10.2</u>	<u>9.8</u>	<u>10.1</u>	<u>10.1</u>
33	27	17	17	13	7.7	12	17	17	23	33

51.0	50.2	47.7	47.4	49.2	49.5	48.8	46.9	46.9	47.7	47.5
<u>4.7</u>	<u>5.5</u>	<u>8.0</u>	<u>8.3</u>	<u>6.5</u>	<u>6.2</u>	<u>7.3</u>	<u>8.8</u>	<u>8.8</u>	<u>8.0</u>	<u>5.2</u>
33	24	18	17	13	6.2	13	17	20	24	33

54.7	53.9	50.7	52.2	51.7	49.9	49.7	51.7	51.5	51.4
<u>1.0</u>	<u>1.8</u>	<u>5.0</u>	<u>3.5</u>	<u>5.4</u>	<u>5.8</u>	<u>6.0</u>	<u>4.0</u>	<u>4.2</u>	<u>4.8</u>
34	23	17	13	33	14	17	19	23	33

58.9	58.9	58.4	55.4	56.6	56.7	55.8	54.3	54.4	56.8	56.4
<u>3.6</u>	<u>3.6</u>	<u>4.1</u>	<u>7.1</u>	<u>5.9</u>	<u>5.8</u>	<u>6.7</u>	<u>8.2</u>	<u>8.1</u>	<u>5.2</u>	<u>6.1</u>
33	28	23	16	14	14	17	19	24	33	

(962.5)

203

202

T.P.

3.03

959.08

9.04

956.05

201

200

199+46

199

B.M.#13

2.30

965.09

2.30

962.76

962.7

198

197

196

T.P.

10.57

965.06

6.34

954.49

195

194

4 br. = 954.00

960.83

193+89

82

54.6

4.5

53.5 53.5 53.7 52.3 52.0 53.9 54.8 55.0 54.4 52.7 53.8 53.8 54.7 54.7
 56 56 54 6.8 7.1 5.2 4.1 4.7 6.4 6.3 5.3 5.4 4.9
 33 f 25 19 16 13 9 4.3 5 16 19 20 21 25 26

55.7 55.7 55.2 53.5 54.1 55.4 56.1 56.3 55.7 54.0 54.0 55.0 55.7 56.1 56.2
 3.4 3.4 3.9 5.6 5.0 3.7 2.8 3.4 5.1 5.1 4.1 3.4 3.0 2.9
 33 23 16 15 13 10 3.0 6 16 18 20 21 24 31 33

58.4 56.3 58.7 56.6 57.0 58.2 57.6 56.1 56.4 57.1 58.6 58.8 58.8
 6.7 f 6.8 6.9 8.5 8.1 6.9 58.2 7.5 9.2 8.7 8.0 6.5 6.3 f 6.3
 33 f 22 19 17 13 11 6.9 16 19 20 21 26 30.5 33

61.9 61.5 59.8 59.7 61.0 60.6 59.1 59.1 60.3 61.3 61.8 61.7
 3.2 f 3.6 5.3 5.4 4.1 60.9 4.3 6.0 6.0 4.8 3.8 3.3 3.4
 33 12 20 16 15 11 4.2 16 19 21 22 26 30 33

62.3 61.7 61.4 61.4 62.1 61.7 60.5 60.5 61.8 62.7 62.6
 2.8 f 3.4 3.7 3.7 3.0 61.3 3.4 4.6 4.6 3.3 2.4 2.5
 33 f 23 18 15 12 2.8 16 18 20 21 29 33

62.8 62.5 62.6 62.6 62.7 61.4 60.3 60.2 61.3 62.2 62.4 62.4
 2.3 2.6 3.1 3.1 3.1 3.7 4.8 4.9 3.8 2.7 2.7 2.7
 33 19 16 14 11 3.1 16 19 20 21 24 29 33

60.9 62.5 59.9 57.7 57.8 59.1 59.2 58.8 57.1 57.1 59.0 59.5 59.6
 4.2 4.6 5.2 7.4 7.3 6.0 59.2 6.3 8.0 8.0 6.1 5.6 f 5.5
 33 21 20 17 14 12 5.9 15 18 20 24 29 33

58.5 58.5 57.3 56.9 56.5 56.0 57.0 56.7 54.8 54.6 56.0 56.3 56.2
 6.6 6.6 7.8 8.2 9.6 9.5 8.1 57.4 8.4 10.3 10.5 9.1 8.8 f 8.9
 33 29 22 19 17 16 11 7.7 15 19 20 24 29 33

3 58.4 57.3 56.4 54.3 54.6 56.2 56.5 55.7 53.5 53.2 54.3 54.8 54.6
 6.7 7.8 8.7 10.8 10.5 8.9 56.5 9.4 11.6 11.9 10.5 10.3 f 10.5
 3 27 24 19 17 15 12 8.6 15 19 21 22 28 33

57.7 57.7 56.4 52.8 54.7 52.0 54.5 52.5 52.7 53.1 54.7 54.6 54.6
 3.1 3.1 4.4 8.0 6.1 52.0 6.3 8.3 8.1 7.7 6.1 6.2 f 6.2
 33 f 31 27 22 16 12 5.8 14 18 20 23 25 28.5 33

4.3 54.1 53.0 52.2 52.3 52.3 53.4 53.0 51.9 50.6 52.5 52.6
 6.5 6.7 7.8 8.6 8.5 7.5 7.4 7.8 8.9 10.2 8.3 8.2
 33 28 24 23 19 17 13 20 25 30 33

52.3 52.2 53.4 53.5 52.2 51.7 50.8
 8.3 8.6 7.4 7.3 8.6 8.1 10.0
 34 29 26 23 20 24 33

(960.8)

236

B.M. #11

9.50

943.54

1.42

934.04 934.

235+50

235

234

233

232+25

6x3x16.3 R.C.B. No Floor

T.P.

5.06

935.46

9.27

930.40

232

231

230

229

228

T.P.

0.22

939.67

12.19

939.45

227

226

951.64

34	33.1	31.1	31.0	32.5	33.1	31.9	31.5	32.2	33.9	34.9	34.8	35.0	35
0.1	10.4	12.4	12.5	11.0	10.4	11.6	12.0	11.3	9.6	8.6	8.7	8.5	
50	41	37	34	30	13	11.1	4	9	11	15	20	25	34
(943.5)													
32.7	32.3	31.9	31.9	31.7	31.3	31.9	31.3	31.1	30.9	33.5	34.1	34.4	
f 2.8	3.2	5.6	3.6	3.8	3.6	4.2	4.4	4.6	2.0	1.4	1.1		
35	28	23	21	17	3.2	10	13	15	16	22	27	33	
31.6	31.2	29.0	29.0	30.7	31.1	30.2	30.5	31.8	33.2	33.1			
f 3.9	4.3	6.5	6.5	4.8	3.1	4.4	5.3	5.0	3.7	2.3	2.4		
32	24	20	18	14	4.0	14	16	19	23	30			
28.7	28.4	27.6	27.6	29.2	30.0	29.8	29.5	29.3	30.1	30.6	31.0		
6.3	7.1	7.9	7.9	6.3	5.5	5.7	6.0	6.2	5.4	4.9	4.5		
33	23	21	18	13	19	15	14	19	28	30	33		
22.7	21.8	29.3			29.6	29.3	28.7	28.6	29.5	29.7	30.0		
7.8	7.7	6.2			6.2	6.5	6.9	6.0	5.8	5.5	3.5		
22	16	11			14	15	24	26	29.5	33			
23.8	26.3	26.0	25.1	26.0	30.3	30.2	30.1	30.3	30.5	25.7	26.1	28.1	29.1
11.7	9.2	9.5	9.9	9.5	5.2	5.3	5.4	5.2	5.0	7.8	9.4	7.4	6.4
00	34	47	23	8	8	7	5.4	8.5	10.3	10.3	30	34	100
(935.5)													
28.4	28.4	28.8	30.4	30.5	30.3	29.1	29.1	29.1	29.1	29.1	29.8	30.4	30.4
f 11.3	11.3	10.9	9.3	9.5	9.4	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
33	23	16	9	9.2	11	17	29.5	33					
30.4	30.5	31.0	31.7	31.1	30.7	30.5	30.7	30.8					
f 9.3	9.2	8.7	8.6	9.0	9.2	9.0	9.0	8.9					
33	24	13	8.0	13	15	25	29.5	33					
33.9	33.4	32.9	32.1	32.2	33.2	33.6	33.0	32.1	32.2	33.0	33.1	33.1	33.1
5.8	6.3	6.8	7.6	7.5	6.5	6.7	7.6	7.5	6.7	6.6	6.6	6.6	6.6
33	25	22	20	17	14	13	17	20	23	29	33		
37.2	36.1	34.2	34.3	35.4	36.1	36.5	34.5	34.6	35.8	36.0	36.1	36.1	36.1
f 2.5	3.6	5.5	5.4	4.3	3.6	4.2	5.2	5.1	3.9	3.7	3.6	3.6	3.6
32	23	19	17	14	3.6	14	17	20	23	29	33		
40.2	40.1	39.5	38.1	37.1	38.3	38.9	38.3	37.3	37.4	39.0	39.0	39.2	39.2
0.5	1.4	0.2	1.6	2.6	1.4	0.8	1.4	2.4	2.3	0.7	0.7	0.5	0.5
33	31.5	23	21	18	14	0.8	14	16	19	21	29	33	33
43.4	43.7	42.4	41.0	40.7	41.3	41.3	40.3	40.3	42.1	43.2	42.3	42.3	42.3
8.2	7.9	9.2	10.6	10.9	10.3	10.3	11.3	11.3	9.5	9.4	9.3	9.3	9.3
33	31.5	22	20	16	15	9.6	14	17	18	22	29	33	33
46.3	45.6	44.1	44.2	45.4	45.4	44.6	43.3	44.1	45.6	46.1	45.9	45.9	45.9
5.3	6.0	7.5	7.4	6.4	6.4	7.0	7.8	7.5	6.0	5.5	5.7	5.7	5.7
33	31	19	16	14	14	14	16	19	23	29	33	33	33

$240 + 50$

240

 $239 + 50$

239

 $238 + 446$ $238 + 20$

Profile of Twp. Rd. # 238

238

+72

237 + 70

P.T.
237 + 65.6

237

7,36 + 50

$$\begin{array}{r} 34.9 \quad 35.3 \quad 35.1 \quad 34.2 \quad 34.0 \quad 34.3 \quad 34.7 \quad 35.3 \quad 35.0 \quad 34.8 \quad 34.1 \quad 36.3 \quad 36.8 \quad 36 \\ 8.6 \quad 8.2 \quad 8.4 \quad 9.3 \quad 9.5 \quad 9.2 \quad 9.7 \quad 8.2 \quad 8.5 \quad 8.7 \quad 8.8 \quad 7.2 \quad 6.7 \quad 6.7 \\ \hline 36 \quad 24 \quad 17 \quad 13 \quad 8 \quad 6 \quad 8.8 \quad 6 \quad 18 \quad 20 \quad 23 \quad 29 \quad 34 \end{array}$$

$$\begin{array}{r} 35.2 \quad 35.7 \quad 35.9 \quad 35.5 \quad 35.7 \quad 36.5 \quad 36.3 \quad 36.0 \quad 36.2 \quad 37.5 \quad 38.0 \\ 8.3 \quad 7.8 \quad 7.6 \quad 8.0 \quad 7.8 \quad 7.9 \quad 7.2 \quad 7.5 \quad 7.3 \quad 6.9 \quad 5.5 \\ \hline 38 \quad 23 \quad 15 \quad 5 \quad 8.6 \quad 5 \quad 16 \quad 28 \quad 30 \quad 34 \quad 38 \quad 44 \end{array}$$

$$\begin{array}{r} 34.8 \quad 35.6 \quad 36.2 \quad 36.1 \quad 36.5 \quad 37.4 \quad 37.1 \quad 36.9 \quad 36.9 \quad 36.6 \quad 36.6 \quad 36.6 \quad 36.6 \quad 36.6 \\ 8.2 \quad 7.9 \quad 7.3 \quad 7.4 \quad 7.0 \quad 6.1 \quad 6.4 \quad 6.4 \quad 6.6 \quad 6.6 \quad 6.6 \quad 6.6 \quad 6.6 \quad 6.6 \\ \hline 42 \quad 24 \quad 6.9 \quad 11 \quad 17 \quad 18 \quad 31 \quad 44 \quad 46 \quad 48 \quad 50 \quad 51 \quad 51 \quad 51 \end{array}$$

$$\begin{array}{r} 34.5 \quad 35.0 \quad 36.7 \quad 37.1 \quad 37.2 \quad 38.0 \quad 38.0 \quad 37.8 \quad 37.8 \quad 38.8 \quad 38.8 \quad 38.8 \quad 38.8 \quad 38.8 \\ 9.0 \quad 8.5 \quad 6.8 \quad 6.4 \quad 6.3 \quad 5.5 \quad 5.5 \quad 5.7 \quad 5.7 \quad 4.9 \quad 4.9 \quad 4.9 \quad 4.9 \quad 4.9 \\ \hline 48 \quad 29 \quad 19 \quad 20 \quad 29 \quad 50 \quad 65 \quad 67 \quad 69 \quad 75 \quad 75 \quad 75 \quad 75 \quad 75 \end{array}$$

$$\begin{array}{r} 34.6 \quad 35.2 \quad 36.7 \quad 37.4 \quad 37.0 \quad 37.5 \quad 38.9 \quad 38.9 \quad 38.9 \quad 38.9 \quad 38.9 \quad 38.9 \quad 38.9 \quad 38.9 \\ 8.9 \quad 8.3 \quad 6.8 \quad 6.1 \quad 6.5 \quad 6.2 \quad 4.6 \quad 4.6 \quad 4.6 \quad 4.6 \quad 4.6 \quad 4.6 \quad 4.6 \quad 4.6 \\ \hline 46 \quad 30 \quad 11 \quad 34 \quad 38 \quad 51 \quad 102 \quad 102 \quad 102 \quad 102 \quad 102 \quad 102 \quad 102 \quad 102 \end{array}$$

$$\begin{array}{r} 35.3 \quad 35.5 \quad 35.9 \quad 35.2 \quad 35.9 \quad 37.0 \quad 37.0 \quad 37.2 \quad 36.9 \quad 36.9 \quad 36.9 \quad 36.9 \quad 36.9 \quad 36.9 \\ 8.2 \quad 8.0 \quad 7.6 \quad 8.3 \quad 7.6 \quad 6.5 \quad 6.5 \quad 6.3 \quad 6.6 \quad 6.6 \quad 6.6 \quad 6.6 \quad 6.6 \quad 6.6 \\ \hline 36 \quad 32 \quad 10 \quad 2 \quad 4 \quad 30 \quad 50 \quad 56 \quad 58 \quad 67 \quad 72 \quad 72 \quad 72 \quad 72 \end{array}$$

$$\begin{array}{r} 29.9 \quad 30.4 \quad 33.2 \quad 36.1 \quad 38.4 \quad 40.9 \quad 43.7 \quad 43.7 \quad 43.7 \quad 43.7 \quad 43.7 \quad 43.7 \quad 43.7 \quad 43.7 \\ 15.6 \quad 13.1 \quad 10.3 \quad 7.4 \quad 5.1 \quad 2.6 \quad 10.2 \quad 10.2 \quad 10.2 \quad 10.2 \quad 10.2 \quad 10.2 \quad 10.2 \quad 10.2 \\ \hline 300 \quad 200 \quad 100 \quad 7.4 \quad 100 \quad 200 \quad 300 \quad 300 \quad 300 \quad 300 \quad 300 \quad 300 \quad 300 \quad 300 \end{array}$$

$$\begin{array}{r} 35.0 \quad 33.9 \quad 33.9 \quad 34.5 \quad 35.2 \quad 35.3 \quad 36.1 \quad 36.4 \quad 36.3 \quad 36.3 \quad 36.3 \quad 36.3 \quad 36.3 \quad 36.3 \\ 8.5 \quad 9.6 \quad 9.6 \quad 9.0 \quad 8.7 \quad 8.2 \quad 7.1 \quad 7.1 \quad 7.2 \quad 7.2 \quad 7.2 \quad 7.2 \quad 7.2 \quad 7.2 \\ \hline 49 \quad 43 \quad 42 \quad 40 \quad 38 \quad 26 \quad 7.4 \quad 31 \quad 40 \quad 40 \quad 40 \quad 40 \quad 40 \quad 40 \end{array}$$

$$\begin{array}{r} 34.8 \quad 34.9 \quad 34.5 \quad 35.1 \quad 35.4 \quad 36.4 \quad 37.3 \quad 37.8 \quad 37.6 \quad 37.6 \quad 37.6 \quad 37.6 \quad 37.6 \quad 37.6 \\ 8.7 \quad 8.6 \quad 9.0 \quad 8.4 \quad 8.1 \quad 7.1 \quad 6.2 \quad 5.9 \quad 5.9 \quad 5.9 \quad 5.9 \quad 5.9 \quad 5.9 \quad 5.9 \\ \hline 50 \quad 46 \quad 29 \quad 23 \quad 8 \quad 8.2 \quad 2 \quad 13 \quad 15 \quad 34 \quad 34 \quad 34 \quad 34 \quad 34 \end{array}$$

$$\begin{array}{r} 34.9 \quad 34.3 \quad 34.7 \quad 35.3 \quad 35.5 \quad 36.4 \quad 37.3 \quad 37.9 \quad 37.9 \quad 37.9 \quad 37.9 \quad 37.9 \quad 37.9 \quad 37.9 \\ 8.6 \quad 9.2 \quad 8.8 \quad 8.2 \quad 8.0 \quad 7.1 \quad 6.2 \quad 5.6 \quad 5.6 \quad 5.6 \quad 5.6 \quad 5.6 \quad 5.6 \quad 5.6 \\ \hline 50 \quad 29 \quad 31 \quad 10 \quad 8 \quad 7.1 \quad 11 \quad 34 \quad 34 \quad 34 \quad 34 \quad 34 \quad 34 \quad 34 \end{array}$$

$$\begin{array}{r} 34.3 \quad 35.0 \quad 35.2 \quad 35.3 \quad 36.5 \quad 36.9 \quad 37.4 \quad 37.5 \quad 37.5 \quad 37.5 \quad 37.5 \quad 37.5 \quad 37.5 \quad 37.5 \\ 9.2 \quad 8.5 \quad 8.3 \quad 8.2 \quad 7.9 \quad 6.6 \quad 6.1 \quad 6.0 \quad 6.0 \quad 6.0 \quad 6.0 \quad 6.0 \quad 6.0 \quad 6.0 \\ \hline 50 \quad 45 \quad 35 \quad 17 \quad 5 \quad 6.6 \quad 5 \quad 22 \quad 24 \quad 24 \quad 24 \quad 24 \quad 24 \quad 24 \end{array}$$

$$\begin{array}{r} 34.4 \quad 34.9 \quad 34.0 \quad 33.5 \quad 33.7 \quad 35.3 \quad 36.3 \quad 36.6 \quad 37.0 \quad 37.0 \quad 37.0 \quad 37.0 \quad 37.0 \quad 37.0 \\ 8.0 \quad 8.5 \quad 10.0 \quad 9.8 \quad 8.2 \quad 7.2 \quad 6.6 \quad 6.7 \quad 6.5 \quad 6.5 \quad 6.5 \quad 6.5 \quad 6.5 \quad 6.5 \\ \hline 50 \quad 43 \quad 29 \quad 28 \quad 22 \quad 19 \quad 13 \quad 6.9 \quad 16 \quad 35 \quad 35 \quad 35 \quad 35 \quad 35 \end{array}$$

$$\begin{array}{r} 33.2 \quad 34.0 \quad 33.3 \quad 32.3 \quad 32.4 \quad 32.9 \quad 34.4 \quad 34.6 \quad 35.7 \quad 35.9 \quad 36.0 \quad 36.3 \quad 36.3 \quad 36.3 \\ 10.3 \quad 8.5 \quad 10.2 \quad 11.2 \quad 11.1 \quad 10.6 \quad 9.1 \quad 8.4 \quad 7.8 \quad 7.6 \quad 7.5 \quad 7.2 \quad 7.2 \quad 7.2 \\ \hline 44 \quad 24 \quad 15 \quad 9 \quad 6 \quad 3 \quad 28 \quad 9 \quad 7 \quad 12 \quad 25 \quad 37 \quad 37 \quad 37 \end{array}$$

(P. 3.5)

253

252

251

250

249

T.P

248

247

246

245

244

243

242

T.P

241 114

0.91 925.46 1058 924.55

1.34 935.13 9.75 933.79

943.54

17.2	17.4	16.4	16.4	16.8	17.3	16.9	17.0	18.3	19.4	27
8.3	8.1	9.1	9.1	8.7	8.2	8.6	8.5	7.2	6.1	
33	25	19	16	12	15	17	21	29	33	
18.7	18.7	18.2	17.7	18.1	18.9	19.4	18.5	18.5	20.2	21.2
6.8	6.8	7.3	7.8	7.4	6.6	6.1	7.0	7.0	5.3	4.3
33	25	20	17	14	11	6.0	12	16	19	27
20.3	20.2	19.4	19.3	20.2	20.8	20.7	20.3	19.9	21.0	22.0
5.2	5.3	6.1	6.2	5.3	4.8	5.2	5.6	4.5	3.5	
33	25	17	14	10	7	11	15	18	24	33
21.7	21.8	20.8	20.8	21.3	21.9	21.8	21.3	21.6	22.7	23.4
3.8	3.6	4.2	4.7	4.2	3.7	4.2	3.9	2.8	2.1	2.1
33	25	16	14	10	3.6	12	16	20	24	31
23.2	23.3	24.4	22.1	22.7	23.1	22.5	22.2	24.0	24.6	24.6
2.3	2.2	3.1	3.4	2.8	2.4	3.0	3.3	1.5	0.9	0.9
33	25	17	15	11	12	14	18	23	30	33
24.3	24.6	24.7	23.8	23.7	24.3	24.5	23.8	23.4	25.1	25.6
10.8	10.5	10.4	11.3	11.4	10.8	10.6	11.3	11.7	10.0	9.5
33	30	25	18	14	10	10.5	12	16	18	22
25.9	25.9	25.4	25.1	25.9	26.5	25.6	25.1	26.4	26.8	27.7
9.2	9.7	9.7	10.0	9.2	8.6	9.5	10.0	8.7	8.3	7.4
33	25	18	14	9	8.3	15	17	19	22	24
27.1	27.5	27.3	26.6	26.4	27.5	28.2	27.3	26.8	28.4	29.4
8.0	7.6	7.8	8.3	8.7	7.6	6.9	7.8	8.3	6.7	5.7
33	25	21	17	13	9	15	19	21	25	27
75	77	79.8	78.1	77.6	77.8	78.6	79.3	79.1	78.7	79.1
7.6	7.4	7.3	7.0	7.5	7.3	6.5	6.2	6.4	6.7	6.4
33	30	25	19	15	12	9	17	19	20	22
28.7	28.9	28.8	28.5	29.9	30.0	29.8	29.5	29.6	30.4	30.8
6.4	6.2	6.3	5.6	5.9	5.1	5.3	5.6	5.5	4.7	4.3
33	26	12	9	5.2	14	17	20	22	26	30
30.9	30.8	29.7	29.5	30.0	31.0	30.9	30.7	30.8	31.9	32.2
4.2	4.3	5.4	5.6	5.1	4.1	4.2	4.4	4.3	3.2	2.9
33	27	23	14	10	4.1	16	19	21	25	29.5
31.4	31.8	31.2	31.0	31.3	31.8	32.5	32.1	31.8	32.5	32.9
3.7	3.3	3.9	4.1	3.8	3.3	2.6	3.0	3.3	2.6	2.2
33	25	18	16	11	9	13	16	18	23	25
33.0	33.0	32.5	32.5	33.0	33.7	33.7	33.3	33.3	34.1	34.2
10.5	10.5	11.0	11.0	10.5	9.8	9.8	10.2	10.2	9.4	9.3
33	27	17	13	11	9.8	15	18	22	25	29.5

263

262

T. P.

26/

7.73 922.08
Noil Temp/c

3,73

9/4, 35

260

259

258

257 + 02

 $256 + 94.5$

N. end

+57

S. en d

+ 49

B.M. #10

2,26

918.08

967

915.79

915.8

256

255

254

925.46

48

14.4 14.6 13.8 13.9 13.0 13.3 13.6
7.7 7.5 8.3 8.5 8.3 8.2 9.1 8.5 f
33 f 25 19 16 12 7.8 13 17 22 31

14.5 14.7 13.6 13.0 13.4 13.7 13.0 13.3 13.6
7.6 7.4 8.5 8.1 8.7 8.4 9.1 8.8 8.5 f
33 f 25 18 16 11 8.2 13 16 24 32

14.4 14.6 14.2 13.2 12.8 13.5 13.3 12.3 12.7 13.3 13.3
3.7 f 3.5 3.9 4.9 5.3 4.6 4.8 5.8 5.4 4.8 f 4.8
33 f 25 21 18 15 12 14 17 20 31 33

14.3 13.6 12.9 12.2 13.2 13.5 13.1 12.0 11.9 12.1 13.5 13.5
f 5.8 5.5 5.2 5.9 4.9 4.6 5.0 6.1 6.2 6.0 5.6 f 4.6
25 21 18 15 12 9.6 13 16 20 27 30.5 33

13.9 13.5 11.9 11.7 12.0 12.2 12.6 12.5 11.7 11.4 11.9 12.5 12.6
4.2 4.6 6.2 6.4 6.1 5.9 5.5 5.6 6.4 6.7 6.2 5.6 5.5
25 23 20 18 16 14 11 5.0 10 15 24 26 30 f 33

12.8 12.6 10.6 10.7 11.5 12.6 11.9 11.9 10.0 10.3 10.3 8.7
5.3 f 5.5 7.5 7.4 6.6 5.5 6.2 8.1 7.8 7.8 f 9.4
33 f 25 23 21 17 13 5.2 8 12 16 21.5 33

10.7 8.1 8.1 15.0 15.1 15.2 9.0 9.4 9.2
7.4 10.0 10.0 3.1 3.0 2.9 9.1 8.7 8.9
25 21 18 8 7 16 19 26

15.7 15.7
2.4 5.6 2.4
8 2.5 8

15.7 15.7 906.0
2.4 9 15.7 12.1
8.0 2.4 8.0 F.L.

10.7 10.6 9.7 9.4 15.4 15.5 9.5 9.6 9.5 13.2 13.2 12.6
7.4 7.5 8.4 8.7 2.7 2.6 8.6 8.2 8.6 4.9 4.9 5.5
27 25 23 19 9 8 17 20 22 28 31 f 33

12.3 12.6 13.5 14.3 14.4 13.4 12.9 12.8 13.2 12.9
13.2 f 12.9 12.0 11.2 14.9 11.1 12.1 12.6 12.7 12.3 12.6
33 f 24 14 12 10.6 11 19 20 22 31 33

14.3 14.7 14.2 14.2 15.3 14.9 14.2 14.3 15.0 15.0
11.2 10.8 11.3 11.3 10.2 10.6 11.3 11.2 10.5 10.5
33 25 19 15 11 10.2 18 20 23 31 33

15.9 16.1 15.7 15.3 16.0 16.2 15.7 15.5 16.3 17.2 17.2
9.6 f 9.4 9.5 10.2 9.5 9.3 9.8 10.0 9.2 8.3 f 8.3
33 f 25 18 15 11 9.5 17 20 22 24 31 33

(925.5)

274

+50

B.M.#9

256

946.50

1.17

937.94

937.9

273

272

271

270

T. P.

269

268

267

10.72

930.86

1.94

920.14

266

265

264

922.08

37.6 36.7 34.7 34.8 34.9 34.5 34.3 33.6 33.7 34.5
 2.9 3.8 5.8 5.1 6.1 3.1 6.2 9.2 6.8 6.0 f
 33 17 11 7 6 6.0 15 18 22 32

38.7 38.1 36.4 36.1 36.3 36.3 36.0 35.0 35.5 35.6
 1.8 2.4 4.1 4.4 4.2 4.2 4.2 5.5 5.0 4.9 f
 33 18 13 10 7 940.5 16 19 25 32

38.3 37.7 36.4 36.0 36.1 35.9 35.6 35.0 34.9 35.0
 0.8 1.2 2.7 3.1 3.0 3.2 3.5 4.1 4.2 4.1 f
 33 18 14 11 10 32 15 18 23 32

35.1 34.8 33.7 33.8 33.8 33.9 32.6 32.5
 4.0 4.2 5.4 5.3 5.3 5.2 6.5 6.6
 33 25 15 12 8 5.3 14 20 32

34.6 34.8 34.2 32.1 32.4 32.9 33.1 32.2 31.9 32.0
 4.5 4.2 4.9 7.0 6.7 6.2 33.2 6.0 6.9 7.2 f
 33 26 19 14 12 9 5.9 15 19 24 32

31.1 31.6 30.5 28.6 28.7 29.7 29.7 29.0 29.0 30.1 30.6
 8.0 7.5 8.6 10.5 10.4 9.4 9.4 9.4 10.1 10.1 9.0 f
 33 25 18 15 13 9 9.4 15 18 20 24 32

26.5 26.9 26.6 25.8 24.9 24.9 25.5 26.0 25.0 25.0 26.3 27.2
 4.0 4.3 5.1 6.0 6.0 5.4 24.0 4.9 5.9 5.9 4.6 3.7 f
 33 25 21 17 15 11 9 4.9 15 18 20 24 32

24.2 24.3 22.8 22.3 22.2 22.4 22.9 22.6 21.7 21.9 22.8
 6.1 6.6 8.1 8.6 8.7 8.5 22.9 8.3 9.2 9.2 8.1
 33 25 18 14 12 9 8.0 14 20 24 33

22.9 23.2 21.8 20.0 19.8 20.4 20.7 20.0 19.1 19.4 19.6 19.7
 8.0 7.7 9.1 10.9 11.1 10.5 20.7 10.9 11.8 11.5 11.3 11.2
 33 25 18 15 13 11 10.72 14 20 23 26 32

(930.9)

19.8 20.6 19.1 19.1 17.1 17.6 18.1 17.9 17.1 16.9 17.6 17.8
 2.3 1.5 3.0 5.0 5.0 4.5 4.0 4.2 5.0 5.2 4.5 4.3 f
 30 25 14 15 12 10 14 17 20 24 32

17.0 17.3 15.8 15.1 15.6 16.2 16.3 15.9 14.9 14.7 15.1 15.3
 5.1 4.8 6.3 7.0 6.5 5.9 16.3 6.2 7.2 7.4 7.0 6.8 f
 29 25 18 14 11 8 5.8 14 17 23 26 32

15.7 15.3 14.5 14.2 14.3 15.0 15.2 14.6 13.7 13.7 13.6
 6.1 6.3 7.6 7.9 7.8 7.1 15.2 14.6 13.7 13.7 13.6
 33 25 19 16 12 8 6.9 14 18 23 32

(922.1)

285

3.10 941.56 11.52 938.46

284

283

282 + 56.4

282

T. P.

7.62	949.98	0.61	942.36
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28/

T. P.

12.27	942.97	0.34	930.70
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279

278

v77+33

3x2 x 24.3 Box's Arch

277

TP

275

2.80	931.04	12.26	938.24
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940.50

Handwritten calculations for the 1940s, showing various numbers and operations, including a large sum of 940.5 at the bottom.

+31

+28

+14

291+02

290+98

290+10

290

289

B.M.#8

288

287

286+40

286

941.56

44.1 43.7 43.3
6.3 6.1 7.1 42.5 41.8 42.3
33 26 11 7.9 19 35

50.2 49.4 46.5 44.4 43.5 42.4 40.1 36.3
0.2 1.0 3.9 6.0 13.5 8.0 10.3 14.1
235 200 100 22 6.9 100 200 300

44.7 44.3 43.9 43.1
5.7 6.1 6.5 7.3
34 18 36

46.7 45.8 44.4 44.3
3.7 4.6 6.2 6.1 43.9 43.4
35 30 20 15 6.5 34

49.0 48.5 48.0 46.0 45.8 46.0 46.4 45.9 45.3 45.5 46.9 46.8
1.4 1.9 2.8 4.4 4.6 4.4 46.2 45.0 45.5 5.1 4.9 3.5 3.6
33 18 14 10 7 5 4.2 7 19 21 24 28 34

48.9 48.8 47.8 45.8 45.7 46.0 46.4 45.9 45.3 45.3 46.4 46.5
1.5 1.6 2.6 4.6 4.7 4.4 46.1 45.0 45.5 5.1 5.1 4.0 3.2
33 26 14 10 7 4 4.3 6 18 20 23 27 34

44.4 44.1 43.2 41.9 41.9 41.7 41.1 41.5 43.1 43.4
6.3 6.3 7.2 8.5 8.5 8.2 9.2 8.8 7.3 7.0
33 29 16 5 8.5 17 22 25 29 34

39.8 39.4 39.0 37.3 37.3 38.0 38.0 36.7 36.9 37.6 37.9
1.8 2.2 2.6 4.3 4.3 3.6 31.9 3.6 4.2 4.7 4.0 3.7
33 20 16 8 5 2 3.7 20 24 29 31 34
36.4 36.2 35.1 35.0 36.4 36.4 36.1 34.2 34.3 34.4
5.2 5.4 6.5 6.6 5.2 36.4 5.3 7.4 7.2 7.2
33 18.5 12 6 1 5.2 19 24 30 34

36.7 33.7 32.7 37.3 36.0 36.2 35.7 32.3 31.9 28.6 26.6
4.9 7.9 8.2 4.3 5.6 5.9 9.2 9.7 13.0 15.0
100 18 7 6 6 5.4 19 19 25 100 200

6.2 35.7 35.3 34.7 34.9 36.1 36.1 36.0 33.5 33.4 33.0
5.4 5.9 6.3 6.9 6.7 5.5 5.6 8.1 8.1 8.0
18 14 0 5 2.5 17 24 26 34

300

299+20

299

T.P. 5.73 935.98 2.35 930.25

298

+94 outo Right

297

296+15

2x2x26

R.C.B.

296

R.M.#7

5.12 932.60 10.65 927.52

295

294

293

T.P. Post Right 0.38

938.17 12.64 937.79

292

291 +40

291 +35

960.43

32.1 31.7 30.5 29.8 30.0 29.8 29.2 28.5 28.3 30.0 30.6 30.8 31.2
 3.9 4.3 5.5 6.2 6.0 6.2 29.6 6.8 7.5 7.7 6.0 5.4 5.2 f
 25 20 17 15 13 10 6.4 14 18 20 25 29 33
 5.5 35.3 34.9 32.9 33.1 33.3 33.6 32.8 32.1 32.0 32.4 33.0 33.4 33.5
 13 13 11 11 11 11 11 11 11 11 11 11 11 11
 13 24 21 17 14 12 4 15 18 20 21 24 29 32.5

35.4 34.5 32.4 31.6 33.1 33.3 33.4 32.8 32.7 32.7 32.5 33.1 33.9
 0.8 1.5 3.6 3.4 2.9 2.7 3.2 3.2 3.2 3.2 3.5 2.9 2.1
 24 20 17 14 12 9 2.6 15 18 20 22 28 33

31.8 31.3 30.8 28.8 28.8 29.6 29.0 28.5 28.2 28.1 28.7 29.5
 0.8 1.3 1.8 3.8 3.8 3.0 2.7 3.6 4.1 4.4 4.5 3.9 3.1
 33 23 19 15 13 8 2.9 14 17 22 26 27 33

27.9 27.9 27.2 25.8 25.5 25.9 26.9 26.0 24.5 24.4 24.7
 4.1 5.2 5.4 6.8 7.1 6.7 5.2 6.9 8.1 8.2 7.7
 33 23 20 17 14 11 8 14 18 22 27 33

29.8 27.0 24.4 24.2 27.1 27.5 27.1 27.0 27.0 23.6 22.8 20.6 18.1
 2.3 5.6 6.2 8.4 5.2 5.1 5.5 5.6 5.6 9.2 9.8 12.8 14.5
 20 100 22 11 10 9 7 5.5 16 17 17 33 100 200

4 25.1 25.6 25.0 25.0 26.9 28.0 24.6 24.4 24.1
 7.3 7.0 7.6 7.6 5.1 27.1 5.6 8.0 8.2 8.5
 23 26 22 17 13 8 5.5 15 23 29 33

10.8 10.5 10.9 11.3 11.1 10.2 28.2 10.2 11.9 11.4 11.8 f
 33 f 22 19 17 13 8 10.0 15 19 24 33

0.9 31.0 30.4 29.1 29.1 30.1 30.0 29.7 29.3
 1.3 1.2 7.8 8.1 8.1 21 30.4 8.2 8.5 8.9 f
 33 22 19 17 14 7 7.8 16 27 33

36.0 35.6 34.8 33.1 32.3 33.1 33.4 33.4 33.1 32.8 32.8 34.0
 2.2 3.6 3.4 5.1 5.9 5.1 1.3 33.5 1.3 5.1 5.4 5.4 4.2 f
 33 22 18 16 15 12 8 4.7 15 17 20 24 34

41.0 41.0 40.2 37.1 37.5 38.2 37.7 37.3 37.1 37.0 38.0 39.7
 9.4 9.4 10.2 13.3 12.9 12.2 38.2 12.7 13.1 13.3 13.4 12.4 10.7
 33 f 21 17 15 13 10 12.2 16 20 21 23 25 34

44.1 44.4 43.8 41.9 42.1 40.9 41.4 42.0 42.4
 6.3 6.0 6.6 8.5 8.3 41.7 9.5 9.8 8.4 8.8
 33 25 21 17 10 8.7 10 27 28 34

43.6 42.5 42.3 42.0 41.1 41.6 42.3 42.4
 6.8 7.9 8.1 42.0 9.3 8.5 8.1 8.0
 33 18 11 9.4 19 27 30 35

Jan. 16, 1925.

T.P. rock right 11.85 928.78 0.69 916.93
310

309

308

307

B.M. #6

+88

+77

306

305

T.P.

304

303

302

T.P.

301

3.77 917.62 3.77 913.85 913.85
6014, 6x4 x 26

6.66 917.62 12.77 910.96

0.11 923.73 12.36 923.62

935.98

15.9 15.9 15.8 15.7 16.3
1.7 1.7 1.8 1.9 1.3 1.6 1.6 1.6 1.3
33 26 17 13 10 0.8 11 17 31

12.7 13.0 13.0 13.7 14.1 13.8 13.3 13.1 12.6
4.9 4.6 4.6 3.8 3.5 3.8 4.3 4.5 5.0 f
33 26 13 11 12 14 22 31 f

10.2 10.5 10.7 11.7 12.1 11.7 10.0 9.9 10.0
7.4 7.1 6.9 5.8 5.5 5.9 7.6 7.1 7.6
33 25 14 9 11 17 22 32 f

10.0 9.6 9.2 10.2 12.5 12.6 12.1 10.5 9.3 9.5 10.1 9.7
7.6 8.0 8.4 7.4 5.1 5.5 7.1 8.3 8.1 7.9
41 25 24 17 12 10 15 17 24 26 28 33

9.9 9.3 7.8 13.5 13.0 13.1 12.7 12.6 12.8 13.5 7.6 9.9 8.7 8.0 8.0 7.5
7.2 8.3 9.6 3.8 4.0 4.2 4.9 12.6 5.0 4.8 4.1 10.0 8.7 8.9 9.6 10.1
100 25 12 12 11 9 7 5.0 10 15 16 16 25 33 100 200 300

10.1 9.4 9.0 12.3 12.2 12.2 10.0 9.3 9.6
7.5 8.2 8.6 5.3 5.4 5.4 7.6 6.3 8.2
26 18 15 11 14 17 25 33

10.1 10.2 8.9 9.4 9.8 9.9 10.2 9.7 9.4 9.1 9.2
7.5 7.4 7.1 8.2 8.3 7.1 7.2 8.2 8.5 8.4
33 30 25 18 15 10 7.4 13 20 27 33

10.8 10.9 10.4 10.0 9.7 10.4 10.9 10.4 9.3 9.1 9.4
6.8 6.7 7.2 7.6 7.9 7.2 6.7 7.2 8.3 8.5 8.2
33 25 20 18 14 10 6.7 13 17 25 33

8 12.8 12.4 11.5 11.2 12.1 12.3 11.4 11.3 11.4
10.9 11.3 12.2 12.5 11.6 12.5 12.3 12.4 12.3
25 20 17 12 5 11.2 13 16 24 33

16.9 16.7 16.5 14.8 14.7 15.2 15.0 14.2 14.3 14.9
6.8 7.0 7.2 8.9 9.8 8.7 9.5 9.4 8.8 f
33 25 20 16 10 8.5 15 19 22 33

21.0 20.9 20.2 18.9 18.5 18.9 18.3 18.2 17.7 17.7 18.2 18.7
2.7 2.8 3.5 4.8 5.2 4.8 5.5 6.0 6.8 5.0 f
31 25 21 17 13 4.9 16 19 21 23 33

9 25.9 25.3 23.4 23.6 23.6 23.0 22.0 22.0 23.1 23.8 24.0
10.1 10.7 12.6 12.4 12.4 13.0 14.0 14.0 12.9 12.7 12.0
33 26 19 15 8 13 19 20 25 29 23

936.0

B.M. #5 8.99 945.85 7.18 936.86 936.89

462 2x2x27 RCB

321

320

T.P.

319

1.10 944.04 10.22 942.94

318

317

316+45

316

315

T.P.

314

12.68 953.16 0.10 946.48

313

T.P.

312

12.36 940.58 0.56 928.22

311

928.78

36.5 36.4 35.9 35.3 35.4 37.1 37.5 37.0 35.1 34.8 35.2 34.7 34.6
 7.5 7.6 8.1 8.7 8.5 6.9 37.5 37.0 35.1 34.8 35.2 34.7 34.6
 33 28 22 19 15 8 6.5 12 8.9 9.2 8.8 9.2 9.2
 41.0 40.8 39.3 38.3 38.4 37.1 39.0 38.2 38.0 38.5 39.1 38.9
 3.0 3.2 4.1 5.7 5.6 4.9 38.3 5.0 5.8 6.0 5.5 4.9 5.1
 33 28 21 16 14 9 4.7 12 15 18 20 25 33
 944.0
 46.1 46.1 45.4 42.2 42.2 42.6 42.8 42.3 41.4 41.5 42.7 43.1 42.7
 7.1 7.1 7.8 11.0 11.0 10.6 10.8 10.9 11.8 11.7 10.5 10.1 10.5
 33 28 22 19 15 12 10.4 13 16 19 21 27 30
 9.1 49.0 48.3 45.5 45.4 45.9 46.2 45.7 46.1 44.8 46.0 45.8 45.4
 4.2 4.9 7.2 7.8 7.3 46.2 7.5 8.1 8.4 7.2 7.4 7.8
 33 28 22 16 13 10 7.0 12 15 17 21 27 33
 10.5 50.8 50.8 48.8 48.9 49.2 49.4 48.9 48.0 47.9 48.9 48.7 48.5 48.4
 2.7 2.4 2.4 4.4 4.5 4.0 4.3 5.2 5.3 4.3 4.5 4.7 4.8
 33 28 20 16 14 12 3.8 13 17 19 20 28 30 33
 52.4 52.2 51.2 49.4 49.4 50.2 50.4 50.1 49.0 49.2 49.9 49.7 49.5 49.5
 0.2 1.0 2.0 3.8 3.8 3.0 5.0 3.1 4.2 4.0 3.3 3.5 3.7 3.7
 33 28 22 18 15 10 2.8 12 16 18 20 28 30 33
 51.5 51.2 50.8 48.4 48.4 49.6 49.4 48.8 48.9 49.9 49.9 49.6
 1.7 2.2 2.4 4.8 4.8 3.6 50.2 3.9 4.4 4.3 3.3 3.3 3.6
 33 28 23 18 16 10 3.2 14 16 17 19 28 33
 46.8 47.1 46.7 43.7 43.7 44.1 44.9 44.2 43.2 44.8 46.2 47.1 47.2 47.1
 6.4 6.5 9.5 9.5 9.1 9.2 9.2 9.2 8.4 7.0 6.1 6.0 6.1
 33 28 22 17 15 13 8.3 12 17 19 23 24 28 33
 953.2
 40.1 40.2 40.0 36.8 37.5 38.1 37.8 36.9 37.1 38.1 39.5 40.7 41.0 41.0
 0.2 0.2 0.6 3.8 3.1 3.8 3.7 3.7 3.2 2.5 1.1 1.0 1.0 1.0
 33 28 22 15 13 2.5 12 15 16 19 23 24 28 33
 33.9 33.8 33.3 30.8 31.3 32.0 31.4 30.1 32.6 35.0 35.3 34.8
 6.7 6.8 7.3 9.8 9.3 9.2 9.2 10.5 8.0 5.6 5.3 5.8
 33 27 21 17 13 8.6 12 15 17 25 29 33
 7.8 27.6 27.2 23.5 25.0 25.7 25.3 24.2 25.5 25.7 28.6 28.8 29.2
 1.2 1.2 1.6 3.3 3.8 3.5 4.2 3.3 3.1 0.2 0.0 1.0 1.0
 33 27 19 14 11 3.1 11 15 18 20 24 30 33
 21.3 21.2 21.1 19.4 19.2 20.1 20.7 20.5 20.4 19.2 20.4 20.6 21.7 21.8 21.5
 1.5 1.6 1.7 9.4 9.6 9.7 9.3 9.4 9.6 9.6 8.4 8.2 7.1 7.0 7.3
 33 27 20 16 14 11 8.1 7 15 16 19 23 25 30 33
 92.88

332

331

T.P.

330

11.08 957.66 5.10 946.58

329

328+75 2x2x 25

328

327

326

325+50

T.P.

325

6.4.9 951.68 2.66 945.19

324

323

322

945.86

49.5	48.4	48.0	47.8	48.8	49.4	49.2	48.6	48.1	48.5	49.5	50.0	50.2
8.3	7.7	9.9	8.9	8.3	8.5	7.6	7.6	8.9	8.2	7.7	7.5	7.5
32	18	15	13	10	8.3	13	16	19	21	30	31	33
46.7	46.5	46.2	45.6	45.6	46.5	47.1	46.9	45.7	45.7	46.3	46.6	
11.0	11.2	11.5	12.1	12.1	11.7	10.6	11.0	12.0	12.0	11.4	11.1	f
33	26	18	16	13	9	14	18	20	23	33	f	
45.1	44.9	44.4	43.8	44.0	45.0	45.2	44.1	43.8	44.5	44.2		
6.6	6.8	7.3	7.9	7.7	6.7	6.5	7.6	7.9	7.2	7.5	f	
32	27	18	15	13	9	6.1	14	17	20	22	33	f
44.3	43.8	42.6	42.9	43.6	44.8	44.5	42.9	42.6	42.6	42.1		
7.4	7.8	9.1	8.8	8.1	6.8	6.9	8.8	9.1	9.1	9.6		
32	19	18	16	14	9	6.6	12	20	24	28	33	
43.9	44.1	42.1	42.1	46.2	45.9	45.6	45.3	45.6	41.7	42.1	40.7	39.3
7.8	7.3	8.8	7.3	5.5	5.8	6.4	6.1	6.1	10.0	9.6	11.0	12.4
32	21	17	12	12	11	6.1	14	15	15	38	100	200
5.9	45.7	44.0	42.9	42.3	44.4	44.6	44.3	42.7	42.8	43.6	43.6	
6.3	7.7	8.8	8.4	7.3	7.4	7.4	8.0	8.9	8.1	8.1	f	
32	24	18	16	12	8	7.1	12	18	24	26	33	
46.0	45.3	43.7	43.6	44.5	44.7	44.4	43.3	43.6	43.4	43.0		
5.7	6.4	8.0	8.1	7.2	7.2	7.3	8.4	8.5	8.3	8.7		
32	24	17	13	9	1.0	12	16	19	21	33		
48.8	48.5	47.6	44.5	44.7	45.3	45.1	44.1	43.4	43.5	44.1	43.6	
3.2	4.1	7.2	7.0	6.4	45.3	6.6	7.6	8.3	8.8	7.6	8.1	f
35	27	27	15	12	9	6.4	11	15	18	19	22	33
49.0	48.5	47.6	44.7	44.4	45.0	45.0	43.3	43.2	44.5	44.1		
3.2	3.9	7.0	7.3	6.7	45.2	6.7	8.4	8.5	7.2	7.6	f	
33	28	26	16	13	12	6.5	12	17	19	22	33	
48.9	49.8	44.2	43.2	41.8	41.8	43.1	43.1	43.1	43.1	43.1		
0.0	1.1	1.1	43.7	2.7	4.1	4.1	2.8	2.8	2.8	2.8	f	
30	12	9	2.2	13	17	18	22	33				
40.7	40.7	40.1	38.8	38.5	38.4	39.4	39.8	38.5	38.3	39.1	39.1	38.9
5.2	5.8	6.1	7.5	7.5	6.5	40.1	6.1	7.4	7.6	6.8	6.8	7.0
23	22	20	17	13	10	5.8	13	17	19	22	28	33
38.1	38.3	37.6	35.9	35.8	37.1	37.6	39.2	36.0	36.0	36.7	36.6	36.5
7.6	8.3	10.0	10.1	8.8	8.3	8.7	9.9	9.9	9.9	9.3	9.3	9.4
33	28	20	16	15	9	12	16	19	23	29	33	f
36.1	35.6	34.6	34.9	35.5	36.7	36.8	36.7	35.8	34.7	34.4	33.9	
10.3	11.3	11.0	10.4	9.2	9.1	9.1	11.2	11.5	12.0	12.0	f	
38	33	20	18	15	9	11	16	19	27	33		

(945.9)

B.M. #3 0.31 943.36 11.61 943.03 943.0

344

343

342

341

T.P

340

339

338

337

336

335

B.M. #4

334

333

7.23 964.68 0.21 957.45 957.4

957.66

45.9 45.5 44.6 42.2 42.6 42.8 42.3 41.3 41.2 42.4 43.0
 8.7 9.1 10.0 12.4 12.0 12.3 13.3 13.2 12.2 11.6
 33 27 18 13 11 11.8 16 19 21 25 33
 48.5 48.0 47.6 45.4 45.6 45.5 45.1 44.5 44.0 44.7 45.2 45.6
 6.1 6.6 7.0 9.4 9.0 9.5 10.1 10.6 9.9 9.4 9.0
 33 26 19 14 11 9.1 17 19 21 22 26 33
 51.8 51.0 48.8 49.0 48.7 48.2 47.6 47.4 48.0 48.9
 2.8 3.6 5.8 5.6 48.7 6.4 7.0 7.2 6.6 5.7
 33 21 15 13 5.9 16 19 22 25 33
 54.2 53.7 52.7 51.7 52.3 51.5 50.6 50.7 51.1 52.1
 0.4 0.9 1.9 2.9 2.3 52.0 3.1 4.0 3.9 3.5 2.5
 33 22 18 16 13 2.6 16 19 22 24 33
 55.8 55.3 54.3 53.6 53.7 54.3 54.0 53.0 53.0 53.7 54.1
 8.9 9.4 10.4 11.1 11.0 10.4 10.7 11.7 11.7 11.0 10.6
 33 22 17 16 14 11 10.2 16 19 23 26 33
 56.9 56.8 56.4 55.2 56.1 56.2 56.2 55.6 55.1 55.4 55.7 56.1
 7.1 7.9 8.3 9.5 8.6 8.5 8.5 9.1 9.6 9.3 9.0 8.6
 33 20 16 14 11 8.5 16 19 21 24 26 33
 58.9 58.7 58.1 57.3 57.1 57.6 58.2 57.7 57.3 56.9 57.4 57.8 58.3
 5.8 6.0 6.6 7.4 7.6 7.1 58.2 7.0 7.4 7.8 7.3 6.9 6.4
 33 24 18 15 13 11 6.5 15 18 21 24 26 33
 60.6 60.5 58.5 58.7 59.5 59.8 59.7 59.3 59.2 59.8 60.4
 4.1 4.2 6.2 6.0 5.2 5.9 5.0 5.4 5.5 4.9 4.3
 33 24 16 13 10 4.9 15 18 22 23 33
 60.6 60.7 60.3 59.4 59.1 59.8 60.6 60.4 59.9 59.9 60.9 61.3
 4.1 4.0 4.4 5.3 5.6 4.9 4.1 4.3 4.8 4.8 3.3 3.4
 33 23 22 17 15 11 4.1 15 17 20 23 33
 58.0 58.8 58.5 58.2 57.4 58.0 58.6 58.0 57.8 57.9 58.5 58.9 59.8
 5.7 5.9 6.2 6.5 7.3 6.7 58.6 6.1 6.7 6.9 6.8 6.2 5.8 4.9
 33 23 22 18 15 11 6.1 11 15 18 19 22 24 33
 56.0 56.3 55.5 54.8 54.4 55.0 55.5 55.2 54.7 54.9 56.0 56.8 57.2
 1.7 1.4 2.2 2.9 3.3 2.7 55.5 5.2 5.0 5.1 5.1 5.1 5.1
 32 14 12 10 11 2.2 14 17 19 21 24 27 33
 52.9 53.1 51.5 51.3 51.5 51.1 51.8 51.0 51.0 51.2 51.7 53.4
 4.8 4.6 6.2 6.0 6.2 5.6 5.9 6.7 6.7 5.5 5.4 4.3
 32 18 14 13 11 5.6 13 16 17 20 22 33

957.7

10,55 908.15

355

354

353

352

35/

350

0.42	918.70	12.76	918.28
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π348740

T. P.

0.62	931.04	12.94	930.42
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348

347

346

345

943.36

Handwritten calculations on lined paper, showing multiple rows of arithmetic problems. The problems involve adding and subtracting fractions and decimals, often with multiple terms. The calculations are organized into columns, with some results circled or underlined. The final result, 943.4, is circled at the bottom.

$\angle = 15^{\circ} 30''$



$\frac{1}{4}$ Cor. Sec. 13-24
Twp. 89 N. R. 12 W.



Sec. Cor. Stone
N.E. Cor. Sec 24
Twp. 89 N. R. 12 W.

5' 10" 40

5:1

5:1

7:1

7:1

L.H.

5:1

11

7:1 = 5' 10"

B.C.

3.1

7:1

7:1 = 5' 10"

KEITH'S RAILROAD CURVE TABLES.

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HOW TO USE KEITH'S TABLES.

EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle
of Intersection or I. P.= $23^{\circ} 20'$ to the R. at Station
542+72.

Ext. in Tab. IV opposite $23^{\circ} 20' = 120.87$

$120.87 + 12 = 132.87$. Say a 10° Curve.

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

$1183.1 + 10 = 1183.1$.

Tab. V. correction for A. $23^{\circ} 20'$ for a 10° Cur. = 0.16

$118.31 + 0.16 = 118.47 =$ corrected Tangent.

(If corrected Ext. is required find in same way)

Ang. $23^{\circ} 20' = 23.33^{\circ} + 10 = 2.3333 =$ L. C.

$2^{\circ} 19\frac{1}{2}' =$ def. for sta. 542	I. P. = sta. 542+72
$4^{\circ} 49\frac{1}{2}' =$ " " " +50	Tan. = 1.18.47
$7^{\circ} 19\frac{1}{2}' =$ " " " 543	B. C. = sta. 541+53.53
$9^{\circ} 49\frac{1}{2}' =$ " " " +50	L. C. = 2.33.33
$11^{\circ} 40' =$ " " " 543+	E. C. = sta. 543+86.86
86.86	

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

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

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

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

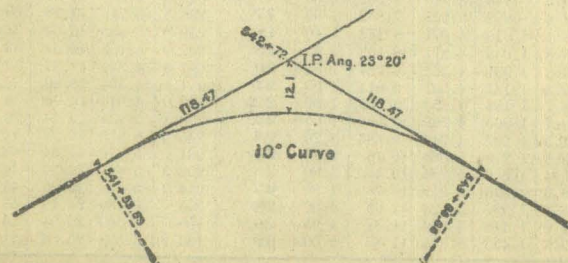


TABLE I. — Minutes in Decimals of a Degree.

1'	.0167	11'	.1333	21'	.3500	31'	.5167	41'	.8333	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

TABLE II. — Inches in Decimals of a Foot.

1-16	3-32	$\frac{1}{8}$	3-16	$\frac{1}{4}$	5-16	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{7}{8}$	
.0052	.0078	.0104	.0156	.0208	.0260	.0312	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

TABLE III. — Radii, Ordinates and Deflections.

Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot
0° 10'	34377.	.036	.145	.291	0.05'	7°	819.0	1.528	6.105	12.21	2.1
20	17189.	.073	.291	.582	0.10	20'	781.8	1.600	6.395	12.79	2.2
30	11459.	.109	.436	.873	0.15	30	764.5	1.637	6.540	13.08	2.2
40	8594.4	.145	.582	1.164	0.20	40	747.9	1.673	6.685	13.37	2.2
50	6375.5	.182	.727	1.454	0.25	50	716.8	1.746	6.976	13.95	2.4
1	5729.6	.218	.873	1.745	0.30	20	688.2	1.819	7.266	14.53	2.4
10	4911.2	.255	1.018	2.036	0.35	30	674.7	1.855	7.411	14.82	2.4
20	4297.3	.291	1.164	2.327	0.40	40	661.7	1.892	7.556	15.11	2.4
30	3819.8	.327	1.309	2.618	0.45	50	637.3	1.965	7.846	15.69	2.7
40	3437.9	.364	1.454	2.909	0.50	20	614.6	2.037	8.136	16.27	2.8
50	3125.4	.400	1.600	3.200	0.55	30	603.8	2.074	8.281	16.56	2.8
2	2864.9	.436	1.745	3.490	0.60	40	593.4	2.110	8.426	16.85	2.8
10	2644.6	.473	1.891	3.781	0.65	50	573.7	2.183	8.716	17.43	3.0
20	2455.7	.509	2.036	4.072	0.70	30	546.4	2.292	9.150	18.30	3.1
30	2292.0	.545	2.181	4.363	0.75	40	521.7	2.402	9.585	19.16	3.1
40	2148.8	.582	2.327	4.654	0.80	50	499.1	2.511	10.02	20.04	3.4
50	2022.4	.618	2.472	4.945	0.85	20	478.3	2.620	10.45	20.91	3.4
3	1910.1	.655	2.618	5.235	0.90	30	459.3	2.730	10.89	21.77	3.7
10	1809.6	.691	2.763	5.526	0.95	40	441.7	2.839	11.32	22.64	3.4
20	1719.1	.727	2.908	5.817	1.00	50	425.4	2.949	11.75	23.51	4.0
30	1637.3	.764	3.054	6.108	1.05	20	410.3	3.058	12.18	24.37	4.1
40	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.1
50	1495.0	.836	3.345	6.689	1.15	40	383.1	3.277	13.05	26.11	4.1
4	1432.7	.873	3.490	6.980	1.20	50	370.8	3.387	13.49	26.97	4.1
10	1375.4	.909	3.635	7.271	1.25	20	359.3	3.496	13.92	27.84	4.1
20	1322.5	.945	3.718	7.561	1.30	30	348.5	3.606	14.35	28.70	4.1
30	1273.6	.982	3.826	7.852	1.35	40	338.3	3.716	14.78	29.56	5.
40	1228.1	1.018	4.071	8.143	1.40	50	319.8	3.935	15.64	31.29	5.
50	1185.8	1.055	4.217	8.433	1.45	20	302.9	4.155	16.51	33.01	5.
5	1146.3	1.091	4.362	8.724	1.50	30	287.9	4.374	17.37	34.73	6.
10	1109.3	1.127	4.507	9.014	1.55	40	274.4	4.594	18.22	36.44	6.
20	1074.7	1.164	4.653	9.305	1.60	50	262.0	4.814	19.08	38.16	6.
30	1042.1	1.200	4.798	9.596	1.65	20	250.8	5.035	19.94	39.87	6.
40	1011.5	1.237	4.943	9.886	1.70	30	240.5	5.255	20.79	41.68	7.
50	982.6	1.273	5.088	10.18	1.75	40	231.0	5.476	21.64	43.28	7.
6	955.4	1.309	5.234	10.47	1.80	50	222.3	5.697	22.50	44.99	7.
10	929.6	1.346	5.379	10.76	1.85	20	214.2	5.918	23.35	46.69	8.
20	905.1	1.382	5.524	11.05	1.90	30	208.7	6.139	24.19	48.38	8.
30	881.9	1.418	5.669	11.34	1.95	40	199.7	6.360	25.04	50.07	8.
40	859.9	1.455	5.814	11.63	2.00	50	193.2	6.583	25.88	51.76	9.

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
1°	50.00	.22	11°	551.70	26.50	21°	1061.9	97.57
10'	58.34	.30	10'	560.11	27.31	10'	1070.6	99.16
20	66.67	.39	20	568.53	28.14	20	1079.2	100.75
30	75.01	.49	30	576.95	28.97	30	1087.8	102.35
40	83.34	.61	40	585.36	29.82	40	1096.4	103.97
50	91.68	.73	50	593.79	30.68	50	1105.1	105.60
2	100.01	.87	12	602.21	31.56	22	1113.7	107.24
10	108.35	1.02	10	610.64	32.45	10	1122.4	108.90
20	116.68	1.19	20	619.07	33.35	20	1131.0	110.57
30	125.02	1.36	30	627.50	34.26	30	1139.7	112.25
40	133.36	1.55	40	635.93	35.18	40	1148.4	113.95
50	141.70	1.75	50	644.37	36.12	50	1157.0	115.66
3	150.04	1.96	13	652.81	37.07	23	1165.7	117.38
10	158.38	2.19	10	661.25	38.03	10	1174.4	119.12
20	166.72	2.43	20	669.70	39.01	20	1183.1	120.87
30	175.06	2.67	30	678.15	39.99	30	1191.8	122.63
40	183.40	2.93	40	686.60	40.99	40	1200.5	124.41
50	191.74	3.21	50	695.06	42.00	50	1209.2	126.20
4	200.08	3.49	14	703.51	43.03	24	1217.9	128.00
10	208.43	3.79	10	711.97	44.07	10	1226.6	129.82
20	216.77	4.10	20	720.44	45.12	20	1235.3	131.65
30	225.12	4.42	30	728.90	46.18	30	1244.0	133.50
40	233.47	4.76	40	737.37	47.25	40	1252.8	135.35
50	241.81	5.10	50	745.85	48.34	50	1261.5	137.23
5	250.16	5.46	15	754.32	49.44	25	1270.2	139.11
10	258.51	5.83	10	762.80	50.55	10	1279.0	141.01
20	266.86	6.21	20	771.29	51.68	20	1287.7	142.93
30	275.21	6.61	30	779.77	52.89	30	1296.5	144.85
40	283.57	7.01	40	788.26	53.97	40	1305.3	146.79
50	291.92	7.43	50	796.75	55.13	50	1314.0	148.75
6	300.28	7.86	16	805.25	56.31	26	1322.8	150.71
10	308.64	8.31	10	813.75	57.50	10	1331.6	152.69
20	316.99	8.76	20	822.25	58.70	20	1340.4	154.69
30	325.35	9.23	30	830.76	59.91	30	1349.2	156.70
40	333.71	9.71	40	839.27	61.14	40	1358.0	158.72
50	342.08	10.20	50	847.78	62.38	50	1366.8	160.76
7	350.44	10.71	17	856.30	63.63	27	1375.6	162.81
10	358.81	11.22	10	864.82	64.90	10	1384.4	164.86
20	367.17	11.75	20	873.35	66.18	20	1393.2	166.95
30	375.54	12.29	30	881.88	67.47	30	1402.0	169.04
40	383.91	12.85	40	890.41	68.77	40	1410.9	171.15
50	392.28	13.41	50	898.95	70.09	50	1419.7	173.27
8	400.66	13.99	18	907.49	71.42	28	1428.6	175.41
10	409.08	14.58	10	916.03	72.76	10	1437.4	177.55
20	417.41	15.18	20	924.58	74.12	20	1446.3	179.72
30	425.79	15.80	30	933.13	75.49	30	1455.1	181.89
40	434.17	16.43	40	941.69	76.86	40	1464.0	184.08
50	442.55	17.07	50	950.25	78.26	50	1472.9	186.29
9	450.93	17.72	19	958.81	79.67	29	1481.8	188.51
10	459.32	18.38	10	967.38	81.09	10	1490.7	190.74
20	467.71	19.06	20	975.96	82.53	20	1499.6	192.99
30	476.10	19.75	30	984.53	83.97	30	1508.5	195.25
40	484.49	20.45	40	993.12	85.43	40	1517.4	197.53
50	492.88	21.16	50	1001.7	86.90	50	1526.3	199.82
10	501.28	21.89	20	1010.3	88.39	30	1535.3	202.12
10	509.68	22.62	10	1018.9	89.89	10	1544.2	204.44
20	518.08	23.38	20	1027.5	91.40	20	1553.1	206.77
30	526.48	24.14	30	1036.1	92.92	30	1562.1	209.12
40	534.89	24.91	40	1044.7	94.46	40	1571.0	211.48
50	543.29	25.70	50	1053.3	96.01	50	1580.0	213.86

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
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	20	2161.2	394.1	20	2753.4	627.3
30	1615.9	223.5	30	2170.8	397.4	30	2763.7	631.7
40	1624.9	226.0	40	2180.3	400.8	40	2773.9	636.2
50	1633.9	228.4	50	2189.9	404.2	50	2784.2	640.7
32°	1643.0	230.9	42°	2199.4	407.6	52°	2794.5	645.2
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	43°	2257.0	428.5	53°	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276.2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
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	50	2363.5	468.4	50	2972.1	725.0
35°	1806.6	278.1	45°	2373.3	472.1	55°	2982.7	729.9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.8	30	3014.5	744.6
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	30	2461.7	506.4	30	3078.7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37°	1917.1	312.2	47°	2491.3	518.2	57°	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
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	10	2561.0	546.3	10	3186.9	826.7
20	1991.5	336.3	20	2571.0	550.4	20	3197.8	832.0
30	2000.9	339.3	30	2581.0	554.5	30	3208.8	837.3
40	2010.2	342.4	40	2591.0	558.6	40	3219.7	842.7
50	2019.6	345.5	50	2601.1	562.8	50	3230.7	848.1
39°	2029.0	348.6	49°	2611.2	566.9	59°	3241.7	853.5
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	3274.8	869.8
40	2066.6	361.3	40	2651.5	583.8	40	3285.8	875.3
50	2076.0	364.5	50	2661.6	588.0	50	3296.9	880.8
40°	2085.4	367.7	50°	2671.8	592.3	60°	3308.0	886.4
10	2094.9	371.0	10	2681.9	596.6	10	3319.1	892.0
20	2104.3	374.2	20	2692.1	600.9	20	3330.3	897.5
30	2113.8	377.5	30	2702.3	605.3	30	3341.4	903.2
40	2123.3	380.8	40	2712.5	609.6	40	3352.6	908.9
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
61°	3375.0	920.2	71°	4086.9	1308.2	81°	4893.6	1805.8
10'	3386.3	925.9	10'	4099.5	1315.6	10'	4908.0	1814.7
20	3397.5	931.6	20	4112.1	1322.9	20	4922.5	1824.1
30	3408.8	937.3	30	4124.8	1330.3	30	4937.0	1833.6
40	3420.1	943.1	40	4137.4	1337.7	40	4951.5	1843.1
50	3431.4	948.9	50	4150.1	1345.1	50	4966.1	1852.6
62°	3442.7	954.8	72°	4162.8	1352.6	82°	4980.7	1862.2
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	73°	4239.7	1398.0	83°	5069.2	1920.5
10	3522.6	996.2	10	4252.6	1405.7	10	5084.0	1930.4
20	3534.1	1002.3	20	4265.6	1413.5	20	5099.0	1940.3
30	3545.6	1008.3	30	4278.5	1421.2	30	5113.9	1950.3
40	3557.2	1014.4	40	4291.5	1429.0	40	5128.9	1960.2
50	3568.7	1020.5	50	4304.6	1436.8	50	5143.9	1970.3
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	50	4383.3	1484.4	50	5234.9	2031.4
65°	3650.2	1063.9	75°	4396.5	1492.4	85°	5250.3	2041.7
10	3661.9	1070.2	10	4409.8	1500.5	10	5265.6	2052.1
20	3673.7	1076.6	20	4423.1	1508.6	20	5281.0	2062.5
30	3685.4	1082.9	30	4436.4	1516.7	30	5296.4	2073.0
40	3697.2	1089.3	40	4449.7	1524.9	40	5311.9	2083.5
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	40	4530.4	1574.7	40	5405.6	2147.5
50	3780.4	1134.8	50	4544.0	1583.1	50	5421.4	2158.4
67°	3792.4	1141.4	77°	4557.6	1591.6	87°	5437.2	2169.2
10	3804.4	1148.0	10	4571.2	1600.1	10	5453.1	2180.2
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	20	4667.4	1660.5	20	5565.4	2258.0
30	3901.2	1202.0	30	4681.3	1669.2	30	5581.6	2269.3
40	3913.4	1208.9	40	4695.2	1678.1	40	5597.8	2280.6
50	3925.6	1215.8	50	4709.2	1686.9	50	5614.2	2292.0
69°	3937.9	1222.7	79°	4723.2	1695.8	89°	5630.5	2303.5
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	80°	4807.7	1749.9	90°	5729.7	2373.3
10	4024.4	1272.1	10	4822.0	1759.0	10	5746.3	2385.1
20	4036.8	1279.3	20	4836.2	1768.2	20	5763.1	2397.0
30	4049.3	1286.5	30	4850.5	1777.4	30	5779.9	2408.9
40	4061.8	1293.6	40	4864.8	1786.7	40	5796.7	2420.9
50	4074.4	1300.9	50	4879.2	1796.0	50	5813.6	2432.9

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
91°	5880.5	2444.9	101°	6950.6	3278.1	111°	8336.7	4386.1
10	5847.5	2457.1	10	6971.3	3294.1	10	8362.7	4407.6
20	5864.6	2469.3	20	6992.0	3310.1	20	8388.9	4429.1
30	5881.7	2481.5	30	7012.7	3326.1	30	8415.1	4450.6
40	5898.8	2493.8	40	7033.6	3342.3	40	8441.5	4472.7
50	5916.0	2506.1	50	7054.5	3358.5	50	8468.0	4494.6
92°	5933.2	2518.5	102°	7075.5	3374.9	112°	8494.6	4516.6
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	103°	7203.2	3474.4	113°	8656.6	4651.3
10	6055.4	2606.8	10	7224.7	3491.3	10	8684.0	4674.2
20	6073.1	2619.7	20	7246.3	3508.2	20	8711.5	4697.2
30	6090.8	2632.6	30	7268.0	3525.2	30	8739.2	4720.3
40	6108.6	2645.4	40	7289.8	3542.4	40	8767.0	4743.6
50	6126.4	2658.5	50	7311.7	3559.6	50	8794.9	4766.9
94°	6144.3	2671.6	104°	7333.6	3576.8	114°	8822.9	4790.4
10	6162.6	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	50	7444.6	3664.5	50	8965.0	4909.9
95°	6252.8	2751.3	105°	7467.0	3682.3	115°	8993.8	4934.1
10	6271.1	2764.8	10	7489.6	3700.2	10	9022.7	4958.6
20	6289.4	2778.3	20	7512.2	3718.2	20	9051.7	4983.1
30	6307.9	2792.0	30	7534.9	3736.2	30	9080.9	5007.8
40	6326.3	2805.6	40	7557.7	3754.4	40	9110.3	5032.6
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	40	7696.3	3865.2	40	9289.2	5184.5
50	6457.3	2903.1	50	7719.7	3884.0	50	9319.5	5210.3
97°	6476.2	2917.3	107°	7743.2	3902.9	117°	9349.9	5236.2
10	6495.2	2931.6	10	7766.8	3921.9	10	9380.5	5262.3
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	20	7934.6	4057.4	20	9598.9	5449.2
30	6649.6	3047.9	30	7959.0	4077.2	30	9630.7	5476.5
40	6669.2	3062.8	40	7983.5	4097.1	40	9662.6	5504.0
50	6688.8	3077.7	50	8008.0	4117.0	50	9694.7	5531.7
99°	6708.6	3092.7	109°	8032.7	4137.1	119°	9727.0	5559.4
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	110°	8182.8	4259.7	120°	9924.0	5729.7
10	6848.5	3199.6	10	8208.2	4280.5	10	9957.5	5758.6
20	6868.8	3215.1	20	8233.7	4301.4	20	9991.0	5787.7
30	6889.2	3230.8	30	8259.3	4322.4	30	10025.0	5817.0
40	6909.6	3246.5	40	8285.0	4343.6	40	10059.0	5846.5
50	6930.1	3262.3	50	8310.8	4364.8	50	10093.0	5876.1

Table V. Corrections for use with table IV,

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		For Tangents Add													
ANGLE	CURVE	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°		.03	.06	.09	.13	.16	.19	.22	.25	.28	.31	.34	.38	.42	.46
15°		.04	.10	.14	.19	.24	.29	.34	.39	.45	.51	.53	.58	.63	.68
20°		.06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	.79	.84	.90
25°		.08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
30°		.10	.19	.29	.39	.49	.59	.69	.79	.89	.99	1.09	1.20	1.29	1.39
35°		.11	.22	.34	.47	.58	.69	.79	.81	.92	1.04	1.29	1.42	1.54	1.66
40°		.13	.26	.40	.53	.67	.80	.93	1.06	1.20	1.34	1.49	1.64	1.79	1.94
45°		.15	.30	.44	.60	.76	.91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
50°		.17	.34	.51	.68	.85	1.02	1.19	1.36	1.54	1.72	1.91	2.10	2.29	2.48
55°		.19	.38	.57	.76	.95	1.14	1.32	1.52	1.72	1.92	2.14	2.35	2.56	2.77
60°		.21	.42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2.60	2.83	3.07
65°		.23	.46	.69	.93	1.16	1.40	1.64	1.88	2.13	2.38	2.63	2.88	3.13	3.39
70°		.25	.51	.76	1.02	1.28	1.54	1.80	2.06	2.33	2.60	2.88	3.16	3.44	3.72
75°		.27	.56	.83	1.12	1.40	1.69	1.98	2.27	2.57	2.87	3.16	3.47	3.78	4.09
80°		.30	.61	.91	1.22	1.53	1.84	2.15	2.46	2.78	3.10	3.44	3.78	4.12	4.46
85°		.33	.66	1.00	1.33	1.68	2.02	2.36	2.70	3.05	3.40	3.77	4.14	4.55	4.89
90°		.36	.72	1.09	1.45	1.83	2.20	2.57	2.94	3.32	3.70	4.10	4.50	4.91	5.32
95°		.39	.79	1.19	1.55	2.00	2.40	2.80	3.20	3.61	4.02	4.40	4.98	5.38	5.83
100°		.43	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5.37	5.85	6.34

For Externals Add

ANGLE	CURVE	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°		.001	.003	.004	.006	.007	.008	.009	.011	.012	.014	.015	.017	.018	.020
15°		.003	.007	.010	.014	.018	.023	.027	.029	.032	.035	.039	.043	.047	.051
20°		.006	.011	.017	.022	.028	.034	.038	.045	.051	.057	.063	.070	.076	.083
25°		.009	.018	.027	.036	.046	.056	.065	.074	.083	.093	.106	.120	.127	.135
30°		.013	.025	.038	.051	.065	.078	.090	.103	.116	.129	.149	.170	.179	.188
35°		.018	.035	.054	.072	.086	.109	.131	.153	.175	.197	.213	.230	.247	.264
40°		.023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341
45°		.030	.060	.093	.119	.153	.184	.216	.254	.289	.325	.351	.378	.411	.445
50°		.037	.075	.116	.151	.189	.227	.266	.305	.345	.384	.425	.467	.508	.550
55°		.046	.093	.142	.188	.236	.283	.332	.381	.420	.479	.530	.582	.641	.700
60°		.056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	.697	.774	.851
65°		.067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.771	.845	.922	1.01
70°		.080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°		.095	.182	.266	.353	.440	.528	.617	.707	.797	.887	.977	1.07	1.18	1.29
80°		.110	.220	.332	.445	.558	.671	.787	.903	1.02	1.13	1.25	1.38	1.50	1.62
85°		.128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1.62	1.76	1.91
90°		.149	.299	.450	.603	.756	.910	1.07	1.22	1.38	1.54	1.70	1.87	2.03	2.20
95°		.174	.350	.522	.706	.885	1.06	1.25	1.43	1.62	1.80	1.99	2.18	2.38	2.58
100°		.200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2.06	2.28	2.50	2.73	2.96

Table VI. Deflections for Sub Chords for Short Radius Curves.

Degree of Curve	Radius 50 sin. def. ang.	$\frac{1}{2}$ sub chord = sin of def. angle				Length of arc for 100 ft.
		12.5 Ft.	15 Ft.	20 Ft.	25 Ft.	
30°	193.18	1° 51'	2° 17'	2° 58'	3° 43'	101.15
32°	181.39	1° 59'	2° 25'	3° 10'	3° 58'	101.33
34°	171.01	2° 06'	2° 33'	3° 21'	4° 12'	101.48
36°	161.80	2° 13'	2° 41'	3° 33'	4° 26'	101.66
38°	153.58	2° 20'	2° 49'	3° 44'	4° 40'	101.85
40°	146.19	2° 27'	2° 57'	3° 55'	4° 54'	102.06
42°	139.52	2° 34'	3° 05'	4° 07'	5° 08'	102.29
44°	133.47	2° 41'	3° 13'	4° 18'	5° 22'	102.53
46°	127.97	2° 48'	3° 21'	4° 29'	5° 36'	102.76
48°	122.92	2° 55'	3° 29'	4° 40'	5° 50'	103.00
50°	118.31	3° 02'	3° 38'	4° 51'	6° 04'	103.24
52°	114.06	3° 09'	3° 46'	5° 02'	6° 17'	103.54
54°	110.11	3° 16'	3° 54'	5° 13'	6° 31'	103.84
56°	106.50	3° 22'	4° 02'	5° 23'	6° 44'	104.14
58°	103.14	3° 29'	4° 10'	5° 34'	6° 57'	104.43
60°	100.00	3° 35'	4° 18'	5° 44'	7° 11'	104.72

CURVE FORMULAS.

$T = R \tan \frac{1}{2} I$	$R = T \cot. \frac{1}{2} I$	Chord def. = $\frac{\text{chord}}{R}$
$T = 50 \tan. \frac{1}{2} I$	$R = 50$	
$\frac{\text{Sin. D}}{\text{Sin. D} = 50}$	$\frac{R}{\text{Sin. D}}$	No. chords = $\frac{1}{2} I$
$\frac{R}{\text{Sin. D} = 50 \tan. \frac{1}{2} I}$	$E = R \text{ ex. sec. } \frac{1}{2} I$	Tan. def. = $\frac{1}{2} \text{ chord def}$
	$E = T \tan \frac{1}{2} I$	

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

Table IV. contains Tangents and External to a 1° curve. Tan. and Ext. to any other radius may be found, nearly enough, by dividing the Tan. c Ext. opposite the given Central Angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table IV.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.), and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance: Multiply the angle by .01745, and the product by the distance.

RIGHT ANGLE TRIANGLES.— Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. 10. $10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. 25. $25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875 = B$

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

Natural Sines

deg.	0'	10'	20'	30'	40'	50'	deg.	0'	10'	20'	30'	40'	50'	deg.
0	0000	0029	0058	0087	0116	0145	89	40	6428	6450	6472	6494	6517	6539
1	0175	0204	0233	0262	0291	0320	88	41	6561	6583	6604	6626	6648	6670
2	0349	0378	0407	0436	0465	0494	87	42	6601	6713	6734	6756	6777	6799
3	0523	0552	0581	0610	0640	0669	86	43	6642	6841	6862	6884	6905	6926
4	0698	0727	0756	0785	0814	0843	85	44	6684	6967	6988	7009	7030	7050
5	0872	0901	0929	0958	0987	1016	84	45	7071	7092	7112	7133	7153	7173
6	1045	1074	1103	1132	1161	1190	83	46	7193	7214	7234	7254	7274	7294
7	1219	1248	1279	1305	1334	1363	82	47	7314	7333	7353	7373	7392	7412
8	1392	1421	1449	1478	1507	1536	81	48	7431	7451	7470	7490	7509	7528
9	1564	1593	1622	1650	1679	1708	80	49	7547	7566	7585	7604	7623	7642
10	1736	1765	1794	1822	1851	1880	79	50	7660	7679	7698	7716	7735	7753
11	1908	1937	1965	1994	2022	2051	78	51	7771	7790	7808	7826	7844	7862
12	2079	2108	2136	2164	2193	2221	77	52	7880	7898	7916	7934	7951	7969
13	2250	2278	2306	2334	2363	2391	76	53	7986	8004	8021	8039	8056	8073
14	2419	2447	2476	2504	2532	2560	75	54	8090	8107	8124	8141	8158	8175
15	2588	2616	2644	2672	2700	2728	74	55	8192	8208	8225	8241	8258	8274
16	2756	2784	2812	2840	2868	2896	73	56	8290	8307	8323	8339	8355	8371
17	2924	2952	2979	3007	3035	3062	72	57	8387	8403	8418	8434	8450	8465
18	3092	3118	3145	3173	3201	3228	71	58	8480	8496	8511	8526	8542	8557
19	3256	3283	3311	3338	3365	3393	70	59	8572	8587	8601	8616	8631	8646
20	3420	3448	3475	3502	3529	3557	69	60	8660	8675	8689	8704	8718	8732
21	3584	3611	3638	3665	3692	3719	68	61	8746	8760	8774	8788	8802	8816
22	3746	3773	3800	3827	3854	3881	67	62	8829	8843	8857	8870	8884	8897
23	3907	3934	3961	3987	4014	4041	66	63	8910	8923	8936	8949	8962	8975
24	4067	4094	4120	4147	4173	4200	65	64	8988	9001	9013	9026	9038	9051
25	4226	4253	4279	4305	4331	4358	64	65	9063	9075	9088	9100	9112	9124
26	4384	4410	4436	4462	4488	4514	63	66	9135	9147	9159	9171	9182	9194
27	4540	4566	4592	4617	4643	4669	62	67	9205	9216	9228	9239	9250	9261
28	4695	4720	4746	4772	4797	4823	61	68	9272	9283	9293	9304	9315	9325
29	4848	4874	4899	4924	4950	4975	60	69	9336	9346	9356	9367	9377	9387
30	5000	5025	5050	5075	5100	5125	59	70	9397	9407	9417	9426	9436	9446
31	5150	5175	5200	5225	5250	5275	58	71	9455	9465	9474	9483	9492	9502
32	5299	5324	5348	5373	5398	5422	57	72	9511	9520	9528	9537	9546	9555
33	5446	5471	5495	5519	5544	5568	56	73	9563	9572	9580	9588	9596	9605
34	5592	5617	5640	5664	5688	5712	55	74	9613	9621	9628	9636	9644	9652
35	5736	5760	5783	5807	5831	5854	54	75	9659	9667	9674	9681	9689	9696
36	5878	5902	5925	5948	5972	5995	53	76	9703	9710	9717	9724	9730	9737
37	6018	6041	6065	6088	6111	6134	52	77	9744	9750	9757	9763	9769	9775
38	6157	6180	6202	6225	6248	6271	51	78	9781	9787	9793	9799	9805	9811
39	6293	6316	6338	6361	6383	6406	50	79	9816	9822	9827	9833	9838	9843

Natural Cosines

deg.	0'	10'	20'	30'	40'	50'	deg.
80	9848	9853	9858	9863	9868	9872	9
81	9877	9881	9886	9890	9894	9898	8
82	9903	9907	9911	9914	9918	9922	7
83	9925	9929	9932	9936	9939	9942	6
84	9945	9948	9951	9954	9957	9959	5
85	9962	9964	9967	9969	9971	9974	4
86	9976	9978	9980	9981	9983	9985	3
87	9986	9988	9989	9990	9992	9993	2
88	9994	9995	9996	9997	9997	9998	1
89	9998	9999	9999	9999	1.0000	1.0000	0

Natural Tangents

sec.	0'	10'	20'	30'	40'	50'	sec.	0'	10'	20'	30'	40'	50'	sec.
0	0000	0029	0058	0087	0116	0145	89	40	8391	8441	8491	8541	8591	8642
1	0175	0204	0233	0262	0291	0320	88	41	8693	8744	8796	8847	8899	8952
2	0349	0378	0407	0437	0466	0495	87	42	9004	9057	9110	9163	9217	9271
3	0524	0553	0582	0612	0641	0670	86	43	9325	9380	9435	9490	9545	9601
4	0699	0729	0758	0787	0816	0846	85	44	9657	9713	9770	9827	9884	9942
5	0875	0904	0934	0963	0992	1022	84	45	1.0000	1.0058	1.0117	1.0176	1.0235	1.0295
6	1051	1080	1110	1139	1169	1198	83	46	1.0355	1.0416	1.0477	1.0533	1.0599	1.0661
7	1228	1257	1287	1317	1346	1376	82	47	1.0724	1.0786	1.0850	1.0913	1.0977	1.1041
8	1405	1435	1465	1495	1524	1554	81	48	1.1106	1.1171	1.1237	1.1303	1.1369	1.1436
9	1584	1614	1644	1673	1703	1733	80	49	1.1504	1.1571	1.1640	1.1708	1.1778	1.1847
10	1763	1793	1823	1853	1883	1914	79	50	1.1918	1.1988	1.2059	1.2131	1.2203	1.2276
11	1944	1974	2004	2035	2065	2095	78	51	1.2349	1.2423	1.2497	1.2572	1.2647	1.2723
12	2126	2156	2186	2217	2247	2278	77	52	1.2799	1.2876	1.2954	1.3032	1.3111	1.3190
13	2309	2339	2370	2401	2432	2462	76	53	1.3270	1.3351	1.3432	1.3514	1.3597	1.3680
14	2493	2524	2555	2586	2617	2648	75	54	1.3764	1.3848	1.3934	1.4019	1.4106	1.4193
15	2679	2711	2742	2773	2805	2836	74	55	1.4281	1.4370	1.4460	1.4550	1.4641	1.4733
16	2867	2899	2931	2962	2994	3026	73	56	1.4826	1.4919	1.5013	1.5108	1.5204	1.5301
17	3057	3089	3121	3153	3185	3217	72	57	1.5399	1.5497	1.5597	1.5697	1.5798	1.5900
18	3249	3281	3314	3346	3378	3411	71	58	1.6003	1.6107	1.6212	1.6319	1.6426	1.6534
19	3443	3476	3508	3541	3574	3607	70	59	1.6643	1.6753	1.6864	1.6977	1.7090	1.7205
20	3640	3673	3706	3739	3772	3805	69	60	1.7321	1.7437	1.7556	1.7675	1.7797	1.7917
21	3839	3872	3906	3939	3973	4006	68	61	1.8040	1.8165	1.8291	1.8418	1.8546	1.8676
22	4040	4074	4108	4142	4176	4210	67	62	1.8807	1.8940	1.9074	1.9210	1.9347	1.9486
23	4245	4279	4314	4348	4383	4417	66	63	1.9626	1.9768	1.9912	2.0057	2.0204	2.0353
24	4452	4487	4522	4557	4592	4628	65	64	2.0503	2.0655	2.0809	2.0965	2.1123	2.1283
25	4663	4699	4734	4770	4806	4841	64	65	2.1445	2.1609	2.1775	2.1943	2.2113	2.2286
26	4877	4913	4950	4986	5022	5059	63	66	2.2460	2.2637	2.2817	2.2998	2.3183	2.3369
27	5095	5132	5169	5206	5243	5280	62	67	2.3559	2.3750	2.3945	2.4142	2.4342	2.4545
28	5317	5354	5392	5430	5467	5505	61	68	2.4751	2.4960	2.5172	2.5386	2.5605	2.5826
29	5543	5581	5619	5658	5696	5735	60	69	2.6051	2.6279	2.6511	2.6746	2.6985	2.7228
30	5774	5812	5851	5890	5930	5969	59	70	2.7475	2.7725	2.7980	2.8239	2.8502	2.8770
31	6009	6048	6088	6128	6168	6208	58	71	2.9042	2.9319	2.9600	2.9887	3.0178	3.0475
32	6249	6289	6330	6371	6412	6453	57	72	3.0777	3.1084	3.1397	3.1716	3.2041	3.2371
33	6494	6536	6577	6619	6661	6703	56	73	3.2709	3.3052	3.3402	3.3759	3.4124	3.4495
34	6745	6787	6830	6873	6916	6959	55	74	3.4874	3.5261	3.5656	3.6059	3.6470	3.6891
35	7002	7046	7089	7133	7177	7221	54	75	3.7321	3.7760	3.8208	3.8657	3.9136	3.9617
36	7265	7310	7355	7400	7445	7490	53	76	4.0108	4.0611	4.1126	4.1653	4.2193	4.2747
37	7536	7581	7627	7673	7720	7766	52	77	4.3315	4.3897	4.4494	4.5107	4.5736	4.6382
38	7813	7860	7907	7954	8002	8050	51	78	4.7046	4.7729	4.8430	4.9152	4.9894	5.0658
39	8098	8146	8195	8243	8292	8342	50	79	5.1446	5.2257	5.3093	5.3955	5.4845	5.5764
40														

sec.	60'	50'	40'	30'	20'	10'	sec.	60'	50'	40'	30'	20'	10'	sec.
80	5.6713	5.7604	5.8708	5.9758	6.0844	6.1970	8							
81	6.3138	6.4348	6.5606	6.6912	6.8269	6.9682	7							
82	7.1154	7.2687	7.4287	7.5958	7.7704	7.9530	6							
83	8.1443	8.3450	8.5555	8.7760	9.0098	9.2553	5							
84	9.5144	9.7882	10.078	10.385	10.7111	11.0595	4							
85	11.430	11.826	12.250	12.706	13.197	13.7274	3							
86	14.300	14.924	15.605	16.350	17.169	18.0753	2							
87	19.081	20.206	21.470	22.903	24.512	26.4322	1							
88	28.636	31.242	34.363	38.180	42.954	49.1041								
89	57.290	68.750	85.940	114.588	171.885	343.770								

Natural Cotangents

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1½ TO 1.

FOR SINGLE TRACK EMBANKMENT.

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

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

MADE IN GERMANY.