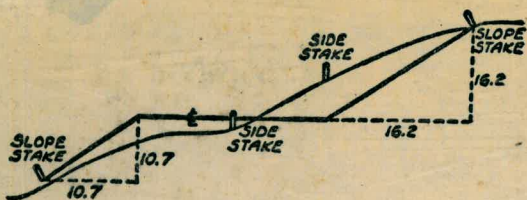




# BLACK CANYON TUNNEL. INSPECTORS WORK BOOK.



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING  
SLOPE 1 TO 1. ROADWAY OF ANY WIDTH

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0
1	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	1
2	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	2
3	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	3
4	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	4
5	5.00	5.10	5.20	5.30	5.40	5.50	5.60	5.70	5.80	5.90	5
6	6.00	6.10	6.20	6.30	6.40	6.50	6.60	6.70	6.80	6.90	6
7	7.00	7.10	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90	7
8	8.00	8.10	8.20	8.30	8.40	8.50	8.60	8.70	8.80	8.90	8
9	9.00	9.10	9.20	9.30	9.40	9.50	9.60	9.70	9.80	9.90	9
10	10.00	10.10	10.20	10.30	10.40	10.50	10.60	10.70	10.80	10.90	10
11	11.00	11.10	11.20	11.30	11.40	11.50	11.60	11.70	11.80	11.90	11
12	12.00	12.10	12.20	12.30	12.40	12.50	12.60	12.70	12.80	12.90	12
13	13.00	13.10	13.20	13.30	13.40	13.50	13.60	13.70	13.80	13.90	13
14	14.00	14.10	14.20	14.30	14.40	14.50	14.60	14.70	14.80	14.90	14
15	15.00	15.10	15.20	15.30	15.40	15.50	15.60	15.70	15.80	15.90	15
16	16.00	16.10	16.20	16.30	16.40	16.50	16.60	16.70	16.80	16.90	16
17	17.00	17.10	17.20	17.30	17.40	17.50	17.60	17.70	17.80	17.90	17
18	18.00	18.10	18.20	18.30	18.40	18.50	18.60	18.70	18.80	18.90	18
19	19.00	19.10	19.20	19.30	19.40	19.50	19.60	19.70	19.80	19.90	19
20	20.00	20.10	20.20	20.30	20.40	20.50	20.60	20.70	20.80	20.90	20
21	21.00	21.10	21.20	21.30	21.40	21.50	21.60	21.70	21.80	21.90	21
22	22.00	22.10	22.20	22.30	22.40	22.50	22.60	22.70	22.80	22.90	22
23	23.00	23.10	23.20	23.30	23.40	23.50	23.60	23.70	23.80	23.90	23
24	24.00	24.10	24.20	24.30	24.40	24.50	24.60	24.70	24.80	24.90	24
25	25.00	25.10	25.20	25.30	25.40	25.50	25.60	25.70	25.80	25.90	25
26	26.00	26.10	26.20	26.30	26.40	26.50	26.60	26.70	26.80	26.90	26
27	27.00	27.10	27.20	27.30	27.40	27.50	27.60	27.70	27.80	27.90	27
28	28.00	28.10	28.20	28.30	28.40	28.50	28.60	28.70	28.80	28.90	28
29	29.00	29.10	29.20	29.30	29.40	29.50	29.60	29.70	29.80	29.90	29
30	30.00	30.10	30.20	30.30	30.40	30.50	30.60	30.70	30.80	30.90	30
31	31.00	31.10	31.20	31.30	31.40	31.50	31.60	31.70	31.80	31.90	31
32	32.00	32.10	32.20	32.30	32.40	32.50	32.60	32.70	32.80	32.90	32
33	33.00	33.10	33.20	33.30	33.40	33.50	33.60	33.70	33.80	33.90	33
34	34.00	34.10	34.20	34.30	34.40	34.50	34.60	34.70	34.80	34.90	34
35	35.00	35.10	35.20	35.30	35.40	35.50	35.60	35.70	35.80	35.90	35
36	36.00	36.10	36.20	36.30	36.40	36.50	36.60	36.70	36.80	36.90	36
37	37.00	37.10	37.20	37.30	37.40	37.50	37.60	37.70	37.80	37.90	37
38	38.00	38.10	38.20	38.30	38.40	38.50	38.60	38.70	38.80	38.90	38
39	39.00	39.10	39.20	39.30	39.40	39.50	39.60	39.70	39.80	39.90	39
40	40.00	40.10	40.20	40.30	40.40	40.50	40.60	40.70	40.80	40.90	40
41	41.00	41.10	41.20	41.30	41.40	41.50	41.60	41.70	41.80	41.90	41
42	42.00	42.10	42.20	42.30	42.40	42.50	42.60	42.70	42.80	42.90	42
43	43.00	43.10	43.20	43.30	43.40	43.50	43.60	43.70	43.80	43.90	43
44	44.00	44.10	44.20	44.30	44.40	44.50	44.60	44.70	44.80	44.90	44
45	45.00	45.10	45.20	45.30	45.40	45.50	45.60	45.70	45.80	45.90	45
46	46.00	46.10	46.20	46.30	46.40	46.50	46.60	46.70	46.80	46.90	46
47	47.00	47.10	47.20	47.30	47.40	47.50	47.60	47.70	47.80	47.90	47
48	48.00	48.10	48.20	48.30	48.40	48.50	48.60	48.70	48.80	48.90	48
49	49.00	49.10	49.20	49.30	49.40	49.50	49.60	49.70	49.80	49.90	49
50	50.00	50.10	50.20	50.30	50.40	50.50	50.60	50.70	50.80	50.90	50

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



BLACK CANYON TUNNEL. "AS DUG" GRADES. 1.

STATION: & GRADE. STATION: & GRADE:

SLOPE IN APPROACH CUT IS .004 DOWN  
TO THE NORTH, AWAY FROM PORTAL.

	INVERT (OPEN CUT)	145+00	1897.64
#0	1893.84	+05	.64
+15	.86	+10	.64
+20	.88	+15	.63
+25	.90	+20	.63
+30	.92	+25	.63
+35	.94	+30	.63
+40	.96	+35	.62
+45	.98	+40	.62
+50	1894.00	+45	.62

NORTH PORTAL, ADJUSTED STATION

SLOPE IN TUNNEL IS .0006' DOWN TO  
THE SOUTH.

LINE AS TYPE "B", REINFORCED SECTION.

144+50	1897.67	+50	.61
+55	.67	+55	.61
+60	.67	+60	.61
+65	.66	+65	.60
+70	.66	+70	.60
+75	.66	+75	.60
+80	.66	+80	.60
+85	.65	+85	.59
+90	.65	+90	.59
+95	.65	+95	.59



STATION:	E GRADE:	STATION:	E GRADE:
146+00	1897.58	147+00	1897.52
+05	.58	+05	.52
+10	.58	+10	.52
+15	.57	+15	.51
+20	.57	+20	.51
+25	.57	+25	.51
+30	.57	+30	.51
+35	.56	+35	.50
+40	.56	+40	.50
+45	.56	+45	.50
+50	.55	+50	.49
+55	.55	+55	.49
+60	.55	+60	.49
+65	.54	+65	.48
+70	.54	+70	.48
+75	.54	+75	.48
+80	.54	+80	.48
+85	.53	+85	.47
+90	.53	+90	.47
+95	.53	+95	.47



REINFORCED TYPE "B" SECTION ENDS AT  
 STATION 148+00. TYPE "C" ROCK SECTION  
 BEGINS. FINISH INVERT GRADE 3.0' BELOW  
 C.

STATION:	C. GRADE.	STATION:	C. GRADE.
148+00	1897.46	149+00	1897.90
+05	.46	+05	.40
+10	.46	+10	.40
+15	.45	+15	.39
+20	.45	+20	.39
+25	.45	+25	.39
+30	.45	+30	.39
+35	.44	+35	.38
+40	.44	+40	.38
+45	.44	+45	.38
+50	.43	+50	.37
+55	.43	+55	.37
+60	.43	+60	.37
+65	.42	+65	.36
+70	.42	+70	.36
+75	.42	+75	.36
+80	.42	+80	.36
+85	.41	+85	.35
+90	.41	+90	.35
+95	.41	+95	.35



STATION:	GRADE:	STATION:	GRADE:
150+00	1897.34	151+00	1897.28
+05	.34	+05	.28
+10	.34	+10	.28
+15	.33	+15	.27
+20	.33	+20	.27
+25	.33	+25	.27
+30	.33	+30	.27
+35	.32	+35	.26
+40	.32	+40	.26
+45	.32	+45	.26
+50	.31	+50	.25
+55	.31	+55	.25
+60	.31	+60	.25
+65	.30	+65	.24
+70	.30	+70	.24
+75	.30	+75	.24
+80	.30	+80	.24
+85	.29	+85	.23
+90	.29	+90	.23
+95	.29	+95	.23



STATION:	% GRADE	STATION:	% GRADE.
152+00	1897.22	153+00	1897.16
+05	.22	+05	.16
+10	.22	+10	.16
+15	.21	+15	.15
+20	.21	+20	.15
+25	.21	+25	.15
+30	.21	+30	.15
+35	.20	+35	.14
+40	.20	+40	.14
+45	.20	+45	.14
+50	.19	+50	.13
+55	.19	+55	.13
+60	.19	+60	.13
+65	.18	+65	.12
+70	.18	+70	.12
+75	.18	+75	.12
+80	.18	+80	.12
+85	.17	+85	.11
+90	.17	+90	.11
+95	.17	+95	.11



STATION:	GRADE:	STATION:	GRADE:
154+00	1897.10	155+00	1897.04
+05	.10	+05	.04
+10	.10	+10	.04
+15	.09	+15	.03
+20	.09	+20	.03
+25	.09	+25	.03
+30	.09	+30	.03
+35	.08	+35	.02
+40	.08	+40	.02
+45	.08	+45	.02
+50	.07	+50	.01
+55	.07	+55	.01
+60	.07	+60	.01
+65	.06	+65	1897.00
+70	.06	+70	.00
+75	.06	+75	.00
+80	.06	+80	.00
+85	.05	+85	1896.99
+90	.05	+90	.99
+95	.05	+95	.99



STATION:	E. GRADE:	STATION:	E. GRADE:
156+00	1896.98	157+00	1896.92
+05	.98	+05	.92
+10	.98	+10	.92
+15	.97	+15	.91
+20	.97	+20	.91
+25	.97	+25	.91
+30	.97	+30	.91
+35	.96	+35	.90
+40	.96	+40	.90
+45	.96	+45	.90
+50	.95	+50	.89
+55	.95	+55	.89
+60	.95	+60	.89
+65	.94	+65	.88
+70	.94	+70	.88
+75	.94	+75	.88
+80	.94	+80	.88
+85	.93	+85	.87
+90	.93	+90	.87
+95	.93	+95	.87



STATION:	% GRADE:	STATION:	% GRADE:
158+00	1896.86	159+00	1896.80
+05	.86	+05	.80
+10	.86	+10	.80
+15	.85	+15	.79
+20	.85	+20	.79
+25	.85	+25	.79
+30	.85	+30	.79
+35	.84	+35	.78
+40	.84	+40	.78
+45	.84	+45	.78
+50	.83	+50	.77
+55	.83	+55	.77
+60	.83	+60	.77
+65	.82	+65	.76
+70	.82	+70	.76
+75	.82	+75	.76
+80	.82	+80	.76
+85	.81	+85	.75
+90	.81	+90	.75
+95	.81	+95	.75



STATION:	± GRADE:	STATION:	± GRADE:
160+00	1896.74	161+00	1896.65
+05	.74	+05	.65
+10	.74	+10	.65
+15	.73	+15	.67
+20	.73	+20	.67
+25	.73	+25	.67
+30	.73	+30	.67
+35	.72	+35	.66
+40	.72	+40	.66
+45	.72	+45	.66
+50	.71	+50	.65
+55	.71	+55	.65
+60	.71	+60	.65
+65	.70	+65	.64
+70	.70	+70	.64
+75	.70	+75	.64
+80	.70	+80	.64
+85	.69	+85	.63
+90	.69	+90	.63
+95	.69	+95	.63



STATION:	E GRADE:	STATION:	E GRADE:
162+00.	1896.62	163+00	1896.56
+05	.62	+05	.56
+10	.62	+10	.56
+15	.61	+15	.55
+20	.61	+20	.55
+25	.61	+25	.55
+30	.61	+30	.55
+35	.60	+35	.54
+40	.60	+40	.54
+45	.60	+45	.54
+50	.59	+50	.53
+55	.59	+55	.53
+60	.59	+60	.53
+65	.58	+65	.52
+70	.58	+70	.52
+75	.58	+75	.52
+80	.58	+80	.52
+85	.57	+85	.51
+90	.57	+90	.51
+95	.57	+95	.51



STATIONS	± GRADE:	STATIONS	± GRADE:
164+00	1896.50	165+00	1896.44
+05	.50	+05	.44
+10	.50	+10	.44
+15	.49	+15	.43
+20	.49	+20	.43
+25	.49	+25	.43
+30	.49	+30	.43
+35	.48	+35	.42
+40	.48	+40	.42
+45	.48	+45	.42
+50	.47	+50	.41
+55	.47	+55	.41
+60	.47	+60	.41
+65	.46	+65	.40
+70	.46	+70	.40
+75	.46	+75	.40
+80	.46	+80	.40
+85	.45	+85	.39
+90	.45	+90	.39
+95	.45	+95	.39



STATION:	E GRADE:	STATION:	E GRADE:
166+00	1896.38	167+00	1896.32
+05	.38	+05	.32
+10	.38	+10	.32
+15	.37	+15	.31
+20	.37	+20	.31
+25	.37	+25	.31
+30	.37	+30	.31
+35	.36	+35	.30
+40	.36	+40	.30
+45	.36	+45	.30
+50	.35	+50	.29
+55	.35	+55	.29
+60	.35	+60	.29
+65	.34	+65	.28
+70	.34	+70	.28
+75	.34	+75	.28
+80	.34	+80	.28
+85	.33	+85	.27
+90	.33	+90	.27
+95	.33	+95	.27



STATION:	E GRADE:	STATION:	E GRADE:
168+00	1896.26	169+00	1896.20
+05	.26	+05	.20
+10	.26	+10	.20
+15	.25	+15	.19
+20	.25	+20	.19
+25	.25	+25	.19
+30	.25	+30	.19
+35	.24	+35	.18
+40	.24	+40	.18
+45	.24	+45	.18
+50	.23	+50	.17
+55	.23	+55	.17
+60	.23	+60	.17
+65	.22	+65	.16
+70	.22	+70	.16
+75	.22	+75	.16
+80	.22	+80	.16
+85	.21	+85	.15
+90	.21	+90	.15
+95	.21	+95	.15



STATION:	E GRADE:	STATION:	E GRADE:
170+00	1896.14	171+00	1896.08
+05	.14	+05	.08
+10	.14	+10	.08
+15	.13	+15	.07
+20	.13	+20	.07
+25	.13	+25	.07
+30	.13	+30	.07
+35	.12	+35	.06
+40	.12	+40	.06
+45	.12	+45	.06
+50	.11	+50	.05
+55	.11	+55	.05
+60	.11	+60	.05
+65	.10	+65	.04
+70	.10	+70	.04
+75	.10	+75	.04
+80	.10	+80	.04
+85	.09	+85	.03
+90	.09	+90	.03
+95	.09	+95	.03



STATION:	± GRADE:	STATION:	± GRADE:
172+00	1896.02	175+00	1891.96
+05	.02	+25	" .86
+10	.02	+50	" .76
+15	.01	+75	" .66
+20	.01	176+00	" .56
+25	.01	+25	" .46
+30	.01	+50	" .36
+35	.00	+75	" .26
+40	.00	177+00	" .16
+50	(OPEN CUT) 1892.96	+25	" .06
+75	" .86	+50	1890.96
178+00	" .76	+75	" .86
+25	" .66	178+00	" .76
+50	" .56		
+75	" .46		
174+00	" .36		
+25	" .26		
+50	" .16		
+75	" .06		

ORIGINAL SOUTH PARTIAL.

ELEV'S. IN OPEN CUT ARE FINISH GRADE

FOR TOP OF LET. BACKFILL OF SELECT MUCK.



BENCH MARKS:

#1. CONC. MON. S. PORTAL. 173+88.82	1896.50
#1-A STEEL PIN BETWEEN RAILS, S. POR.	1892.53
#1-B " " L. SIDE, 171+02.2	1892.63
#2. " " L. SIDE, 158+21	1894.44
#3. " " L. SIDE, 155+81	1894.80
#4. " " R. SIDE, 152+80	1894.75
#5. ROCK AT N. PORTAL.	1896.24

$177+22.83$   
 $- 171+68.57$   


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 $65.76$

$172+32.88$   
 $- 172+28.87$   


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 $3.96$

166

1892.75  
3.17  
1895.92

BLACK CANYON TUNNEL CONTROL POINTS:

SPAD NO.	STATION:	ELEV.	CUT-G
#1	172+40.42	1899.71	3.71
#2	172+28.87	1900.86	
#3	171+68.57	1899.83	
#4	171+48.67	1900.09	
#5	171+13.88	1901.14	
#6	170+81.60	1901.74	5.82
#7	170+12.90	1901.23	5.31
#8	169+47.24	1900.48	4.56
#9	168+92.79	1899.74	3.82
#10	168+33.97	1900.22	
#11	167+87.49	1900.21	
#12	167+37.29	1900.22	
#13	167+05.19	1900.22	
#14	166+61.79	1900.87	
#15	166+08.17	1901.13	
#16	165+66.00	1901.58	
#17	165+23.29	1900.95	
#18	164+71.06	1901.06	
#19	164+22.10	1901.41	

16



$$\begin{array}{r} 1900.62 \\ - 7.96 \\ \hline 1892.66 \end{array} \text{ WATER}$$

$$\begin{array}{r} 1591.22 \\ - 67 \\ \hline 1584.55 \end{array}$$

$$\begin{array}{r} 1900.62 \\ - 1892.87 \\ \hline 7.75 \end{array}$$

SPAD No.	STATION:	ELEV.	CUT &
20.	165+76.69	1900.62	
21.	163+26.12	1901.24	
22.	162+74.09	1900.97	
23.	162+25.62	1900.94	
24.	161+74.78	1900.47	
25.	161+24.98	1900.07	
26.	160+76.96	1901.71	
27.	160+28.11	1900.77	
28.	159+72.97	1901.09	
29.	159+22.21	1900.25	
30.	158+58.63	1900.80	
31.	158+11.95	1901.13	
32.	157+61.90	1900.81	
33.	157+11.63	1900.61	
34.	156+54.30	1901.31	
35.	156+06.03	1901.77	
36.	155+50.41	1901.29	
37.	154+97.28	1901.23	
38.	154+45.78	1901.50	



SPAD No.	STATION:	ELEV.	CUT 2
39,	153+87.15	1901.57	
40,	153+28.47	1901.92	
41,	152+78.54	1900.81	
42,	152+18.52	1901.22	
43,	151+61.67	1901.20	
44,	151+02.45	1901.70	
45,	150+48.98	1901.71	4.40
46,	149+91.86	1901.58	4.23
47,	149+33.58	1901.02	3.64
48,	148+75.91	1901.37	3.95
49,	+26.51 148+26.06	1901.16	3.71
50,	+65.88 147+65.43	1901.78	4.30
51,	+15.85 147+15.01 =	1902.15 1901.94	4.44 <sup>.64</sup>
52,	+56.00 146+55.55 =	1902.36	4.81
53,	98.84 145+98.39 =	1902.07	4.49
54,	49.97 145+49.52 =	1901.84 <sup>.86</sup>	4.25 <sup>.25</sup>
55,	95.07 144+94.62 =	1901.78	4.14
56,	+51.69 144+51.24 =	1901.41	3.73
	144+51.69 FROM ANGLE POINT AT	143+69.19	

150 = CORRECTED STATIONING FROM R.P. AT N. PORTAL.

145.024

56 IN FALSE PORTAL WOODEN SHED FRAMEWORK.

NOTE: STATIONING TO BE CORRECTED TO A AT N. PORTAL.



R.M. #1 CONC. MON. SOUTH APP. CUT,  $\frac{1}{2}$ " STEEL ROD TOP.  
 #1A.  $\frac{1}{2}$ " STEEL PIN BETWEEN RAILS, 172+85 $\pm$   
 #1B.  $\frac{1}{2}$ " " " L. SIDE, 171+02.

R.M. #2 DRILL STEEL, L. TOE, 158+21 $\pm$  ELEV. 1894.44  
 R.M. #3 " " " " 156+81 $\pm$  ELEV. 1894.80  
 R.M. #4 " " R. " 152+80 ELEV. 1894.75

OCT. 16, 53. LEONARD - K 19.  
 COLE - ROO.

CHECK LEVELS OVER SPANS IN TUNNEL.

R.M. #1 +0.43	1896.93		1896.50
#1A S. POINT.		-4.40	1892.53
#1B +4.71	1897.24	-4.60	1892.64
SPAN #3: +4.87	1897.51	+2.735	1900.245
" #3: -1.905	1898.34	+2.62	1900.96
" " -2.68	1898.28		
R.M. #2.		-3.84	1894.44
R.M. #3. +4.44	1898.88	-4.08	1894.80
R.M. #4. +3.61	1898.41	-3.66	1894.75
SPAN #8 +3.81	1898.56	+2.81	1901.37
	-1.85		1899.52
SPAN #9,		+1.64	1901.16
" #50,		+2.26	1901.78
" #51,		+2.39	1901.91
" #52		+2.84	1902.36
" #53		+2.55	1902.07
	-3.90		1898.17
SPAN #54		+3.67	1901.84
" #55		+3.61	1901.78



## CHECK LEVELS, CONT'D.

H.d. 1898.17

SPAD #56 IN TIMBER OF PORTAL ROCK SHED.

SPAD #56 +3.24 1901.41

ROCK IN N. PORTAL APPROACH CUT E. SIDE.

R.M. #5 -1.98 1896.24

+2.15 1898.39

T.P. -3.68 1894.71

+4.66 1899.37

T.P. -4.82 1894.55

+4.25 1898.80

CHECK R.M. #4 -4.055 1894.745 =

1894.75 0.15.



OCT. 21.

LEONARD  
COLE.

21.

T.O.M. SPAD #52  
 GRADE OF "B" LINE IN INVERT.  
 DITTO.  
 ELEV.'S OF HIGH SPOTS.

1897.50

-3.67

1893.83

1897.55

3.67

1893.88

1897.58

-3.67

1893.91

STATION.	H.d.	GRADE ROD.	"B" LINE INVERT.
SPAD #52, -4.25	1898.11		1902.86
146+55 TO		-4.23	1893.88
147+00		-4.26	1898.85
146+00	"B" GRADE 1898.91	-4.01 C.19	1894.10
+05	" .91	-4.17 C. <sup>0.19</sup> <sub>0.2</sub>	1893.94
+09	" .91	-4.03 C.17	1894.08
+22	" .90	-4.05 C.16	1894.06
+31	" .90	-4.08 C.13	1894.03
+35	" .89	-3.88 C.34	1894.23
+39	" .89	-4.21 C.11	1893.90
+42	" .89	-4.12 C.10	1893.99
+44	" .89	-4.09 C.12	1894.02
+56	" .88	-3.86 C.37	1894.25
SPAD #52,		+4.25	

OCT. 22.

SPAD #51, -3.55

1898.52

GRADE ROD.

1902.07

147+15 - +30

-4.69

1893.83



OCT. 26, 53

LEONARD - X  
COLE - P.O.

22.

T.B.M. SPAD #49

CHECK SUR GRADE IN TYPE "C" BOTTOM AFTER CLEANED.

STATION	SUR. GRADE		ACTUAL FLEV.
D49, -2.67	1898.49		1901.16
148+00	1894.12	-4.44	1894.05 o.k.
+09	1894.07	-4.45	1894.04 o.k.
+10	1894.06	-4.87	1893.62 o.k.
+20	1894.00	-4.76	1893.73 o.k.
+27	1893.95	-5.75	1892.74 o.k.
+30	1893.94	-4.93	1893.56 o.k.
+35	1893.90	-4.65	1893.84 o.k.
+39	1893.88	-4.52	1893.97 o.k.
+42	1893.87	-5.65	1892.84 o.k.
+43.5	1893.87	-4.78	1893.71 o.k.
SPAD #50		+3.28	1901.77 = 1901.78
#51		+3.42	1901.91 o.k.
#52		+3.87	1902.36 o.k.

CHECK SPAD #50



OCT. 28, 53.

LEONARD  
COLE:

23.

#49 - 2.99	1898.17		1901.16
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SUB GRADE: GRADE P10

148+40	1898.87	- 4.90	
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148+70	1898.84	- 4.88	
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SPAD NO: NOV. 2, 53

LEONARD  
COLE.

#46 - 3.07	1898.51		1901.58
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150+50		G. P10 = 4.84	1898.67
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NOV. 3.

LEONARD  
COLE.

H. d. GRADE P10. SUB. GRADE

#45 - 3.44	1898.27		1901.71 T.R.M.
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148+00		- 4.15	1894.12
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+40		- 4.40	1898.87
-----	--	--------	---------

149+00		- 4.45	1898.82
--------	--	--------	---------

+50		- 4.50	1898.77
-----	--	--------	---------

150+00		- 4.55	1898.72
--------	--	--------	---------

+50		- 4.60	1898.67
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REVISED INVERT GRADE, FINISH ELEV'S.

As shown on Dwg. No. 6010-W, Oct. 5, 53  
AND REVISED BY CARL R. RANKIN, CONSULTING  
ENGINEER.

TYPE "B" SECTION: 144+50 TO 148+00 6.0' I.D.  
" "C" " 148+00 " 169+00 VARIED.  
" "D" " 169+00 " 172+32 6.33' I.D.

STATION:	INVERT GRADE:	STATION	INVERT GRADE:
144+50	1894.66	157+50	1893.75
145+00	1894.65	158+00	<u>1893.60</u>
145+50	1894.60	+25	1893.50
146+00	1894.57	+50	1893.40
146+50	1894.54	+75	1893.30
147+00	1894.51	159+00	<u>1893.20</u>
147+50	1894.48		LEVEL.
148+00	<u>1894.45</u>	166+00	<u>1893.20</u>
148+10	1894.39	166+50	1893.05
+20	1894.32	167+00	1892.90
+30	1894.26	167+50	<u>1892.75</u>
+40	<u>1894.20</u>		LEVEL.
149+00	1894.15	172+40	1892.75
+50	1894.10		
150+00	1894.05		
150+50	<u>1894.00</u>		
	FLAT.		
156+50	<u>1894.00</u>		
157+00	<u>1893.90</u>		

NO. 1035 "B" SECTION  
EALY

SEE PAGES #39 + #40 FOR MORE DETAIL GRADES.

RED LINE = CHANGE IN GRADE RATE OF SLOPE,



Nov. 6, '59

LEONARD - X  
- COLE - ROD.

25.

STATION:	T.R.M.	H.d.	GRADE ROD.	ELEV.
152+73.5 <sup>+</sup>	SPAD #41 -2.31	1898.50		1900.81
150+50 TO 156+50	SUB GRADE:		-4.83	1893.67

Nov. 27.

LEONARD.  
COLE.

T.R.M.				
RESET SPAD #51	STA. 147+15.35	SPAD #50. -2.68	1899.10	1901.78
CHECK #52,		" #51,		+3.05 1902.15
CHECK #53,		" #52,		+3.76 1902.36 a.u.
RESET PIN IN #54,		" #53,		+2.97 1902.07 a.u.
		" #54,		+2.76 1906.86



Nov. 6, '53

LEONARD - F 26.  
COLE. - R00.

USE FOR TRIMMING S. END.

CHECK LEVELS OVER RESET SPADS:

PIN IN CONC. MON. SOUTH PORTAL APPROACH CUT.

R.M. #1. +0.54 1897.04 1896.50

PIN BETWEEN TRACKS, S. PORTAL.

R.M. #1-A. -4.51 1892.53

SPAD STATION:

REVISED  
E. GRADE:

CUT:

+4.92 1897.45

172+40.42

1895.92

3.79

SPAD #1

+2.26 1899.71

172+28.57

"

4.44

#2

+2.91 1900.36

171+68.57

"

3.41

#3

+1.88 1899.33

171+48.67

"

4.17

#4

+2.64 1900.09

TYPE "D" SECTION.

171+15.89

"

5.22

#5

+3.69 1901.14

6'4" INSIDE DIA.

170+81.60

"

5.82

#6

+4.29 1901.74

3'10" R" LINE RADIUS.

170+12.90

"

5.31

#7

+3.785 1901.235

169+47.24

"

4.56

#8

+3.03 1900.48

168+92.79

"

3.82

#9

+2.29 1899.74

PIN IN HOLE, LEFT SIDE, STA. 171+02.

CHECK R.M. #1 B.

-4.83 1892.62 =

NOTE: REVISED GRADES TAKEN FROM DWG. # 6010-W AS

1892.64

REVISED BY CARL R. RANKIN, CONSULTING ENGINEER,

ON OCT. 6, 1953.

Inv. 1892.75

3.17

1895.92

3.41

TIGHTENED WOODEN PLUGS AND RESET SPADS ON

"AS EXCAVATED" CENTER LINE. (ALIGNMENT NOT CHANGED)

PK



Nov. 24, '85

LEONARD K  
COLE, -POR.

27.

## GRADES FOR DOWELS, N. PORTAL.

GRADE ON DOWELS AT 3.73 BELOW $\frac{1}{2}$ GRADE.	R.M. $\frac{1}{2}$ +3.07	1899.31	1896.24
		DOWEL GRADE: 1899.31	h.d. 1899.31
144+55	1893.94	-3.41	1895.90 C.1.96
+57.4	"	-3.81	1895.50 C.1.56
+58.8	"	-4.49	1894.92 C.0.88
+64.8	1893.93	-4.87	1894.44 C.0.51
+69.8	"	-4.92	1894.39 C.0.46
+75.4	"	-4.54	1894.77 C.0.84
+81.0	"	-4.35	1894.96 C.1.02
+85.0	1893.92	-4.61	1894.70 C.0.78
+88.9	"	-2.95	1896.33 C.2.41
+93.5	"	-4.30	1895.01 C.1.09
+97.8	"	-4.62	1894.69 C.0.77
145+03.9	1893.91	-3.10	1896.21 C.2.30
+07.7	"	-3.17	1896.14 C.2.25
+12.4	"	-3.75	1895.56 C.1.65
+16.7	1893.90	-3.50	1895.51 C.1.91
+23.0	"	-2.92	1896.39 C.2.49
+28.5	"	-3.32	1895.99 C.2.09



	1899.81		
145+34.4	1898.89	-1.98	1897.83 C3.44
+40.7	"	-1.81	1897.50 C3.61
+47.0	"	-2.07	1897.24 C3.85
+52.5	1898.88	-2.91	1896.40 C2.52
SPAD #34.		+2.52	1901.83

NOV. 25.

SPAD #50: -3.72	1898.85		1902.07
145+58.8	STEEL GRADE: 1898.88	-2.72	1895.63 C 1.75
+65.4	.87	-2.06	1896.79 C 2.42
+70.9	.87	-3.05	1895.30 C 1.43
+75.7	.87	-1.95	1896.42 C 2.55
+81.7	.86	-1.70	1896.65 C 2.79
+85.2	.86	-1.72	1896.63 C 2.77
+90.6	.86	-2.30	1896.05 C 2.19
+96.4	.86	-1.85	1896.50 C 2.64
146+02.8	.85	-1.95	1896.40 C 2.55
+07.5	.86	-2.29	1896.06 C 2.21
+12.6	1898.85	-2.59	1895.76 C 1.91

1897.61  
3.73  
1898.88



H.d.	1898.35			
	STEEL GRADE			
146+18.0	1897.84	-2.36	1895.99	C2.15-
+23.0	.84	-2.10	1896.25	C2.41-
+28.8	.84	-2.03	1896.32	C2.48-
+35.0	.83	-3.30	1895.05	C1.22-
+40.4	.83	-3.27	1895.08	C1.25-
+45.2	.83	-2.74	1895.61	C1.78-
+50.4	.82	-3.43	1894.92	C1.10-
+56.6	.82	-3.18	1895.17	C1.35-
+61.9	.82	-3.21	1895.14	C1.32
+67.6	.81	-3.15	1895.20	C1.39-
+72.5	.81	-3.54	1894.81	C1.00-
+78.6	.81	-3.68	1894.67	C0.86-
+84.3	.80	-3.76	1894.59	C0.79-
+89.5	.80	-3.52	1894.83	C1.03-
+94.0	.80	-3.85	1894.50	C0.70-
+99.6	.79	-3.52	1894.83	C1.04-
147+04.9	.79	-3.34	1895.01	C1.22-
+11.3	1893.79	-3.33	1895.02	C1.23-



	1898.35			
	STEEL GRADE.			
147+16.6	1898.78	-2.04	1896.81	C 2.58 ✓
+22.0	.76	-2.81	1895.54	C 1.76 ✓
+27.7	.78	-3.51	1894.84	C 1.06 ✓
+34.0	.77	-4.07	1894.28	C 0.51 ✓
+39.6	.77	-3.84	1894.51	C 0.74 ✓
+45.5	.77	-3.48	1894.87	C 1.10 ✓
+56.0	.76	-3.32	1895.03	C 1.27 ✓
+56.0	.76	-4.00	1894.35	C 0.59 ✓
+62.0	.75	-3.06	1895.29	C 1.54 ✓
+67.9	.75	-3.09	1895.26	C 1.51 ✓
+73.4	.75	-3.56	1894.79	C 1.04 ✓
+78.7	.75	-3.23	1895.12	C 1.37 ✓
+83.8	.74	-3.16	1895.19	C 1.45 ✓
+89.2	.74	-3.34	1895.01	C 1.27 ✓
+94.5	.74	-3.48	1894.87	C 1.12 ✓
148+00	1895.78	-3.50	1894.85	C 1.12 ✓
SPAD # 49.		+2.88	1901.18 = 1901.16	



## REMARKS.

145+50 DRY NOW, SMALL LEAK, ROCK JOINT.  
 146+52 SMALL LEAK, NOW DRY.  
 146+60 DAMP.  
 146+63.5 DRIP.  
 146+69 SMALL DAMP AREA - 5' LONG.  
 147+50 SLIP CRACK 1" TO 8" THICK, DRY.  
 147+68 LEAK ABOUT 2' WIDE, NOW DRY.  
 147+79.5 LEAK ZONE ABOUT 2' SQUARE, NOW DRY.  
 148+58. LEAK AT JOINT LINE 5' WIDE ACROSS TOP.  
 148+76. " " " " 8" " TOP & WEST UPPER  $\frac{1}{2}$ '  
 149+06 TOP G. SLIP 4" TO 12" THICK AT  $\searrow$  TO G.  
 149+85 TO +95 DAMP AREA IN MANY SMALL JOINTS.  
 150+07 LEAK IN FAULT SLIP, NOW DRY.  
 150+27 SMALL LEAK IN JOINT.  
 150+33 SOFT LINE FROM SPRING LINE TO BOTTOM.  
 151+00 LEAKS IN ROCK JOINTS, SMALL, NOW DRY.  
 151+20 MANY SMALL LEAKS IN ROCK JOINTS, NOW DRY.  
 FRACTURE ZONE 2" THICK PITCHING 60° NE.  
 SLIP JOINT 2" TO 4" THICK, USE EXISTING PIN HOLE

Nov. 30, 53.

LEONARD.  
COLE.

31.

## LEAKS - SPRINGS - FRACTURE ZONES, ETC.

STATION: PRESENT CONDITION,	POSITION IN TUNNEL,
145+50 DRY,	TOP & W. SIDE.
146+52 DRY	E. SIDE, UPPER $\frac{1}{2}$
146+60, DAMP.	E. SIDE, FAULT CRACK.
146+63.5 DRIP,	TOP. " "
146+69 DAMP.	TOP & E. SIDE.
147+50 DRY,	SLIP, PITCH 60° N.
147+68 DRY,	TOP TO W.
147+79.5 DRY,	TOP, IN SLIP CRACK.
148+58. DRY,	#1 ACROSS TOP, JOINT LINE.
148+76 DRY	#2 TOP & W. SIDE,
149+06 DRY,	#3 SLIP, PITCH 60° NE.
149+85 TO 149+95 DRY,	#4 & #5 TOP & E. SIDE.
150+07 DRY,	#6 TOP, FAULT JOINT.
150+27 DRY	#8 TOP, JOINT LINE.
150+33 - +36, DRY,	#9 LOWER E. SIDE.
151+00 - +05 DRY,	#10 FULL TOP & E. SIDE.
151+20 - +35 DRY,	#11 - #12 FULL TOP & E. SIDE.
149+66 DRY,	#7 TOP LEFT.



## REMARKS.

151+62 SMALL LEAK AROUND SEAD HOLE IN FAULT LINE,  
 151+70-80 FAULT LINE PITCHES  $45^{\circ}$  N. ON BOTH SIDES,  
 152+05 DAMP AREA IN JOINT LINE, NOW DRY,  
 152+90 GENERAL DAMP AREA - NO RAD LEAKS. NOW DRY,  
 153+86 " " " " NOW DRY,  
 153+72 SLIP CRACK, RAD LEAK WHEN DUG, NOW DRY,  
 153+85 SEEPAGE FROM SLIP JOINT. DIPS  $60^{\circ}$  TO E.,  
 153+92 " " " " " "  
 154+10 HEAVY SEEPAGE " " " " DIPS  $60^{\circ}$  SE,  
 154+54 SPRING FROM HOLE IN ROCK. NOW DRY,  
 154+90 AREA ABOUT 2' WIDE, VERTICAL JOINT, DRIPPING WET,  
 155+52 SMALL DAMP AREA IN TOP. SOME SEEPAGE.  
 156+11, ORIGINALLY A SPRING. 1" CRACK 2' LONG. NOW DRY,  
 156+17, SEEPAGE FROM BRECCIA BENEATH QUARTZ VEIN,  
 156+96 FRACTURE ZONE, 4" QUARTZ VEIN DIPS  $80^{\circ}$  SOUTH,  
 157+12 LEAKS ON BOTH SIDES, TOP & BOTTOM.

## LEAKS, ETC. CONT'D.

STATION: PRESENT CONDITION POSITION, IN TUNNEL.

151+62, DRY	#13	TOP, JOINT,
USE PIN HOLE.	#14	
151+70 - +80 DRY		TOP TO E. TOE,
152+05 DRY,		E. SIDE SPRING LINE,
152+90 TO 153+05 DRY.		TOP & E. SIDE,
153+86 TO 153+45 DRY		E. SIDE, TOP TO BOTTOM,
153+72 AT TOP. 153+55 AT TOE.		W. SIDE. DIP $60^{\circ}$ N. TO BOTTOM.
153+85, DRY		E. SIDE SPRING LINE,
153+92, DRY.		TOP & .
154+10 DRY,		TOP TO BOTTOM, E. SIDE,
154+54 DRY		W. SIDE $45^{\circ}$ ABOVE &
154+90 #16 SLOW DRIP,		E. SIDE, TOP TO BOTTOM,
155+52, SEEPAGE,		TOP CENTER, 2' DIA,
156+11.5 #17. DAMP,		E. SIDE TOP $\frac{1}{4}$ , SPRING.
156+17, STEADY SEEPAGE,		TOE ON E. SIDE.
156+96 #18. SLOW DRIP.		
TO 157+05 WET.		FULL CIRCUMFERENCE.
157+12 BEGIN EXTENSIVE WET AREA,		
157+54 TO +60 SEEPAGE		E. SPRING LINE,
157+64 "		TOP & BOTH SIDES







## LEAKS, ETC., CONT'D.

STATION; PRESENT CONDITION, POSITION IN TUNNEL,

164+09 DAMP AREA ABOUT 2' WIDE.	164+09 <sup>238</sup> SEEPING.	E. SIDE, LOWER HALF.
164+27 CONE HOLE #2. DRIPPING. <sup>294</sup>	164+27. DRIPPING.	TOP, E. SIDE.
164+49. SPRING IN QUARTZ VEIN. 6" THICK.	164+49. STEADY SEEP.	W. SIDE 2' ABOVE BOTTOM.
164+53. HEAVY LEAK ORIGINALLY, FROM JOINT IN ROCK.	164+53. DAMP.	ENTIRE W. SIDE.
164+66. SEEPING NEXT TO THICK QUARTZ VEIN.	164+66. SEEPING.	E. SIDE, LOWER HALF.
165+75 SEEPING FROM LONG CRACK IN ROCK.	165+75 TO +80 " "	E. SIDE " "
165+86 FLOWING SPRING FROM CRACK 1' BELOW SPRING LINE.	165+86 <sup>295</sup> SPRING - 1 QT. MIN.	E. SIDE " "
167+30 FRACTURED ROCK ZONE ABOUT 4' WIDE.	167+30 DRIPPING.	TOP & E. SIDE.
167+45 SEEPAGE FROM ROCK JOINTS.	167+45 DAMP.	FULL E. SIDE, - CAR HOLE.
167+50 MANY SMALL SEEP SPOTS FROM CRACKS.	167+50 TO +85 DAMP.	FULL CIRC. CUMFERENCE.
167+95 " " " " " "	167+95 TO 168+20 DAMP	" "
170+12 D. 6. DAMP SINCE RECENT RAINS.	170+12 TO +22 DAMP.	FULL TOP.

NOTE: FROM 168+25 TO S. PORTAL HAS NOT BEEN WASHED DOWN YET AND MUD UNDOUBTEDLY HIDES

FORMER WET SPOTS THAT SHOULD BE LOCATED, DEC. 10TH.

168+65 JOINT LINE, PITCH SW. 45°	168+65 SEEPING.	W. SIDE, LOWER HALF.
164+44 BENEATH 8" QUARTZ VEIN.	164+44. DRY.	TOP TO W. SIDE.
164+49. SPRING ON TOP OF 6" QUARTZ VEIN.	164+49. SEEPING.	LOWER W. SIDE.



Dec. 10.

LEONARD  
YARNEY.

35.

## LEAKS, ETC. CONT'D.

164+66	SEEPAGE	BENEATH QUARTZ VEIN.	164+66	DAMP	E. SPRING LINE.
165+67	"	AT JOINT LINE.	165+67	"	TOP E. SIDE.
165+71	"	" " "	165+71	"	TOP HALF E. SIDE.
165+74	"	" " "	165+74	"	" " W. "
165+80	"	" " "	165+80	"	" " W. "
165+87	SPRING	" " "	165+87 TO +89	SPRING.	LOWER HALF E. SIDE.
165+97	SEEPAGE	FROM MANY JOINT LINES.	165+97 TO 166+04	DAMP	FULL W. SIDE.
166+11	"	" PIN HOLE IN JOINT LINE.	166+11	"	TOP HALF, E. SIDE
167+42	"	FROM HORIZONTAL JOINT LINES.	167+42 + 48	SEEPING.	ENTIRE E. SIDE IN CAR HOLE.
167+84	"	" JOINT LINE.	167+84	"	TOP HALF W. SIDE
167+96	DRIP	FROM 1' QUARTZ VEIN, DIP 60° S.	167+96	DRIP	TOP ♀
168+02	"	" 2" " " " " "	168+02	"	TOP ♀ BOTH SIDES.
168+12	"	" THIN " " " " "	168+12	"	" " "

## MISC. HOLES:

<sup>20</sup>15 IN CORE HOLE <sup>20</sup>SP AT STA. 150+64, TOP.

<sup>20</sup>21 IN SPRING, EAST TOE, STA. 155+19.



Dec. 21, '53

LEONARD  
VARNEY,

36.

## CRACKS FOR GROUTING, N. PORTAL.

NOTES: PIECES OF #9 WIRE PLACED IN CRACKS  
SO IT WILL PROTRUDE INSIDE OF GUNITE, WHEN  
PLACED, TO FACILITATE RELOCATION OF CRACKS  
FOR DRILLING GROUT HOLES. **WIRES LOST.**

HOLE NO.	DEPTH:	MISSED HOLES:
#1	1.50	1 MISS 0.6'
#2	2.20	3 MISSES: 0.8', 0.7' & 0.9'
#3	1.92'	
#4	1.70	2 MISSES: .7' & .6'
#5	1.60	1 MISS .5'
#6	1.95'	
#7	1.95'	
#8	2.05'	1 MISS .75'
#9	2.10'	2 MISSES. .60' & .
#10	2.36'	
#11	1.80'	
#12	1.38'	
#13	1.46'	

23.92' TOTAL GOOD HOLES DRILLED.

144+57.5 E. SPRINGLINE.

#1 &amp; #2

144+65 W. UPPER  $\frac{1}{4}$ 

#3

144+66 E. "  $\frac{1}{4}$ 

#4

144+70.5 E. SPRINGLINE

#5

144+74 TOP  $\frac{1}{2}$ 

#6

144+78 W. FULL SIDE.

HOLE UPPER  $\frac{1}{4}$  #7144+79.5 E. TOP  $\frac{1}{4}$ 

#8

144+86 W. UPPER  $\frac{1}{4}$  #9

CRACK 2' LONG, HORIZ.

144+90 BOTTOM TO (#10 AND #11 AT 144+95)

144+94 TOP  $\frac{1}{2}$  JOINT CRACK 2" WIDE, FULL CIRC.144+95 W. UPPER  $\frac{1}{4}$ 

JOINT LINES 0.111.

145+03 E. UPPER  $\frac{1}{4}$ 

#12 &amp; #13.



Check levels on spads

12.8.53 37

Sta		I.I.	#	Elev.		I.I.	+	Elev.
Spad #9				1899.74	#25		2.28	1900.07
	2.25	1897.49				2.53	1897.54	
#10			273	1900.22	#26		3.67	1901.21
#11			272	1900.21	#27		3.23	1900.77(76)
#12			273	1900.22	#28		3.55	1901.09(50)
#13			273	1900.22	#29		2.69	1900.23(24)
#14			3.385	1900.875	#30		3.26	1900.80
TP #15			3.635	1901.135	BM		3.11	1894.43
	3.340	1897.795						(1894.44)
#16			3.590	1901.385				
#17			3.16	1900.955				
#18			3.275	1901.065				
#19			3.625	1901.115				
#20			2.835	1900.625				
#21			3.45	1901.245				
#22			3.18	1900.975				
#23			3.15	1900.945				
#24			2.68	1900.47				



JAN 9, 54,

LEONARD - X  
KEMP - ROD,

38.

B. 17 <sup>#2</sup>	+3.28	1897.72		1894.44
SPAD <sup>#21</sup>			+3.41	1901.13
" <sup>#22</sup>			+3.09	1900.81 <sup>+</sup>
" <sup>#23</sup>			+2.89	1900.61
" <sup>#24</sup> , T.P.	-2.77	1898.54	+3.59	1901.31
" <sup>#25</sup>			+3.23	1901.77
" <sup>#26</sup>			+2.755	1901.295
" <sup>#27</sup> , T.P.	-2.35	1898.48	+2.69	1901.23
" <sup>#28</sup>			+3.02	1901.50
" <sup>#29</sup>			+3.10	1901.58
" <sup>#40</sup> CHECK,			+3.44	1901.92 =
				1901.92



REVISED GRADES IN ROCK SECTION.

STATION:	FINISH/INVERT:	SUB. GRADE:
148+00	1894.45	1894.12
+10	" .39	" .06
+20	" .33	1894.00
+30	" .26	1893.93
+40	" .20	" .87
+50	" .19	" .86
+60	" .18	" .85
+70	" .17	" .84
+80	" .17	" .84
+90	" .16	" .83
149+00	" .15	" .82
+10	" .14	" .81
+20	" .13	" .80
+30	" .12	" .79
+40	" .11	" .78
+50	" .10	" .77
+60	" .09	" .76
+70	" .08	" .75
+80	" .07	" .74

STATION:	FINISH INVERT:	SUB. GRADE:
149+90	1894.06	1893.73
150+00	" .05	" .72
+10	" .04	" .71
+20	" .03	" .70
+30	" .02	" .69
+40	" .01	" .68
150+50	1894.00	1893.67
70	LEVEL.	LEVEL.
156+50	1894.00	1893.67
+60	1893.98	" .65
+70	" .96	" .63
+80	" .94	" .61
+90	" .92	" .59
157+00	1893.90	" .57
+10	" .87	" .54
+20	" .84	" .51
+30	" .81	" .48
+40	" .78	" .45
+50	1893.75	1893.42



REVISED GRADES IN ROCK SECTION, CONT'D.

STATION:	FINISH INVERT:	SUR. GRADE:
157+60	1893.72	1893.39
+70	" .69	" .36
+80	" .66	" .33
+90	" .63	" .30
168+00	" .60	" .27
+10	" .56	" .23
+20	" .52	" .19
+30	" .48	" .15
+40	" .44	" .11
+50	" .40	" .07
+60	" .36	" .03
+70	" .32	1892.99
+80	" .28	" .95
+90	" .24	" .91
169+00	1893.20	" .87
TO	LEVEL.	LEVEL.
166+00	1893.20	1892.87
+10	" .17	" .84
+20	" .14	" .81

STATION:	FINISH INVERT:	SUR. GRADE:
166+50	1893.11	1892.78
+40	" .08	" .75
+50	" .05	" .72
+60	" .02	" .69
+70	1892.99	" .66
+80	" .96	" .63
+90	" .93	" .60
167+00	" .90	" .57
+10	" .87	" .54
+20	" .84	" .51
+30	" .81	" .48
+40	" .78	" .45
167+50	" .75	" .42
TO	LEVEL.	LEVEL.
169+00	1892.75	1892.42
169+00	1892.75	1891.92
TO:		
172+28.33	1892.75	1891.92
172+30.33	1892.92	"
172+31.67	1892.81	PING.
172+32.33	1892.81	"



JAN 6, 58

LEONARD.

41.

GRADES IN ROCK SECTION INVERT.

NOTE: GRADES SET ON  $\frac{1}{4}$ " STEEL PINS HELD UPRIGHT  
IN MOUND OF GUNITE, ALONG CE OF FLOOR.  
STATIONING TAKEN FROM END OF REINFORCED  
SECTION AT 148+00.

T.O.M.  $\frac{3}{4}$ " STEEL PIN IN INVERT AT STA 148+00

	H. d.		
B.M. SPAD #48 - 2.93	1898.44		1901.37
	<u>FIN. GRADES</u>		
STA 148+00	1894.45	-4.56	1894.08 F 0.37'
+04.2	" .43	-3.01	1895.43 C 1.00'
+11.8	" .39	-3.05	1895.39 C 1.00'
+23.8	" .31	-3.06	1895.38 C 1.07'
+32.2	" .25	-2.85	1895.59 C 1.34'
+36.5	" .22	-3.76	1894.65 C 0.46'
+40.9	" .20		PIN PULLED OUT.
	H. d.		
T.O.M. +4.49	1898.57		1894.08
	<u>FIN. GRADES</u>		
148+40	1894.20	-3.78	1894.79 C 0.59'
CHECK SPAD #50		+3.21	1901.78 = 1901.78
148+46.6	1894.19	-3.77	1894.80 C 0.61'
+61.4	" .18	-3.79	1894.78 C 0.60'
+69.9	" .17	-4.14	1894.43 C 0.26'
+76.4	" .17	-3.96	1894.61 C 0.44'
+85.7	" .16	-4.04	1894.53 C 0.37'



JAN 7, 54 LEONARD,

42.

FINISH GRADE PINS IN ROCK SECTION

STATION OF PIN	FINISH GRADE		PIN ELEV.	CUT:
SAD #49, -2.42	1898.60		1901.02	
148+94.9	1894.16 <sup>15</sup>	-3.55	1895.05	0.89 <sup>70</sup>
148+99.3	" .15	-3.78	1894.82	0.67'
149+08.5	" .15	-3.29	1895.31	1.16'
" +09.3	" .14	-3.35	1895.25	1.11
<del>" +14.6</del>	<del>" .14</del>	<del>OMIT.</del>		
+18.8	" .13	-3.42	1895.18	1.05
+21.5	" .13	-3.59	1895.01	0.88
+27.9	" .12	-3.32	1895.28	1.16
CHECK PIN +85.7		-4.45	1894.15 = 1894.16	SET AS



T.R.M. SPAD<sup>44</sup> AT STA. 151+02.5

JAN. 11, '54

LEONARD, T  
SCHEMELING - ROD.

43.

FINISH GRADE PINS		SET IN ROCK SECTION.	
STA. OF PIN,	FINISH GRADE,	-	PIN ELEV. OUT,
SPAD <sup>44</sup>	-3.57 = 1898.13		1901.70
149+27	1894.12	-2.83	1895.30 C1.18
+35	.11	-3.08	95.05 C0.94
+41	.11	-3.19	94.94 C0.83
+49.5	.10	-3.09	95.04 C0.94
+56.5	.09	-2.56	95.57 C1.48
+64.8	.08	-2.87	95.26 C1.18
+72.0	.08	-2.92	95.21 C1.13
+80.6	.07	-2.27	95.86 C1.79
+90.5	.06	-2.69	95.44 C1.38
150+00	1894.05	-2.63	1895.50 C1.45

NOTE: ALL PINS HAVE TO BE RESET;  
REGROUND DUMPED IN BOTTOM LAST SAT.  
IS TOO HIGH AND WILL BE REMOVED.

12



VARNEY.

1-12-54

44.

150+00	1898.77	1895.50
SPAD 44 3.27	Pin Elev	Cut
F.G.		
150+00	1894.05	-
+10	1894.04	3.17 95.60 1.56 ✓
+18	.03	3.16 95.61 1.57 ✓
+25	03	3.27 95.50 1.47 ✓
+32	.02	3.55 95.22 1.20 ✓
150+40	1894.26	3.28 95.49 1.48 ✓
150+50	1894.00	3.55 95.22 1.22 ✓
1	1894.00	3.33 95.44 1.44 ✓
2		3.61 95.36 1.36 ✓
3		3.75 95.02 1.02 ✓
4		3.52 95.25 1.25 ✓
5		3.78 94.99 0.99 ✓
6		3.67 95.10 1.10 ✓
7		3.94 94.83 0.83 ✓
8		3.99 94.78 0.78

CHECK SUB GRADE IN ROCK SECTION.

SPAD 43 2.25	1898.85	1901.20
149+19	FIN. GRADE: -4.87	1895.98
148+85.7	-4.85	
SPAD 50 - 2.79	1898.99	1901.78
STA. 149+19 T.P.	-4.85	1894.14
+4.48	1898.62	
149+86 PIN	1894.11	-3.60 1895.02 C.O. 91
+41 PIN	1894.11	-3.98 1894.64 C.O. 53
+50 PIN	1894.10	-3.85 1894.77 C.O. 67
+57 PIN	1894.09	-3.81 1895.31 C.I. 22
150+18 PIN	1894.08	-3.05 <sup>±</sup> 1895.57 C.I. 54
+50 GROUND	-4.60	1894.02



Grades raked from 148+00  
to 151+61.76

1.13.54  
Wert  
Varney

45.

Spad #43	-2.20 (1899.00)	1901.20
148+00	4.55	1894.45
150+00		
151+61.67 (Spad #43)	4.77	1894.23

JAN. 14, 54

LEONARD  
HAGLUND,

SPAD #42 -2.47  
(REVISED)

1898.75

1901.22

SUB GRADE -

1893.67

-5.05

GRADE ROD.

BASED ON REVISED GRADE.

CHECK ELEV. OF INVERT AS PLACED.

151+10 FINISHED.

-4.56

1894.19.09 LOW

BASED ON ORIGINAL PLAN GRADE.

151+70 SUB. GRADE.

1893.91

-4.84

GRADE ROD.



JAN. 13, 54  
9 A.M.

LEONARD - K  
HAGLUND - P10.

46.

CHECK GRADE IN BOTTOM AS FINISHED.

PIN SET FOR GRADE AT 148+00.

T.B.M.	+4.64	1899.09	1894.45
148+10	+06 ✓	-4.59	1894.50 <sup>44</sup>
+20	+04 ✓	-4.61	94.48 <sup>42</sup>
+30	-03 ✓	-4.69	94.40 <sup>43</sup>
+40	-02 ✓	-4.68	94.41 <sup>43</sup>
+50	-03 ✓	-4.70	94.39 <sup>42</sup>
+60	-07 ✓	-4.75	94.34 <sup>41</sup>
+70	-04 ✓	-4.72	94.37 <sup>40</sup>
+80	-02 ✓	-4.71	94.38 <sup>40</sup>
+90	-02 ✓	-4.71	94.38 <sup>40</sup>
149+00	+02 ✓	-4.68	94.41 <sup>39</sup>
+10	+02 ✓	-4.72	94.39 <sup>39</sup>
+20	+03 ✓	-4.68	94.41 <sup>38</sup>
+30	+03 ✓	-4.69	94.36 <sup>37</sup>
+40	+02 ✓	-4.74	94.35 <sup>37</sup>
+50	+05 ✓	-4.68	94.41 <sup>36</sup>
+60	+04 ✓	-4.70	94.39 <sup>35</sup>
+70	+05 ✓	-4.72	94.37 <sup>34</sup>



Grade pins for Inv. (Gunite)

198 1899.24 1901.22  
 Spad #42. Inv. Gr. 5.04 1894.20  
 151 + 10 (End. Inv.) 4.98 1894.26

Spad #40 - 2.32 1899.60 1901.92  
 153 + 03 5.45 1894.15  
 152 + 12 5.40 1894.20

148.  
 152 + 18.52  
 -14 418.52  
 6  
 251512  
 148  
 151 + 10  
 310  
 6  
 186

153 + 28.47 = 40  
 153 + 03.47

1-15-54 47.  
 V.E.W.

1894.45  
 25  
 1894.20

1894.45  
 19  
 1894.26

1-18-54  
 504 1894.45  
 1 30  
 304 1894.15

412  
 6  
 25



JAN. 19, 1954

LEONARD  
HAGLOHD.

SEE PAGE 50 AND 53.

48.

CHECK INVERT GRADE AS PLACED IN ROCK SECTION

SPAD 40 - 2.80	1899.12	1901.92	H.d.	1899.12
148+00	-4.80	1894.32 <sup>NOT FINISHED.</sup> .14 Low	149+80	-4.78 <sup>.02 Low</sup> 1894.34
+10	-4.94	94.38 <sup>.08 Low</sup>	+90	-4.79 <sup>.02 Low</sup> 94.33
+20	-4.79	94.39 <sup>.06 Low</sup>	150+00	-4.82 <sup>.04 Low</sup> 94.30
+30	-4.81	94.31 <sup>.14 Low</sup>	+10	-4.81 <sup>.03 Low</sup> 94.31
+40	-4.81	94.31 <sup>.14 Low</sup>	+20	-4.79 <sup>OK</sup> 94.33
+50	-4.84	94.28 <sup>.15 Low</sup>	+30	-4.75 <sup>.05 Hi</sup> 94.37
+60	-4.87	94.25 <sup>.18 Low</sup>	+40	-4.78 <sup>.03 Hi</sup> 94.34
+70	-4.84	94.28 <sup>.14 Low</sup>	+50	-4.81 <sup>OK</sup> 94.31
+80	-4.84	94.28 <sup>.14 Low</sup>	+60	-4.80 <sup>.01 Hi</sup> 94.32
+90	-4.80	94.32 <sup>.09 Low</sup>	+70	-4.82 <sup>OK</sup> 94.30
149+00	-4.77	94.35 <sup>.05 Low</sup>	+80	-4.83 <sup>.01 Hi</sup> 94.29
+10	-4.80	94.32 <sup>.08 Low</sup>	+90	-4.79 <sup>.04 Hi</sup> 94.33
+20	<b>VOID.</b> -4.74	94.38 <sup>.01 Low</sup>	151+00	-4.77 <sup>.07 Hi</sup> 94.35
+30	<b>LEVEL OUT</b>	94.34 <sup>.05 Low</sup>	+10	-4.80 <sup>.04 Hi</sup> 94.32
+40	<b>OF ADJUSTMENT,</b>	94.31 <sup>.07 Low</sup>	+20	-4.79 <sup>.05 Hi</sup> 94.33
+50	-4.77	94.35 <sup>.02 Low</sup>	+30	-4.82 <sup>.03 Hi</sup> 94.30
+60	-4.78	94.34 <sup>.03 Low</sup>	+40	-4.74 <sup>.12 Hi</sup> 94.38
+70	-4.78	1894.34 <sup>.02 Low</sup>	+50	-4.77 <sup>.10 Hi</sup> 1894.35

**VOID**



JAN. 21, 54

LEONARD  
HAGLUND.

49.

CHECK INVERT AS PLACED - CONT'D.

H. I.	1899.12		
151+60	-4.76	1894.36	.11 Hi
+70	-4.78	94.34	.10 Hi
+80	-4.77	94.35	.11 Hi
+90	-4.85	94.27	.04 Hi
152+00	-4.84	94.28	.06 Hi
+10	-4.87	94.25	.03 Hi
+20	-4.89	94.23	.02 Hi
+30	-4.90	94.22	.01 Hi
+40	-4.94	94.18	.02 Low
+50	-4.94	94.18	.01 Low
+60	-4.97	94.15	.04 Low
+70	-4.95	94.17	.01 Low
+79 END.	-4.98	1894.14	.04 Low

VOID.

GRADE PINS SET:

SAND #29. -2.64	1898.93		1901.57
Pin. GRADE.			
Pin 152+93	1894.17	-4.15	1894.78 C.O. 61'
153+06.5	94.16	-4.83	94.60 C.O. 44'
153+19.5	94.15	-4.38	94.55 C.O. 40'
153+32	94.14	-4.16	94.77 C.O. 63'
153+45	1894.14	-3.90	1895.03 C.O. 89'
SET T.R. 17.			
STA. 152+50 ON P.K. NAIL:		-4.78	1894.15
CHECK #29:		-2.64	1901.57 F.O.M.
			LEONARD
	JAN. 22.		HAGLUND.
			P.K.
152+50 +5.02	1899.17 H.I.		1894.15 NAIL.
			T.R.M.
CHECK SAND #28		+2.39	1901.50 = 1901.50
SUR GRADE 154+45	1893.75	-5.42	GRADE ROD.
" " 155+65	1893.67	-5.50	" "
155+19 - SPRING.		-4.88	1894.29
	JAN. 25		
SAND #26 -2.93	1898.36		1901.29 T.R.M.
SUR GRADE:	1893.67	-4.69	GRADE ROD.



Invert grade on granite  
displaced

0006

1.20.54  
Varney, Wert.

Spad <sup>#</sup> 40	-2.64 (1899.28)	1901.92	Final	
14.8+00	4.84	94.44	94.45	-.01
+10	4.78	94.50	94.44	+06
+20	4.80	94.48	94.44	+04
+30	4.88	94.40	94.43	-03
+40	4.87	94.41	94.43	-02
+50	4.89	94.39	94.42	-03
+60	4.95	94.33	41	-08
+70	4.92	94.36	41	-05
+80	4.92	94.36	40	04
+90	4.89	94.39	40	-01
1A9+00	4.88	94.40	94.39	+01
+10	4.91	94.37	39	-02
+20	4.87	94.41	38	+03
+30	4.90	94.38	37	+01
+40	4.93	94.35	37	-02
+50	4.88	94.40	94.36	+04
+60	4.89	94.39	35	+04



150-40 51.  
151-50

99.28

+70	4.93	94.35	25	—
+80	4.92	94.36	24	+02
+90	4.92	94.36	24	+03
150+00	4.94	94.34	94.33	+01
+10	4.94	94.34	32	+02
+20	4.94	94.34	32	+02
+30	4.89	94.39	31	+08
+40	4.94	94.34	31	+03
+50	5.00	94.28	94.30	-02
+60	4.96	94.32	29	+03
+70	4.99	94.29	29	—
+80	5.02	94.26	28	-02
+90	4.98	94.30	28	+02
151+00	4.95	94.33	94.27	+06
+10	4.99	94.29	27	+02
+20	4.99	94.29	26	+03
+30	5.03	94.25	25	—
+40	4.94	94.34	25	+09
+50	5.00	94.28	94.24	+04

standing water



99.78

151 + 60	4.97	94.21	23	+08
+70	4.99	94.29	23	+06
+80	5.00	94.28	22	+06
+90	5.06	94.22	24	—
152 + 00	5.09	94.19	94.21	-02
+10	5.07	94.21	21	—
+20	5.09	94.19	20	-01
+30	5.11	94.17	19	-02
+40	5.13	94.15	19	-04
+50	5.15	94.13	94.18	-05
+60	5.18	94.10	18	-08
+70	5.18	94.10	17	-07
152 + 79	5.18	94.10	94.17	-07



JAN. 20, 54.

LEONARD  
HAGLUND.

53.

RE RUN CHECK LEVELS OVER BOTTOM.

Deviation

H.d.

1899.14

FINISH GRADE  
1894.36

SPAD #	1899.14 FINISH GRADE	1901.92	149+80	1894.36	1894.87
SPAD #40, -2.78	1899.14	1901.92	149+80	1894.36	1894.87 .01 Hi
148+00	1894.46	1894.42 .04 Low	+90	94.35	94.37 .02 Hi
+10	94.46	94.51 .05 Hi	150+00	94.39	94.34 OK
+20	94.45	94.51 .06 Hi	+10	94.34	94.34 OK
+30	94.45	94.41 .04 Low	+20	94.33	94.35 .02 Hi
+40	94.44	94.42 .02 Low	+30	94.33	94.39 .06 Hi
+50	94.43	94.38 .05 Low	+40	94.32	94.34 .02 Hi
+60	94.43	94.34 .09 Low	+50	94.31	94.28 .03 Low
+70	94.42	94.36 .06 Low	+60	94.31	94.32 .01 Hi
+80	94.42	94.36 .06 Low	+70	94.30	94.29 .01 Low
+90	94.41	94.39 .02 Low	+80	94.30	94.27 .03 Low
149+00	94.40	94.42 .02 Hi	+90	94.29	94.31 .02 Hi
+10	94.40	94.35 .02 Low	151+00	94.28	94.34 .06 Hi
+20	94.39	94.41 .02 Hi	+10	94.28	94.30 .02 Hi
+30	94.39	94.38 .01 Low	+20	94.27	94.30 .03 Hi
+40	94.38	94.35 .03 Low	+30	94.27	94.26 .01 Hi
+50	94.37	94.41 .04 Hi	+40	94.26	94.35 .09 Hi
+60	94.37	94.40 .03 Hi	+50	94.25	94.30 .05 Hi
+70	94.36	1894.37 .01 Hi	+60	94.25	1894.31 .06 Hi



	1899.14		
151+70	1894.24	-4.85	1894.29 .05 Hi
+80	94.24	-4.85	94.29 .05 Hi
+90	94.25	-4.92	94.22 .01 Low
152+00	94.22	-4.94	94.20 .02 Low
+10	94.22	-4.95	94.21 .01 Low
+20	94.21	-4.96	94.18 .03 Low
+30	94.21	-4.98	94.16 .05 Low
+40	94.20	-5.00	94.14 .06 Low
+50	94.19	-4.99	94.15 .04 Low
+60	94.19	-5.04	94.10 .09 Low
+70	94.18	-5.02	94.12 .06 Low
+79 END.	94.18	-5.00	94.14 .04 Low
CHECK SPAD #40		+2.78	1901.92

Grade pins  
 1.22-  
 V & W  
 1901.50 0.06

	3.44		
	1898.06		
154+45.78			1894.45
645.78			38
6			1894.07
387468			01
154+25	3.99		1894.06
153+45			1894.45
545			33
3270	3.94		1894.11
*36	-255	1898.75	1901.30

1.26-54  
 155.50  
 7.50  
 6  
 45 - 1894.00 - 4.75 (4.68)



SPAD #37 -2.47 1898.76 1901.23

SUR. GRADES 1898.76 5.06 GRADE P.D. 1.27.54

1894.06

39

1894.45

64.1

47

3870

SPAD #35 -2.66 1899.11 1901.77

780

156+06

6  
4680

155+80

5.13

1893.98

154+45

5.05

1894.06

1893.98

SPAD #36 -2.26 1899.04 1901.30

727

1894.45

1.28.54

155+27

5.03

1894.01

6

44

156+25±

5.09

1893.95

4367

1894.01

(155+82)

(Grade from last pin)

157+20

(Used pin for elev.)

1893.95

-.004

55

2.1.54

V.W.

157+75

1893.73

220

#29 - 1900.22

159+22.21

#30 158+58.63

1900.80



JAN. 28, '54.

LEONARD,  
HAGLUND,

CHECK ROCK SUB GRADE:

R.M. #2 + 2.65	1897.09	1894.44
STATION!	SUB. GRADE!	GRADE ROD!
157+76 TO	1893.55 TO	-3.54 O.K.
158+60 TO	1893.50	-3.59 O.K.
159+75	1893.49	-3.66 O.K.

1-29.

+37 -3.54 (1897.69) 1901.23  
 156+70 376 1893.93  
 Level from 156+70

D.P. -2.94	1898.30	1901.24
T.P. +3.97	1897.27 -5.00	1893.30 ON RAIL.
	-4.07	1893.20 GRADE:

32 - 1900.81	157+61.90
37 - 1901.23	157+70
866 1894.45	156+70
5196	1893.93



FEB. 1, '54

LEONARD  
HASLUND.

57.

## INVERT GRADES SET.

229.	-2.86	1897.37	1900.23	
T.P.	+4.69	1897.81	-4.25	1893.12 PIN.
STA.		FINISH INV. GRADE.	-	PINELEV. TOT.
157+47		1893.76	-3.97	1893.84 CO.08'
+54		1893.75	-3.84	1893.97 CO.24'
+68		1893.70	-4.05	1893.76 CO.06'
+76		1893.67	-4.07	1893.74 CO.07'
+83		1893.65	-4.10	1893.71 CO.06'
+89		1893.65	-3.98	1893.83 CO.20'
+96		1893.61	-4.17	1893.64 CO.08'
158+03		1893.59	-3.97	1893.84 CO.25
+10		1893.56	-4.07	1893.74 CO.18
+16		1893.54	-4.28	1893.53 GRADE.
+31		1893.48	-4.12	1893.69 CO.21'
+38		1893.44	-4.10	1893.71 CO.27'
+48		1893.40	-4.63	1893.18 FO.22'
+56		1893.38	-4.55	1893.26 FO.12'
<del>+63</del>		1893.35	-4.69	1893.12 <del>FO.28'</del>
+71		1893.32	-4.44	1893.37 CO.05'

(PIN EVIDENTLY PULLED UP, RESET TO 1893.80)  
GRADE PINS SET BY VARNEY NOT CHANGED.

GRADES SET TO RANKIN'S REVISED GRADE LINE.  
FOUND LOW SPOTS OF NEARLY A FOOT DEEP  
BELOW THIS GRADE TO BE FILLED IN.

PIN REMOVED-LOOSE



2-3-54 (V&amp;W)

#26 -4.15. 1897.06 1901.21

160+74, 160+78 #27

158+56 3.68 1893.38

End of gunitite (invert)

159+00 3.86 1893.20

Grade-change

Level

159+80± 3.86 1893.20

FEB. 3, '54

LEONARD  
HAGLUND

#25 -2.55 1897.49 1900.07

159+80 to 160+52 -4.29 1898.20

2-5-54

V&amp;W.

-2.95 98.29 1901.24

160+52 to 161+80± 5.09 93.20

#21. 1901.24 163+76

#22. 1900.97 - 162+74

-09 ✓ -31 ✓

-36 ✓ -21 ✓

-19 ✓ -31 ✓

-34 ✓

-14 ✓

-29 ✓

-27 ✓

-34 ✓



2.9.54  
V-W

#18	-2.72	(98.34)	1901.06
Fin. Inv.	5.14		1893.70

164.7302.10.54  
V-W

#16	-3.05	(98.33)	1901.38
Fin. Inv.	5.13		1893.20

165.466165.555



WERT  
McDermot

60.

Set Grade Pins From Sta 165+52 to Sta. 166+78 Feb 11, 1954

Station	+	H.L.	-	Elev.	
167+37.29				1900.22	Elev. of Spod #12
		1897.89	2.33		
166+00			4.69	1893.20	
165+52			4.69	1893.20	End of finish invert (1-10-54) (Set 7 pins in level section)
166+87			4.95	1892.94	Set pin at this point & rake from 166+00



Set Grade pin for Invert Sta 166+11 to 168+93 Feb 15 - 54

	+	H.I.	-	Elev.	Grade
170+42.90				1901.23	Spad #7

1897.38 3.85

1897.38

168+47

4.63 1892.75

Set pin to grade

167+10

4.40 1892.98

1892.98 Elev invert

Note: Raked grade pins from invert to elev. 1892.75 Sta 168+47. Set grade pins level 40 ft ahead

Due to close rock tolerance at Sta. 167+25 & 167+45 grade break was moved to Sta 168+47

LEONARD  
2-15-54 HAGLUND,

T.R. 171	1897.34	- 3.80	1901.14	SPAD #5,
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SET SPIKE LAST TIE,	-4.61	1892.73	F.O. 02'	SET 40 PP SPIKE IN LAST PART OF GRADE AT 169+00.
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CHECK FORWARD N. END	+ 2.80	1899.54 + .17 = 1899.81	ELEV. ON BOTTOM OF 2" PLANK,	170+69
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" " S. END.	+2.21	1899.56 + .17 = 1899.76	" " " " " "	170+81
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## Set Steel Grades in "D"

## Section

Feb, 18, 1954

Sta.	+	H.I.	-	Elev	Grade	Fill
SPed #5 171+13.83				1901.14		
		1897.31	3.83			
TP			4.08	1893.23		
	4.15	1897.38				
169+10			5.78	1891.60	1892.33	0.73
+20			5.54	1891.84		0.49
+30			5.58	1891.80		0.53
+40			5.26	1892.12		0.21
+50			5.40	1891.98		0.35
+60			5.30	1892.08		0.25

Note: 3.50 was added to  
each fill; radial grades were  
established in this manner

continued page 63



63.  
WEBT  
McDermote

Set Steel Grades in "D"

Section

Feb, 18, 1954

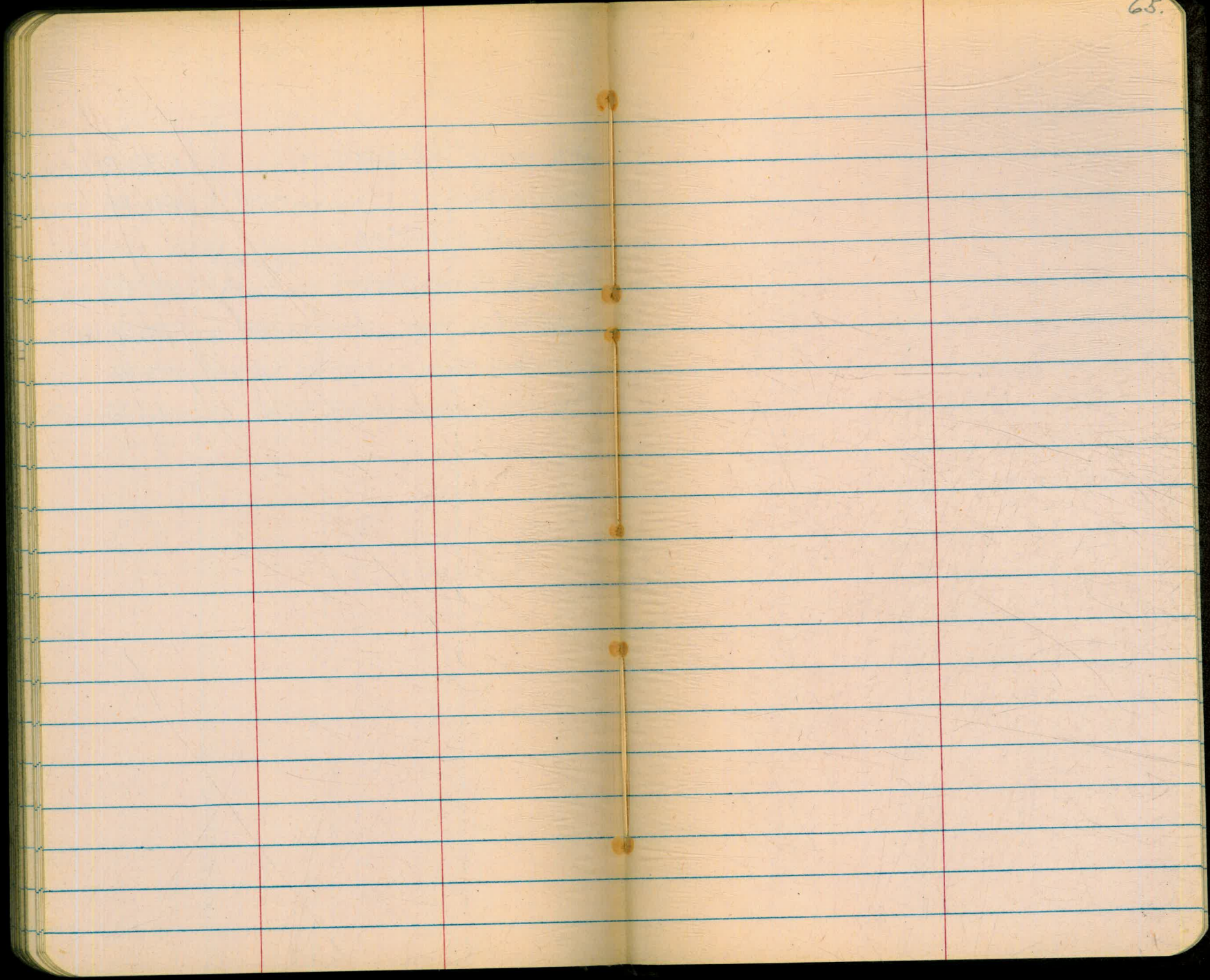
Station	+	H.I.	-	Elev.	Gr.	CUT / FILL
Spad # 5 171+13.83				1901.14		
		1897.54	3.60			
			5.64	1891.90	1892.33	.43
			5.60	1891.94		0.39
			5.55	1891.99		0.34
			5.75	1891.79		0.54
			5.85	1891.69		0.64
			5.51	1892.03		0.30



NOTE: GRADE OF INVERT IN TYPE "D" SECTION  
 WAS RAISED .12' TO INSURE SUFFICIENT  
 COVERAGE OVER REINFORCING STEEL, WHICH  
 WAS SET HIGH FROM .02' TO .12', DUE TO BEING  
 POORLY ROLLED AT THE MILL, AND FLATTENING  
 OUT IN THE CENTER WHEN THE ENDS WERE  
 PULLED OUT TO 3'6" RADIUS LINE.

B.M. +2.85	1898.85		1896.50
INVERT OF PING.		-5.91	1892.94
+4.26	1897.20		
ADJUSTED INVERT TYPE "D".		GRADE ROD, 4.33	1892.87
END. ROCK SECT. INVERT.		-4.45	1892.75
ROCK SECT. INVERT		-4.40	1892.80
ROCK SECT. INVERT.		-4.43	1892.77

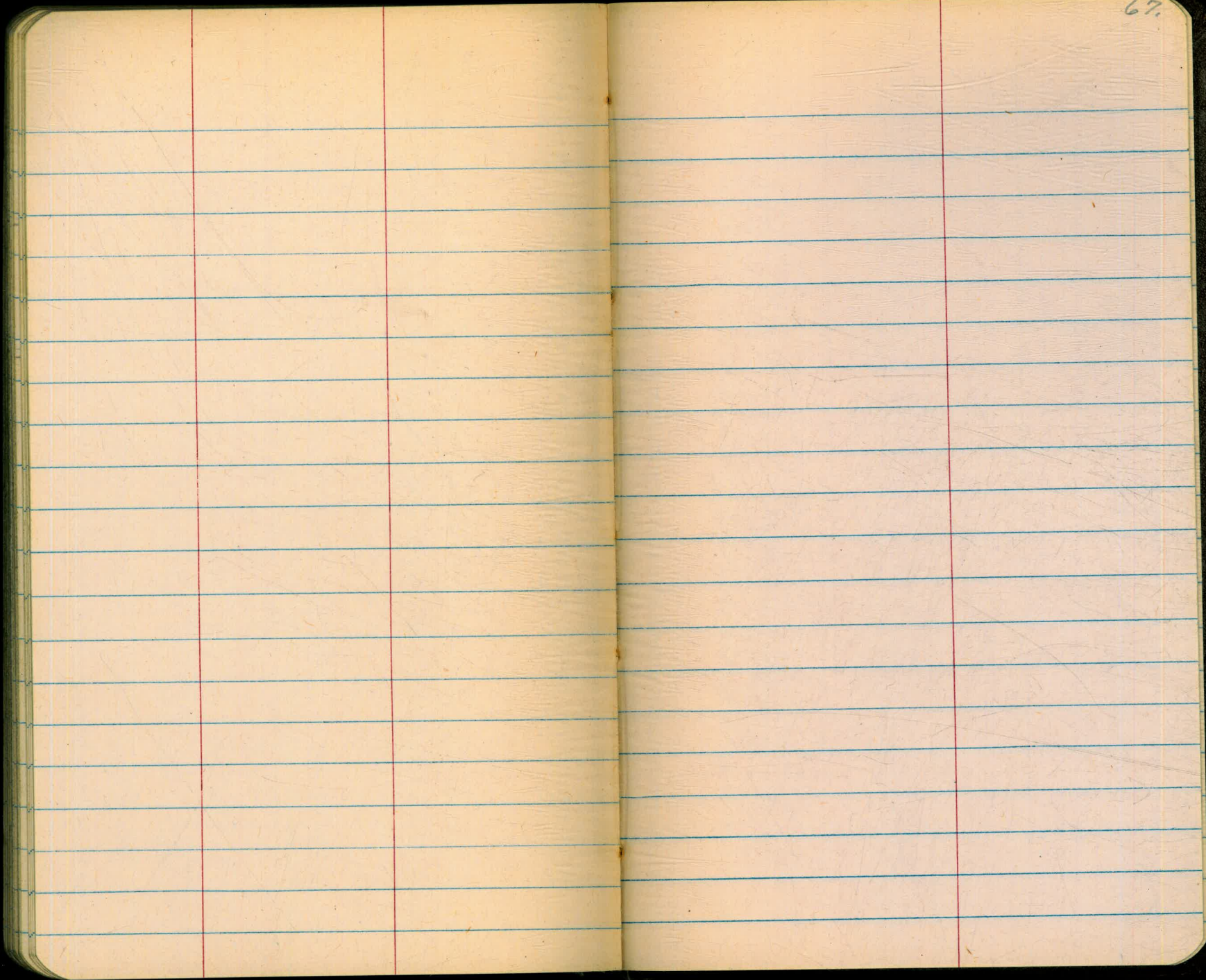




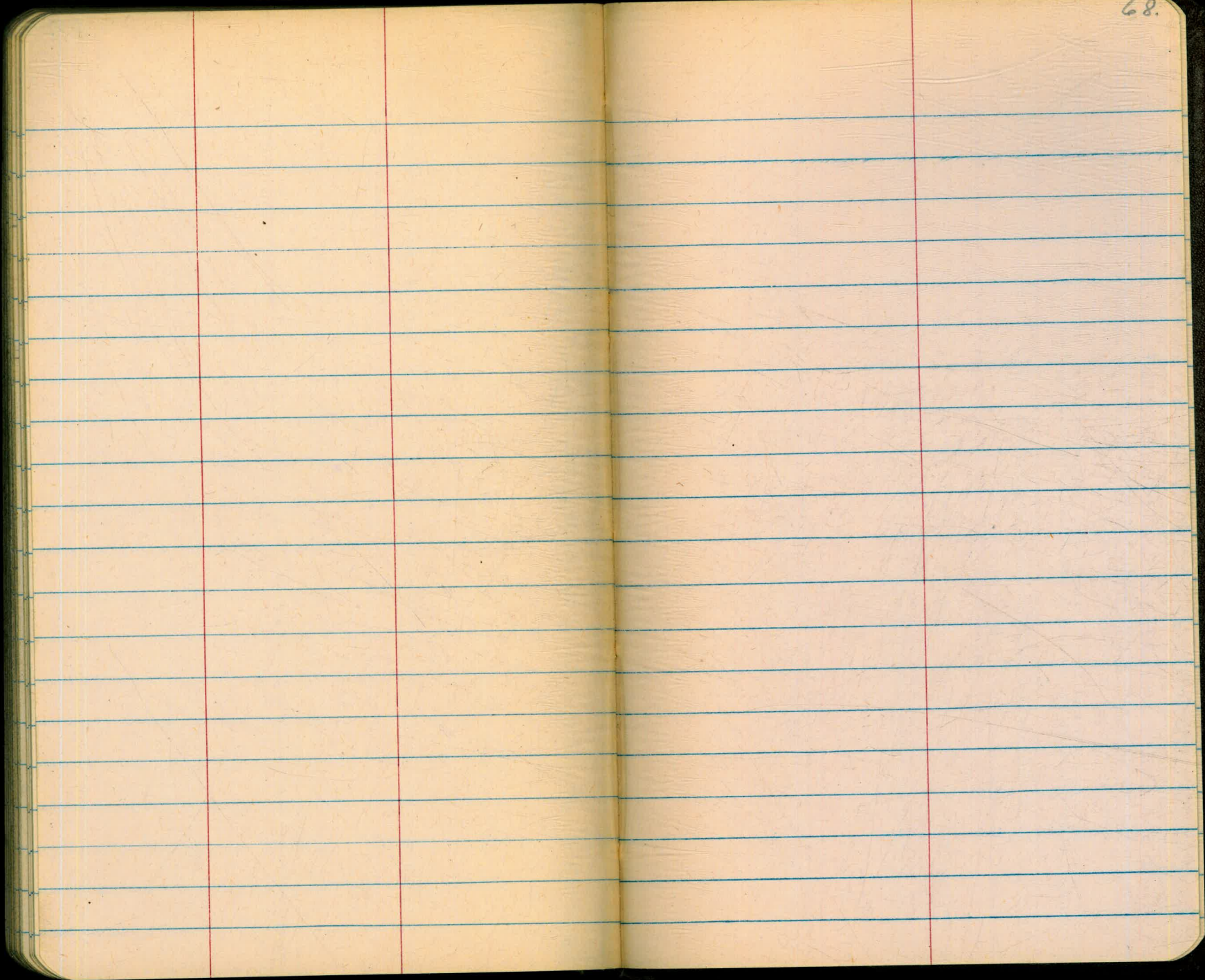


The image shows an open notebook with two facing pages. Both pages are cream-colored and feature horizontal blue ruling lines. Each page has two vertical red margin lines, one on the left and one on the right, creating three columns. The pages are otherwise blank. In the top right corner of the right page, the number "66." is handwritten in black ink. The notebook's binding is visible in the center, and the dark cover is seen at the edges.

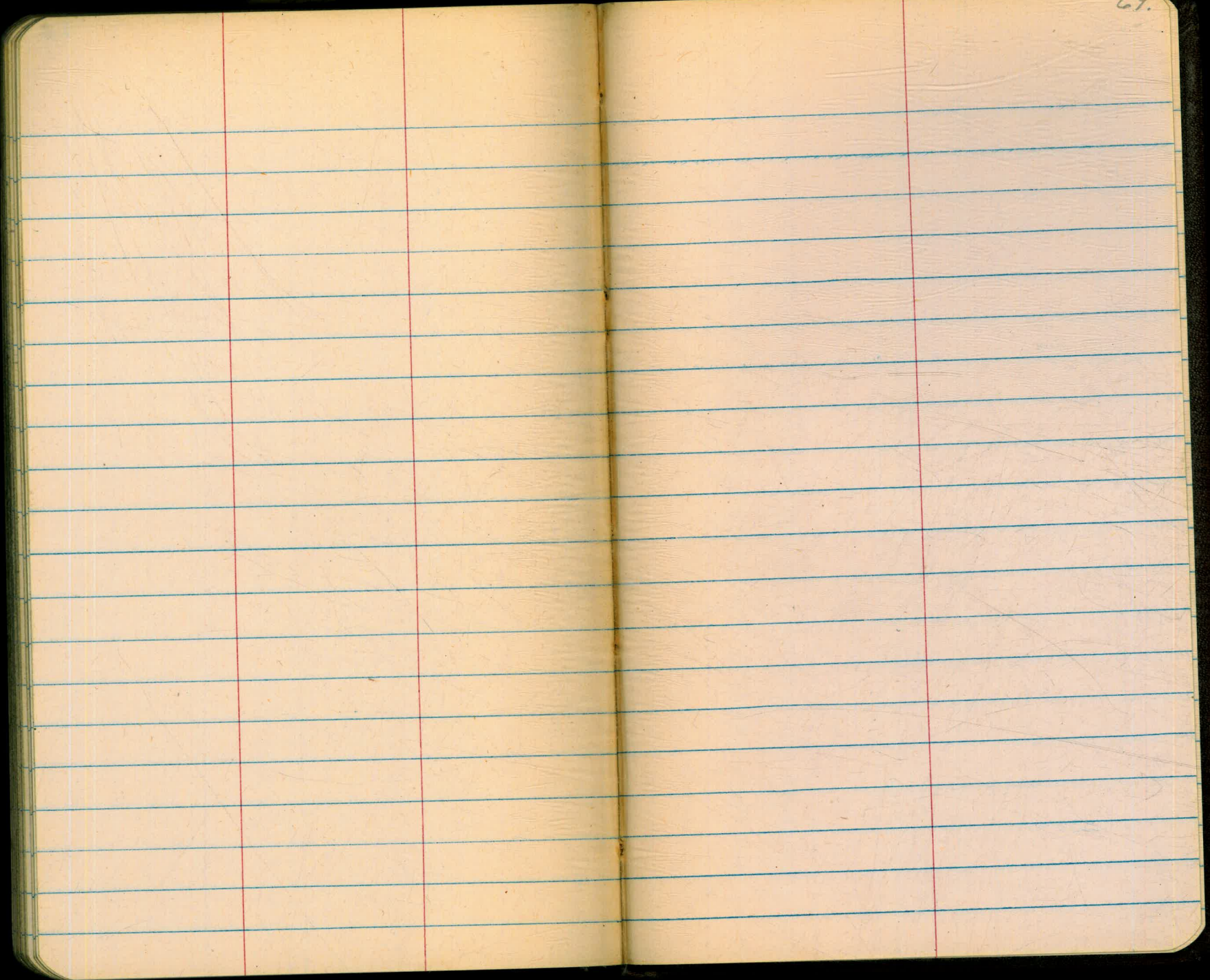




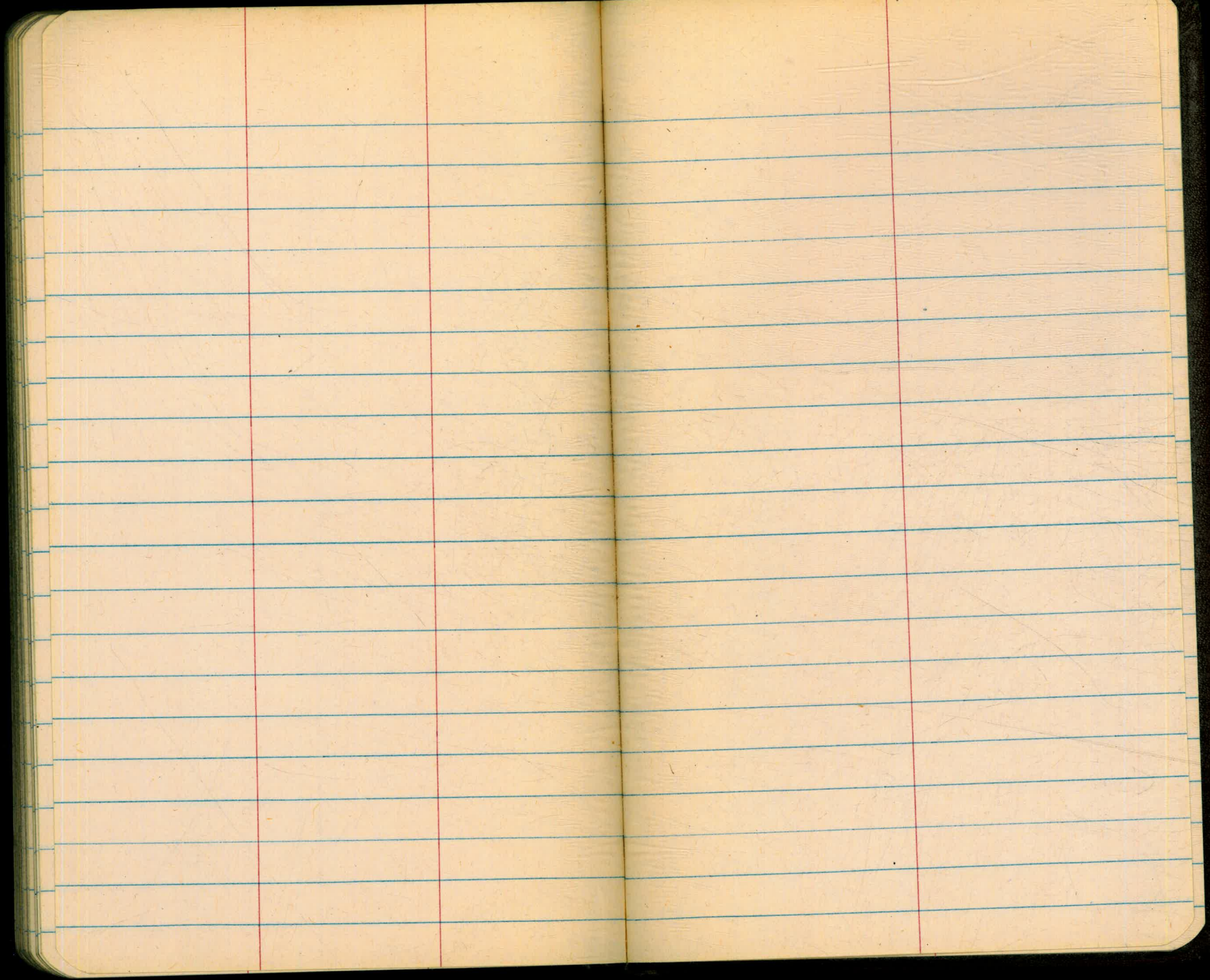




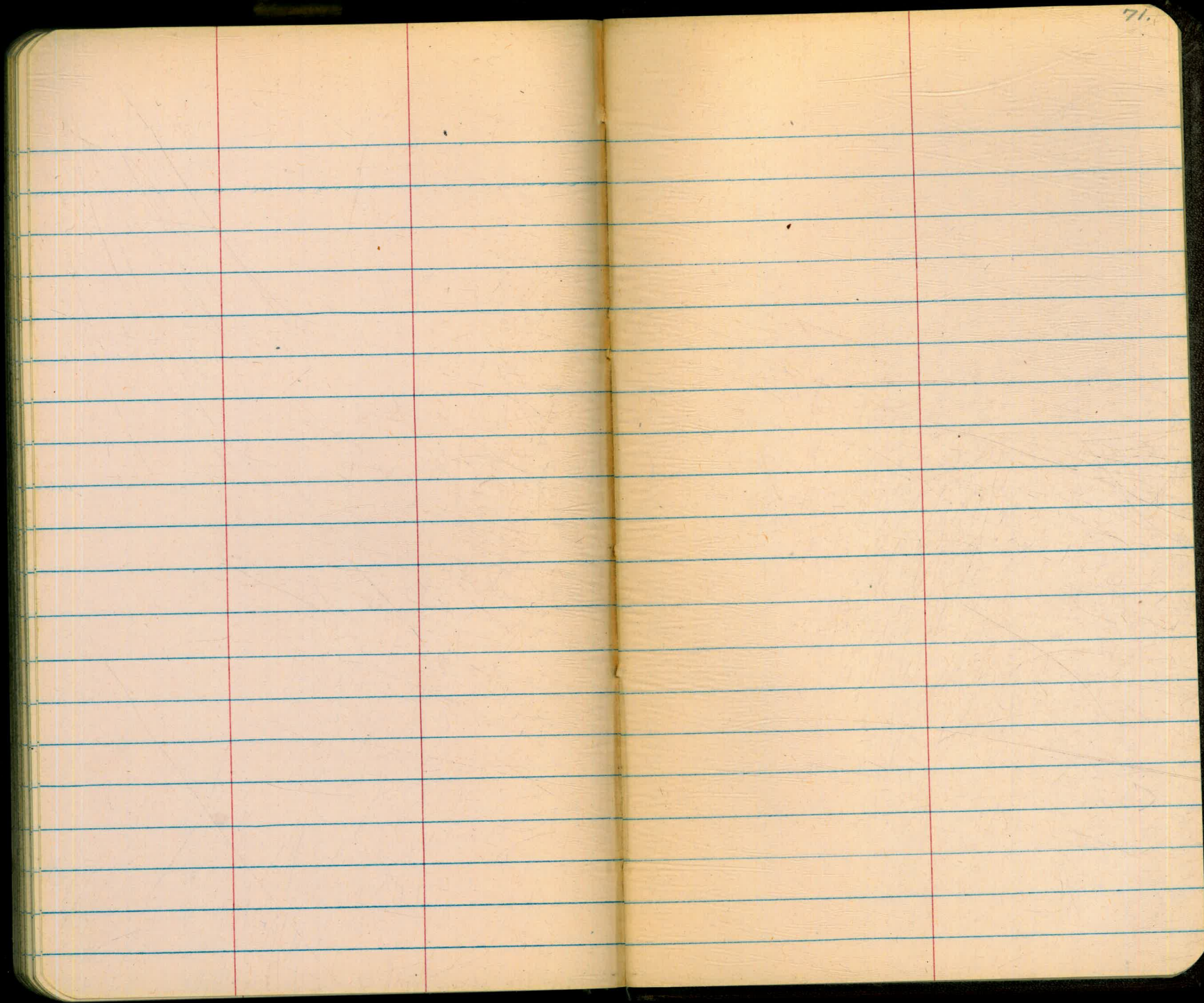




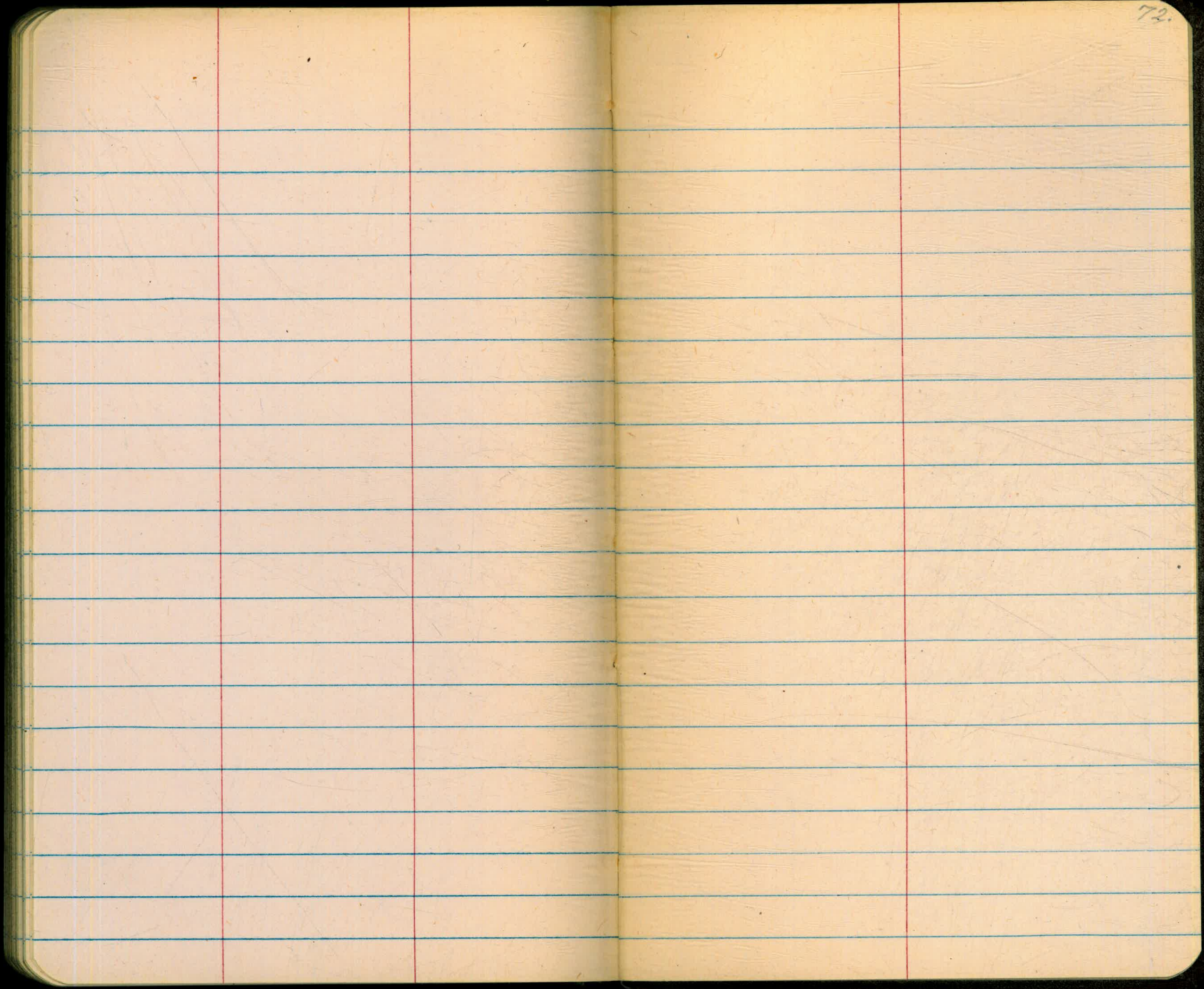




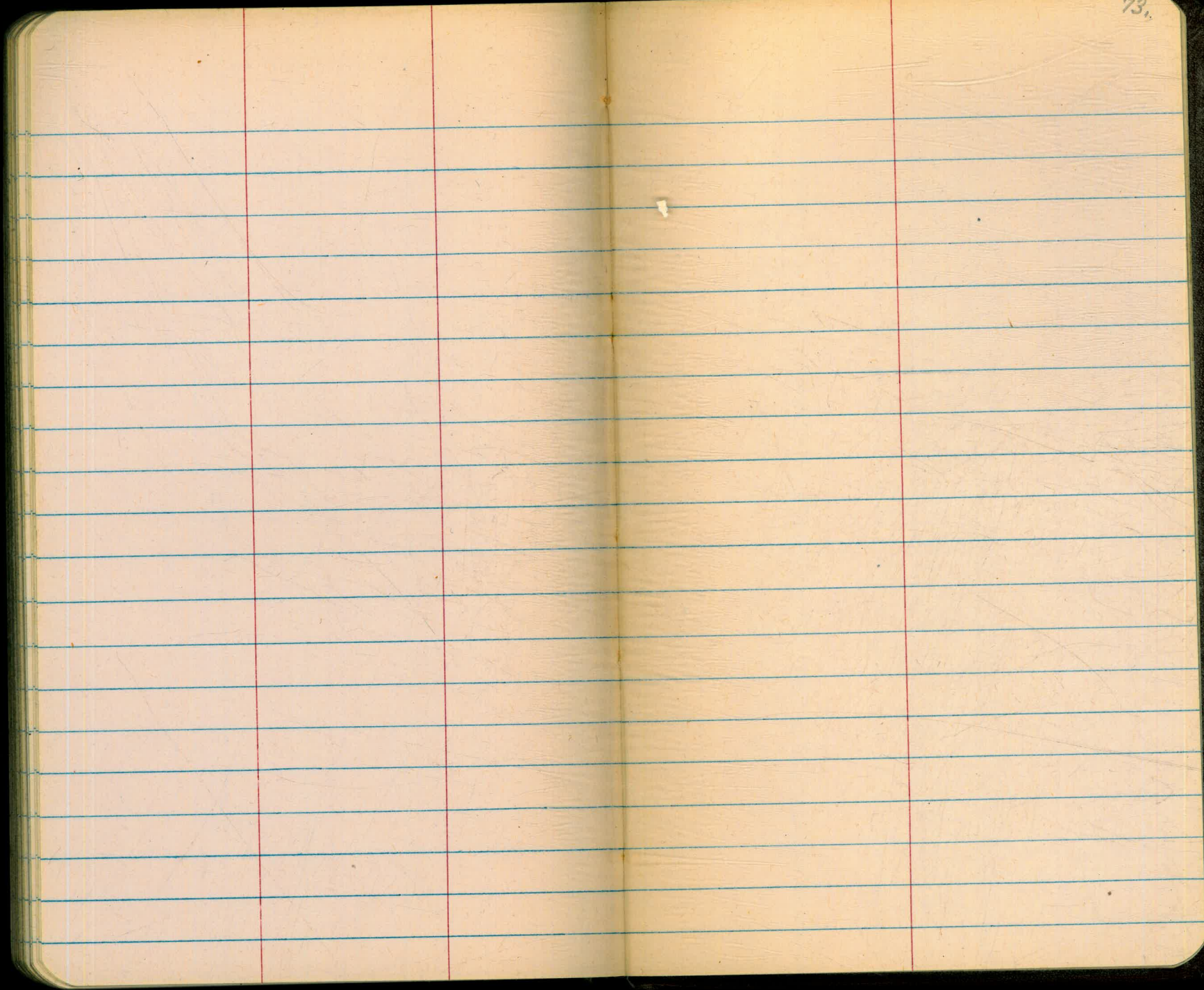








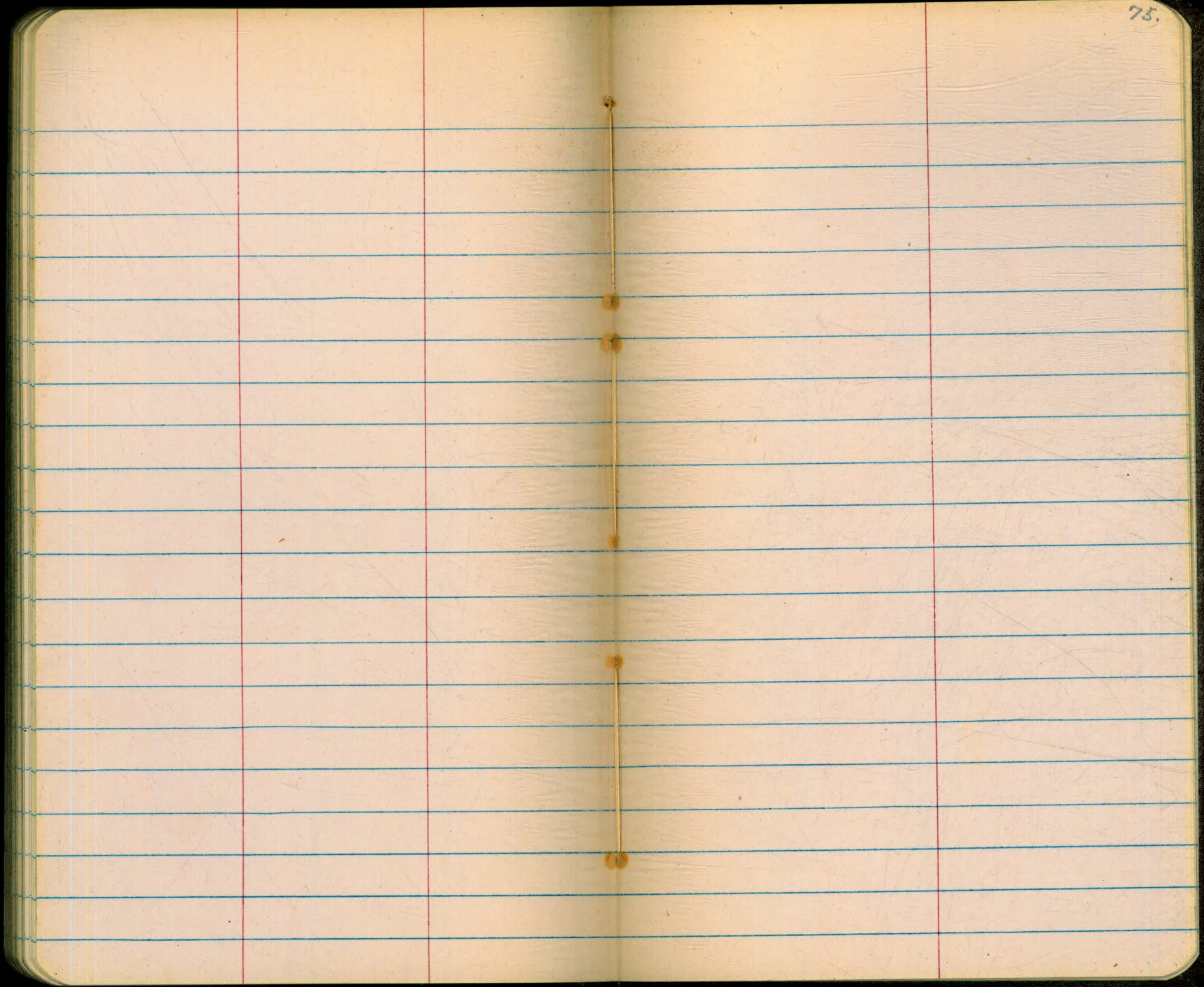






The image shows an open notebook with two facing pages. The pages are cream-colored and feature horizontal blue ruling lines. Each page has two vertical red margin lines, one on the left and one on the right, creating three columns. The right page has the number '74.' written in the top right corner. The notebook is bound in the center, and the pages appear slightly aged with some minor discoloration and faint smudges. The background is dark, likely the notebook's cover or the surface it is resting on.





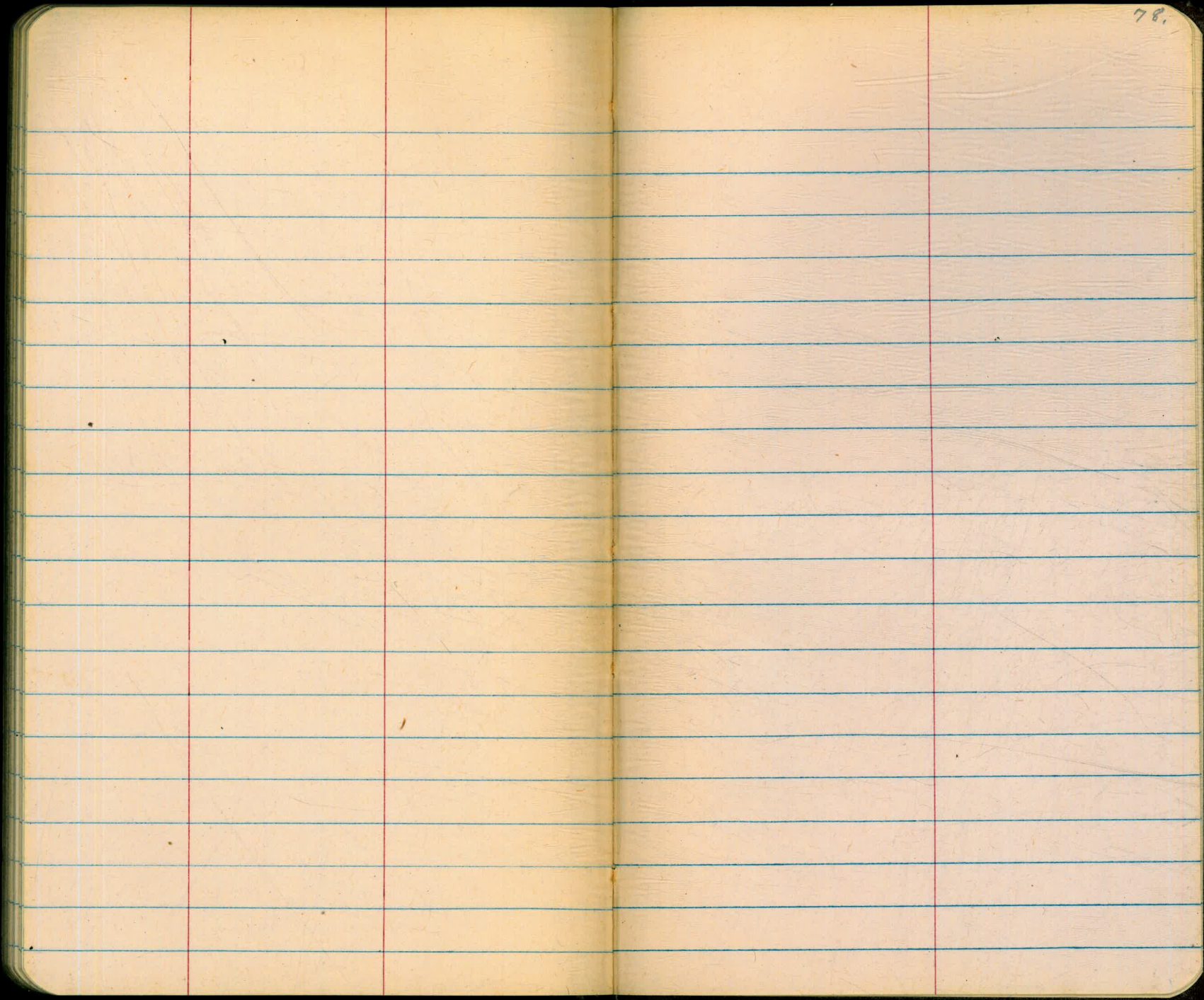


The image shows an open notebook with two facing pages. Both pages are cream-colored and feature horizontal blue ruling lines. Each page also has two vertical red margin lines, one on the left and one on the right, creating three columns. The pages are otherwise blank. The number '76.' is handwritten in the top right corner of the right page. The notebook is bound in the center, and the dark cover is visible around the edges.



The image shows an open notebook with two facing pages. The pages are cream-colored and feature horizontal blue ruling lines. Each page is divided into three vertical columns by two vertical red lines. The notebook is bound in the center, and the dark cover is visible at the edges. The pages are blank, with no writing or markings other than the faint page number '77.' in the top right corner of the right page.

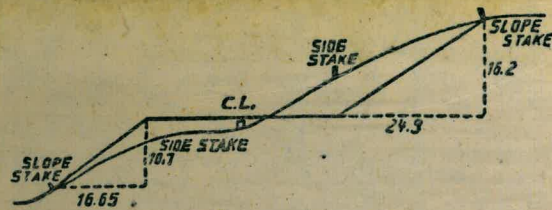












**DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.**  
SLOPE  $1\frac{1}{2}$  TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.00	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.50	1.65	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	1
2	3.00	3.15	3.30	3.45	3.60	3.75	3.90	4.05	4.20	4.35	2
3	4.50	4.65	4.80	4.95	5.10	5.25	5.40	5.55	5.70	5.85	3
4	6.00	6.15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	4
5	7.50	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85	5
6	9.00	9.15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	6
7	10.50	10.65	10.80	10.95	11.10	11.25	11.40	11.55	11.70	11.85	7
8	12.00	12.15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35	8
9	13.50	13.65	13.80	13.95	14.10	14.25	14.40	14.55	14.70	14.85	9
10	15.00	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	10
11	16.50	16.65	16.80	16.95	17.10	17.25	17.40	17.55	17.70	17.85	11
12	18.00	18.15	18.30	18.45	18.60	18.75	18.90	19.05	19.20	19.35	12
13	19.50	19.65	19.80	19.95	20.10	20.25	20.40	20.55	20.70	20.85	13
14	21.00	21.15	21.30	21.45	21.60	21.75	21.90	22.05	22.20	22.35	14
15	22.50	22.65	22.80	22.95	23.10	23.25	23.40	23.55	23.70	23.85	15
16	24.00	24.15	24.30	24.45	24.60	24.75	24.90	25.05	25.20	25.35	16
17	25.50	25.65	25.80	25.95	26.10	26.25	26.40	26.55	26.70	26.85	17
18	27.00	27.15	27.30	27.45	27.60	27.75	27.90	28.05	28.20	28.35	18
19	28.50	28.65	28.80	28.95	29.10	29.25	29.40	29.55	29.70	29.85	19
20	30.00	30.15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	20
21	31.50	31.65	31.80	31.95	32.10	32.25	32.40	32.55	32.70	32.85	21
22	33.00	33.15	33.30	33.45	33.60	33.75	33.90	34.05	34.20	34.35	22
23	34.50	34.65	34.80	34.95	35.10	35.25	35.40	35.55	35.70	35.85	23
24	36.00	36.15	36.30	36.45	36.60	36.75	36.90	37.05	37.20	37.35	24
25	37.50	37.65	37.80	37.95	38.10	38.25	38.40	38.55	38.70	38.85	25
26	39.00	39.15	39.30	39.45	39.60	39.75	39.90	40.05	40.20	40.35	26
27	40.50	40.65	40.80	40.95	41.10	41.25	41.40	41.55	41.70	41.85	27
28	42.00	42.15	42.30	42.45	42.60	42.75	42.90	43.05	43.20	43.35	28
29	43.50	43.65	43.80	43.95	44.10	44.25	44.40	44.55	44.70	44.85	29
30	45.00	45.15	45.30	45.45	45.60	45.75	45.90	46.05	46.20	46.35	30
31	46.50	46.65	46.80	46.95	47.10	47.25	47.40	47.55	47.70	47.85	31
32	48.00	48.15	48.30	48.45	48.60	48.75	48.90	49.05	49.20	49.35	32
33	49.50	49.65	49.80	49.95	50.10	50.25	50.40	50.55	50.70	50.85	33
34	51.00	51.15	51.30	51.45	51.60	51.75	51.90	52.05	52.20	52.35	34
35	52.50	52.65	52.80	52.95	53.10	53.25	53.40	53.55	53.70	53.85	35
36	54.00	54.15	54.30	54.45	54.60	54.75	54.90	55.05	55.20	55.35	36
37	55.50	55.65	55.80	55.95	56.10	56.25	56.40	56.55	56.70	56.85	37
38	57.00	57.15	57.30	57.45	57.60	57.75	57.90	58.05	58.20	58.35	38
39	58.50	58.65	58.80	58.95	59.10	59.25	59.40	59.55	59.70	59.85	39
40	60.00	60.15	60.30	60.45	60.60	60.75	60.90	61.05	61.20	61.35	40
41	61.50	61.65	61.80	61.95	62.10	62.25	62.40	62.55	62.70	62.85	41
42	63.00	63.15	63.30	63.45	63.60	63.75	63.90	64.05	64.20	64.35	42
43	64.50	64.65	64.80	64.95	65.10	65.25	65.40	65.55	65.70	65.85	43
44	66.00	66.15	66.30	66.45	66.60	66.75	66.90	67.05	67.20	67.35	44
45	67.50	67.65	67.80	67.95	68.10	68.25	68.40	68.55	68.70	68.85	45
46	69.00	69.15	69.30	69.45	69.60	69.75	69.90	70.05	70.20	70.35	46
47	70.50	70.65	70.80	70.95	71.10	71.25	71.40	71.55	71.70	71.85	47
48	72.00	72.15	72.30	72.45	72.60	72.75	72.90	73.05	73.20	73.35	48
49	73.50	73.65	73.80	73.95	74.10	74.25	74.40	74.55	74.70	74.85	49
50	75.00	75.15	75.30	75.45	75.60	75.75	75.90	76.05	76.20	76.35	50

WASH 152+50  
BOTTOM 153+75

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