W24

24

H. S. CROCKER COMPANY

DRAWING MATERIALS AND SURVEYING INSTRUMENTS

SAN FRANCISCO

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 Kueffel & 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.

MICROFILMED
JAN 8 1965

Transit Book
So Cal. Mt Water Co.
Conduit line,
Dulzura to Otay.
Dec 1907 Jan 1908.
R. Wheeler

FROM
LORING'S BOOK STORE
SAN DIEGO, CAL.

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1.

Sta.	Dist.	Def. Ang. Left	Def. Ang. Right	Cal. Co.	Var. Plate 13°30' Mag. Co.
	206.4				
+92.1			15°10'	S 59°10 E	S 59°05' E
	61.6				
12+30.5			60°25'	S 74°20' E	S 74°20' E
	87.1				
11+43.4			38°38½'	N 45°15' E	N 45°15' E
	210.2				
9+33.2		75°16'		N 6°36½' E	N 6°33' E
	197.6				
7+35.6			55°54'	N 81°52½' E	N 81°55' E
	66.5				
+69.1			31°26½'	N 25°58½' E	N 25°55' E
	50.0				
6+19.1			14°56'	N 5°28' W	N 5°30' W
	77.1				
5+42.0			6°34'	N 20°24' W	N 20°25' W
	176.5				
3+65.5		131°58'		N 26°58' W	N 27°00' W
	77.5				
+88.0			19°09'	S 75°00' E	S 75°00' E
	85.9				
2+02.1			25°35'	N 85°51' E	N 85°45' E
	122.4				
+79.7		86°49'		N 60°16' E	N 60°15' E
	79.7				
Sta 0					S 32°55' E
	1498.5	294°03'	267°48'		

12-10-07.

Wueste
Waterman
Sa Pure
Rogers.

Stadia		
300 507		Pr on Rk
200 261		
200 286		Pr on Rk
200 410		= Sta 1219+00
300 497		
100 166		Pr on Rk
100 149		Pr on Rk
100 176		= Sta 1223+00
100 276		
100 176		
100 185		
400 522		
136 215		= Sta 1228+47.5

Commenced 24 + 52.5
12 + 11 - '07
Minute
Waterman
Sa Rue
Rogers.

Sta.	Dist.	Def. Ang. Left	Def. Ang. Right	Cal. Co.	Mag. Co.
	62.6				
33 + 22.9			5°51'	N 23°49' E	N 23° 45' E
	103.8				
32 + 19.1		126°05'		N 17°58' E	N 17° 55' E
	126.0				
+ 93.1			36°33½'	S 35°57' E	S 36° 00' E
	51.8				
30 + 41.3			6° 54½'	S 72°30½' E	S 72° 30' E
	229.4				
28 + 11.9			8° 33½'	S 79°25' E	S 79° 30' E
	102.0				
27 + 09.9			15° 46'	S 87°58½' E	S 88° 00' E
	138.8				
25 + 71.1		67°02½'		N 76°15½' E	N 76° 10' E
	118.6				
24 + 52.5			26°28'	S 36°42' E	S 36° 40' E
	253.0				
+ 99.5			70° 08'	S 63°10' E	S 63° 10' E
	52.5				
21 + 47.0			42°34½'	N 46°42' E	N 46° 40' E
	250.3				
18 + 96.7		119°29½'		N 4° 07½' E	N 4° 00' E
	173.3				
17 + 23.4		18°18'		S 56°23' E	S 56° 25' E
	224.9				
14 + 98.5			21°05'	S 38°05' E	S 37° 50' E
	1887.0	330°55'	235°54'		

Stadia		
4.00 4.62		
		31°
2.00 3.03		
	N 9° W	20° Pr on Rk
2.00 3.26		
		26° Pr on Rk
3.00 3.51		
		27°
3.00 5.21		
		31°
3.00 4.01		
		29° = Sta 12.01 + 00
2.00 3.39		
	N 15° E	24°
2.00 3.18		
		22°
3.00 5.52		
	N 28° W	17° Pr on Rk
3.00 3.52		
		19° Pr on Rk
3.00 5.50		
	N 23° W	24°
1.00 2.73		
		= Sta 12.11 + 00
2.00 4.25		

Commenced 33 + 85.5

12-12-07
Wyeth
Waterman
La Rue
Rogers

Sta.	Dist.	Def. Ang. Left	Def. Ang. Right	Cal. Co.	Mag. Co.	Stadia		
	80.3					200 379		
58+65.5			46° 17'	S43°06'E	S42° 00'E (S88°25'E)			33°
					S89° 20' E			
Tunnel # 6	1069.3				S89° 15' E			
	See page 77							
					S88° 55' E			
47 + 96.2		28°30'		S89° 23'E	S89° 05' E		← N25°W	18° = Sta 1179 + 73 Pron RK
	366.4					280 647		
44 + 29.8		24°53½'		S60°53'E	S60°55' E			32°
	157.3					200 356		
42 + 72.5			8°14½'	S35°59½'E	S36°05' E			34° = Sta 1185
	136.0					300 435		
41 + 36.5			58°53½'	S44°14' E	S44°25' E		← N25°E	28° Pron RK
	144.2					400 543		
39+92.3			12°37½'	N76°52½'E	N76°45' E			33°
	94.4					400 493		
38+97.9			5°24½'	N 64°15'E	N64°05' E		← N8° E	34° = Sta 1188 + 67.4
					N58°50' E			
Tunnel # 7	512.4							
	(See page 79)				N58°40' E		← N44°W	= Summit
33+85.5			35°01½'	N58°50½'E	N58°50' E		← S86°W	32° = Sta 1193 + 84
	2560.3	53° 23½'	166°28½'					

Commenced Sta 63+54.6
12-13-07.
Wenesti
La Rue
Rogers.

Sta.	Dist.	Def. ang. Left	Def. ang. Right	Cal. Co	Mag. Co	Stadia				
	61.6					300 360				
79+25.7			34°28'	N55°11'E	N55°25'E				23°	
	64.5					300 3635				
78+61.2			24°11'	N20°43'E	N20°50'E				27°	
	214.8					400 614				
76+46.4		103°36'		N3°28'W	N3°25'W			N35°W	32°	
	295.0					200 495				
73+51.4			11°33½'	S79°52'E	S79°40'E				33°	Pr on Rk at Sta 1154+00
	73.2					100 173				
+78.2			6°37½'	N88°34½'E	N88°50'E				31°	Pr on Rk
	54.1					000 053				
72+24.1			35°22'	N81°57'E	N82°15'E			N30°W	37°	Pr on Rk
	69.6					1100 1168				
71+54.5			9°08'	N46°35'E	N46°50'E		28°		90°	Pr on Rk Cliff 10' above grade
	306.5					300 607				
68+48.0		55°40'		N37°27'E	N37°35'E			N18°W	40°	Pr on Rk Cliff 15' above grade
	195.0					000 195				
66+53.0			62°34'	S86°53'E	S86°30'E			N21°W	24°	5' R+Sta 1161+00
	138.8					300 438				
65+14.2			9°30'	N30°33'E	N30°50'E				29°	
	159.6					300 459				
63+54.6		23°29'		N21°03'E	N21°20'E				32 = Sta 1164+00	
	207.0					300 506				
61+47.6			6°33'	N44°32'E	N44°50'E				36°	
	201.8					200 402				
59+45.8		98°55'		N37°59'E	N39°00'E			N40°E	40°	Rk face
	2041.5	281°40'	199°57'							

Commenced Sta 78+61.2
12-14-'07.
Wuleste
Waterman
Sabine
Rogers

Sta	Dist.	D & Ang. Left	D & Ang. Right	Cal. Co.	Mag Co	Stadia		
	134.0					400 532		
95+70.6		41°24'		S70°31'E	S70°15'E		← N72°E	17° = Sta 1131+59.1
					S28°55'E			
Tunnel # 5								
43	495.7 (see page 76)				S28°55'E		← N57°E	- Summit
					S29°00'E			
					S29°00'E			
90+74.9			90°+9'	S29°07'E	S29°00'E		← N47°W	39° = Sta 1136+5.7
	180.8					200 380		
88+94.1			12°24'	N60°34'E	N60°45'E			37° Pr on Rk
	183.7					200 384		
87+10.4		51°45'		N48°10'E	N48°25'E		← N12°W	40° Pr on Rk
	126.3					100 226		
+84.1			16°16'	S80°05'E	S80°00'E			Pr on Rk
	50.9					300 350		
85+33.2		43°05'		N83°39'E	N83°55'E			35° = Sta 1142+6.5
	478.3					100 580		
80+54.9			32°20'	S53°16'E	S53°00'E			27°
	67.6					300 367		
79+87.3			39°13'	S85°36'E	S85°25'E		← N53°W	25°
	1717.3	136°14'	190°32'					

Commence Sta 95 + 68.8
12-15-07
Lincoln
Watterman
Sabre
Rogers

Sta	Dist	Deflang Left	Deflang Right	Cal Co	Mag to
	37.4				
115+14.6			20°53'	S 4°02½'W	S 4°20' W
	174.8				
113+39.8		24°38'		S 16°50½'E	S 16°30' E
	305.4				
110+34.4			41°29'	S 7°42½'W	S 8°00' W
	46.7				
109+87.7			69°32½'	S 33°46½'E	S 33°30' E
	107.2				
108+60.5		86°32'		N 76°41'E	N 77°00' E
	66.4				
+94.1			33°00'	S 16°47'E	S 16°30' E
	56.4				
107+37.7		78°30'		S 49°47'E	S 49°30' E
	302.6				
104+35.1			33°09½'	S 28°44'W	S 28°55' W
	50.1				
103+85.0			65°31'	S 4°25½'E	S 5°30' E
	317.0				
100+68.0			22°37'	S 70°03½'E	S 69°55' E
	193.3				
98+74.7		41°40½'		N 87°19½'E	N 87°35' E
	80.3				
+94.4			9°09'	S 44°00'E	S 43°50' E
	89.8				
97+04.6			17°22'	S 53°09'E	S 53°00' E
	1847.4	238°16½'	312°30'		

Sta	Dir	Deflang	
500 537			
			31° = Sta 1111+99 Pt on Pk
300 474			
			37° = Sta 1113+74
200 504			
			18°
300 346	N 56° E		
			17°
400 827			
	N 44° E		22°
200 265			
			24°
300 356			
	N 82° E		26°
700 500			
			6° = Sta 1123+00
300 350			
	N 63° E		4° Pt on Pk (Brm 04)
300 617			
			17°
200 393			
	N 29° E		24°
900 379			
			21°
300 389			
			23°

7.

Commenced Sta 116+05.6
12-16-'07
Wuesta
Waterman
S. Rose
Rogers.

Sta	Dist	Def ang Left	Def ang Right	Cal Co	Mag Co	Stadia			
	86.9					200 286			
137 + 15.7			21°03½'	S81°11½'E	S81°30'E			26°	Pr on RK
	84.3					100 184			
136+31.4		94°22'		N77°45'E	N77°30'E		N30°E	18°	
	85.7					100 184			
135+45.7		51°40		S7°53'E	S7°55'E			13°	
	228.2					200 427			
133+17.5			10°10'	S43°47'W	S43°55'W			28°	Pr on RK
	175.3					100 274	167°40		
131+42.2			27°40'	S33°37'W	S33°50'W		S70°E	26°	Pr on RK
	307.4					300 606			
128+34.8			48°54'	S5°57'W	S6°00'W		N81°E	25°	Above saddle
	102.9					200 303			
127+31.9			28°10'	S42°57'E	S42°45'E			27°	
	145.2					200 344			
125+86.7		124°19½'		S71°07'E	S70°55'E		N76°E	32°	Coulee with tank pr on RK
	144.8					300 443			
124+41.9			16°08'	S53°12½'W	S53°30'W			29°	Pr on RK
	195.3					100 295			
122+46.6			19°55'	S37°04½'W	S37°10'W			36°	Pr on RK
	224.4					300 575			
120+22.2		30°07'		S17°09½'W	S17°20'W		S53°E	38°	Pr on RK ar 1106+96
	416.6					200 615			
116+05.6			7°07'	S47°16½'W	S47°30'W			32°	
	53.6					200 252			
115+52.0			36°07'	S40°09½'W	S40°30'W		S69°E	31°	Pr on RK
	2250.6	300°28½'	215°14½'						

+ Knob of saddle

Commenced Sta 149+51.5
12-17-07
Wuelsh
Waltman
Sa Rue
Rogers

Sta	Dist	Def Angle Left	Def Angle Right	Cal Co	Mag Co	Stadia				
	38.0					063 100				
157+32.1			108°47½'	S6°47'W	S6°45'W			N63°E Rky Pr.	15°	Pr on Rk
	149.5					300 448				
155+82.6			11°24'	N77°59½'E	N78°00'E				26°	Pr on Rk
	86.5					100 186				
154+96.1		10°43½'		N66°35½'E	N66°35'E				27°	on little jut of solid rock
	95.7					000 096				
154+00.4		130°51'		N77°19'E	N77°30'E			N51°E	27°	near 1072+01
	142.6					000 142				
152+57.8		4°03'		S28°10'W	S28°10'W				38°	= Sta 1074+00
	306.3					300 605				along face of vert. cliff +00.00 from 149+51.5
149+51.5		15°36'		S32°13'W	S32°10'W		41°		37°	Pr on Rk
	372.4					200 570				
145+79.1			20°40'	S47°49'W	S48°35'W		34°	S36°E	32°	Hut
	152.3					300 451				
144+26.8		41°59'		S27°09'W	S27°40'W			S43°E	31°	Hut at 1082+41.5
	202.7					400 602				
142+24.1			31°15½'	S69°08'W	S69°35'W				16°	Pr on Rk
	55.6					200 255				
+68.5			43°54½'	S37°52½'W	S38°10'W				16°	
	49.2					450 498				
141+19.3			31°30'	S6°02'E	S5°30'E			N83°E 162°27'	17°	
	52.2					100 152				
140+67.1			20°42'	S37°32'E	S37°15'E				19°	
	264.5					200 465				
138+02.6			22°57½'	S58°14'E	S57°45'E				20°	Pr on Rk
	1967.5	203°12½'	291°11'							

Knot at end of

9

Commenced 167+57.5

1-4-'08

Sta	Dist	D of Ang Left	D of Ang Right	Cal Co	Mag Co	Stadia			Wheeler / La Rue / Rogers / Hill
	124.9					300 424			
171+26.1			59°14½'	S21°26'E	S21°10'E		N31°E	18°	
	129.2					160 288			
169+96.9			18°42'	S80°40½'E	S80°25'E			27°	
	239.4					300 539			
167+57.5		45°18'		N80°37½'E	N80°55'E		N30°E	30°	
	111.3					200 311			
166+46.2			42°23'	S54°04½'E	S53°45'E		N18°E		
	48.2					200 247			
165+98.0			47°07'	N83°32½'E	N83°55'E			25°	below 1060+45
	94.6					200 294			
165+03.4		N°35'		N36°25½'E	N37°00'E			35°	
	76.2					100 175			
164+27.2		104°20'		N55°00½'E	N56°05'E		N20°E	33°	Pr on Rk back of 1062+12
	83.7					300 383			
163+43.5			21°28'	S20°39½'E	S19°40'E			30°	Pr on Rk
	48.6					300 358			
162+94.9			4°48½'	S42°07½'E	S41°30'E			29°	
	61.2					100 160			
162+33.7			38°58½'	S46°56'E	S45°55'E			27°	Sta 1064+00
	60.0					200 259			
161+73.7			21°23½'	S85°54½'E	S85°15'E			30°	Pr on Rk
	282.3					200 482			
158+91.4		123°21'		N72°42'E	N72°45'E		N24°E	30°	
	121.3					200 370			
157+70.1			9°16'	S16°03'W	S16°00'W			14°	Pr on Loose Bldr
	1480.9	291°34'	263°21'						

Sta	Dist	Def. ang. Left	Def. ang. Right	Calco	Magco
	92.8				
186+84.1			18°53'	S60°07½'E	S59°35'E
	87.7				
185+96.4		104°24'		S79°06½'E	S78°30'E
	176.5				
184+19.9			26°47'	S25°23½'W	S25°40'W
	45.0				
183+74.9			59°30½'	S1°23½'E	S1°- E
	178.5				
181+96.4		2°16½'		S60°54'E	S60°30'E
	181.0				
180+15.4		126°06'		S58°37½'E	S58°25'E
	48.9				
178+66.5			4°59'	S67°28½'W	S67°40'W
	150.5				
177+16.0			20°04½'	S62°29½'W	S62°35'W
	42.3				
176+73.7			9°13'	S42°25'W	S42°35'W
	49.6				
176+24.1			16°02½'	S33°12'W	S33°20'W
	56.6				
175+67.5			50°31½'	S17°09½'W	S17°15'W
	155.9				
174+11.6			4°42'	S33°22'E	S33°05'E
	160.6				
172+51.0		16°38'		S38°04'E	S37°55'E
	1525.9	249°24½'	210°43'		

Stadia			
200 292		34°	Pr on Rk
213 300			
	N61°E	28°	Hub
400 576			
		23°	Pr on Rk
100 144			
	N63°E	19°	Pr on Rk
300 479			
		35°	
140 320			
	N86°E	28°	
500 648			
		31°	Pr on Rk Cliff
400 550			
		26°	Hub
600 642			
		28°	Pr on Rk
400 449			
		29°	Pr on Rk
400 456			
	N89°E	23°	
300 455			
		31°	
300 461			
		21°	

Var 16°4' E.

Sta	Dist	Def Angle LT	Def Angle RT	Cal Co	Mag Co
	48.9				
197 + 28.9			15°52'	S 8°09' W	S 9°30' W
	76.3				
196 + 52.6			19°48'	S 7°43' E	S 6°30' E
	112.3				
195 + 40.3			14°05'	S 27°31' E	S 26°15' E
				(S 41°36½' E)	
	84.2				
194 + 56.1		47°34'		S 43°27' E	S 43° – E
	86.9				
193 + 69.2			16°52'	S 4°07' W	S 4°30' W
	39.2				
193 + 30.0			36°19'	S 12°45' E	S 12°20' E
	33.7				
192 + 96.3		67°35'		S 49°24' E	S 48°35' E
	92.2				
192 + 04.1			9°28'	S 18°31' W	S 19° – W
	84.5				
191 + 19.6		17°34½'		S 9°03' W	S 9°25' W
	109.5				
190 + 10.1			14°18'	S 26°37½' W	S 27° – W
	50.8				
189 + 59.3			16°34'	S 12°19½' W	S 12°35' W
	90.3				
188 + 69.0			27°01½'	S 4°14½' E	S 3°55' E
	92.1				
187 + 76.9			28°51½'	S 31°16' E	S 30°45' E
	1000.9	132°43½'	199°09'		

Note:
Commencing at 195 + 40.3
Bearings are true — (Still subject to instrument error correction.)

commenced 194 + 56.1
1-6-08.
Inverness
Sandy
Rogers
Hill

Station	Bearing	
400 448		
	29°	Prism RK
100 176		
	29°	Hub
150 262		
	27°	Prism RK
500 583		
	23°	Hub
300 386		
	30°	Hub
330 369		
	27°	Hub
600 633		
← N65°E	31°	Prism RK
300 391		
	32°	Hub
500 583		
← N40°	29°	Hub
400 508		
	28°	Hub
400 450		
	29°	Hub
300 389		
	27°	Prism RK
400 491		
	28°	Hub at 103+52

Sta	Dist	Det angle LT	RT	Cal co	Mag Co
	163.8				
208+46.2			0°09½'	S12°10E	S11°-E
	80.6				
207+65.6			3°54'	S12°19½E	S11°-E
	141.5				
206+24.1			12°34½	S16°13½E	S14°55E
	221.9				
204+02.2			16°48'	S28°48'E	S27°25E
	50.5				
203+51.7			29°53'	S45°36'E	S44°10'E
	78.1				
202+73.6			7°28½'	S75°29E	S74°05'E
	80.0				
201+93.6		95°25'		S82°57½E	S81°35'E
	47.2				
201+46.4			32°37½'	S12°27½W	S13°30'W
	77.6				
200+68.8		30°44'		S20°10E	S19°-E
	76.9				
199+91.9			16°43'	S10°34'W	S12°20'W
	95.8				
198+96.1		73°48'		S6°09E	S4°50'E
	69.3				
198+26.8			33°49'	S67°39'W	S65°25'W
	49.0				
197+77.8			25°41'	S33°50'W	S35°-W
	1232.2	199°57'	179°38'		

Stadia			
200363			
		37°	Hub
100179			
		34°	Pr on Pk
200342			
		33°	Pr on Pk
200421			
		32°	Hub at 1021+54
300350			
		31°	Hub
300377			
		38°	Hub
200279			
	← N60°E	27°	Pr on Pk
300346			
		29°	Pr on Pk at 1024+30
300377			
	← N75°E	25°	Hub
300376			
		31°	Hub
050145			
	← S81°E	32°	Pr on Pk
100169			
		27°	Hub
200245			
		26°	Hub

13.

Sta	Dist	Det angle Lt	Rt	Cal to	Mag to
	44.4				
222+60.8			18° 13½'	S 40° 41' W	S 6° – W
	82.2				
221+78.6			38° 43'	S 13° 32½' E	S 12° 30' E
	106.5				
220+72.1		72° 38'		S 52° 15½' E	S 51° 05' E
	136.5				
219+35.6			19° 21'	S 20° 23½' W	S 21° 30' W
	53.8				
218+81.8			25° 58½'	S 1° 01½' W	S 2° 05' W
	110.4				
217+71.4		12° 18'		S 24° 57' E	S 23° – E
	97.4				
216+74.0			10° 41½'	S 12° 39' E	S 11° 25' E
	129.6				
215+44.4			26° 53'	S 23° 20½' E	S 22° 05' E
	80.2				
214+64.2			25° 20'	S 50° 13½' E	S 48° 45' E
	139.2				
213+25.0		93° 50'		S 75° 39½' E	S 74° 10' E
	68.6				
212+56.4			60° 18½'	S 18° 16½' W	S 19° 25' W
	46.8				
212+09.6		39° 36'		S 42° 02' E	S 40° 45' E
	199.6				
210+10.0			9° 44'	S 2° 26' E	S 1° – E
	1295.2	218° 22'	235° 15'		

Commenced 217+71.4
1-7-08
Wright
LaRue
Rogers

Stadia				
300 344				
			28°	Pr on Pk
200 281				
			32°	Pr on Pk
400 507				
	N 70° E	35	28°	Hub
100 235				
			30°	Hub
400 453				
			28°	Hub
300 410				
			28°	Pr on Pk
300 396				
			27°	Pr on Pk
200 329				
			26°	Hub
300 379				
			26	Hub
200 338				
	N 6½° E		29°	Pr on Pk at 011+05
400 468				
	N 60° E	5	27°	Hub
200 246				
	N 53° E	5	28°	Hub
300 499				
			32°	Hub

Commenced 251+35.2
1-9-'08

Sta	Dist	Def Angle Lt	Def Angle Rt	Cal Co	Mag Co	Stadia			Wrist Sabine Rogers Hill
	44.5					400 444			
252+57.1		80° 15'		N 25° 55½' W	N 24° 55' W			18°	Hub
	52.0					300 351			
252+05.1		29° 47½		N 54° 19½' E	N 55° E			12°	Pr on Rk
	69.9					500 569	← N am 45 / 25 N 15° W		Flume begins
251+35.2			11°	N 84° 07' E	N 85° E				=973+29
(△6) Tunnel #4	987.1				N 74° 10' E				Hub
	909.7								
232+38.4			25° 08½'	N 73° 07' E	N 74° 10' E		← N 65° W	33°	=Sta 992+42
	70.7					500 570			
231+67.7			10° 08½	N 47° 58½' E	N 49° E			35°	Hub
	57.4					300 357			
231+10.3			18° 33½	N 37° 50' E	N 39° E			32°	Hub
	103.9					200 303			
230+06.4			1° 57'	N 19° 16½' E	N 20° 30' E			28°	Pr on Rk
	197.6					300 496			
228+08.8		21° 42'		N 17° 19½' E	N 18° 30' E			35°	Hub
	137.1					300 437			
226+71.7		47° 21'		N 39° 01½' E	N 40° E			32°	Hub
	105.2					500 605			
225+66.5		65° 29'		N 43° 22½' E	N 44° 30' E			41°	Pr on Rk
	70.3					100 170	← N 40 E 35 / 35 Cedar Canon Creek		
224+96.2		93° 11½'		S 71° 08½' E	S 70° 05' E			25°	Pr on Rk
	191.0					300 490			at 1000+06
223+05.2			17° 22'	S 22° 03' W	S 23° 30' W			32°	Pr on Rk
	2996.4	294° 46'	84° 09½'						

Sta	Dist	Def Angle Lt	Def Angle Rt	Calc Co	Mag Co
	119.1				
267+74.8			16°47'	S 80°19'E	S79°-E
	64.9				
267+09.9			16°24½'	N82°54'E	N84°25'E
	69.4				
266+40.5			22°00'	N66°29½'E	N67°45'E
	63.5				
265+77.0			15°51½'	N44°29½'E	N45°30'E
	62.5				
265+14.5			20°24'	N28°38'E	N30°05'E
	177.9				
263+36.6			10°26'	N8°14'E	N9°30'E
	67.9				
262+68.7		50°31½'		N2°12'W	N1°05'W
	262.2				
260+06.5			9°49'	N48°19½'E	N49°-E
	90.2				
259+16.3			29°42'	N38°30½'E	N38°30'E
	56.5				
258+59.8			4°25'	N8°48½'E	N9°05'E
	44.6				
258+15.2			27°16½'	N4°23½'E	N4°55'E
	171.7				
256+43.5		29°16'		N22°53'W	N22°16'W
	341.9				
253+01.6			32°18½'	N6°23'E	N7°10'E
	1592.3	79°47½'	205°24'		

Station			
500 619			
	N10°E	22°	Hub
300 364			
		24°	Hub
500 568			
		23°	Hub
100 163			
		25°	Hub
300 362			
		30°	Hub
300 477			
		33°	Pr on Pk
300 367			
	N59°W	34°	Pr on Pk
100 361			
		34°	Pr on Pk
400 489			
		28°	Pr on Pk
500 555			
		30°	Pr on Pk
100 144			
		30°	Pr on Pk
400 571			
		32°	Pr on Pk Sudgy
200 541			
		17°	Pr on Pk

Commenced 277+22.8.
1-10-'08.
Wm. Stu
Sa Rue
Rogers
Hill

Sta	Dist	Def angle Lt	Def angle Rt	Cal to	Mag to	Stadia			
	117.6					400 517			
286+53.2		144°49'		N 6°11½'E	N 7°25'E		← N 12°W	5°	Pr on Pk
	99.1					400 499			
285+54.1			15°22'	S 28°52½'E	S 27°45'E			20°	= Sta 38+50
	84.0					200 273			
284+70.1		30°36'		S 44°14½'E	S 43°05'E			26°	Pr on Pk
	130.0					071 200			
283+40.1			8°32'	S 13°38½'E	S 12°30'E			27°	Pr on Pk
	164.6					400 56			
281+75.5		18°14'		S 22°10½'E	S 21°E			28°	Hub
	452.7					100 550			
277+22.8			37°51'	S 3°56½'E	S 2°45'E			22°	Pr on Pk
	111.8					400 512			
276+11.0			52°27½'	S 41°47½'E	S 40°35'E			19°	= Sta 94.8
	44.3					500 544			
275+66.7			27°40'	N 85°45'E	N 86°50'E			29°	Pr on Pk
	137.5					500 637			
274+29.2		116°34½'		N 58°05'E	N 59°05'E		← N 34°E	31°	Hub
	192.6					300 492			
272+36.6			10°45'	S 55°20½'E	S 40°25'E			24°	Hub
	49.3					500 541			
271+87.3			17°13'	S 16°05½'E	S 15°10'E			23°	Hub
	40.4					460 500			
271+46.9			21°15'	S 33°11½'E	S 32°15'E			25°	Hub
	253.0					300 554			
268+93.9			25°45½'E	S 54°33½'E	S 53°20'E			24°	Hub
									at 95.5+51
	1876.9	310°13½'	216°51'						

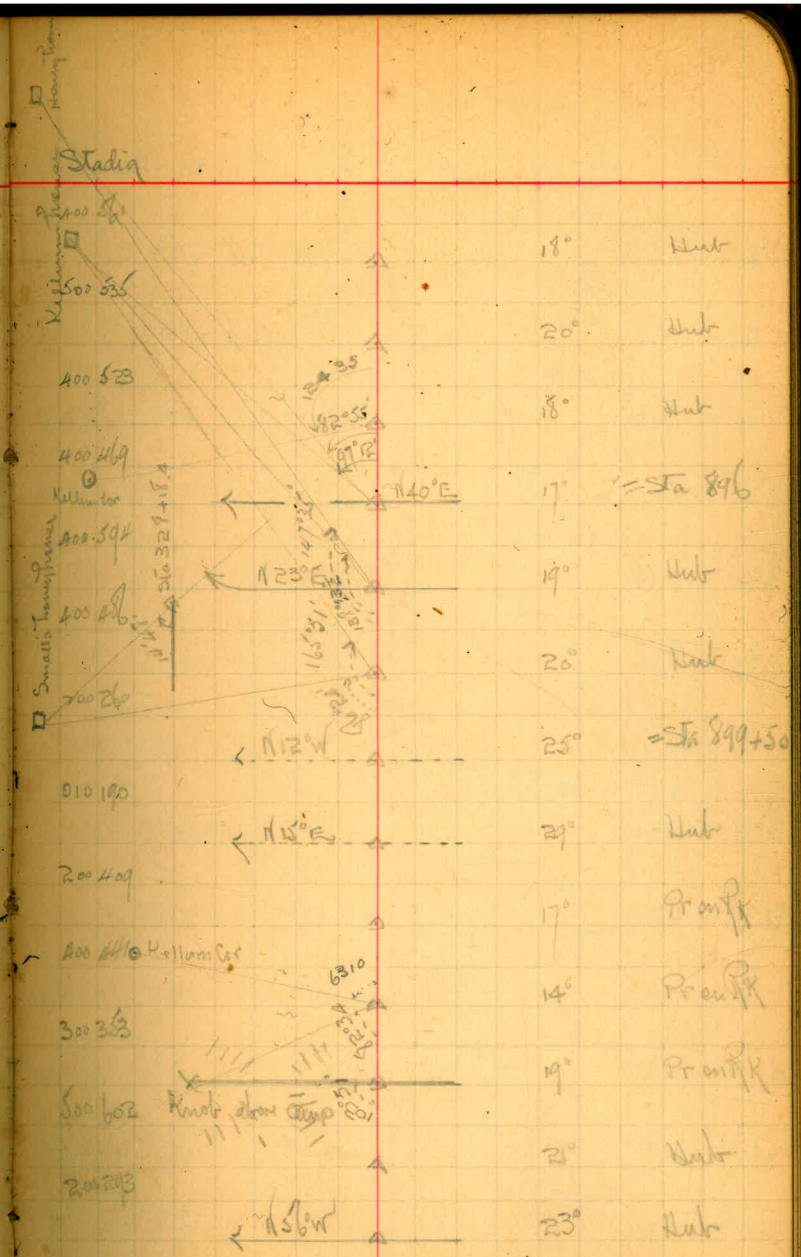
Sta	Dist	Def. Angle Lt	Def. Angle Rt	Cal Co	Mag Co	Stadia			
	112.4					400 512			
303+54.0			6°56'	N 3°57' W	N 3° – W			15°	Pr on RK
	88.3					300 387			
302+65.7		25°07'		N 10°53' W	N 10° – W			24°	Hub
	175.8					100 275			
300+89.9			30°20½'	N 14°14' E	N 15°10' E		S 82° W	20°	Hub
	69.6					500 569			
300+20.3			10°42'	N 16°06½' W	N 15°15' W			20°	= Sta 923
	109.4					500 608			
299+10.9			21°59½'	N 26°48½' W	N 25°50' W			20°	Hub
	170.8					400 571			
297+40.1		67°04		N 48°48' W	N 48° – W		S 68° W	20°	Pr on RK
	134.1					400 534			
296+06.0			27°34	N 18°16' E	N 19°10' E		N 83° W	25°	Hub
	49.7					500 549			
295+56.3		25°26½'		N 9°18' W	N 8°25' W		N 76° W	27°	Pr on RK
	98.1					500 597			
294+58.2			3°38½'	N 16°08½' E	N 17° E			32°	Hub
	311.3					300 611			
291+46.9			26°44½'	N 12°30' E	N 13°30' E			19°	Pr on RK
	55.2					445 500			
290+91.7		15°04'		N 14°14½' W	N 12°30' W			20°	Pr on RK
	185.6					300 485	35'		
289+06.1			15° –	N – 49½' E	N 1°55' E			23°	Pr on RK
	135.3					500 634			
287+70.8		20°29'		N 14°10½' W	N 13° – W			22°	Hub
	1695.6	153°10½'	142°55'						

commenced 315+77.0
1-11-08
Wuestie
La Rue
Rogers
Hill.

Sta	Dist	Def Angle Lt	Def Angle Rt	Cal Co	Mag Co	Stadia			
	69.9					400 469			
316+54.5			14°17'	N25°25½'E	N26°05'E			24°	Hub
	77.5					440 517			
315+77.0			11°55'	N11°08½'E	N11°50'E			27°	Hub
	71.1					500 570			
315+05.9			5°22'	N 46½'W	N0°05'W			31°	=Sta 908+50
	113.3					500 612			
313+92.6		17°51'		N6°08½'W	N5°35'W			34°	Hub
	176.6					300 476			
312+16.0			21°56½'	N11°42½'E	N12°30'E			27°	Pr on RK
	89.9					400 489			
311+26.1		131°43'		N10°14'W	N9°25'W		N47°W	10°	Pr on RK 20' beyond flume
	102.4					300 402			
310+23.7		26°–		S58°31'E	S57°30'E			24°	=Sta 913–
	114.1					400 514			
309+09.6			61°49'	S32°31'E	S31°15'E		N27°E	10°	Pr on RK
	48.0					400 447			
308+61.6			25°10'	N85°40'E	N86°40'E			14°	Pr on RK
	78.3					500 577			
307+83.3		36°29'		N60°30'E	N61°30'E			16°	Hub
	83.3					500 582			
307+00.0			42°34'	S83°01'E	S82°–E			12°	Hub 1.5 Rt 916+20 (10' cut)
	96.2					400 497			
306+03.8	10° cut	233.6			N55°20'E		N28°W		
	137.4					300 338			
304+66.4			58°22'	N54°25'E	N55°–E		S25°W	9°	=Sta 918+54
	1258.0	212°03'	241°25½'						

Sta	Dist	Def Angle Lt	Def Angle Rt	Cal to	Mag to
	161.5				
329 + 77.1			23°18½'	S 5°15' W	S 6° W
	35.5				
329 + 41.6			12°50½'	S 18°03½' E	S 17°10' E
	123.2				
328 + 18.4			10°25'	S 30°54' E	S 29°50' E
	69.9				
327 + 48.5			14°51½'	S 41°19' E	S 40°35' E
	194.4				
325 + 54.1			28°37½'	S 56°10½' E	S 55°15' E
	87.3				
324 + 66.8			24°17'	S 74°48' E	S 74°03' E
	61.2				
324 + 05.6		34°36½'		N 70°55' E	N 71°35' E
	180.5				
322 + 25.1		36°21½'		S 74°28½' E	S 73°55' E
	209.3				
320 + 15.8			15°52½'	S 38°07' E	S 37°25' E
	41.8				
319 + 74.0			57°46½'	S 53°59½' E	S 53°15' E
	53.2				
319 + 20.8			17°06'	N 68°14' E	N 69° E
	102.3				
318 + 18.5			13°13½'	N 51°08' E	N 51°55' E
	94.1				
317 + 24.4			12°29'	N 37°54½' E	N 38°35' E
	1414.2	70°58'	230°47½'		

Stadia



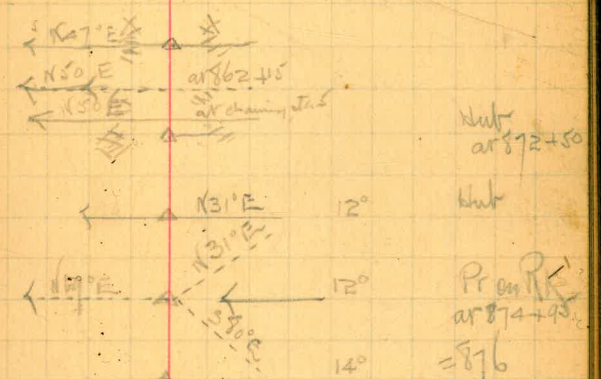
Sta	Dist	Def angle LT	Def angle RT	Cal Co	Mag Co	Stadia			
	55.4					500 555			
342 + 52.9			29°31'	S57°22'E	S56°30'E		← N47°E	22°	Hub
	86.7					500 586			
341 + 66.2		104°23'		S86°53'E	S86°20'E		← N67°E	20°	Hub
							← S78°E	30°	
	204.3					400 604			
339 + 61.9			22°57'	S17°30'W	S18°25'W		110°	22°	= 883 + 50
	50.2					600 649			
339 + 11.7			9°50'	S5°27'E	S4°25'E			24°	= 884
	99.9					400 499			
338 + 11.8			21°39'	S15°17'E	S14°25'E			24°	= 885
	49.9					500 549			
337 + 61.9			17°48'	S36°56'E	S36°-E			27°	= 885 + 50
	41.8					600 641			
337 + 20.1		61°45'		S54°44'E	S53°55'E		← N63°E	25°	Hub
	144.5					500 643			
335 + 75.6			4°55'	S7°01'W	S8°-W			27°	Hub
	72.9					400 472			
335 + 02.7			15°45½'	S2°06'W	S3°-W			23°	Hub
	88.4					400 488			
334 + 14.3			12°25'	S13°39½'E	S12°50'E			23°	Hub
	154.5					400 554			
332 + 59.8			17°23½'	S26°04½'E	S25°-E			23°	Hub
	50.0					400 449			
332 + 09.8			16°58½'	S43°28'E	S42°25'E			25°	Hub
	71.2					500 570			
331 + 38.6		65°41½'		S60°26½'E	S59°35'E		← N68°E	15°	Hub
	1169.7	231°49½'	169°12½'						

Sta	Dist	Def Angle	Cal Co	Mag Co
	60.1			
371 + 28.3			17°54'	S 13°21'W	S 14°55'W
	34.8			
370 + 93.5			19°37'	S 4°33'E	S 3°00'E
	57.4			
370 + 361			18°00½'	S 24°10'E	S 22°30'E
	96.5			
369 + 396			12°52'	S 42°10½'E	S 40°20'E
	524.8			
364 + 148				
	44.6			
363 + 702					S 53°40'E
	1381.3			
349 + 889			22°31'	S 55°02½'E	S 53°15'E
	108.3			
348 + 806			7°17'	S 77°33½'E	S 76°25'E
	1343			
347 + 463		111°10'		S 84°56½'E	S 83°45'E
	95.9			
346 + 504			30°40½'	S 26°19½'W	S 27°30'W
	49.9			
346 + 005			7°17'	S 4°30'E	S 3°30'E
	168.0			
344 + 325			18°32'	S 11°47'E	S 11°-E
	124.2			
343 + 083			27°03'	S 30°19'E	S 29°30'E
	2880.1	111°10'	181°53'		

Commenced 349 + 889
1-13-08
measured Sa Run
Hill 1-15-08

(Pr 369 + 39.6)

Stadia		
500 559		
	26°	Hub ar 851
300 334		
	28°	Hub
300 357		
	29°	Hub
300 526		
	39°	Hub 0.5' Pr + 882.88
(9) △		
(8) △		
400 588		Hub ar 872 + 50
	12°	Hub
400 534		
	12°	Pr on Rk ar 874 + 95
500 595		
	14°	= 876
500 549		
	15°	= 876 + 50
400 567		
	22°	Hub
500 623		
	19°	Hub



Sta	Dist	Distance Lt	Distance Rt	Cal. to	Mag. to
	57.5				
382+62.5		91°24'		N6°37'W	N4°55'W
	101.6				
381+60.9			36°27'	N84°47'E	N86°10'E
	141.8				
380+19.1			11°32'	N48°20'E	N49°45'E
	108.9				
379+10.2		42°52'		N36°48'E	N38°25'E
	63.7				
378+46.5			14°00½'	N79°40'E	N81°05'E
	57.5				
377+89.0			20°16'	N65°39½'E	N67°05'E
	143.3				
376+45.7		112°04½'		N45°23½'E	N46°50'E
	85.8				
375+59.9		61°01½'		S22°32'E	S21°E
	36.7				
375+23.2			22°35'	S38°29½'W	S40°00'W
	69.0				
374+54.2		32°37'		S15°54½'W	S17°40'W
	118.1				
373+36.1			19°01'	S48°31½'W	S49°55'W
	36.7				
372+99.4			6°31'	S29°30½'W	S31°05'W
	111.0				
371+88.4			9°38½'	S22°59½'W	S24°30'W
	1131.6	339°59'	140°01'		

Stadia			
200257			
	N45°W	24°	Pr on Rk at 839+40
500601			
		29°	Hub
130271			
		27°	Hub
500608			
	N27°W	24°	Pr on Rk
500563			
		34°	Pr on Rk
0.00057			
	N29°W	38°	Pr on Rk
400543			
	N45°W	33°	Hub at 845+87
500585	N79°E 50 25 Wt Branch Dycam + Canon		
	S17°E	22°	Pr on Rk at 846+72
400536			
		25°	Pr on Rk
100169			
		34°	Hub
500617			
		28°	Hub
500536			
		31°	Hub
300410			
		26°	Hub

23.

Sta	Dist	Rt angle Lt	Rt	Cal to.	Mag to.
401 + 12.6					
	607.6				
395 + 05.0			7°03'	S24°25½'E	S23°-E
	35.4				
394 + 69.6			27°08'	S31°28½'E	S30°-E
	65.9				
394 + 03.7			39°19½'	S58°36½'E	S57°-E
	14.5				
392 + 62.2			23°21'	N82°04'E	N84°-E
	169.7				
390 + 92.5		17°50'		N58°43'E	N59°50'E
	97.0				
389 + 95.5			21°06'	N76°33'E	N78°-E
	47.4				
389 + 48.1			18°46½'	N55°27'E	
	39.7				
389 + 08.4			25°37'	N36°40½'E	N38°-E
	193.1				
387 + 15.3		110°06'		N11°03½'E	N12°30'E
	110.1				
386 + 05.2			53°37'	S58°50½'E	S57°-E
	184.5				
384 + 20.7			23°45'	N67°32½'E	N69°10'E
	59.2				
383 + 61.5			38°23'	N43°47½'E	N45°25'E
	41.5				
383 + 20.0			12°01½'	N5°24½'E	N7°-E
	1185.0	127°56'	290°07½'		

Commenced 394 + 69.6
1-16-'08
Wenatchee
Sno Pine
Hill

Stadia

600 634	26°	E N 8 27 + 05
500 56	17°	Pt on Rk
400 541	19°	Hub
400 469	31°	Hub
400 446	27°	Hub
400 447	26°	Hub
300 339	25°	Hub
400 572	25°	Hub
400 510	30°	Hub 91 + 23 + 92
300 484	22°	Hub
300 389	23°	Pt on Rk
300 341	26°	Pt on Rk
	29°	Pt on Rk

N4°W 150

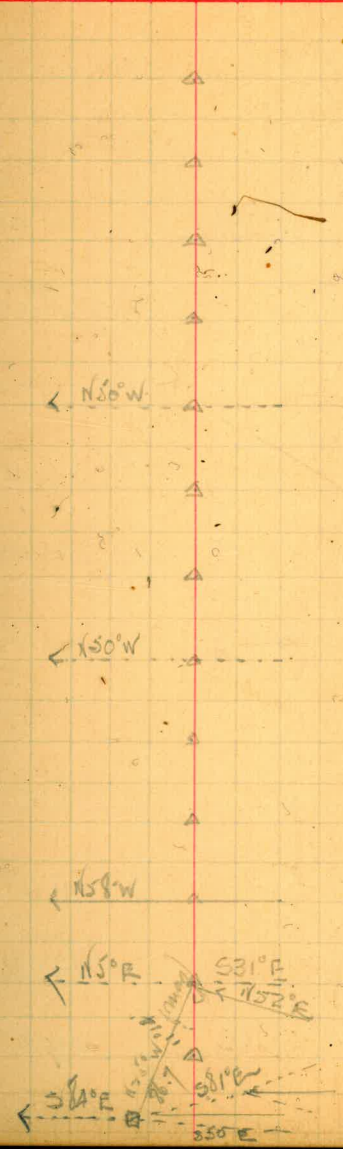
70°03½'
140°06½'
140°03½'
3½'

N67°W

N16°W

Commenced 407 + 41.8
1-17-'08.
Wireless
Sabine
Hill

Sta	Dist.	Def Angle Lt	Def Angle Rt	Cal Co	Mag Co	Stadia			
	107.6					400 507			
417 + 50.4			19°33'	N70°47'E	N72°30'E			33°	Pr on Pk
	39.6					300 339			
417 + 10.8			13°42'	N51°15'E	N53°1'E			32°	Hub
	62.8					500 562			
416 + 48.0			17°51'	N37°35'E	N39°10'E			32°	Hub
	70.7					500 570			
415 + 77.3			15°41'	N19°44'E	N21°35'E			31°	Hub ar 806
	43.1					500 543			
415 + 34.2		70°08½		N4°03'E	N5°45'E		N50°W	33°	Hub ar 806+43
	220.2					300 520			
413 + 14.0			23°45'	N74°11½'E	N76°25'E			36°	Pr on Pk
	214.7					400 614			
410 + 99.3			55°57'	N50°26½'E	N51°05'E			28°	Hub
	40.1					400 440			
410 + 59.2		99°35		N5°36½'W	N6°05'W		N50°W	26°	Pr on Pk
	67.5					400 467			
409 + 91.7			33°41'	S85°58½'E	S85°15'E			32°	Pr on Pk
	90.3					200 790			
409 + 01.4			5°22½'	N60°20½'E	N60°45'E			34°	Hub
	88.9					400 488			
408 + 12.5			17°35'	N54°58'E	N55°30'E		N58°W	31°	Hub
	70.7					500 570			
407 + 41.8		105°07½		N37°23'E	N38°30'E		N5°E	36°	Pr on Pk
	83.8					500 583			
406 + 58.0		13°04'		S37°29½'E	S36°15'E			23°	Hub
	545.4								
	1745.4	287°55'	203°07½						=815+40



Sta	Dist	Def angle L	Def angle R	Cal to	Mag to
	79.8				
433+10.8			58°03'	S 74°53½'E	S 73°-E
	241.2				
430+69.6			27°32	N 47°03½'E	N 48°45'E
	143.7				
429+25.9		74°19½'		N 19°31½'E	N 21°15'E
	174.7				
427+51.2			14°22½'	S 86°09' E	S 84°35'E
	55.0				
426+96.2			19°58'	N 79°27½'E	N 81°15'E
	109.8				
425+86.4			19°38'	N 59°30½'E	N 61°15'E
	49.6				
425+36.8			23°18'	N 39°52½'E	N 41°30'E
	189.5				
423+47.3		81°18'		N 16°34½'E	N 18°30'E
	169.3				
421+78.0			16°11'	S 82°07½'E	S 80°20'E
	36.3				
421+41.7			31°30½'	N 51°41½'E	N 53°30'E
	168.1				
419+73.6			17°26'	N 50°11' E	N 52°-E
	43.1				
419+30.5			20°04½'	N 32°45' E	N 34°30'E
	72.5				
418+58.0		58°06½'		N 12°40½'E	N 14°30'E
	1532.6	213°44'	248°03½'		

Commenced 429+25.9
1-18-08
Outside
Star Pine
Hill.

Stadia			
100 179			
	← N 2°W	19°	Pr on Pk
200 442			
	← N 53°W	25°	Pr on Pk
200 343			
	← N 60°W 30'	35°	Hub
010 185			
		29°	Hub
400 858			
		29°	Hub
100 710			
		29°	Hub
500 549			
		28°	Pr on Pk
400 589			
	← N 43°W 30'		Pr on Respondent Pk Cliff
000 169			
		29°	Pr on Pk
300 736			
		29°	Hub
200 368			
		33°	Pr on Pk
300 382			
		34°	Pr on Pk
300 372			
	← N 44°W	32°	Hub

Sta	Dist	Def angle Lt	Def angle Rt	Calc Co	Mag Co	Stadia			
	49.7					400 449			
448 + 97.0			13°32½'	N14°07'W	N12°05'W			28°	= Sta 772
	70.8					400 470			
448 + 26.2			14°45½'	N27°39½'W	N26°W			29°	Hub
	51.5					300 351			
447 + 74.7			16°09'	N42°25'W	N40°45'W			29°	Pr on Rk
	42.6					400 442			
447 + 32.1			19°55'	N58°34'W	N56°55'W			28°	Pr on Rk
	55.6					200 255			
446 + 76.5			21°12½'	N78°29'W	N77°W			30°	Pr on Rk
	49.7					600 649			
446 + 26.8		93°39½'		S80°18½'W	S81°40'W		← S50°W	32°	Pr on Rk
	153.4					100 252			
444 + 73.4			23°46'	N6°02'W	N4°30'W		← S76°W 100'	33°	Hub
	334.4					200 533			
441 + 39.0		131°20'		N29°48'W	N28°10'W		← N57°W 55'	30° 11°	Hub
	353.1					100 454			
437 + 85.9			18°36'	S78°28'E	S77°E			38°	Pr on Rk
	67.8					300 367			
437 + 18.1			16°13½'	N82°56'E	N84°40'E			37°	Hub
	140.8					000 140			
435 + 77.3		67°32'		N66°42½'E	N68°15'E		← N18°E	29°	Hub
	130.5					400 530			
434 + 46.8			13°16'	S45°45½'E	S43°50'E			25°	Hub at 786+97
	56.2					400 455			
433 + 90.6			15°52'	S59°01½'E	S57°E			24°	Pr on Rk at 787+53
	1556.1	292°31½'	173°18'						

Sta	Dist	Det angle Lt	Det angle Rt	Cal to	Mag to
	71.5				
461 + 15.6			23°36½'	N12° 26'E	N14°E
	35.5				
460 + 80.1			14°25'	N11°02½'W	N9°30'W
	123.6				
459 + 56.5		59°40'		N25°35½'W	N24°W
	85.7				
458 + 70.8			20°04'	N34°04½'E	N35°55'E
	68.3				
458+02.5			24°31	N14°00½'E	N15°45'E
	171.5				
456 +31.0			31°46½'	N10°30½'W	N11°05'W
	28.0				
456+03.0		112°05½'		N42°17'W	N40°35'W
	171.15				
454+31.9			31°03½'	N69°48½'E	N71°25'E
	40.3				
453+91.6			4°25'	N38°45'E	N40°15'
	55.3				
453 +36.3			21°17'	N34°20'E	N35°30'E
	135.6				
452 +00.7		36°54½'		N13°03'E	N14°30'E
	215.1				
449 + 85.6			40°47½'	N49°57½'E	N51°50'E
	38.9				
449 +46.7			23°17'	N9°10'E	N10°55'E
	1240.4	208°40	235°13		

Commenced 458+02.5 1-31-08.

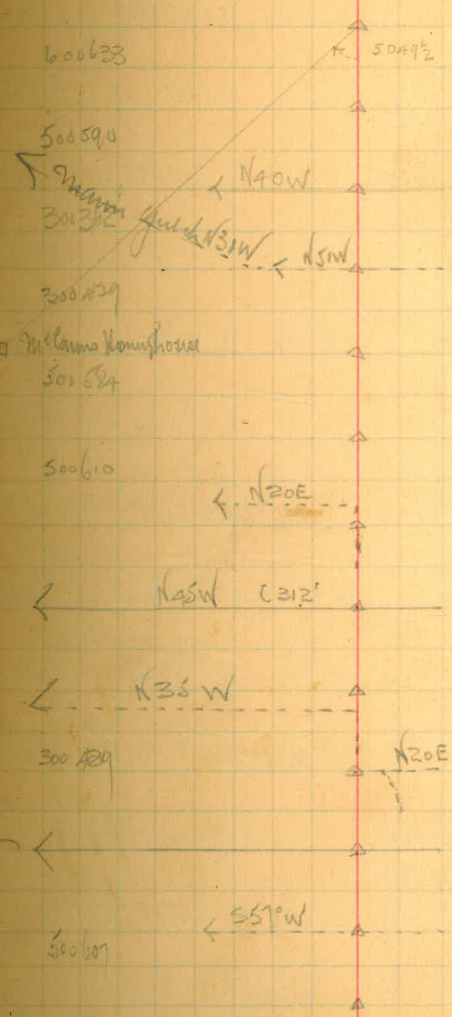
Stadia				
100 170				
500 535			34°	Hub
400 523			34°	Hub
200 385	← N86°W		36°	Hub
300 358			32°	Pr on Pk
400 571			32°	Pr on Pk
600 607			35°	Pr on Pk
400 571	← N48°W	N62W	30°	Pr on Pk
600 639			31°	Hub
500 555			31°	Sta 767
400 535			32°	Hub
300 515			34°	Hub
600 638			27°	Hub
			28°	Sta 771+50

Commenced sta 462+95
2-1-'08.
477+25.4
2-5-'08.

Sta	Dist	Det angle L+	Det angle R+	Cal to	Mag to	Stadia		
	118.1					100218		
480+43.3			35°42½	S59 13½E	S57°E		17°	Hub
	34.2					600633		
480+09.1			2233	N 8504E	N 85°30E		17°	Hub
	91.2					500590		
479+17.9			3702	N6231E	N6255E		18°	Hub
	62.4					300362		
478+55.5		4811½		N2529E	N2605E		24°	Hub
	130.1					300439		
477+25.4			23°58½'	N7340½E	N74°E	McCarmo Homesphouse	25°	=743+50
	85.2					500584		
476+40.2			5°05½	N49°42'E	N49°45'E		23°	Hub
	110.8					500610		
475+29.4		2°15½'		N4436½E	N4625E		22°	=Sta 745+50
	187.8							
△(2)								
	272.2							
470+69.4			32°50'	N46°52E	N47°30E		10°	=Sta 750+15
	139.8							
469+29.6		21°49'		N1402E	N15°E	300439		
	452.3							at 751+64.5
△(4)								
	182.3							
462+95.0			15°03'	N35°51'E	N37°30'E		47°	=Sta 758
	107.9					500607		
461+87.1			8°22'	N20°48'E	N22°30'E		35°	Hub
	1974.3	7216	18036½					

Tunnel #18

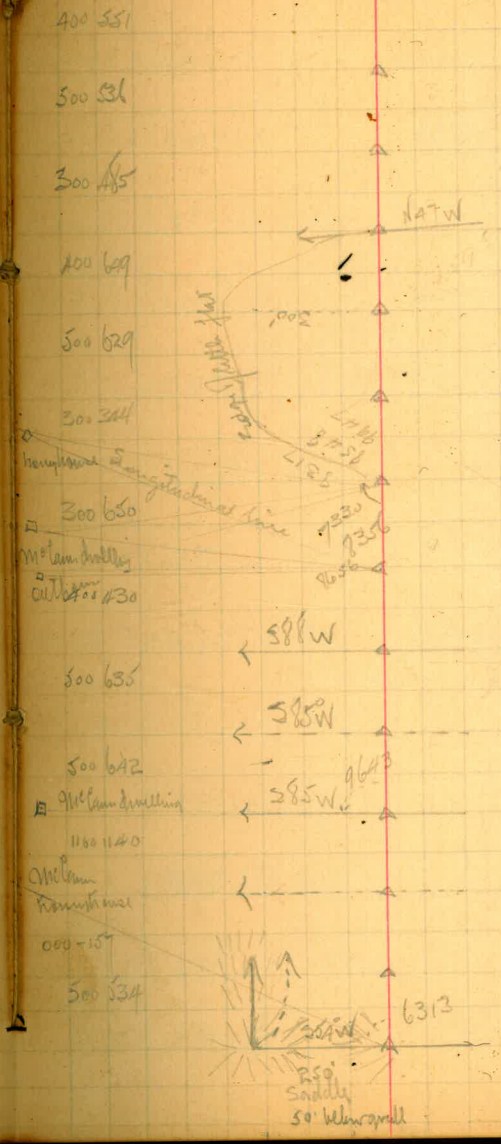
30 cut



Sta	Dist	Def angle L+	Def angle R+	Cal Co	Mag Co	Stadia			
	46.0					200 245			
493+48.3			34°34½'	N 34°59½' W	N 33° W			20°	Pr on Rk
	47.1					600 646			
493+01.2			10°51½'	N 69°34' W	N 67°30' W			12°	Pr on Rk
	155.0					100 255			
497+46.2		110°27'		N 80°25½' W	N 79° W		S62W	29°	Pr on Rk 10' above grade
	124.0					200 324			
490+22.2			18°53'	N 30°01½' E	N 30°55' E			29°	= Sta 730
	35.9					600 635			
489+86.3			26°15'	N 11°08½' E	N 11°30' E		S75W	31°	Hub
	33.9					500 533			
489+52.4			28°01'	N 15°06½' W	N 15° W			31°	Hub
	87.7					500 587			
488+64.7		101°57'		N 43°07½' W	N 42°15' W		N87°W	25°	Pr on Bis Rk above grade
	219.2					300 570			
486+45.5			50°26½'	N 58°49½' E	N 58°30' E			25°	Pr on Rk
	84.6					000 683			
485+60.9			15°01'	N 8°23' E	N 8°30' E			30°	= Sta 734+50
	49.9					600 649			
485+11.0			18°08½'	N 6°38' W	N 6°30' W		S77W	28°	= Sta 735
	211.5					300 511			
482+99.5		48°09½'		N 24°46½' W	N 24°30' W		N72W	21°	Hub
	31.8					600 631			
482+67.7			21°27½'	N 23°23' E	N 23° E			30°	= Sta 737+65
	106.3					500 606			
481+61.4		118°51' L+		N 1°55½' E	N 3°30' E		N27W	13°	Pr on Rk
	1232.9	379°24½'	223°38½'						

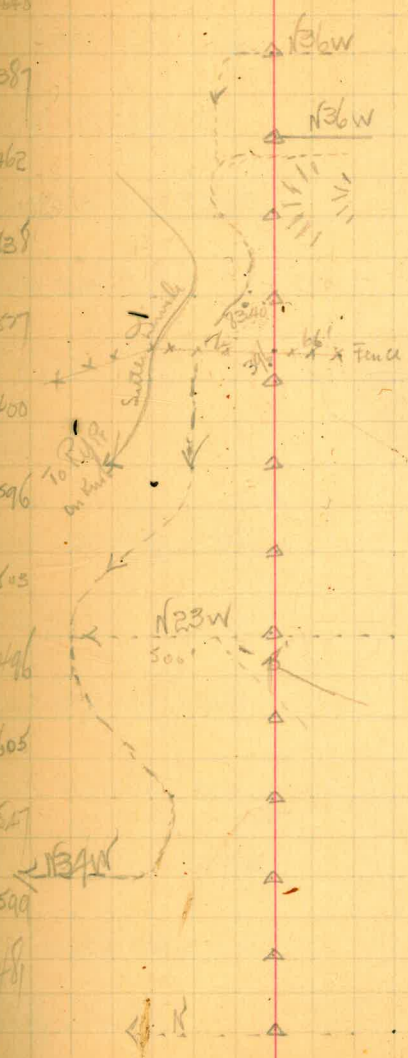
Commenced Sta 499+38
2-6-'08.
Wheeler
Sa Rue
Hill

Sta	Dist	Defange Lt	Defange Rt	Cal Co	Mag Co	Stadia			
	150.8					400 551			
509+344			1320	S41°08'E	S38°25'E			26°	Pr on RR
	36.1					500 536			
508+983			19°17'	S54°28'E	S51°35'E			27	Hub
	185.2					300 485			
507+131			70°34'	S73°45'E	S70°50'E		N47W	15°	Hub
	249.1					400 649			
504+640		36°28'		N35°41'E	N38°30'E			23°	= Sta 715+50
	129.8					500 629			
503+342			19°03½'	N72°09'E	N75°5'E			18°	Pr on RR
	44.3					300 344			
502+899			42°17½'	N53°05½'E	N56°-E			20°	Pr on RR
	351.9					300 650			
499+380			18°33'	N10°48'E	N12°25'E	McCann dwelling		32°	Pr on RR
	30.3					400 430			
499+07.7			22°18'	N7°45'W	N7°-W		S88W	32°	Hub
	136.3					500 635			
497+71.4		60°52'		N30°03'W	N28°10'W		S85W	36°	Hub
	143.2					500 642			
496+282			68°00½'	N30°49'E	N31°-E	McCann dwelling	S85W 9643	20°	= Sta 724
	40.7					1160 1140			
495+875		56°55'		N37°11½'W	N36°-W	McCann homeplace		16°	Pr on RR 5' above grade
	158.2					000-157			
494+293			11°06'	N19°43½'E	N20°55'E			15°	= Sta 726
	35.0					500 534			
493+943			43°37'	N8°37½'E	N10°-E		S54W 6313	15°	Pr on RR
	1690.9	154.15	328°06½'						



Commenced 525+12.7
2-7-08

Sta	Dist	Def angle LT	Def angle Rt	Cal Co	Mag Co	Stadia
	248.3					200 448
533+262		125°40'		N28°40'W	N26°10'W	
	87.8					300 387
532+384		183°8'		S83°00'E	S81°10'E	
	262.1					200 462
529+763			192°7½'	S64°22'E	S62°05'E	
	237.0					200 438
527+393		23°59'		S83°49½'E	S81°30'E	
	226.6					300 577
525+127			59°49'	S59°50½'E	S57°40'E	
	99.9					300 400
524+128			59°43½'	N60°20½'E	N63°-E	
	96.1					500 596
523+167			8°12'	N0°37'E	N2°35'E	
	302.6					200 503
520+141		145°23'		N7°35'W	N5°30'W	
	295.9					200 496
517+182			7°04'	S42°12'E	S39°50'E	
	204.5					400 605
515+137			47°16½'	S49°16'E	S46°50'E	
	47.6					500 547
514+661			5°35½'	N83°27½'E	N86°-E	
	299.1					300 599
511+670			42°57'	N77°52'E	N80°30'E	
	81.8					400 481
510+852		103°57'		N34°55'E	N37°30'E	
	248.93	417.37	250.05			



4°	Pr on Rt
8°	Sta 687 (Flume begin)
19°	hub
21°	hub
17°	Sta 694+50
16°	Sta 695+50
16°	Pr on Rt
17°	Pr on Rt
21°	Sta 702+50
20°	Pr on Rt
20°	Pr on Rt
25°	hub
32°	Sta 709

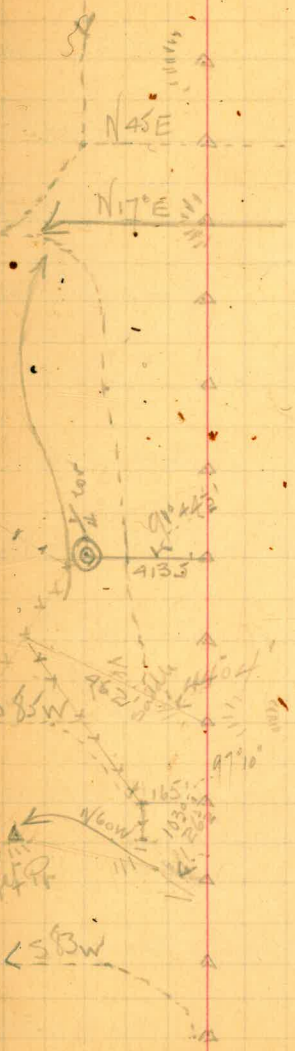
611+50 – 612+50 N 70 19 W

Sta	Dist	Deflangle Lt	Deflangle Rt	Cal to	Mag to
	99.8				
562+46.8			44°43'	S 32°55 E	S 30°10' E
	227.4				
560+19.4		45°16'		S 77°38 E	S 75°00 E
	340.9				
556+78.5			56°28'	S 32°21½ E	S 29°35 E
	396.6				
552+81.9		7°30'		S 88°47½ E	S 86°05' E
	294.4				
549+87.5		20°12½		S 81°19½ E	S 78°30' E
	100.0				
548+87.5			18°55'	S 61°07 E	S 58°25 E
	74.3				
548+13.2			25°56'	S 80°02 E	S 77°25' E
	110.4				
547+02.8			34°35'	N 74°02 E	N 77° E
	28.4				
546+74.4			50°53'	N 39°27 E	N 42° E
	624.0				
540+50.4		27°59'		N 11°26 W	N 9°35 W
	99.5				
539+50.9			43°11½'	N 16°33 E	N 18°30 E
	50.1				
539+00.8			30°06½'	N 26°31½ W	N 24°35 W
	326.3				
535+74.5		28°05''		N 56°45 W	N 54°55 W
	2771.6	129°03'	304°48'		

Commenced 560+19.4
2-8-08.

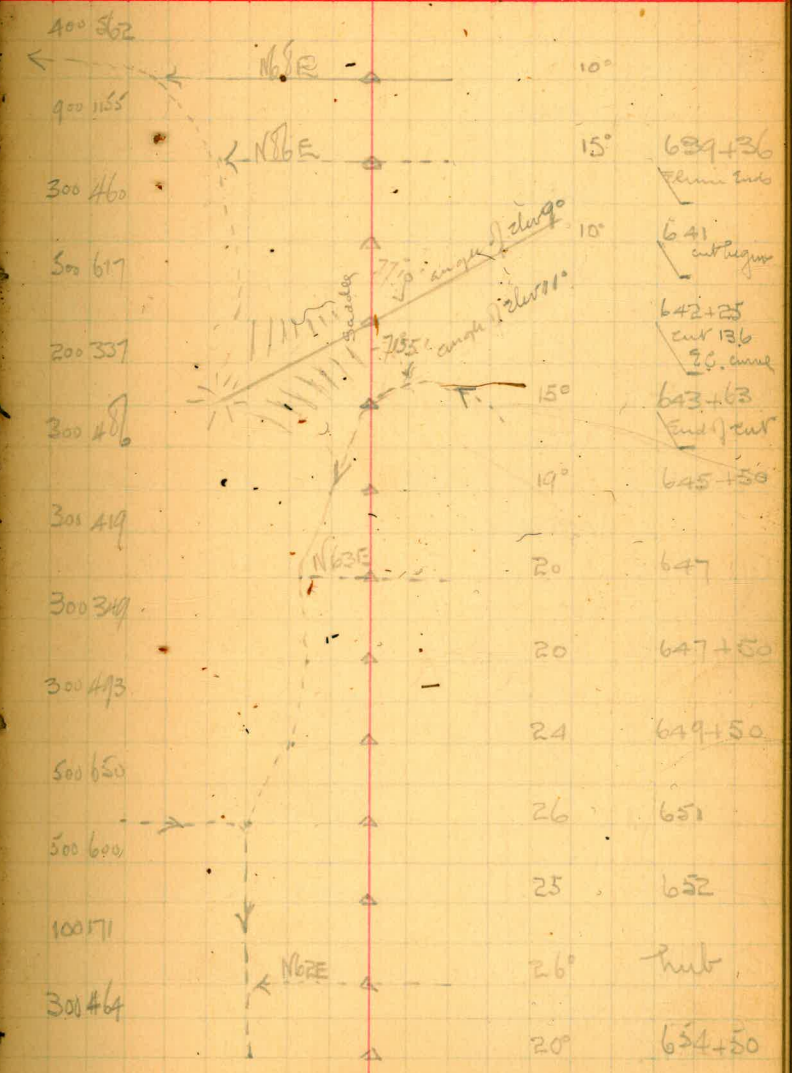
Station

500 599
300 527
700 1040
N 5 W
600 10.00
200 445
500 599
800 278
500 610
600 628
S 85 W
500 1127
500 599
500 550
47 0.30
(Zero)



19° ~~Pr 565+50~~
24° Pub
16° Pr on PK
25° = Sta 665+50
25° = Sta 668+50
21 = Sta 669+50
18° Pr on PK
13° Pub
23° Pub
14° Sta 678
9° Sta 679
11° = Sta 679+50
14° = Sta 683

Sta	Dist	Def angle Lt	Def angle Rt	Cal Co	Mag Co
	162.7				
580 + 50.0			50°16'	S1°39½'W	S3°-W
	255.3				
577 + 94.7		8247½		S4836½E	S4635E
	160.3				
576 + 34.4			5927½	S3411W	S3640W
	117.0				
575 + 17.4			2701½	S2516½E	S2255E
	136.0				
573 + 81.4		27°36		S52°18'E	S4950E
	186.3				
571 + 95.1			2446	S24°42'E	S2225E
	119.4				
570 + 75.7		4520½		S49°28'E	S46°50'E
	50.0				
570 + 25.7			2429½	S4°07½'E	S1°30'E
	193.4				
568 + 32.3			344½	S28°37'E	S26-E
	149.6				
566 + 82.7			1457½	S3221½E	S2935E
	100.2				
565 + 82.5			2146	S4719E	S4430E
	71.4				
565 + 11.1		5706		S69°05'E	S6625E
	165.0				
563 + 46.1			20°56'	S1159E	S9 25E
	1866.6	21250	24724½		



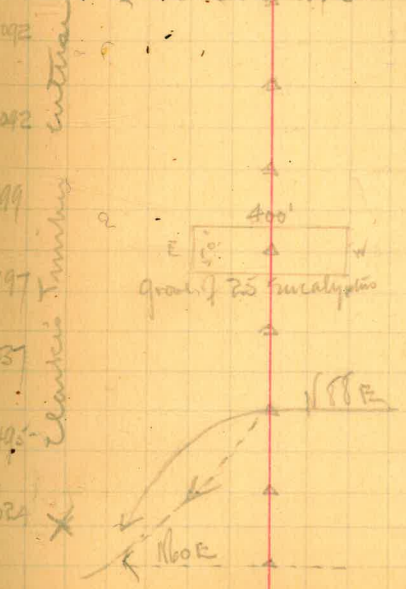
Sta	Dist	Deflangle W	Deflangle R	Calc	Magic
603+448			12°	S71°48½E	S68°45E
	149.4				
601+954			29°24	S73°16½E	S70°35E
	245.0				
599+509		79°33		N77°19½E	N79°55E
	99.0				
598+514			10°10½	S23°07½E	S20°—E
	145.9				
597+055			45°10	S33°18E	S31°—E
	102.2				
596+033		97°28½		S78°28E	S77°10E
	492.4				
591+109			51°10½	S90°02½W	S101°0W
	142.7				
589+682		38°43		S42°10E	S40°45E
	100.0				
588+682		63°09		S3°27E	S2°—E
	98.1				
587+701			29°44½	S59°42W	S60°35W
	137.1				
586+330			64°30	S29°57½W	S31°30W
	295.3				
583+377			27°44	S34°32½E	S32°10E
	125.0				
582+127		63°56		S62°16½E	S60°15E
	66.3				
	2132.1	332°49½	289°21½		

Commencement 591+109

2-12-08

Stadia			
			611+50
400 549		7°	612+50
300 545		8°	614
400 495		5°	616+50
300 446		12°	617+50
200 301		7°	618+96
600 1092		9°	620
900 1092		7°	625+55
400 499		5°	627
100 197		6°	628
300 437		6°	629
200 492		5°	630+50
500 624		10°	633+50
		18°	

Cut 0.8



Clarence Tunnel entrance

35.

Sta	Dist	Det Lt	angle Rt	Cal to	Mag to	Stadia

Synopsis of Azimuth Corrections.

Bearings of Jamul Ranch Line — True

All work west of △3 Tunnel 5 requires	an azimuth correction of	+ 1°46'
Traverse of Tunnel 5 "	" " " "	+ 1°51'
△3 Top of Tunnel #5 — Sta 141+19.3 "	" " " "	+ 1°51'
Sta 141+19.3 — 154+00.4 "	" " " "	+ 1°53'
Sta 154+00.4 — 167+57.5 "	" " " "	+ 1°55"
Sta 167+57.5 — 184+19.9 "	" " " "	+ 1°54'
Sta 184+19.9 — 194+56.1 "	" " " "	+ 1°57'
Sta 195+40.3 — 204+02.2 "	" " " "	+ 0°08'
Sta 204+02.2 — 215+44.4 "	" " " "	+ 0°10'
Sta 215+44.4 — 231+67.7 "	" " " "	+ 0°12'
Sta 231+67.7 — 265+77.0 "	" " " "	+ 0°12
Sta 265+77.0 — 276+11.0 "	" " " "	+ 0°14'
Sta 276+11.0 — 306+83.8 "	" " " "	+ 0°17'

Sta 306+03.8 — 319+74.0	requires	an azimuth correction of	+ 0°19'
Sta 319+74.0 — 328+18.4	"	" " " "	+ 0°21'
Sta 328+18.4 — 363+70.2	"	" " " "	+ 0°25'
Sta 363+70.2 — 381+60.9	"	" " " "	+ 0°31'
Sta 381+60.9 — 389+08.4	"	" " " "	+ 0°33'
Sta 389+08.4 — 415+34.0	"	" " " "	+ 0°34'
Sta 415+34.0 — 425+36.8	"	" " " "	+ 0°36'
Sta 425+36.8 — 453+36.3	"	" " " "	+ 0°39'
Sta 453+36.3 — 502+89.9	"	" " " "	+ 0°36'
Sta 502+89.9 — 603+44.8 (612+50)	"	" " " "	+ 0°38'

L+	R+	Cal Co
	77 24½	N 1 27 7/24 W
8800 3/4		N 7 851 19/24 W
2535 1/4		N 908 23/24 E
2406 3/4		N 3 449 5/24 E
3315		N 5850 23/24 E
3757 2/3		S 8 754 1/2 E
	4°26 3/8	S 49°56 3/4 E
		S 5423 E
~	# ~	
	5°50 1/2	N 1°25' W (N 1°23' W)
132°52½'		N 7°15½' W
27°07'		S 54°23' E
		S 27°16' E

= Meridian Line at Mt Clare Camp

= Ref Pr on Knob on Tunnel # 2 Ridge

= Ref Pr on Kellum Hill

= Co Tunnel # 5 – Knob above Happy Valley Camp

~ # ~

= W elongation polaris Happy Valley Camp

= Ref Pr on Knob above Happy Valley Camp

= Co of Tunnel # 5 (True)

angle checks

Sta	Dist	Def. Ang. Left	Def. Ang. Right	Cal. Co	Traverse Co	
0		6°24'		S 33°03'E	S 32°55'E	= Initial Co
7+35.6		7°25'		S 35°21'W		
11+43.4		2°22½'		S 42°46'W		
12+30.5		50°02½'		S 45°09½'W	S 45°15'W	= Rev Co 11+43.4 – 12+30.5
△ Top #7			36°26'	N 84°49'W		
△ Top #7		38°44½'		S 58°45'W	S 58°50½'W	= Rev. Co #7
△ (4)			6°57'	N 72°30½'W		
△ (#5)			32°14'	N 89°27½'W	N 89°23'W	= Rev Co #6
79+87.3		36°04'		S 51°18½'W		
80+54.9		10°02'		N 85°37½'W	N 85°36'W.	= Rev. Co 79+87.3 – 80+54.9
△ (#3)		45°28½'		N 74°35½'W		
					N 29°07'W	= Reverse Co #5

Angle checks continued

1-1-'08
Wuerste
SaRue
Rogers

Sta	Dist.	Def. Angle LT	Def. Angle Rt	Cal Co	Mag Co	
167 + 57.5						
166 + 46.2		48°41½'		S 54°00½' E	S 53°45' E	(S 54°04½' E)
141 + 19.3			12°19'	S 5°19' E	S 6°10' E	
131 + 42.2		38°42'		S 17°38' E	S 17°30' E	
115 + 52.0			21°54'	S 21°04' W	S 21°20' W	
ar 110 + 34.4			8°23'	S 0°54' E	S 0°50' E	
103 + 85.0			50°32½'	S 9°17' E	S 9°05' E	
△3 #5		30°42½'		S 59°49½' E S 29°07' E	S 59°40' E	=Co #5

Angle checks continued

1-20-'08
Wuestin
La Rue
Hill.

Sta	Def	Sub. Def	Co	Sub Co	Mag Co					
	45°40'L+		N 90 1½ W	(N 71 0½ W)	(N 71 5½ W)					
Ref Pr on Hill at Happy Valley Camp	34 03 L+		N 36 3 8½ E							
Pr on R K Tunnel 4	0°58'L+		N 70° 41½ E							
Pr on R K Tunnel 4	27°12'L+		N 71° 39½ E							
Pr on R K Tunnel 4	88°29'L+		S 81 0 8½ E							
		59°40'L+		S 52° 19½ E		To 231+67.7	(N 46 0 7½ E)	81°18½'L+	N 46°22'E	+14½
214+64.2		59°14½'L+		S 51°54'E		To 215+44.4	(S 52° 04½ E)			+10½
	55°31½'R+		S 7°20½'W		S 10°05'W					
		69°58'R+		S 21°47'W	S 24°30'W	To 204+02.2	(S 30°39'E)	52°17'L+	S 30°30'E	+9
Shut East side Canon		124°09½'R+		S 75°58½'W	S 78°50'W	To 184+19.9	S 25°23½'W	50°32½'L+	S 25°26'W	+2½
141+19.3	30°33'L+		S 48°11'E S 17°38'E		S 45°05'E					

Angle Checks Continued

Sta	Def	Sub Def	Co	Sub Co	Mag Co		From Traverse notes Course to Next Sta	Def. to Next Sta	Check Course to Next Sta	Azimuth Correction
433+10.8	10577 L+		N35°43½W							
	3942½ L+		N6938½E				S7453½E	3608' Rt	S7413½E	+40
		3401 L+		N7520 E		To 425+36.8	(N3952½E)	3450 L+	N4030 E	+37½
							8216 L+ to flag on #2 Ridge			
		739 L+		S7818 E		To 415+34.0	(N403E)	9705 L+	N437 E	+34
Δ5 on Tunnel 2	16°06' L+		S70°39E							
		3319 L+		S8752 E		To 394+03.7	(S5836½E)	2949 Rt	S58°02½E	+34
		2342 Rt		S7815 E		To 389+08.4	N3640½E)	6430 L+	N3715 E	+34½
		3°36' Rt		S5059 E		To 381+60.9	(N8447E)	4344 L+	N8519 E	+32
	18°41' L+		S 5433 E			Co Tunnel 3	(S5502½E)	L+	Rt	+29½
	8°19' Rt		S3552 E						5803 2733	
								7419½		
Sta 327+48.5	3656 L+	3°14½' Rt	S4411½E	S4057 E		To 328+18.4	(S41°19'E)		1433½ 1958 1938 3318	+22
		19°20' L+		S2635½E		To 319+74.0	(S5359½E)	2704½ L+	S5340 E	+19½
		21°19½ Rt		S14°04½W		To 306+03.8	(N5425E)	13921 L+	N5443½E	+18½
		2435½ Rt		S17°20W		To 276+11.0	(S41°47½'E)	5852½ L+	S4132½E	+15
Ref Prabom Happy Valley Cemetery		4338 Rt	S7°15½E	S3622½W		To 265+77.0	(N4429½E)	17140 L+	N4442½E	+13

Sta	Def	Sub Def	Co.	Sub Co		From Traverse Notes Course To Next Sta.	Def To Next Sta	Check Course To Next Sta	Azimuth Correct
		1809 L+		N1635E	To 502+899	(N5305½E)	3706 R+	N5341E	+35½
		1524 L+		N1920E	To 499+380	(N1048E)			
		6859 R+		S7617E	To 489+863	(N1108½E)	9158 L+	N1145E	+36½
		15156 R+		S640W	To 477+254	(N7340½E)	11224 L+	N 7416E	+35½
			N3444 5/24 E		= Co No 1 Ridge to Knob above McCanns.				
		2248 L+		N6918E	To Summit #1	(N3551E)	3251 L+	N 3627E	+36
		9056 R+		S7758E	To 453+363	(N3420E)	6703½ L+	N3458½E	+38½
		2931 R+		S5823E	To 447+321	(N5834W)	17932½ L+	N5755½W	+39½
			S8754E		= Co. Kellum Hill to #2 Ridge page 49				

55 check angles from Mclain meridian line

Sta	Def	Co	Sub Def	Sub Co
	41 05 R+	S 15 05½ E		
			86 35½ R+	S 30 20 W
	95 53½ R+	S 56 10½ E		
	52 12 L+	N 27 56 E		
			13 36 R+	S 86 16 E
			132 21 R+	S 32 29 W
	100 3½ R+	N 80 08 E		
	31 08 L+	N 70 04½ E		
	77 24½ L+	S 71 47½ E		
		S 1 28 E		

From Transit notes

	Course to Mer Sta	Def to Mer Sta	Check to Mer Sta	Azimuth correction
By other survey			S 70 19 E	52'
To 612+50	(S 71 48½ E)	56 05½ L+	S 71 11 E	+37½
To 575+17.4	(S 25 16½ E)	55 03 L+	S 24 38 E	+38½
To 539+50.9	(N 16 33 E)	76 33½ L+	N 17 10½ E	+37½
To 515+13.7	(S 49 16 E)	81 07 L+	S 48 38 E	+38

Topography Angles from Ref Pt.

Transit on #2 Knob Hor Angle	Vert Angle	Transit on #1 Ridge		Transit on McCan Knob	
				8711 L+	
				1502 L+	
				6648 R+	
		5748 R+			
		12512 R+			
622 L+	441 E	9304 R+			
1649 R+	850 E	10321 R+			
3827 R+	701 E			2634 L+	
3944 R+	1410 D				
15848 R+	400 D	17348 L+			
16102 R+	239 E	17043 L+			
8617 L+	431 D				
9903 L+	451 D	11525 L+			
13140 L+	500 D	16058 L+			
5633 L+	042 D	7651 L+		2902 R+	
14115 R+	839 D				
12224 R+	711 E	17201 R+			
1516 L+	655 E	3004 R+			
S8754E	page 49	N5851E	page 49	S3444W	page 49

Co 612+50 to last check angle flag
7801 L+ to Denohoe Mt.
5305 L+ to south hill back of clark's culture
2907 L+ to middle hill " " " "
2411 L+ to north hill " " " "
Co last check angle flag to sta 612+50
2852 R+ to south hill back of clarks culture
3704 R+ to middle hill " " " "
10806 R+ to north " " " "
Denohoe Mt.
End of Ridge just above #1
End of 30' cut Ridge
Head of left branch of gulley bet. #1 and 30' cut
Highest Pt on hill south of Prospect gulch
Bare yucca on Prospect gulch ridge above #1
Square Rk on Ridge above prospect gulch
Yucca on highest hill above prospect gulch
Junction of Prospect gulch with east branch Dye Crk.
Junction of canon on #3 with west branch Dye Crk
Manzanita bush on knob south of tunnel 3
Little Round little on 30' cut Ridge
Black yucca stalk at end of #2 Ridge
Ctr 1st knob north of Ref Pt on #2 Ridge
Ctr green bush on little bare hill on #1 Ridge
Saddle south of Ref Pt. on #2 Ridge
Yucca on high pt south of Ref Pt. on #2 Ridge
To Stake on Denohoe Mountain

Measurement Notes over Tunnel 1 and 30' Cut

2-1-'08.
Wrestle
Sarkee
Hill

Sta.	Dist	Chain	Vert Elev	angle Dep				
					Sta 745+50			
18781	126.34							
		129.12		12°04'		3	S. 27395 = 2.437672	S. 6160 = 1.789581
	61.47						S. cos 635 = 9.997127	S. cos 347 = 9.999053
Summit cut 31.2		61.60		3°47'		2	2.434799	1.788634
272.14	272.14						272.14	61.47
		273.95	6°35'		= Sta 750+15	1	S. 129.12 = 2.111263	
	459.95				4.65		S. cos 1204 = 9.990297	
							2.101560	
							126.34	
					at Sta 751+69.5	6	S. 58.85 = 1.769746	S. 116.10 = 2.064832
	141.25						S. cos. 3955 = 9.884783	S. cos. 2126 = 9.968877
452.29		145.91		14°31'		5	1.654529	2.033709
	311.04						45.14	108.08
Summit		314.70		8°45'		4	S. 29.41 = 1.468495	S. 314.70 = 2.497897
	29.06						S. cos 853 = 9.994759	S. cos. 845 = 9.994916
		29.41	8°53'			3	1.463254	2.492813
182.24	108.08						29.06	311.04
		116.10	21°26'			2	S. 145.91 = 2.164085	
	45.14						S. cos. 1431 = 9.985909	
		58.85	39°55'		= Sta 758	1	2.149994	
	634.57				6+35		141.25	

Measurement notes of Random

Sta | Dist | Chain | Vert. angle Elev | Dep. | |

8) △ 1153.03					= 815+40
	347.94				
7) △ 805.09		396.50		28°39'	
	134.29				
6) △ 670.80		144.32		21°29'	
	63.17				
5) △ 607.63		63.82		8°12'	S22°45'E
	29.95				
4) △ 577.68		30.32	8°58'		
	43.30				
3) △ 534.38		45.85	19°12'		
	78.03				
2 456.35		87.40	26°46'		
	456.35				
1		499.73	24°03'		= 827+03
	1153.03				11+63

Line over #2.

1-16-08
Wheeler
Sa Rue
Hill.

Log 499.73 = 2.698735
Log Cos 24°03 9.960561
2.659296
456.35

Log 87.40 = 1.941511
Log Cos 26.46 = 9.950778
1.892289
78.03

Log 45.85 = 1.661339
Log Cos 19.12 = 9.975145
1.636484
43.30

Log 30.32 = 1.481729
Log Cos 8.58 = 9.994660
1.476389
29.95

Log 63.82 = 1.804957
Log Cos 8.12 = 9.995537
1.800494
63.17

Log 144.32 = 2.159326
Log Cos 21°29' = 9.968728
2.128054
134.29

S 396.50 = 2.598243
S Cos 28.39 = 9.943279
2.541522
347.94

815+40

Measurement Notes over #3

Sta	Dist	Chain	Vert. angle Elev	Vert. angle Dep	
12					= 852+88
	370.23				
11		397.20		21°14'	
	116.30				
10		132.52		28°39'	
524.84	38.31				
(9) △		41.00		20°52'	
44.55	44.55				
(8) △		44.59		2°19'	
	26.54				
7		26.70	6°11'		
	71.97				
6		75.75	18°11'		
	492.72				
5		494.39	4°43'		
	189.85				
4		190.39	4°18'		
	92.11				
3		92.85	7°15'		
	99.12				
2		100.88	10°43'		
1381.34	409.03				
1		424.15	15°22'		= 872+50
					1962.0
	1950.73				

1-13-'08
Measure Sunken Hill

S. 424.15 = 2.627569
S. cos. 15°22' = 9.984190
2.611759
409.03

S. 100.88 = 2.003807
S. cos. 10°43' = 9.992359
1.996166
99.12

S. 92.85 = 1.967782
S. cos. 7°15' = 9.996514
1.964296
92.11

S. 190.39 = 2.279644
S. cos. 4°18' = 9.998776
2.278420
189.85

S. 494.39 = 2.694070
S. cos. 4°43' = 9.998527
2.692597
492.72

S. 75.75 = 1.879383
S. cos 18°11' = 9.977752
1.857135
71.97

S. 26.70 = 1.426511
S. cos. 6°11' = 9.997466
1.423977
26.54

S. 44.59 = 1.649237
S. cos. 2°19' = 9.999645
1.648882
44.55

S. 41.00 = 1.612784
S. cos. 20°52' = 9.970538
1.583322
38.31

S. 132.52 = 2.122292
S. cos. 28°39' = 9.943279
2.065561
116.30

S. 397.20 = 2.599009
S. cos. 21°14' = 9.969469
2.568478
370.23

= 349 + 889
(872+50)

Measurement notes over #4

Sta	Dist	Chain	Vert. Angle Elev.	Vert. Angle Dep.	
11					= Sta 973 + 29
	31.79				
10		35.30		25°44	
	432.09				
9		497.19		29°39'	
	278.90				
8		287.37		13°57'	
	137.82				
7		151.96		24°55'	
6 987.05	106.45				
		107.39		7°35'	
	47.19				
5		47.19	0°31'		
	211.47				
4		212.79	6°23		
	101.19				
3		103.00	10°46'		
	105.08				
2		124.85	32°41'		
	426.47				
1		499.91	31°27'		
	18.34				
0 909.74		23.75	39°27'		= Sta 992 + 42
	1896.79				

1-8-'08
Wuester
Sa Rue
Rogers
Hill

S. 23.75 =	1.375664	S. 499.91 =	2.698892
S. Cos 39°27' =	9.887718	S. Cos. 31°27' =	9.930998
	1.263382		2.629890
18.34		426.47	
S. 124.85 =	2.096390	S. 103.00 =	2.012837
S. Cos. 32°41' =	9.925141	S. Cos. 10°46' =	9.992287
	2.021531		2.005124
105.08		101.19	
S. 212.79 =	2.327951	S. 47.19 =	1.673850
S. Cos. 6°23' =	9.997299	S. Cos. 0°31' =	9.999982
	2.325250		1.673832
211.47		47.19	
S. 107.39 =	2.030964	S. 151.96 =	2.181730
S. Cos. 7°35' =	9.996185	S. Cos. 24°55' =	9.957570
	2.027149		2.139300
106.45		137.82	
S. 287.37 =	2.458442	S. 497.19 =	2.696522
S. Cos. 13°57' =	9.986998	S. Cos. 29°39' =	9.939052
	2.445440		2.635574
278.90		432.09	
S. 35.30 =	1.547775		
S. Cos. 25°44' =	9.954640		
	1.502415		
31.79			

Tying to RJ #4.

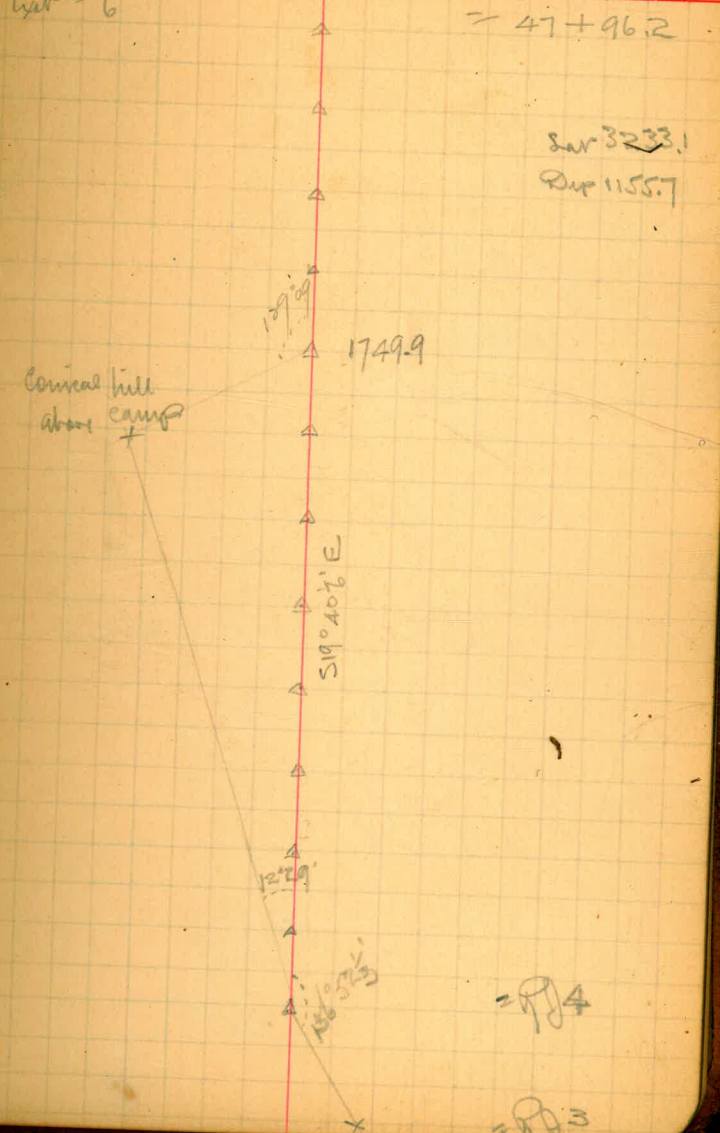
Sta	Dist	Chain	Vert. Ang. Elev	Dip
13	386.0			
12		396.2	13°02'	
	263.1			
11		269.3	12°20'	
	474.5			
10		496.3	17°02'	
	494.1			
9		495.7	4°37'	
	65.8			
8		66.8	9°36'	
	96.8			
7		105.3	23°09'	
	482.5			
6		500.5	15°11'	
	78.6			
5		83.4	19°29'	
	95.9			
4		107.2	26°31'	
	498.7			
3		500.2	4°27'	
	70.6			
2		70.9		4°58'
	112.6			
1		113.4	6°53'	
	314.2			
0		319.0	9°53'	
	3433.4			

1-2-08
Wuleste
Sa Rue
Rogers.

Exit #6

= 47 + 96.2

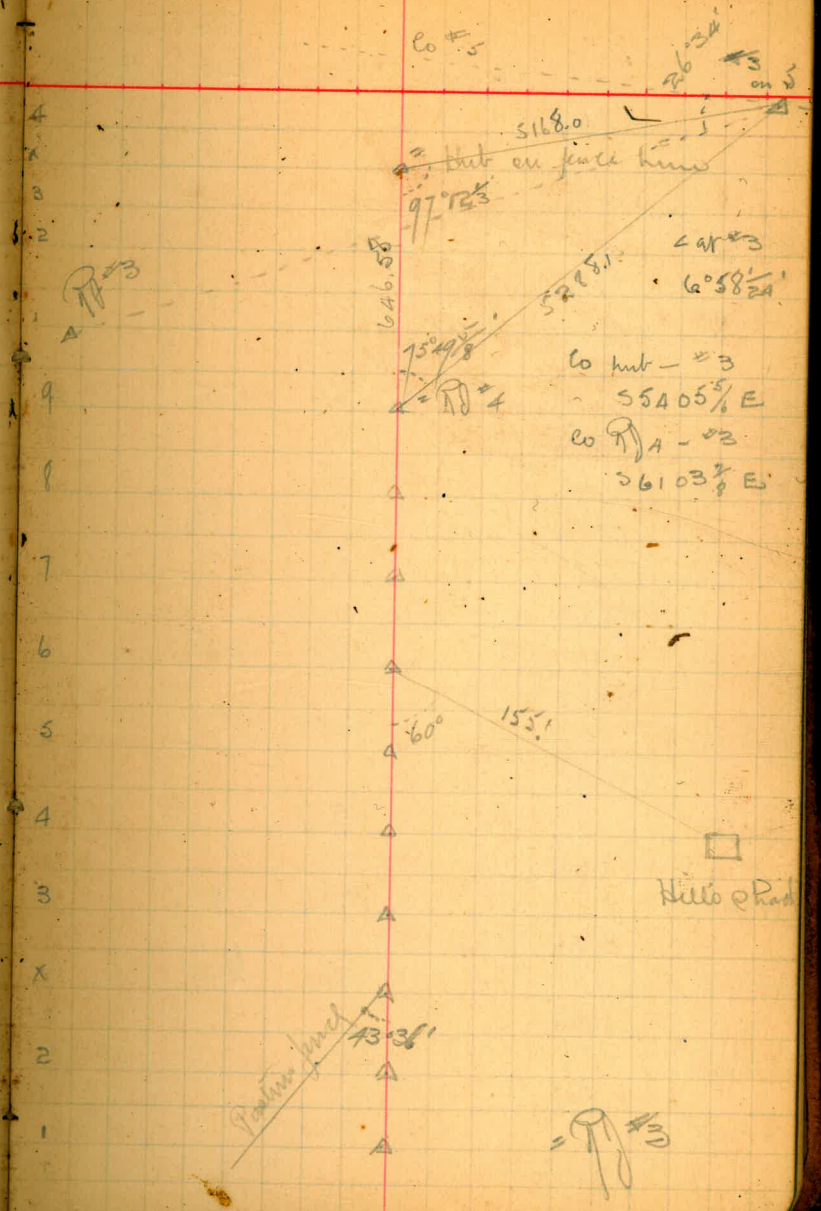
Sat 3233.1
Dip 1155.7



= RJ 4

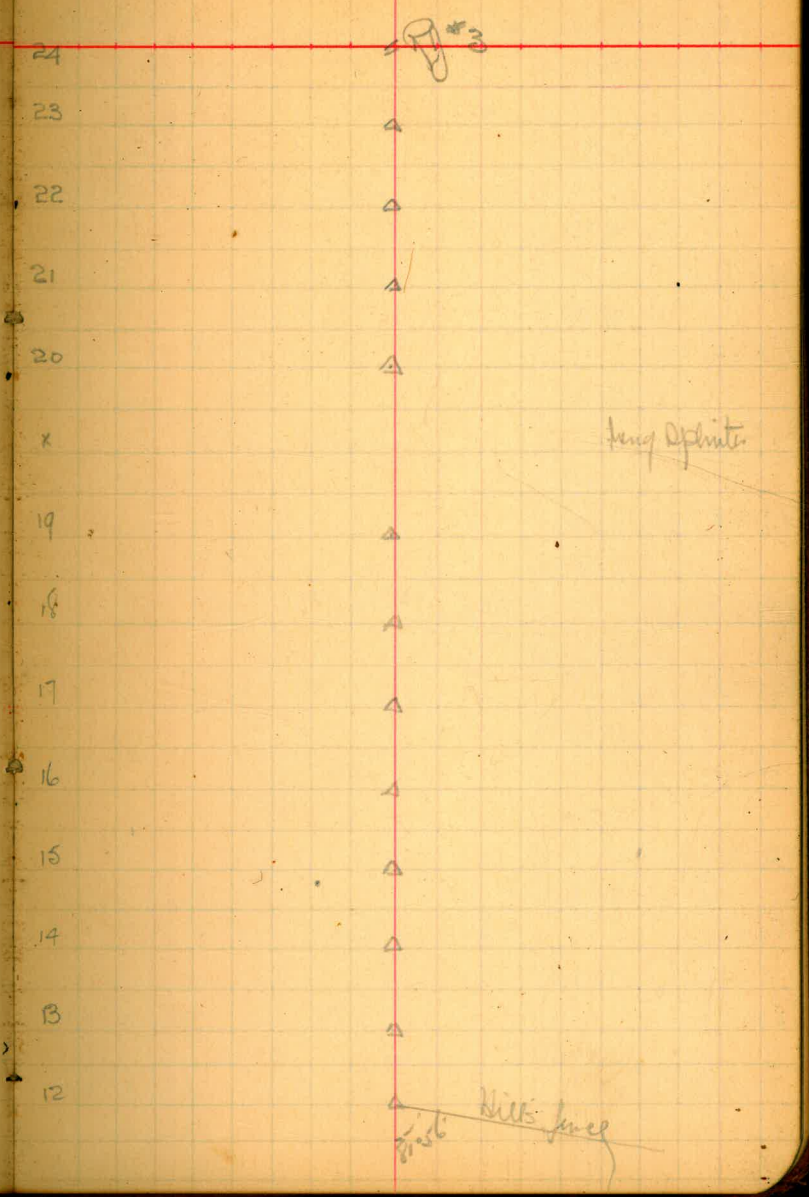
= RJ 3

Sta	Dist	Int Chain	Chain	Vert angle Elev.	Vert angle Dep.
Babcock Mcor					
745.8	99.2			14°34'	
646.6 46.31	46.3	48.10	150.3	15°41'	
600.3 100.29	100.3		112.0	26°26'	
500. 499.98	500.0				
RJ 4 646.58			500.-	0°26'	
3481.8					
	424.3				
3057.5			425.0	3°19'	
	499.5				
2558.0			500.-	2°38'	
	500.0				
2058.0			500.-	0°34	
	500.0				
1558.0			500.-	0°52'	
	498.4				
1059.6			500.-		4°35'
	66.0				
993.6			66.0		0°29'
	194.3				
799.3					
	302.4				6°36'
496.9		306.0	500.-		8°45'
	496.9				
0			500.-		6°26'
	3481.8				



25848

Sta	Dist	Sub chain	Chain	Vert angle Elev	Vert angle Dip
6778.4					
	167.2				
6611.2			168.0		5°42'
	164.7				
6446.5			165.0		3°18'
	175.0				
6271.5			175.0	0°18'	
	109.3				
6162.2			110.0	6°37'	
	43.8				
6118.4					
	126.7			11°32'	
5991.7		129.6	174.0	12°09	
	229.2				
5762.5			235.0	12°48'	
	499.5				
5263.0			500.✓	2°35'	
	186.9				
5076.1			187.0		1°58'
	130.0				
4946.1			130.0	0°31'	
	133.4				
4812.7			135.0	8°46'	
	490.8				
4321.9			500.✓		10°59'
	128.3				
4193.6			130.0		9°14'
	107.9				
	4085.7				
	6778.4		6778.4		



Measurement Notes

Jamul Finer Sur RJ 2-3-4

12-30-07
Wrest
Sa Rue
Stake Rogers

Sta	Dist	Sub-chain	Chain	Vert. angle Elev	Vert. angle Dep.		
4085.7						x	
	4.2			1°36'			
4081.5		4.2	112.1	—		11	
	498.1						
3583.4			500.—		5°04'	10	
	95.7						
3487.7			96.0		5°45'	9	
	91.8						
3395.9			92.0	3°53'		8	
	414.7						
2981.2			425.0	12°39'		7	
	266.3						
2714.9						x	= Pile of Rts
	222.9			11°55'			
2492.0		225.0	500.—	7°51'		6	48°26' Mosshalder fence Mk on RK
	493.5						
1998.5			500.—	9°17'		5	
	498.5						
1500			500.—		4°31'	4	
	117.0						
1383.						x	= Rotten Hub.
	383.0			0°15'			
1000.		383.0	500.—	0°16'		3	
	500.0						
500.			500.—		0°04'	2	
	500.0						
0			500.—		0°21'	1	= RJ #2
	4085.7						

Miscellaneous Notes.

Interior angle at Rf #4 = 85° 54½'
Exterior angle at Rf #3 = 92° -'
Interior angle at Rf #2 = 155° 29¾'

— * —

Tying to Ranch cor

Dist #3 - 6+69.1 = 483.3

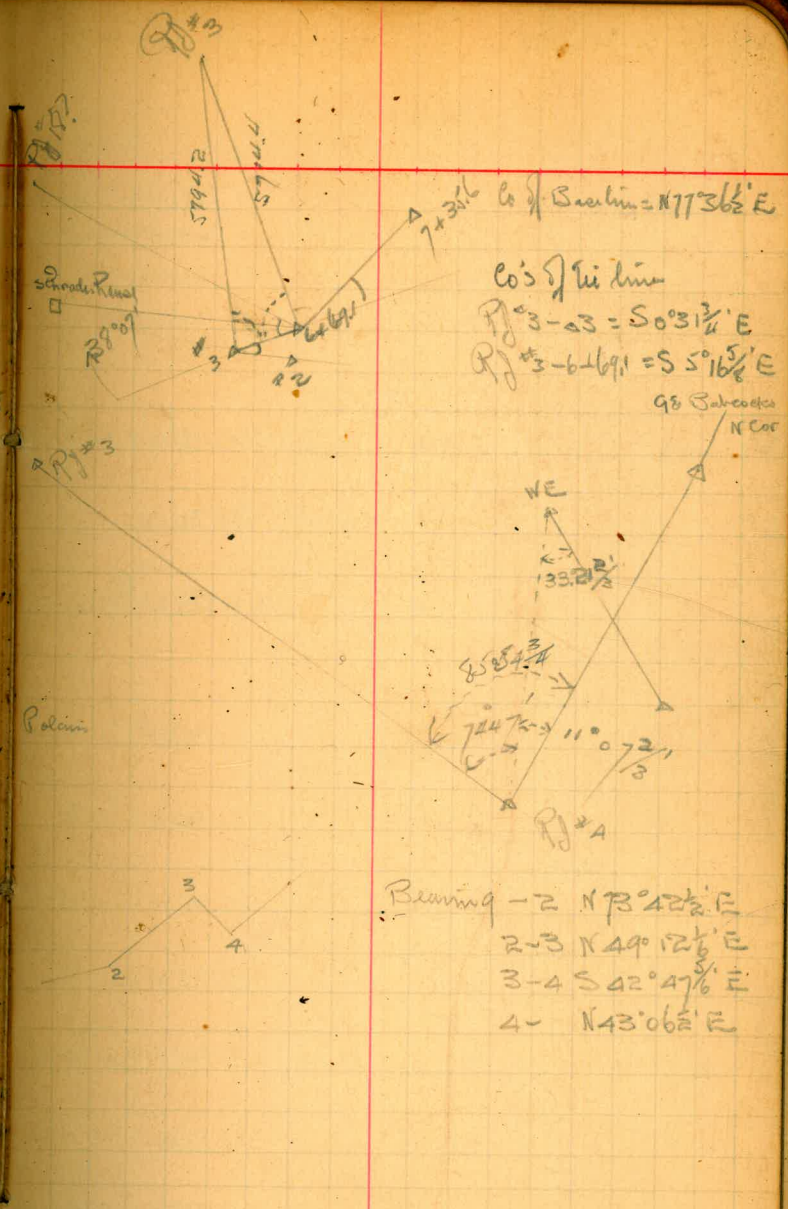
					Av
∠3-6+69.1-Rf3	97°07'	194°14'	291°21'	28°27½'	97°06⅞
∠3-6+69.1-Rf4	47°10'	94°19½'	141°29'	188°39'	47°09¾
∠Rf#3-#3-6+69.1	78°08	156°16½'	234°25'	312°33'	78°08¼
∠7+35.6-6+69.1-			49°52½'	99°44'	49°52
∠#2-#3-6+69.1			62°15½'	104°31'	62°15½

— * —

True bearing of Rf 4-3

Rf #4-#3		105°13½'	N42°47½'W
		33°22'	S31°39'W
			S1°23'E

• West Along Polaris



Bearing -2 N73°42½'E
2-3 N49°12⅙'E
3-4 S42°47⅚'E
4- N43°06½'E

Continuation of Traverse West of Sta 0

Sta	Dist	Det. angle L	Det. angle R	Cal Co	Mag Co			
at 6-7			48°12½'	= Schrader house				
			57°28'	= Moschalder house				
at 7-6		120°41'		= Moschalder "				
		130°30'		= Schrader "				
Sta 6+69.1		64°39'		N25°56½'E	N25°58½'E	= Co 6+69.1 — 7+35.6		
			20°08'	S89°24½'E				
				N70°27½'E = Proj Co 6-7				
7								= Sta 1237+50
	126.2							
6		24°40'		S70°27½'W	S70°30'W	21°		Pr on Pk
	139.5							
5		11°45½'		N84°52½'W	N84°55'W	24°		hut
	224.5							
4		27°02'		N73°07'W	N73°05'W	26°		hut
	72.2							
3		4°11'		N46°05'W	N46°05'W	27°		hut
	169.2							
2			53°49'	N41°54'W	N41°55'W	29°	N16°E	Pr on Pk
	79.8							
1		22°00½'		S84°17'W	S84°10'W	22°		Pr on Pk
	81.7							
0		40°38½'		N73°38½'W	N73°35'W	20°		
					N32°55'W			
		130°26½'	53°49'					

Finding True Bearing of Initial Course and Co of Tunnel #5

12-27,8-'07.
Wuesta
Waterman

Sta		Def. Angle L+	Def. Angle R+	Cal. Co.	Var. Plate 13½° Mag. Co.			
			29°36½	S27°16'E	= Co #5	(S29°07'E) 1°51'(+)		
		56°52½		S56°52½'E			△	= no. End of Meridian at Camp Babcock's
				S.				
	~~ # ~~~							
			120°23½	S62°25'W	= Per Co 88+94.1 −90+79.9	(S60°34'W) 1°51'(+)		
		57°58½		S57°58½'E				= north End meridian at camp. Babcock's
	~~ # ~~~			S.				
6							△	= Sta 0+79.7
5		34°46'		S31°09'E		(S32°55'E) 1°46'(+)	△	= Sta 0
4			8°29'	S3°37'W			△	
3		130°24'		S40°52'E			△	
2			17°07'	N54°28'W			△	
1		70°12'		N71°35'W			△	
0				N1°23'W			△	= S. End of West Elongation of Polaris. Babcock's
		235°22	25°36'					

Angles to Minnewawa Lodge from Pts on Traverse of #7

	∠S R+		∠S L+		∠S L+	
Junct diagonal & Junct Fence			76°44'		138°58'	
W Cor Barn	30°05'		54°19'		113°57'	
N Cor of Property	41°37'		41°02'			
S Cor of Property	29°27'		52°39		101°19'	
Fence Cor S of Barn	22°45½'					
Gate	18°29'		70°03'		133°07'	
Pump house	17°30'		71°23½'		134°55'	
Large Tank	13°21'		75°40		138°51'	(62.4' = circum)
Tent	36°01'		45°09'			
E Cor Barn	31°34		52°27'		112°01'	
Gas house	35°25'		47°22'		106°34'	
Small Tank	37°43'		44°46½'		104°13'	
Chimney Lodge	31°16'		51°55'		110°34'	S62°36' E = Rw. Co 11-12
		N41°21½' W				= Course 4-5, Traverse #7
				N49°52½' E		= Rw. Co 8-9, " " "

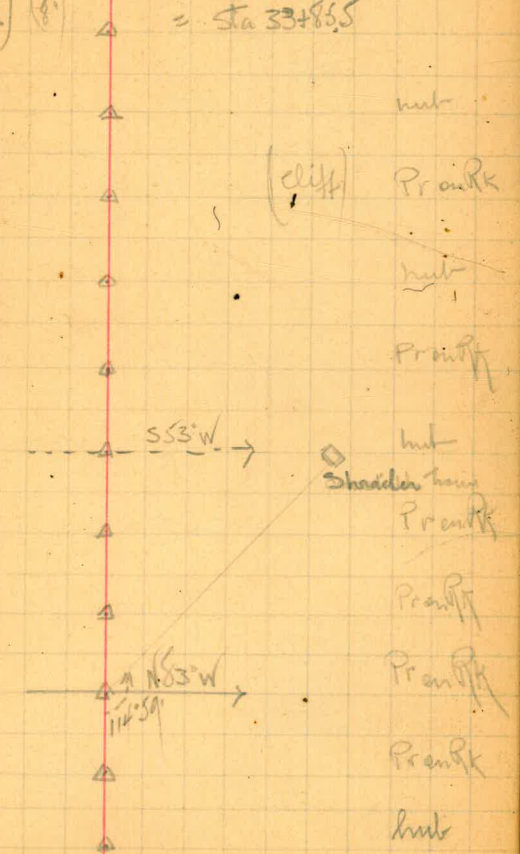
70 Traverse of Tunnel #7 (Continued)

N 35°43½' E
146
3729.4 59
35

114 59
3729½
7729½

Sta	Dist	Def Angle Lt	Def Angle Rt	Cal. Co	Mag. Co
23		84°16½'		N58°42½'E	N58°55'E
	221.2				
22			28°47½'	S37°01'E	S36°55'E
	134.0				
21		23°00½'		S65°48½'E	S65°50'E
	145.5				
20		17°40½'		S42°48'E	S42°40'E
	181.0				
19		24°25'		S25°07½'E	S25°10'E
	160.4				
18			68°52'	S00°42½'E	S00°40'E
	125.2				
17		22°01'		S69°34½'E	S69°30'E
	79.7				
16		19°41'		S47°33½'E	S47°30'E
	126.2				
15		63°36'		S27°52½'E	S28°00'E
	47.3				
14		25°30½'		S35°43½'W	S35°35'W
	152.9				
13		22°36'		S61°14'W	S61°00'W
	1768.5				
	314.19	302°47'	97°39½'		

(N58°50½'E) (8') = Sta 33+85.5



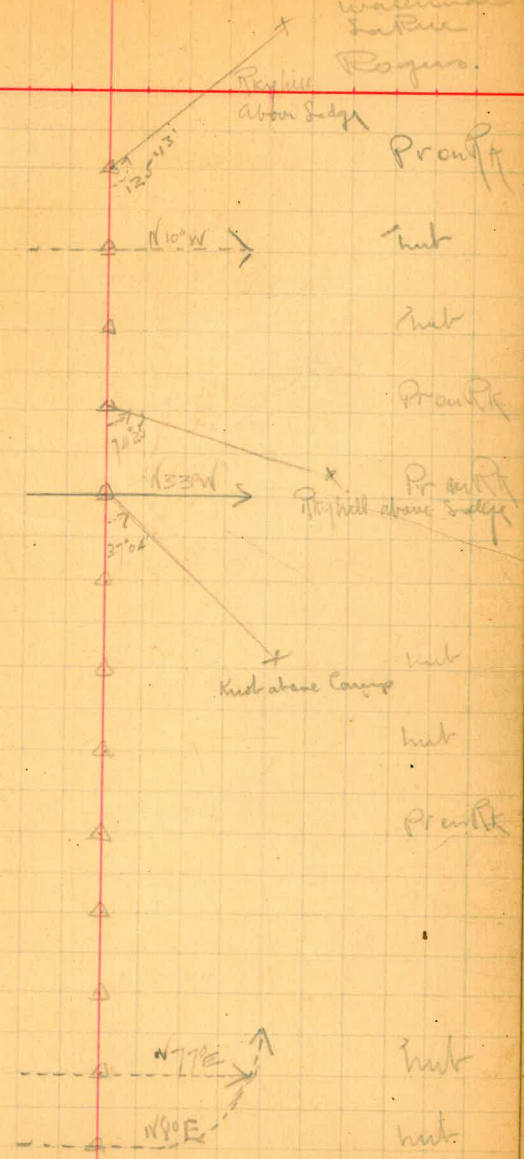
Traverse of Tunnel #7.

12-21-07

Wheeler
Waterman
LaRue
Rogers.

Sta	Dist.	Def ang Lt	Def ang Rt	Calc	Magn
	135.5				
12		33°34'		S 83°50' W	S 83°30' W
	174.0				
11			55°10½'	N 62°36' W	N 62°40' W
	84.4				
10			21°46'	S 62°13½' W	S 62°00' W
	232.8				
9		9°25'		S 40°27½' W	S 40°15' W
	40.0				
8		31°38'		S 49°52½' W	S 49°30' W
	27.2				
7		32°11'		S 81°30½' W	S 81°00' W
	78.9				
6		23°50'		N 66°18½' W	N 66°35' W
	167.0				
5		1°07'		N 42°28½' W	N 42°40' W
	215.8				
4		26°03½'		N 41°21½' W	N 41°30' W
	86.6				
3		15°37½'		N 15°18' W	N 15°30' W
	86.3				
2		7°24'		N 0°19½' E	N 0°05' E
	335.8				
1			47°14'	N 7°43½' E	N 7°30' E
	104.2				
0		98°21'		N 39°30½' W N 58°50½' E	N 39°35' W
	1768.5	279°11'	124°10½'		

Stadia			
400 536			
	16°		Pr on Rk
200 372			
	22°	N 10° W	hut
100 184			
	31°		hut
400 631			
	22°		Pr on Rk
100 139			
	21°	N 33° W	Pr on Rk
300 327			
	19°		
200 278			
	23°		hut
300 467			
	30		hut
340 556			
	30°		Pr on Rk
200 286			
	33°		
200 285			
	29°		
100 437			
	34°	N 77° E	hut
400 504			
	32°	N 8° E	hut



Traverse of Tunnel # 6 (continued)

Sta	Dist	Drifting LT	Drifting RT	Cal Co	Mdg Co	Station			
26	328.9	90°35'		S89°28'E	S89°[illegible]'E	(S89°23'E) 300 630	24°	N25°W	Sta 47+96.2
25	60.3	46°03'		S1°07'W	S0°45'W	500 559	25°	N62°W	
24	209.9		56°46'	S47°10'W	S46°35'W	400 609	29°	N63°W	
23	125.5	8°31'		S9°36'E	S9°40'E	300 425	32°		Pren Rk
22	48.6	33°19'		S1°05'E	S0°45'E	500 548	33°		Pren Rk
21	154.8	38°33'		S32°12'W	S32°05'W	400 555	28°	N40°W	Pren Rk
20	82.0		50°08'	S70°47'W	S71°25'W	100 184	33°	N40°W	Pren Rk
19	214.1	5°04'		S20°39'W	S21°15'W	400 614	35°		Inst
18	97.0		30°42'	S25°43'W	S26°15'W	400 496	32°		Inst
17	164.8	25°30'		S4°59'E	S4°30'E	300 465	25°	N42°W	Inst
16	47.0	9°05'		S20°31'W	S21°00'W	200 246	32°		Pren Rk
15	70.2	27°23'		S29°36'W	S30°10'W	[illegible]	31°		Pren Rk
14	307.5	48°19'		S56°59'W	S57°30'W	300 605	29°	N3°W	
13	(1529.3)		57°51'	N74°42'W	N74°10'W		18°	N10°W	
	3439.9	332°22'	195°27'						

Traverse of Tunnel #6

Sta	Dist	Det ang Rt	Det ang Rt	Calco	Magco
	135.7				
12		63°25'		S47°07'W	S47°50'W
	46.0				
11		49°45½'		N69°08'W	N68°45'W
	62.3				
10		44°40'		N19°22½'W	N19°00'W
	49.6				
9		6°23½'		N25°17½'E	N25°35'E
	183.7				
8			67°55'	N31°41'E	N32°05'E
	201.5				
7		63°07'		N36°14'W	N35°45'W
	137.9				
6			51°29'	N26°53'E	N27°25'E
	116.0				
5			11°35'	N24°36'W	N24°10'W
	222.9				
4		18°54'		N36°10'W	N35°45'W
	87.6				
3		12°29'		N17°17'W	N17°00'W
	109.2				
2		1°09'		N4°48'W	N4°25'W
	189.6				
1		3°03'		N3°39'W	N3°20'W
	166.3				
0		91°13'		N0°36'W S89°23'E	N0°30'E
	1529.3	354°09'	130°59'		

12-19, 20-'07

Unesco
Waterman
Sorum
Rogna

Tendir			
200 334			
	17°	N4°W	
400 446			Rky Pr.
	19°	S64°E	
300 362			
	25°		
500 549			
	25°		
200 313			
	30°	N70°E	Hub
400 601			
	15°	N67°E	Pr on Rk
300 457			
	31°	S80°E	Hub
500 615			
	29°		Pr on Rk
300 522			
	25°		Pr on Rk
200 288			
	24°		Pr on Rk
300 428			
	26°		Pr on Rk
300 488			
	26°		Pr on Rk
200 365			
	37°		= Sta 58+65.5 = Calco #6

Sta	Dist.	Def Ang Left	Def Ang Right	Cal Co	Mag Co	Studia			
				(S29°07'W)					
21		54°34'		S29°16'E	S29°00'W		39°	N47°W	= 90+749
	148.7					400 549			
20			3°43'	S25°18'W	S25°35'W				Hub
	37.6					400 437			
19		23°21'		S21°35'W	S21°55'W		35°	N35°W	Hub
	46.3					755 300			
18		17°19'		S44°56'W	S45°15'W		35°		Hub
	73.5					180 253			
17		15°17'		S62°15'W	S62°30'W		38°		Hub
	60.6					300 359			
16		13°21'		S77°32'W	S77°50'W		35°		Hub
	81.3					180 701			
15			19°11'	N89°07'W	N88°55'W		33°		Hub
	158.4					400 558			
14		45°20'		S71°42'W	S72°05'W		25°	N28°E	Hub
	229.4					400 628			
13			3°54'	N62°58'W	N62°30'W		28°		Hub
	(1232.6)								
	2068.4	169°12'	26°48'						

75 Traverse around Tunnel #5

12-18-07
Wuestu
Watson
Jackson

Sta	Dist	Def Ang Left	Def Ang Right	Cal Co	Mag Co	Stadia		Rogus
	142.4					200 342		
12		8°58'		N66°52'W	N66°30'W		27°	Hub
	69.0					100 168		
11		26°50		N57°54'W	N57°30'W		24°	Pr on Rk
	44.7					200 244		
10		22°32'		N31°04'W	N30°45'W		22°	Hub
	59.2					200 258		
9		18°09'		N8°32'W	N8°15'W		21°	Pr on Loose Rk
	71.8					300 371		
8		20°39'		N9°37'E	N9°55'E		19°	Pr on Rk
	67.8					300 367		
7		17°02'		N30°16'E	N30°30'E		16°	Pr on Rk
	55.9					100 155		
6		14°42'		N47°18'E	N47°35'E		18°	Hub
	59.7					400 459		
5		31°36'		N62°00'E	N62°30'E		21°	Pr on Rk
	104.0					300 483		
4		13°50'		S86°24'E	S86°00'E		20°	Pr on Rk
	82.3					400 482		
3			93°40'	S72°34'E	S72°30'E		23°	Hub
	138.1					500 636		
2		18°11'		N13°46'E	N14°00'E		25°	Pr on Rk
	63.0					700 762		
1		40°13'		N31°57'E	N32°10'E			Pr on Rk
	274.7					800 1073		
0		78°43'		N72°10'E	N72°30'E		24°	= Sta 95 + 70.6
				S29°07'E				= Course of #5
	1232.6	311°25'	93°40'					

S31°E

N72°E

12-14-07

Sta	Dist	Chain	Cor. Vert. Angle Elev.	Dep.	
5) 495.69					= Sta 1131459
	197.93				
4) 297.76		215.80		23°29'	
	102.75				
3) 195.01		105.10		12°09'	
	40.21				
2) 154.80		41.10	11°58'		
	92.79				
1) 62.01		107.88	30°39'		
	62.01				
0)		80.29	39°26'		= Sta 1136757
	495.69				

Log. 80.29 = 1.904661
"Cos. 39°26' 9.887822
1.792483
62.01

Log. 107.88 = 2.032942
"Cos. 30°39' 9.934649
1.967591
92.79

Log. 41.10 = 1.613842
"Cos. 11°58' 9.990458
1.604300
40.21

Log. 105.10 = 2.021603
"Cos. 12°09' 9.990161
2.011764
102.75

Log. 215.80 = 2.334051
"Cos. 23°39' 9.962453
2.296504
197.93

(90 + 74.9)

Re-measurement Notes over #6.

12-13-07

Sta	Dist	Chain	Corrected Elev.	Vert. Ang. Dip	
	(Hor Chng 1073.3)				
9					= Sta 1168+79
	100.87				
8		126.00		36°49'	
	64.32				
7		77.60		34°01'	
	118.42				
6		134.10		27°59'	
	76.87				
5		82.10		20°34'	
	127.47				
4		127.56		2°08'	
	100.99				
3		101.72	6°52'		
	115.89				
2		121.38	17°18'		
	215.17				
1		238.20	25°24'		
	149.33				
0		163.00	23°38'		= Sta 1179+73
	1069.33				

Sog. 163.00 = 2.212188
" Cos. 23°38' 9.961957
2.174145
149.33

Sog. 238.20 = 2.376942
" Cos. 25°24 9.955849
2.332791
215.17

Sog. 121.38 = 2.084147
" Cos. 17°18' 9.979895
2.064042
115.89

Sog. 101.72 = 2.007407
Cos. 6°52' 9.996874
2.004281
100.99

Sog. 127.56 = 2.105715
" Cos. 2°08' 9.999699
2.105414
127.47

Sog. 82.10 = 1.914343
" Cos. 20°34' 9.971398
1.885741
76.87

Sog. 134.10 = 2.127479
" Cos. 27°59' 9.946002
2.073431
118.42

Sog. 77.60 = 1.889862
" Cos. 34°01' 9.918489
1.808351
64.32

Sog. 126.00 = 2.100371
" Cos. 36°49' 9.903392
2.003763
100.87

Measurement notes over #6

Sta	Dist	Chain	Vert. Angle Elev.	Vert. Angle Dep.	
9					= Sta 1168+79
	101.22		36°33		
8		126.00			
	64.61		33°45'	37°00	
7		77.70 .60			
	162.98		27°43	34°16'	
? 6		184.11 / 134.10			
	76.92		20°18'	28°16'	
5		82.00 .10			
	127.43			20°50'	
4		127.54 .56		2°24' .25'	
	101.03				
3		101.80 .72	6°36' .35'		
	116.09				
2		121.42 .38	17°02'		
	215.73				
1		238.32 .20	25°09' .07'		
	149.56				
0		162.92 163.00	23°22'	23.55'	= Sta 1179+73
	1115.57				

Correction necessary for vertical angles as disclosed by following notes.
+16' for ∠s of elevation
−16' " " " depression.

12-12-07

Log. 162.92 = 2.211974
" Cos. 23°22' 9.962836
2.174810
149.56

Log. 121.42 = 2.084290
" Cos. 17°02' 9.980519
2.064809
116.09

Log. 127.54 = 2.105646
" Cos. 2°24' 9.999619
2.105265
127.43

Log. 184.11 = 2.265078
" Cos. 27°43' 9.947070
2.212148
162.98

Log. 126.00 = 2.100371
" Cos. 36°33' 9.904898
2.005269
101.22

Log. 238.32 = 2.377160
" Cos. 25°09' 9.956744
2.333904
215.73

Log. 101.80 = 2.007321
" Cos. 6°36' 9.997112
2.004433
101.03

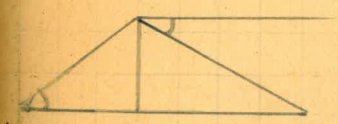
Log. 82.00 = 1.913814
" Cos. 20°18' 9.972151
1.885965
76.92

Log. 77.70 = 1.890421
" Cos. 33°45' 9.919846
1.810267
64.61

Measurement Notes over 7'

Sta.	Dist.	Chain	Elev.	Vert. angle Dep.	
8					=Sta 11 88+67
	47.90				
7		56.28		31°40'	
	161.14				
6		182.87		28°27½'	
	16.68				
5		17.32		15°37'	
	55.08				
4		55.09		1°08'	
	86.20				
3		92.65	21°30½'		
	69.37				
2		40.30	30°15'		
	29.39				
1		33.23	27°48'		
	46.63				
0		55.70	33°09½'		=Sta 11 93+62
	512.39				

log 55.70 =	1.745855	log 33.23 =	1.521530
" cos 33°09½'	9.922810	" cos 27°48'	9.946738
	1.668665		1.468268
46.63		29.39	
log 80.30 =	1.904716	log 92.65 =	1.966845
" cos 30°15'	9.936431	" cos 21°30½'	9.968653
	1.841147		1.935498
69.37		86.20	
log 55.09 =	1.741073	log 17.32 =	1.238548
" cos 1°08'	9.999915	" cos 15°37'	9.983664
	1.740988		1.222212
55.08		16.68	
log 182.87 =	2.262143	log 56.28 =	1.750354
" cos 28°27½'	9.944070	" cos 31°40'	9.929919
	2.207213		1.680343
161.14		47.90	



8216
N 4030 E
N 4+46 W
8058
12244
180
35716 W

8216
N 7520 E
N 656 W
8058
8752

8216
N 437 E
7739
8058
15837
180
21123

5209
3543½
8752½

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

For Single Track Embankment.

Roadway 14 feet wide. Side Slopes $1\frac{1}{2}$ to 1.

	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	27
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.