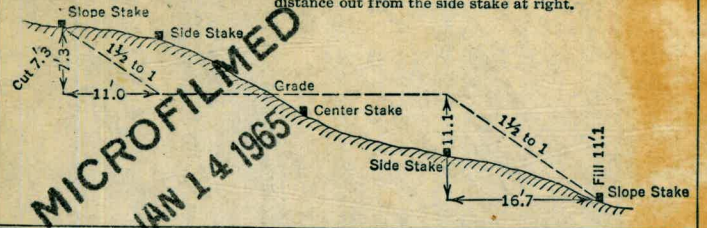
DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

KEUFFEL & ESSER CO., N. Y.

For Curve Tables see end of book.

670

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This entire book on Dulzura P.L. investigations.

INDEX

Dulzura Pl. stadia survey.
At La Mesa Hts

6-28-43 Hill King Otton Polok

Pt.	Dist	Vert. ∠	Hor. ∠	Rod	H.I.
2-3	(448.8) 452'	-4° 49'	22° 41' Rt		5.1
* 1-2	(977") 980'	-3° 03'	2° 56' Lt		5.0

Elev. Pt. #1

W.H. 751.0

747.8 −8° / π31

752.1 +3° / π21'

#1 751.0

744.5 −7° 30' / 50' π

730.5 −13° 40' / 60'

788.8
849.9 USGS.

761.8 −10° / 101

779.1 −5° 20' / π36

782.4 −3° 40' / π100

#2 788.8

784.1 −2° 40' / 102 π

769.8 −8° 20' / 100'

Reduced by W.H. 7/6/43

Pt	Dist.	Vert ∠	Hor ∠	Rod	H.I.
	(768.5)				
#5-6	771'	-3°15'	49°25' Rt		5.2
	✓ 1061.5				
#2-5	1062'	-1°21'	P.O.T.		5.1
	(730.3)				
2→4	731'	-1°42'	P.O.T.		5.1

Elev

✓ 720.2

721.3 −2°30' 120'

726.5 +3° 120' ℄ #6

720.7

716.3 −3°10' 70' ℄

708.9 −8°20' 50' ℄

698.9 −15° 40'

✓ 763.8

735.9 −6° 160'

757.5 −6° 100' ℄

762.9 −1°20' 40' ℄ #5

763.8

760.0 −4°20' 50' ℄

743.7 −9°20' 10'

W.A. 767.1

754.2 −10° 60'

764.5 −3° 50' ℄

767.1 #4

761.8 −4°20' 70' ℄

746.4 −10° 90'

Pt	Dis.	Vert ∠	Hor ∠	Rod	H.I.
	(401.5)				
.8-9	402'	-2° 0'	P.O.T.		4.8
	(710.6)				
*6-8	711'	-1° 22'	P.O.T.		5.2
	(367.4)				
.6-7	374'	-7° 27'	P.O.T.		5.2

Elev

W. P. 689.3

680.1	690.5	689.3	677.2	665.1
-6° / 100'	+0° 40' / 100'T	#9	-7° / 100'T	-7° / 100'

W. P. 703.3

683.3	697.8	703.3	700.5	695.0	686.1
-9° / 100'	-3° 30' / 98'T	#8	-2° / 80'T	-6° 20' / 50'T	-8° 30' / 60'

W. P. 672.1

650.2	657.5	672.1	701.5	706.7	701.8
-8° 30 / 50'	-8° 30' / 100'	#7	+1° 0 / 56'T	+4° / 60'T	-3° 30 / 80'

P.T.	Dis	Vert ∠	Hor ∠	Rod	H.I	Elev
11-12	(287.1) 288′	−3° 10′	17° 23′ Rt		5.1	W.H. 703.9
* 8-11	✓ 1231′	+0° 46′	P.O.T		4.8	✓ 719.8
8-10	✓ 691′	−0° 13′	P.O.T		4.8	W.H. 700.7

687.9 695.3 703.2 703.9 698.8 686.4 684.1
−8° 40 / 50′ −6° 30′ / 70′ π −0° 40′ / 60′ π −2° 40′ / 110′ π −8° / 90′ π −1° 20′ / 100′

693.6 701.8 718.1 719.8 711.1 684.7
−9° 30′ / 50′ −9° 30′ / 100′ π −2° / 50′ π −5° / 100′ π −7° 40′ / 200′

679.9 696.6 703.5 700.7 696.5 676.2
−10° 40′ / 50′ −5° / 80′ +4° / 40′ π +10 −6° / 40′ π −12° / 100′

Pt	Dist.	Vert. ∠	Hor ∠	Rod	H.I.	Elev
.14-15	(187.7) 191'	-7° 33'	0.0		5.1	M.H. 664.4
*13-14	(187.5) 188'	-2° 56'	24° 18' Lt.		5.1	✓ 689.3
*11-13	(458') 459'	-2° 37'	P.o.T		5.1	✓ 698.9

? 653.1 | 659.2 | 668.7 | 664.4 | 660.5 | 643.0 | 616.5

-7° / 50' | -5°30' / 100' | +5° / 50'π | #15 | -7°30 / 30'π | -13° / 80'π | -18° / 90'

656.7 | 677.0 | 685.1 | 689.3 | 689.6 | 678.3 | 653.0

-12° / 100 | -6°40' / 70'π | -4° / 60π | #14 | +0°30' / 40'π | -6°30' / 100'π | 7° 20' / 200'

7

681.7 | 695.2 | 698.9 | 698.0 | 693.3 | 683.6

-6° / 130' | -3° / 70'π | #13 | -0°30' / 100'π | -3° / 90'π | -7°20' / 100'

Pt	Dist.	Vert. ∠	Hor ∠	Rod	H.I.
· 17-18	273'	-0° -16'	2° 10' Lt	side shot	5.2
	(545.3)				
* 14-17	547'	-3° 10'	P.O.T.		5.1
	(354.8)				
14-16	358'	-5° 24'	P.O.T	Rd.	5.1

Elev.

W.H.
657.8
Knoll at end of hog back

J
659.1

648.9	660.1	659.1	652.9	645.6
-9° 20' / 70'	+1° / 60' π		-6° / 60' π	-10° 40' / 40'

W.H.
655.9

656.1	658.7	655.9	648.6	620.6
-2° 30' / 60'	+4° / 40' π		-7° / 60' π	-17° / 100'

Pt.	Dist.	Vert. ∠	Hor. ∠	Rad	H.I.
	(319.7)				
*17-21	328'	-9° 10'	84° 13' Rt	6.2	5.2
	(1550.5)				
17-20	1551'	-1° 0'	P.O.T.	Side shot - Hill	5.2
	(893.3)				
17-19	910'	-7° 46'	52° 40' Rt	Side shot Rd.	5.2

Elev.

607.5 ✓ 29

W. H.
633.1
top of hill

W. H.
537.3

Pt. 19 on dirt road

Pt.	Dist.	Vert ∠	Hor ∠	Rod	H.I.
	(497.4)				
23-24	500'	-4°08'	P.O.T.	10.9	9.9
	(995.5)				
21-23	1012	-7°20'	P.O.T.		5.1
	(495.4)				
21-22	511'	-10°04'	P.O.T.	Road	5.1

Elev.

443.5
Less 5.0
438.5
El.

479.4

H.I.
520.0

Pt.	Dist.	Vert ∠	Hor ∠	Rod	H.I
26-	731'	-0° 30'	74° 08' Lt.	Intersec Mass. + Uni.	5.24
	(784)				
*25-26	785'	-2° 01'	P.O.T.	& Uni Extens.	5.1
	(851)	-2° 05'			
*23-25	853'	-5° 11'	P.O.T.		4.9

Elev.

413.96 B.M.
411.54

5.78

411.0

438.5

26 -	(211.9) 212'	+1° 10'	100° 14' Rt	Inters Yale 4N	4.9

Topog at Pt #2 Dulzura
P.L. Stadia survey

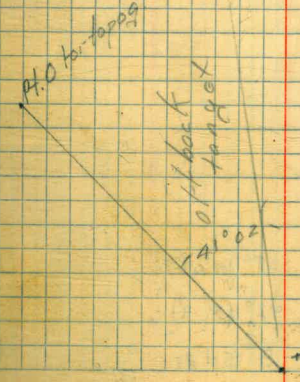
HING
Green
Polar
6-30-93

Pt.	Dist	Vert ∠	Hor ∠	Rod	H.I
			T.		
0-23	208' (202.2)	-9° 37'	3° 04' Rt		5.3
0-22	125' (121.2)	-9° 59'	32° 30' Rt		5.3
0-21	136' (132')	-9° 55'	84° 23' Rt.		5.3
0-20	364' (348.4)	-11° 56'	41° 55' Rt	11.3	5.3
0-19	396' (387.1)	-8° 37'	57° 11' Rt	11.3	5.3
0-18	387' (384.4)	-4° 44'	72° 27' Rt.		5.3
0-17	623' (622.4)	-1° 49'	65° 30' Rt		5.3
0-16	981' (980.9)	-1° 22'	62° 48' Rt.		5.3
0-15	908' (902.9)	-4° 32'	53° 49' Rt.		5.3
0-14	1167' (1155.2)	-5° 46'	46° 37' Rt.		5.3
0-13	970' (967.6)	-8° 37'	41° 02' Rt		5.3
0-12	618' (600.9)	-9° 34'	43° 01' Rt		5.3
0-11	631' (619.7)	-7° 41'	37° 43' Rt.		5.3
0-10	998' (983.6)	-6° 53'	36° 46' Rt.		5.3
0-9	962' (959.5)	-2° 55'	26° 48' Rt.		5.3
0-8	773'	-0° 39'	16° 04' Rt.		5.3
0-7	628' (627.4)	+1° 45'	0° 53' Rt		5.3
0-6	664' (663.4)	+1° 25'	12° 03' Lt		5.3
0-5	822' (821.8)	-0° 53'	31° 37' Lt		5.3
0-4	701' (698)	-3° 44'	41° 18' Lt		5.3
0-3	533' (530)	-4° 18'	43° 30' Lt		5.3
0-2	309' (282.6)	-16° 59'	54° 6' Lt	10.3	5.3
0-1	261'	-1° 07'	95° 38' Lt	9.3	5.3
#2-0	132' (131.7)	-4° 21'	41° 02' Lt		5.3

Point #2 = 788.8

Reductions by W.H.

Elev.
749.5
757.5
755.7
~~705.2~~ 699.2
720.1
747.0
759.1
755.5
707.2
662.1
635.0
677.5
695.2
660.0
729.9
770.0
798.0
795.2
766.1
733.2
738.9
687.5
769.7
778.8



O-26	206'(202.7)	-7° 16'	25° 19' Lt.	5.3	757.9
O-25	479'(478.2)	-2° 15'	12° 14' Rt	5.3	760.0
O-24	335'(331)	-6° 19'	8° 54' Rt.	5.3	742.7

Add. topog from Pt. #19 (see page 7)
Dulzura stadia pt. survey

Pt.	Dist	Vert. Δ	Hor. Δ	H.I.	Rod
5 to 6	(99.8) 103'	+10°13'	P.O.T.	4.9	4.9 (579.4)
* 0 to 5	(299) 301'	+4°37'		5.0	5.0
0 to 4	(207.2) 208'	+3°28'		5.0	5.0
0 to 3	(157.7) 158'	+2°32'		5.0	5.0
0 to 2	(102.9) 103	+1°30'		5.0	5.0
0 to 1	51'	+0°18'		5.0	5.0

Pt. 0
pt. 19 backsight on Pt. 17

8/12/43 Hill King Otten

13.

Elev. L ℄ R

561.1: −7°42' / 162' / 159.1 — 568.9: −6°31' / 122' / (121.7) — 582.6: +2°25' / 75' / ⩚ — 581.9: +5°32' / 26' / (25.8) — 579.4 — 576.6: −2°28' / 66' / (65.9) — 575.2: −1°29' / 161' / (160.9) — 571.7: −2°09' / 205' / (204.7) — 569.4: −2°35' / 222' / (221.6)

(561.4) — 540.1: −5°39' / 217' / (214.9) — 546.1: −4°51' / 182' / (180.7) — 562.1: +1°21' / 30' / ✓ — 561.4 — 560.6: −2°13' / 20' / ✓ — 553.7: −4°13' / 105' / (104.4) — 564.8: +0°52' / 222' / ✓ top of knoll

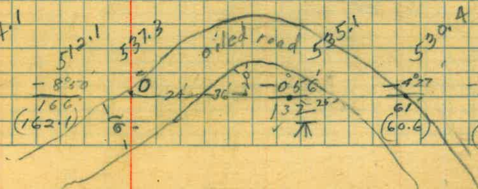
(549.9) — 516.6: −8°03' / 240 / (235.3) — 539.6: −6°37' / 90' / (88.8) — 547.1: −5°05' / 32' / (31.8) — 549.9 — 549.1: −2°22' / 19' / ✓ — 543.8: −4°51' / 72 / (71.5) — 534.7: −7°19' / 120 / (118.1) — 542.9: −1°57' / 206' / (205.8) — 545.3: −0°59' / 268' / (267.9)

(544.3) — 498.8: −9°18' / 285' / (277.6) — 510.9: −10°20' / 189 / (182.9) — 530.8: −8°10' / 96' / (94.1) — 543.4: −4°50' / 23' / (22.8) — 544.3 .3 — 543.1: −1°31' / 35' / ✓ — 530.7: −7°25' / 106' / (104.2) — 531.1: −6°08' / 124' / (122.6) — 530.1: −3°12' / 255' / (254.2)

(540.0) — 488.90: −12°47' / 225' / (214') — 525.50: −10°45' / 65' / (62.7) — 537.40: −3°56' / 38' / ⩚ (37.8) — 540.0 .2 — 536.7: −3°11' / 60 / ⩚ (59.8) — 522.1: −9°57' / 86 / (83.4) — 517.1: −7°50' / 145' / (142.3) — 512.6: −6°10' / 226' / (223.4)

(537.6) — 501.8: −9°09' / 228' / (222.2) — 536.2: −3°12' / 25' — 537.6 .1 — 535.1: −1°46' / 83' ⩚ — 517.2: −9°14' / 126' / (123.4) — 513.0: −8°04' / 159' / (155.9) — 508.2: −7°01' / 222' / (218.7)

537.3 — 504.1: −9°38' / 201 / (195.4) — 512.1: −8°50' / 166 / (162.1) — 537.3 .0 — 535.1: −0°56' / 132' / ⩚ — 530.4: −4°27' / 61 / (60.6) — 515.0: −7°26' / 157' / (154.4)



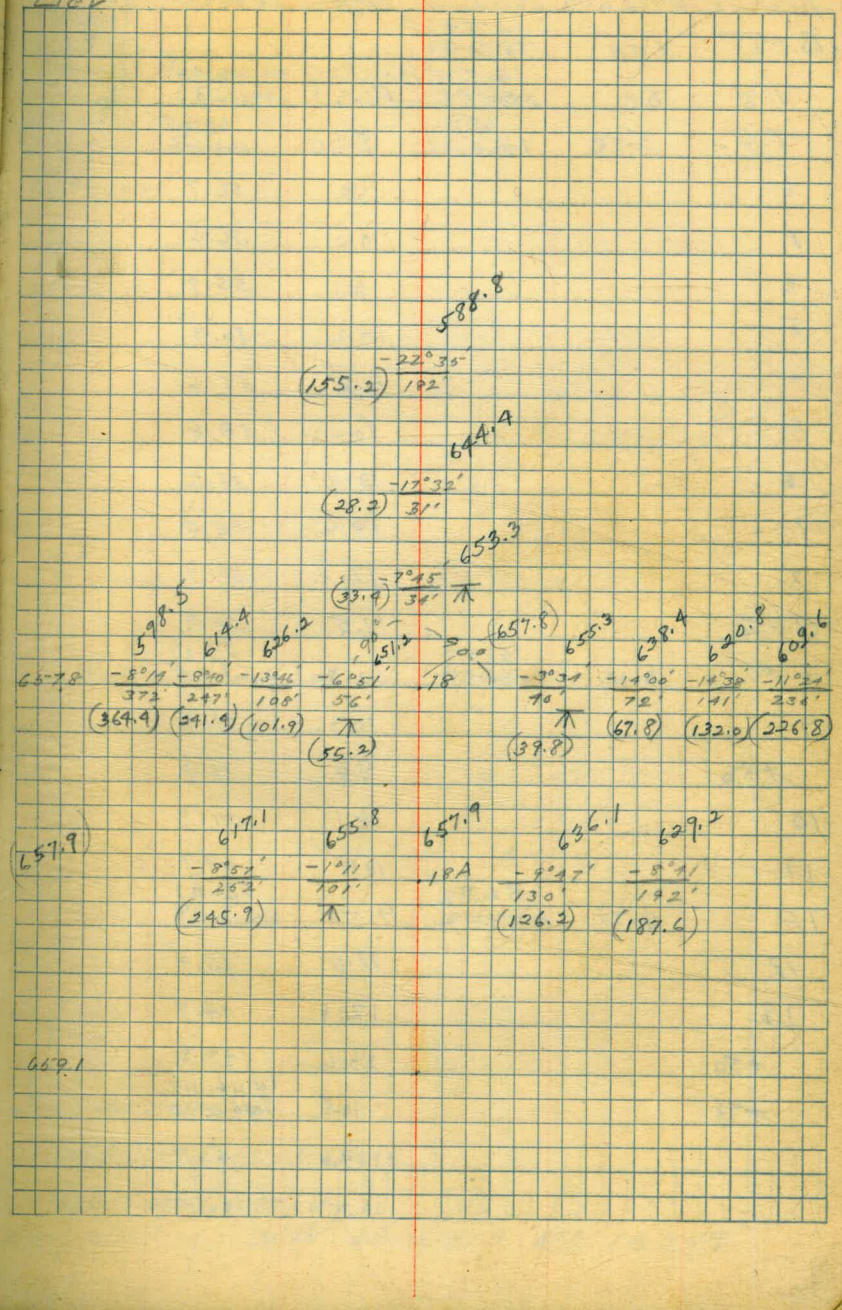
Add. topog. from pt. 18 (See page 6)
Dulzura stadia v2 survey

Pt.	Dist	Vert ∠	Hor ∠	H.I.	Rod
17 to 18	223'	−0°16'		5.2	5.2
17 to 18A	120' ✓	−0°50'	P.O.T.	5.2	5.2
17 foresight on 18.					

8/13/43 Hill
King
Offen

L ∠ R

Elev



7-11-43 H. 11 King

Profile	Datum	Conduit	Tunnel	to weir	0+TIN
B.M.	1.58	1477.40 ~~1477.88~~			1475.82 ~~1476.3~~
T.P	0.84	1465.75 ~~1466.21~~	12.51	64.89 ~~1465.37~~	
T.P	5.92	65.97 ~~1466.45~~	5.70	60.105 ~~1460.53~~	
0			9.3	56.7	
1			10.0	56.0	
2			10.1	55.9	
3			10.2	55.8	
4			10.4	55.6	
5			10.4	55.6	
6			10.4	55.6	
7			10.6	55.4	
8			11.3	54.7	
8+50			11.5	54.5	
T.P.	8.42	61.59 ~~462.07~~	12.80	53.17 ~~453.65~~	
9			10.3	51.3	
+50			9.8	51.8	
10			10.1	51.5	
11			11.9	49.7	
TP	4.91	56.92 ~~457.40~~	9.58	52.01 ~~452.49~~	
12			11.0	45.9	
13			12.1	44.8	
+50			13.6	43.3	
+93			10.5	1446.42 ~~1446.90~~	
			14.0	42.9	
			10.85	46.07	

X on rock So. W cor. 600' East school

El. Tunnel

Top metal weir

Ground at Face of weir

Top Conc. apron

Creek 1000' NW. of weir El. 1425.9

Levels to Passes 1, 2 + 3 see Pages 23, 24 + 25 for pass profiles

		1456.92 ✓ 1457.40			
B.M.	9.77	1459.20 ✓ 1459.74	7.43	1449.97 ✓ 1449.77	
TP	11.57	71.06	0.25	1459.49	
TP	10.84	81.12	0.78	70.28	
B.M.			4.78	76.86 1476.34	1475.82 1476.3
T.P.	1.02	78.45	3.69	77.43 ✓	
T.P.	1.39	66.89	12.95	65.50 ✓	
T.P.	0.97	55.00	12.86	54.03 ✓	
T.P.	0.50	42.68	12.82	42.18 ✓	
T.P.	0.40	1430.16	12.92	29.76 ✓	
T.P.	1.57	18.72	13.01	17.15 ✓	
T.P.	1.04	06.83	12.93	1405.79 ✓	
T.P.	8.34	14.65	0.52	1406.31 ✓	
T.P.	13.01	25.29	2.37	1413.28 ✓	
B.M. #1			12.15	1412.66 1413.14	
T.P.	12.71	37.26	0.74	24.55 ✓	
T.P.	12.22	48.94	0.54	36.72 ✓	
0+00 T.P.	12.67	59.09	2.04	1446.42 ✓ 1446.90	
T.P.	12.63	71.14	0.58	58.51 ✓	
T.P.	3.86	74.04	0.96	70.18 ✓	
1+25			3.91	69.65 ✓ 70.17	Gimney
T.P.	1.62	63.50	12.16	61.88 ✓	
T.P.	7.55	58.56	12.49	51.01 ✓	
2+85			12.14	46.42 ✓	
3+15			18.9	39.7	

16

X Top Conc Wall No. side-Next to recording house

Creek Bed 1000' N.W. Weir Elev. 1425.9

Weir Elev. at So. END Rt #1 0-50' So. 13.15' lower

Top Saddle Rt. #1 saddle is 2.3' lower 75' West of 1+25

Weir Elev. at No. end Rt. #1

Bottom Gulley

H.11 Mine Otter 7-18-93

B.M #1	2.47	21.13 ✓		1412.66	
T.P.	12.80	32.20 ✓	1.73	19.40 ✓	
T.P.	12.62	42.82 ✓	2.00	30.20 ✓	
T.P.	11.70	54.17 ✓	0.35	42.47 ✓	
0+00 B.M.			7.75	1446.42 ✓	
T.P.	12.23	65.83 ✓	0.57	53.60 ✓	Gulley
T.P.	3.42	68.10 ✓	1.15	64.68 ✓	
1+11			2.32	65.78 ✓	
T.P.	1.76	57.84 ✓	12.02	56.08 ✓	
2+22			11.42	46.42 ✓	
2+72			23.4	34.4 ✓	
B.M. Rt 2	11.46	57.88 ✓			1446.42
TP	10.60	61.94 ✓	6.54	51.34 ✓	
T.P.	2.46	51.89 ✓	12.51	49.43 ✓	
T.P.	0.55	39.42 ✓	13.02	38.87 ✓	
T.P.	0.91	27.38 ✓	12.95	26.47 ✓	
T.P.	6.90	15.52 ✓	12.76	14.62 ✓	
T.P.	0.94	1403.61 ✓	12.85	02.67 ✓	
			10.83	1392.78 ✓	
Checkback		1403.61 ✓			
T.P.	11.13	1411.09 ✓	3.65	1399.56 ✓	
T.P.	6.74	1412.45 ✓	5.38	1405.71 ✓	
T.P.	12.40	24.40 ✓	0.45	1412.0 ✓	
T.P.	12.16	36.07 ✓	0.49	23.91 ✓	
T.P.	10.40	45.65 ✓	0.82	35.25 ✓	

Weir Elev. East end Rt. #2 0-50 9.4' lower

Elev. Top Saddle Rt. 2

Weir Elev. West end Rt 2

50' down Gulley

Topsaddle Rt 3

1445.65 ✓

T.P	12.45	57.57 ✓	0.53	45.12 ✓	
T.P.	10.77	67.73 ✓	0.61	56.96 ✓	
T.P.	12.78	79.93 ✓	0.58	67.15 ✓	
B.M 600' East school at X Road S.W. cor.			4.25	75.68 ✓	75.82

Elev. El 100

½ mile shot taken across Valley

Levels to pass in sec. 7 T

B.M.	11.65	51.44 ✓			1039.79
T.P.	8.32	59.35 ✓	0.41	51.03 ✓	
T.P	0.30	50.45 ✓	9.20	50.15 ✓	
B.M #1	0.18	38.65 ✓	11.98	38.47 ✓	
T.P.	7.59	41.02 ✓	5.22	33.43 ✓	
T.P	1.57	30.19 ✓	12.40	28.62 ✓	
T.P	0.96	18.89 ✓	12.26	17.93 ✓	
T.P	1.30	07.72 ✓	12.47	1006.42 ✓	
T.P	5.69	1000.60 ✓	12.81	994.91 ✓	
B.M.	2.51	90.25 ✓	12.86	987.74 ✓	
T.P.	7.78	84.98 ✓	13.05	977.20 ✓	
T.P.	6.68	78.88 ✓	12.78	972.20 ✓	
T.P	12.53	83.15 ✓	8.26	970.62 ✓	
T.P	4.33	79..65 ✓	7.83	975.32 ✓	
T.P	12.90	91.83 ✓	0.72	978.93 ✓	
T.P.	12.58	1003.76 ✓	0.65	991.18 ✓	
T.P	9.77	12.88 ✓	0.65	1003.11 ✓	
T.P.	4.93	09.97 ✓	7.84	1005.04 ✓	
T.P.	4.31	1010.98 ✓	3.30	1006.67 ✓	
0+00		~~04.54~~	3.90	1007.08 ✓	
T.P.	12.04	22.38 ✓	0.64	10.34 ✓	
1+00			5.2	1021.9	
T.P.	11.89	33.65 ✓	0.62	21.76 ✓	
2+00			0.8	1032.9	
T.P.	12.89	46.04 ✓	0.50	33.15 ✓	

Profile of pass

231' N.E. School house X roads. USGS marker

N. in T.P. 1st cor. west Jamul School #174672

~~N.E~~ part ~~West~~ S.W. Cor. N.E¼ Sec 7 so. side Rd

On Rock east of Eucalyptus Grove 500'

W. East of road -125' North olive grove

S. end of pass

		1046.04 ✓		
T.P	10.75	56.22 ✓	0.57	45.47 ✓
3+00			9.3	1046.9
T.P.	10.98	66.58 ✓	0.62	55.60 ✓
4+00			9.6	1057.0
5+00			3.6	1063.0
T.P.	4.71	65.83 ✓	5.46	61.12 ✓
6+00			2.4	63.4
7+00			8.4	57.4
T.P	1.87	1056.06 ~~55.06~~ x	11.64	54.19 ✓
8+00			6.6	49.5
8+85			17.0	39.1
B.M. 9+40	1.22	1044.50 ~~43.50~~ x	12.78	1043.38 ~~42.28~~ x
10+00			12.5	1032.0
T.P.	0.30	1031.75 ~~30.75~~ x	12.85	1031.65 ~~30.65~~ x
11+00			9.0	1022.8
T.P.	0.11	1031.76 ~~30.76~~ x	10.10	1021.65 ~~20.65~~ x
11+50			1.0	1020.8
12+00			11.0	1010.8

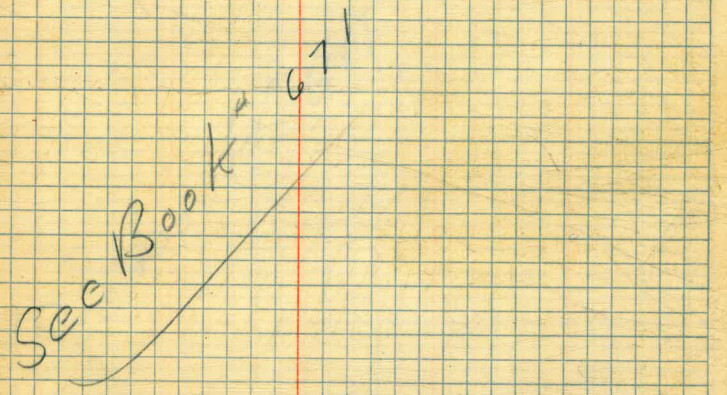
Bottom Draw ∆ 20° LEFT

6': Boulder

KING
OTTEN
8-24-43

Pt.	Dulzura Dist.	Stadia Vert ∠	survey Hor. ∠	H.I.	Rod
Pt*8-12	(975.7) 976'	-0° 59'	P.O.T.	5.1	5.1
Pt 8-11	(761.7) 763'	-2° 20'	P.O.T.	5.1	5.1
Pt 8-10	(549.3) 550'	-2° 03'	P.O.T.	5.1	5.1
Pt 8-9	(232.3) 233'	-3° 04'	P.O.T.	5.1	5.1
Pt 6*-8	(875.6) 876'	+1° 11'	P.O.T.	5.1	5.1
Pt. 6-7	568'	-0° 18'	P.O.T.	5.1	5.1
Pt*4-6	(810.8) 811'	-0° 55'	P.O.T	5.2	5.2
Pt. 4-5	(558.4) 559'	-1° 49'	86° 48' Lt.	5.2	5.2
Pt.*2-4	(913.5) 914'	-1° 24'	P.O.T.	5.1	5.1
Pt 2-3	(338.2) 339'	-2° 51'	P.O.T.	5.1	5.1
P.T.#1-2	(459.3) 460'	+2° 15'	P.O.T	5.0	5.0
Elev. Pt#1					
B.M.					

Elev.	
1023.7	
1009.4	
1020.9	
1028.3	
1040.5	
1019.5	
1022.5	
1017.8	
1035.5	
1041.2	
1057.80	
1040.94	
1039.79	231' N.E. Samuel school - ON Rock N.E. Cor xroad



Pt	Dist	Ver ∠	Hors	HI	Rod
12-15	(884.8) 886'	+2°08'	P.O.T.	5.1	5.1
Pt 12-14	416'	+0° 01'	P.O.T.	5.1	5.1
12-13	(123.7) 123'	-2° 46'	91° 27½'	5.1	5.1

1056.7

1023.8

1017.8

See book # 671

Profile Pass "1

B.M. = 0+00	0.21	1446.63 ✓		1446.42
T.P.	0.43	1434.11 ✓	12.95	1433.68 ✓
− 1+56			13.0	21.4 ✓
− 0+66			5.1	29.0 ✓
B.M.	5.20	1474.85 ✓		1469.65
0+95			6.3	68.6 ✓
1+25			5.2	69.7 ✓
1+57			7.7	67.2 ✓
B.M.	0.91	1447.33 ✓		1446.42
2+85			0.9	46.4 ✓
3+15			7.6	39.7 ✓
T.P.	1.62	1435.84 ✓	13.01	1434.32 ✓
3+65			1.5	34.3 ✓
5+08			14.0	1421.8 ✓

Hub set at weir elev. S. side of saddle

Hub set at top of saddle

Hub set at weir elev. N. side of saddle

3+15 = bot. of gully - gully makes angle of about 30° R.

bot. of gully

" " "

Profile of Pass #2

BM. 0+00	0.32	1446.74 ✓		1446.42
T.P.	0.71	1434.45 ✓	13.00	1433.74 ✓
-1+03			13.4	21.1 ✓
-0+70			0.7	33.8 ✓
B.M.	4.63	1470.41 ✓		1465.78
0+86			6.8	63.6 ✓
1+11			4.6	63.8 ✓
1+67			10.1	60.3 ✓
B.M.	0.32	1446.74 ✓		1446.42
2+22			0.3	46.4 ✓
T.P.	0.39	1434.17 ✓	12.96	1433.78 ✓
3+00			13.2	21.0 ✓

Hub at S. end of pass, weir elev. = 0+00

Hub set at top of saddle

Hub set at N. end of pass, weir elev.

Profile of Pass #3

B.M.	1.63	1394.41 ✓		139278
T.P.	0.71	1384.20 ✓	10.92	1383.49 ✓
0+00			13.0	71.2 ✓
0+50			3.0	81.2 ✓
B.M.	1.20	1393.98 ✓		139278
1+50			1.2	92.8 ✓
1+91			5.1	88.9 ✓
T.P.	0.72	1381.69 ✓	13.01	1380.97 ✓
2+50			4.8	76.9 ✓
3+00			13.9	67.8 ✓

Hub set at top of saddle

State route Dulzura P.L. - Stadia Survey
Dulzura weir to Dty. (Green route)

Point to Point	Dist	Mag. B	Hor. Δ	Vert. Δ	Rod H.I.
3 to 4	192 (191)	N33°W	14° 16' Rt	-0°22'	9.1 Rod 4.7 H.I.
	192 (191)				
	1309.5 W.N.				
1 to 3	1301.? (1310)		P.O.T.	-1°08'	4.9 4.9
	1310				
	827.3 W.N.				
1 to 2	828.5 (830)	N48 W	1°39' Rt	-3°18'	4.9
		?			
0 to 1	861 (860)	N 51° W	P.O.T.	+0°15'	12.1 Rod 5.1
EL. of Pt. 0					5.1

Dulzura Green Route
State

Feb 10 - 44

Elev.

1416.0 W.N.
~~1416.2~~
1415.5

Heavy Boulder formation
Point 2 to Creek Crossing

1421.8
1421.2
1421.6 W.N.

1399.8 W.N.

1447.5 W.N.
1447.6 1447.1

1450.9 U.S.G.S.

9 to 8	354.6 W.H. (357)		Pot	-4° 44'	
7 to 9	645.9 W.H. 645.6 (644)	~~N 4° W~~ N 8° W	~~9° 11' L~~ 13° 24' 30" L	-3° 56'	4.9 Rod 4.9 HI
5 to 7	2009.8 W.H. 2010 (2010)	N E	P.O.T.	-0° 34'	5.0 5.0
5 to 6	1118.6 W.H. (1130)	N 5° E	5° 33' R	-5° 46'	5.0 Rod 5.0 HI
4 to 5	106 (105)	N 0° 30' W	32° 21' Rt.	-0° 22'	5.0 5.0

1321.2 W.H.

1350.5 W.H.

~~1392.2~~ 1351.3

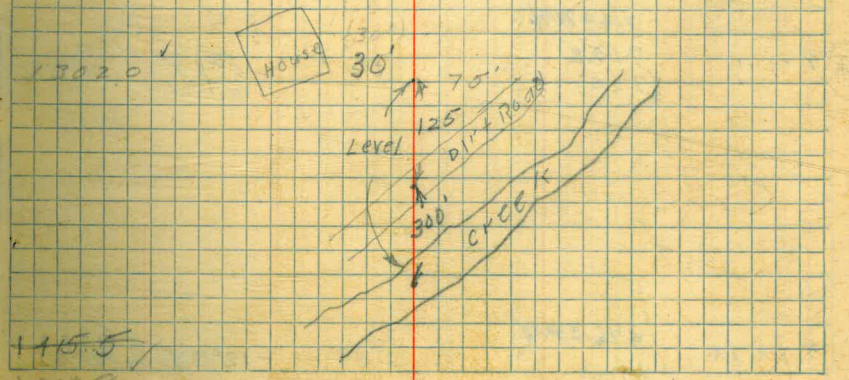
135.1.0

~~1395.8~~

1395.5

1394.9 W.H.

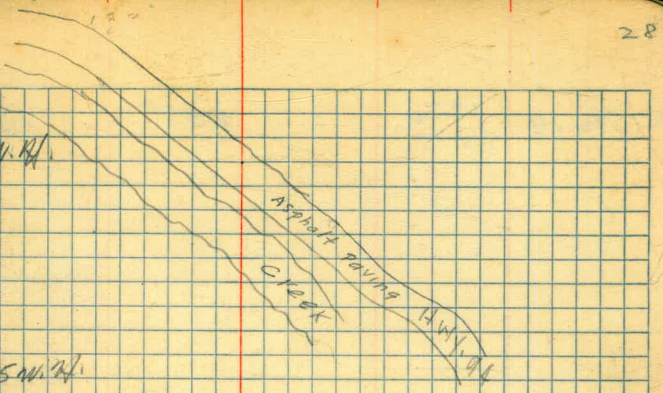
1414.8 alt.



P to P	Dist	Mag. B	Horiz. L	Vert L	Rod & H.I.
13 to 14	459.0 (470)		Pot.	−8° 48′	5.0 5.0
11 to 13	339.5 W.M. 341 (340)		Pot	−2° 18′	4.9 Rod 4.9 H.I.
11 to 12	166.1 W.M. (175)		Pot	−13° 0′	4.9 Rod 4.9. H.I.
9 to 11	714.0 W.M. 715.2 (720)		Pot	−5° 14′	5.0 5.0 H.I.
9 to 10	476.3 W.M. (500)		POT	−12° 35′	5.0 5.0 H.I.

Elev.

1200.4 W.M.



1271.5 W.M.
1313.1 +272.3
1272.0

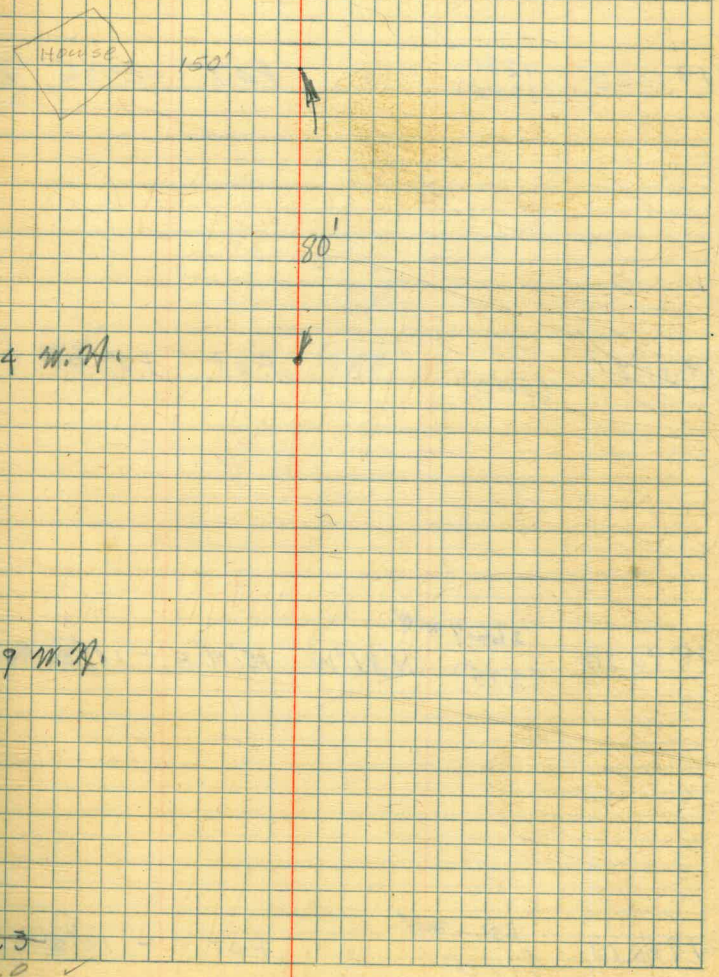
1246.7 W.M.

1285.1 W.M.
1326.7 +286.
1285.6

1244.2 W.M.

ℸ 15 to 19	1376 (1376)		POT	-0° 22'	4.7 HI
15 to 17	372.3 (380)		POT	-8° 12'	
15 to 16	211.9 W.M. (240)	N 46° W	32°15' Lt. 38° 02'	-20° 0'	
ℸ 13 to 15	939.7 W.M. 936 (945)		POT	+5° 59'	S.O. R.O. 5.0 HI.

~~1361.5~~
1341.2



~~1370.3~~
1370.0

23 to 22	260.3 W.M. (280)		Pot	-15° 24'	5.0 Rod
19 to 23	1281 ✓ (1280)		Pot	-0° 22'	5.0 Rod
19 to 21	(500) ✓		Pot	+0° 08'	5.0 Rod
19 to 20	266.7 W.M. (275)	N 31° W	15° 11' R	-10° 0'	5.0 Rod
19 to 18	651.2 W.M. (720)		Pot	- 18° 0'	5.0 HI. 5.0 HI.

Creek

1281.3 W.M.

~~1333.3~~ 1333.0 ✓

1362.4 W.M.

1314.2 W.M.

1149.6 W.M.

	1321.2 W.H.			
28 to 27	(440)		Pot	-7°40'	
	1221.9 W.H.			
⊼ 25 to 28	1223		Pot	-4°46'	5.0
	(1230)				5.0
	358.7 W.H.			
25 to 26	(368)	N68 3/4 W	7°01' R	-9°10'	
	310.8				5.0
⊼ 24 to 25	(318')	N67 3/4 W	12°34 L	-8°47'	5.0
	280.4				5.3
⊼ 23 to 24	(285)	N55°W	24°11' Lt.	+7°25'	5.3

1383
87.1
99.7

NE Cor of Sec 1/4 of Sec 33

1183.7 W.H.

W.L.B.
L. S. 1980
N.E. Cor.
S.E. 1/4 Sec. 33
El. 1333.9

1/4 Cor.

87°24' Off Back Term. 810.5

+242.2
1241.9

Dirt Road

Fence

CULTIVATED

1283.6 W.H.

1341.5 W.H.
1341.7

1389.8 Dist. 10,110' 1043.2
1389.5 HVD. Grade 1360 1354.9

32 to 34	697.2 W.H. (720)	Pot	-10° 15'	5.0 5.0
32 to 33	509.4 W.H. (500)	Pot	-17 30'	5.0 5.0
31 to 32	183.6 W.H. (186)	N72½W	2° 45' L	-6° 30'	5.0 5.0
28 to 31	1319.7 W.H. 1321 (1320)	Pot	+0° 46'	5.0 5.0
28 to 30	899.4 W.H. (900)	Pot	-1° 31'	5.0 5.0
28 to 29	280.5 W.H. (287)	N69¾W	9° 09' L	-8° 11'	5.0 6.0

1112.6 W.H.

1098.1 W.H.

REDDISH adobe WITH SCATTERED OUT CROPPINGS

1238.7 W.H.

210'

1269.0
1234.6

1218.1 W.H.

CULTIVATED

1199.1 W.H.

DIRT ROAD

38 to 39	902.2 W.M. (920)	N 72½° W	22° 11' L	-8° 0'	5.0 5.0
π 36 to 38	1751 ✓ (1750)		POT	-0° 13'	5.2 5.2
36 to 37	1111.7 W.M. (1125)	N 50° W	22° 11' R	-6° 15'	5.0 5.0
π 31 to 36	2161 ✓ (2160)		POT	-0° 22'	5.0 5.0
32 to 35	1065.1 (1100)		POT	-10° 15'	5.0 5.0

1112.4 W.M.

~~1239.6~~ 16,888 Dist.
1239.2 ✓ Hor. Dist. = 1346.1

1124.1 W.M.

~~1215.8~~ "
~~1246.2~~ Point 256 should be moved up hogback (to right) about 300' in dist. = 75' in elev.

1046.1 W.M.

43 to 44	592.5 (596)	N51°W	~~P.O.T.~~ 22°06'R	-4° 22'	5.0 5.0
	704.8 W.M.				
⊼ 41 to 43	705.8 (705)	~~N51°W~~	~~22°06'R~~ POT	+1° 01'	5.1 5.1
	319.5 W.M.				
41 to 42	(320)	N73°W	0°28'L	-2° 27'	5.1 5.1
	1691				5.0
⊼ 38 to 41	(1690)		POT	+0° 20'	5.0
	1003.4				5.0
38 to 40	(1020)		POT	-7° 20'	5.0

1228.2 W.M.

Cultivated

198'

~~1261.4~~
1261.5

1232.3 W.M.

1249.6 W.M.

~~1247.9~~
1244.0

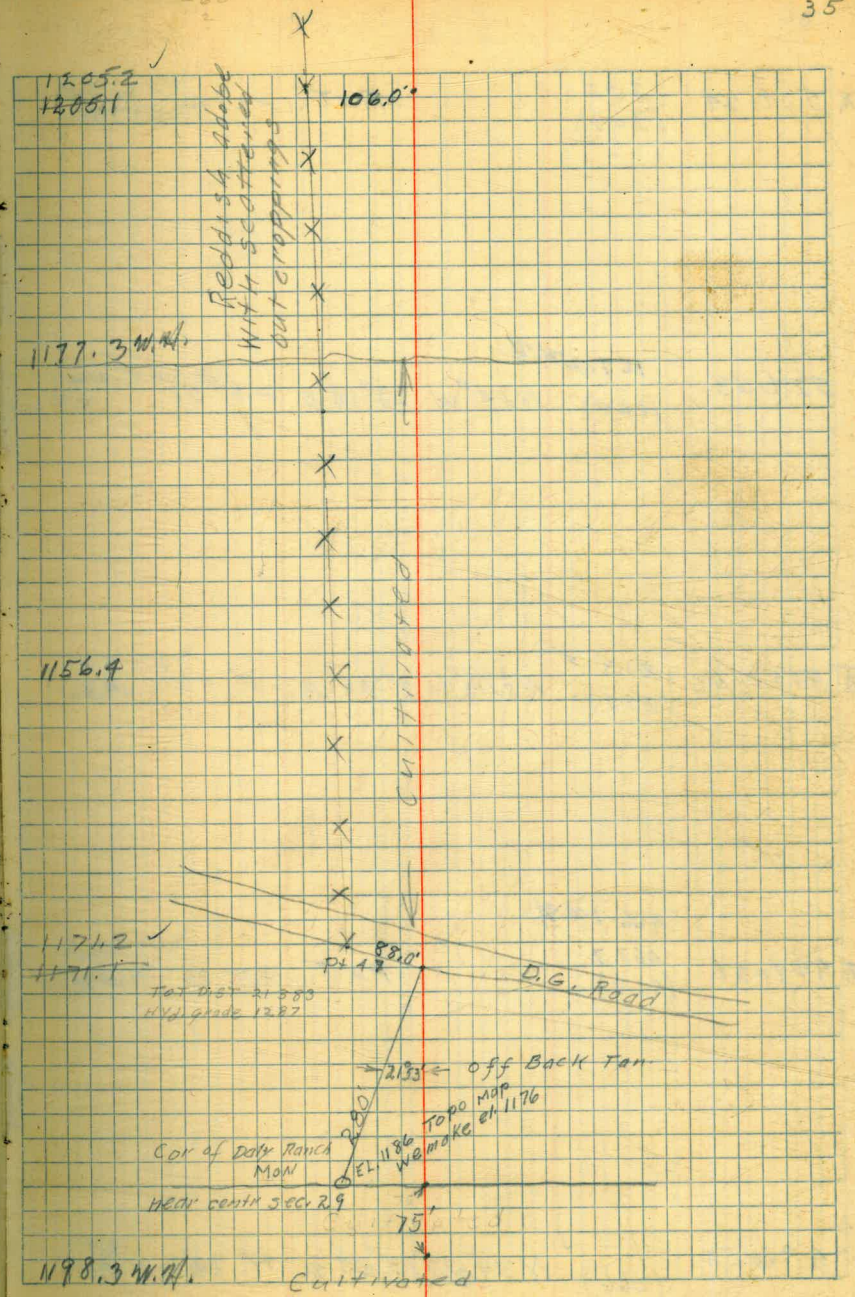
DIRT ROAD

50'

1110.1 W.M.

150'

	898.8 W.M.			
ℸ 47 to 49	899.7 (900)	P.O.T.	+2° 10'	4.9 4.9
Should be after #49				
49 to 48	518.6 W.M. (520)	P.O.T.	-3° 05'	4.9 4.9
	194.7 W.M.			
47 to 46	(195')	P.O.T.	-2° 27'	12.0 4.5
	2096 W.M.			
ℸ 43 to 47	2098 (2100)	P.O.T.	-2° 28'	5.0 5.0
43 to 45	1517.3 W.M. (1520)	P.O.T.	-2° 33'	5.0 5.0



℄ 52 to 54	302 (301)		POT	+ − 0° 48′	4.9 4.9
52 to 53	167.2 W.H. (164)	N 14° W	23° 14′ R	− 5° 52′	12.1 4.7
℄ 51 to 52	213 (212)	N 37½° W	2° 36′ R	0° 00′	4.8 4.8
℄ 49 to 51	466.1 W.H. 467.7 (468)		POT	+ 3° 39′	4.9 4.9
49 to 50	(266)	N 34½° W	15° 58′ R	+ 1° 20′	9.9 4.9

1230.7
~~+2.32.8~~

1210.3 W.H.

1234.9 ✓
~~12-36.5~~

1234.9 ✓
~~12-36.5~~

1206.4 W.H.

58 to 59	178.7 (287)	N58°W	4°07'L	-9°46'	5.1 5.1
58 to 57	165.9 W.M. (167)		POT	-4°43'	5.1 5.1
54 to 58	1661 ✓ (1660)		POT	+0°04'	5.0 5.0
54 to 56	796.2 W.M. (800)		POT	-9°56'	5.0 5.0
54 to 55	608.1 (630)	N54°W	39°34'R ?	+10°15'	5.0 5.0

39° 34' Lt W.M. in office

1184.7 W.M.

1219.0 W.M.

1232.7 ✓

1230.2

24,924 Tot dist
Hyd p: 1249.2

1094.8 W.M.

1115.3 W.M.

T63 to 64	391 ✓ (390)	N 79° W	1° 47' Rt.	−0° 05'	4.9 4.9
T62 to 63	101.8 W.H. 102.8 ✓ (102)	N 20½ W	37° 27' Rt.	+ 2° 45'	5.0 5.0
T58 to 62	1040 ✓ (1039)		POT	−0° 26'	5.1 5.1
58 to 61	607 W.H. (610)		POT	−4° 08	5.1 5.1
58 to 60	407.3 W.H. (410)		POT	−4° 45'	5.1 5.1

1229.1 W.H.
1226.3
1226.6

1229.7 W.H.
1226.9
1227.2

1229.8 W.H.
1222.1 ?
1222.3

1188.8 W.H.

1198.9 W.H.

1387.4 W.H.

~~64 to 67~~	1389 (1390)	PoT	-2° 15'	5.0 5.0
64 to 66	~~564.8~~ (570)	PoT	-5° 30'	5.0 5.0
64 to 65	~~342.7~~ W.H. (345)	N 60° W	41° 25' L -4° 40'	5.0 5.0

1174.5 W.H.

1171.8
1172.1

Tot. dist 27821.0
Wd. gr. = 1245.5

1174.7 W.H.

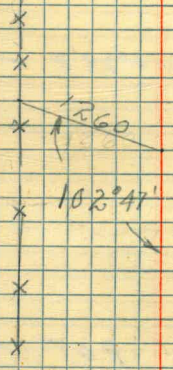
1201.1 W.H.

Heavy Boulders. Numerous outcroppings

71 to 72	366.8 (379)	N 34° W	36° 50' R	−10° 20'	4.8 4.8
67 to 71	1217.7 W.M. 1218.7 (1220)		POT	+2° 30'	4.9 4.9
67 to 70	(800) ✓		POT	−0° 10'	4.9 4.9
67 to 69	551.3 W.M. (560)		POT	−7° 15'	4.9 4.9
67 to 68	297.9 W.M. (300)	N 71½° W	10° 54' L	−4° 51'	4.9 4.9

1160.8 W.M.

1227.7 W.M.
1225.0
+2.3
HYD 1237.6



1172.2 W.M.

1104.4 W.M.

1149.2 W.M.

75 to 77	473.4 W.H. (475)	POT	−3° 23'	4.6 4.6
75 to 76	315.7 W.H. (220)	N 32° W 2°28' R	−8° 0'	4.6 4.6
✱ 71 to 75	1511 (1510)	POT	−0° 22'	4.8 4.8
71 to 74	1124.9 W.H. (1130)	POT	−3° 52'	4.8 4.8
71 to 73	911.6 W.H. (915)	POT	−3° 34'	4.8 4.8

1190.0 W.H.

1187.7

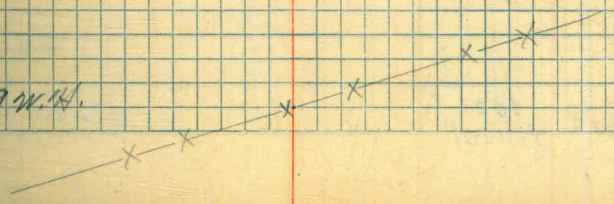
1218.0 W.H.

~~1215.3~~

~~1215.6~~

1151.7 W.H.

1170.9 W.H.



81 to 82	185.3 W.M. (195)		P.O.T. -12°53'	4.7 4.7
80 to 81	569.9 W.M. (570)		P.O.T. -0°58'	4.6 4.6
80 to 79	609.5 W.M. (740)	N61°W	22°47'L -24°50'	4.6 4.6
			Should by P.O.T. by W.M.	
✝ 78 to 80	1142.8 W.M. 1143.9 (1143)	N38°W	5°46' Rt -0°47'	4.5 4.5
			5°46' Lt. W.M. in office	
✝ 75 to 78	1021 ✓ (1020)		-0°22'	4.6 4.6

Should be 4 to 0.

1143.8 W.M.

1186.2 W.M.

Reddish alder scattered on crappings boulders

CREEK

913.8 W.M.

1193.8

1195.8 W.M.

1211.5 W.M.

1208.8

1209.1

85 to 87	479.7 (495)		POT	-10° 08'	4.5 4.5
85 to 86	307.5 (330)	N54°W	6°26'R	-15° 07'	4.5 4.5
85 to 84	313.5 (330)		POT	-8° 15'	4.5 4.5
80 to 85	1371 (1370)		POT	+0° 08' +2° 46'	4.6 4.6
81 to 83	329.7 (303)		POT	-1° 49'	4.7 4.7

1113.3 W.H.

1115.9 W.H.

1152.1 W.H.

1199.0 W.H.
1196.3
~~1195.9~~

Road to Lyons Valley

1176.6 W.H.

	380				
	~~335.1 W.H.~~				
91 TO 92	(360)	S 85° W	42° 18' L	-15° 15'	4.5 4.5
	333.6 W.H.				
91 TO 90	(336)		POT	-4° 50'	8.5 4.5
	1487.2 W.H.				
~~X~~ 85 TO 91	~~1698.1~~ ~~(1700)~~ 1490		POT	-2° 29' ✓	4.5 4.5
85 TO 89	923.9 W.H. (925)		POT	-2° 06'	4.5 4.5
85 TO 88	557.7 W.H. (580)		POT	-11° 18'	4.5 4.5

1043.2 W.H.

Creek

1102.3 W.H.

Dirt road

1134.5 W.H.
1132.1
1122.3

1165.1 W.H.

1087.6 W.H.

	204.8 W.H.			
97 TO 98	(205)	N 80½° W	1° 54' R	-2° 04'	5.0 5.6
	514			
⊼ 95 TO 97	(515)		POT	72° 36'	5.0 5.0
	243.1 W.H.				9.0
95 TO 96	(255)	N 82½° W	18° 52' R	-12° 30'	5.0
	824.3 W.H.				6.0
⊼ 94 TO 95	(835)	S 79° W	5° 47' LT	+6° 39'	5.0
	1071.8 W.H.				
⊼ 91 TO 94	1072.8 (1080)		POT	-5° 0'	4.5 4.5
	507.6 W.H.				13.5
91 TO 93	(380) 544		POT	-14° 59'	4.5

1592
1318
274
518

1151.7 W.H.

1159.1 W.H.
1157.7
~~1138.9~~ 1146.3

338'

1077.9 W.H.

1135.8 W.H.
1134.4
~~1124.5~~

Top. disk 34,859.5 Th. 3 point should be UP
Hvd. sta 11 87.2 The ridge Northerly Approx 200' and 25' higher

1040.8 W.H.
1038.4
~~1028.5~~

85.

VERY POOR STATION

El. 1007 Topo Map
~~El. 1017.4~~ WE make
9.96.2 recheck

989.7 W.H.

				-0.21'	
✱ 99 To 106	~~1640~~		POT	~~-2°22'~~	4.6
	(~~1640~~)				4.6
	1650 ✓				
	565.8 W.M.				
102 To 105	572		POT	-6° 0'	4.6
					4.6
	455.4 W.M.				
102 To 104	(459)		POT	-5° 03'	4.6
					4.6
	139.2 W.M.				
102 To 103	(144)		POT	-10° 30'	4.6
					4.6
SEE Ahead for 99 To 106					
	408.6 W.M.				4.6
⑧ 99 To 102	(410)		POT	-3° 22'	4.6
	108.2 W.M.				1.6
99 To 101	(110)		POT	-7° 26'	1.6
	73' W.M.				4.6
99 To 100	(84)	N 89 3/4° W	9° 31' L	-21° 15'	4.6
	564 ✓			-0.77	5.0
✱ 97 To 99	(564)		POT	+ 8° 46'	5.0

1156.6 W.M.

1155.2
~~1135.7~~

1083.2 W.M.

1102.4 W.M.

1116.9 W.M.

1142.7 W.M.

1152.6 W.M.

1138.3 W.M.

1166.7 W.M.
1165.3
~~1146.2~~ 14.86.4 W.M.

Reddish adobe rocky Numerous outcroppings of large Boulders

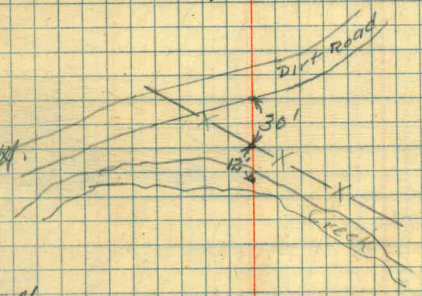
111 TO 113	580.8 W.H. (581)		POT	+1° 09'	4.9 4.9
111 TO 112	344.9 W.H. (346)	S 7 5½ W	18° 15' 30" R	-3° 15'	4.9 4.9
108 TO 111	859.8 W.H. ~~865~~ (~~865~~) 860		POT	-0° 58'	4.5 4.5
108 TO 110	569.8 W.H. (570)		POT	-1° 11'	4.5 4.5
	Exchange distances				
108 TO 109	~~744.4 W.H.~~ (778)		POT	-12° 0'	4.5 4.5
106 TO 108	641.5' (642)		POT	-1° 39' -~~1° 40'~~	4.7 4.7
106 TO 107	303.8 W.H. (315)	S 57¾ W	31° 38' L	-10° 51'	6.7 4.7

1135.3 W.H.

1104.0 W.H.

1123.6 W.H.
1122.2
~~1102.4~~

1122.0 W.H.



1022.2 W.H.

1138.1 W.H.
1136.?
~~1117.0~~

1096.4 W.H.

120 TO 119	387.0 W.M. (390)		POT	−5°0′	8.0 5.0
SEE Ahead for #117 TO #121					
#117 TO 120	(419)		POT	−3°29′	5.0 5.0
117 TO 118	154.2 W.M. (155)	N 73 10/4 W	10°09′30″ L	−4°15′	5.0 5.0
117 TO 116	144.5 W.M. (149)		POT	−9°58′	5.0 5.0
#114 TO 117	751 (751) 755 ✓		POT	−0°23′ +0°24′	5.1 5.1
114 TO 115	(371) ✓	N 63° W	41°57 1/2″ R	+0°34′	5.1 5.1
#111 TO 119	895.1 W.M. 895.3 ✓ (898)		POT	+3°15′ ✓	4.9 4.9

1076.6 W.M.

1113.5 W.M.

1157.8 W.M.

1173.9 W.M.

1169.3 W.M.
1167.9
1148.0 1159.8 W.M.

1178.1 W.M.

1174.4 W.M.
1173.0
1153.2

Continued

	1269.5 W.H.			
T 122 TO 126	1268.3 (1270)	POT	-1° 12' / -1° 13'	4.8 / 4.8
	845.1 W.H.			
122 TO 125	(855)	POT	-6° 15'	4.8 / 4.8
	712.6 W.H.			
122 TO 124	(720)	POT	-5° 58'	4.8 / 4.8
	429.3 W.H.			
122 TO 123	(445)	POT	-10° 50'	4.8 / 4.8
	280.5 W.H.		-5° 25'	
T 121 TO 122	282.5 (283)	POT	-5° 28'	5.0 / 5.0
T 117 TO 121	1111.2 (1115)	POT	-3° 23'	5.0 / 5.0

1050.5 W.H.

1049.1

1028.4

Dirt Road

984.5 W.H.

Creek

1002.6 W.H.

994.9 W.H.

1077.0 W.H.

1075.6

1054.3

1103.6 W.H.

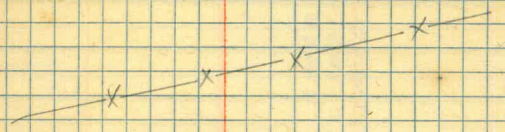
1102.2

1082.3

131 TO 133	240.8 W.H. (245)	P.T	-7° 32'	4.8 4.8
131 TO 132	(20)	P.T	—	
131 TO 130	115.7 W.H. (116)	P.T	+2° 39'	4.8 4.8
126 TO 131	1520.6 W.H. ~~1551.6~~ ~~(1556)~~ 1524	P.T	~~-2° 42'~~ ~~-2° 43'~~	5.0 5.0
126 TO 129	1039.4 W.H. (1060)	P.T	-8° 0'	5.0 5.0
126 TO 128	727.4 W.H. (750)	P.T	-10° 0'	5.0 5.0
126 TO 127	299.1 W.H. (315)	P.T	-13° 0'	5.0 5.0

946.9 W.H.

Mt. Elev.



984.1 W.H.

978.7 W.H.

977.3

~~954.8~~

CULTIVATED

904.4 W.H.

922.2 W.H.

981.5 W.H.

	1676.6 W.H. 1680			
136 TO 139	~~1651.9~~ (1655)	POT	+2° 33'	5.1 5.1
136 TO 138	1159.8 W.H. (1160)	POT	-0° 45'	5.1 5.1
136 TO 137	542.6 W.H. (550)	POT	-6° 15'	8.1 5.1
136 TO 135	304.3 W.H. (305)	POT	-2° 47'	5.1 5.1
131 TO 136	1332.7 W.H. ~~1336.8~~ (~~1344~~) 1336	POT	-2° 51'	4.8 1.8
131 TO 134	520.6 W.H. (522)	POT	-2° 57'	4.8 1.8

987.1 W.H.
985.6
~~961.7~~

897.1 W.H.

Reddish gabbro
Sparse anorthosite inclusions
Large boulders.

845.1 W.H.

Creek

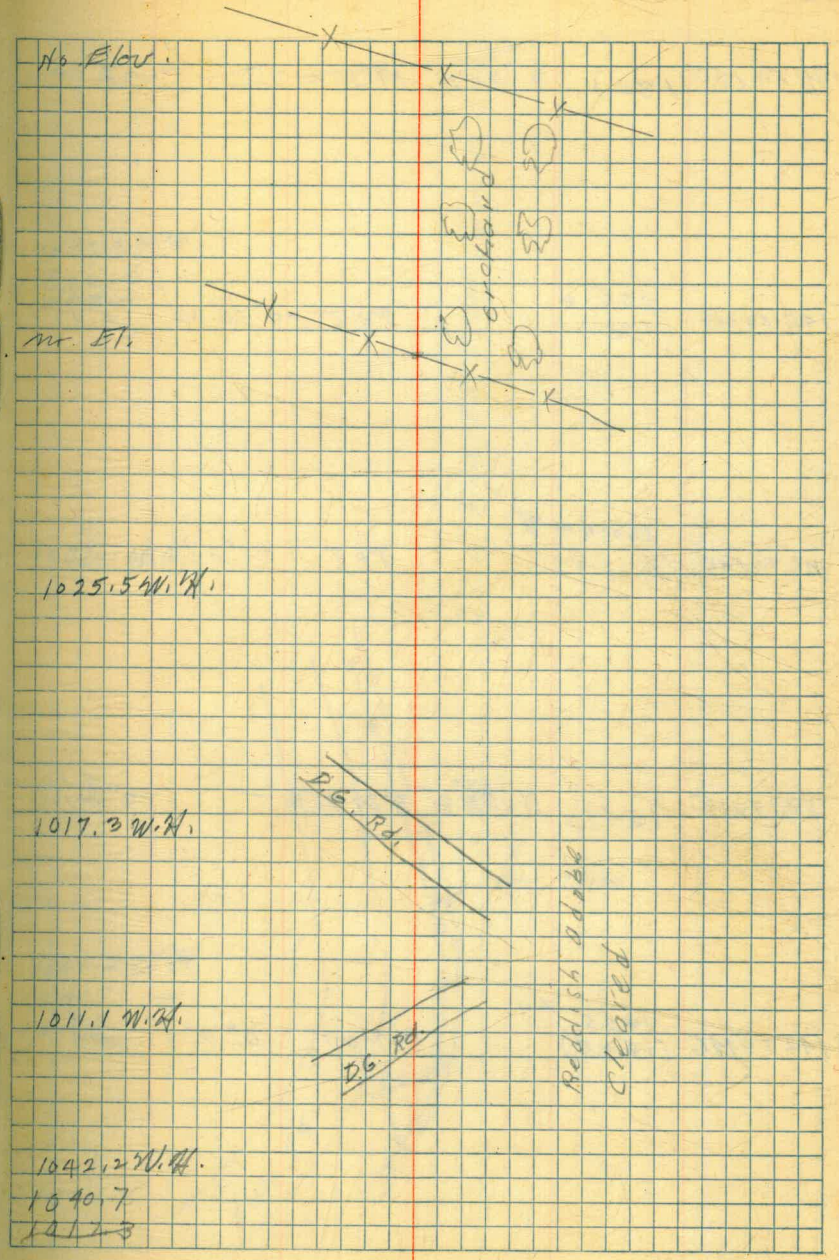
897.5 W.H.

912.3 W.H.
911.0
~~889.2~~

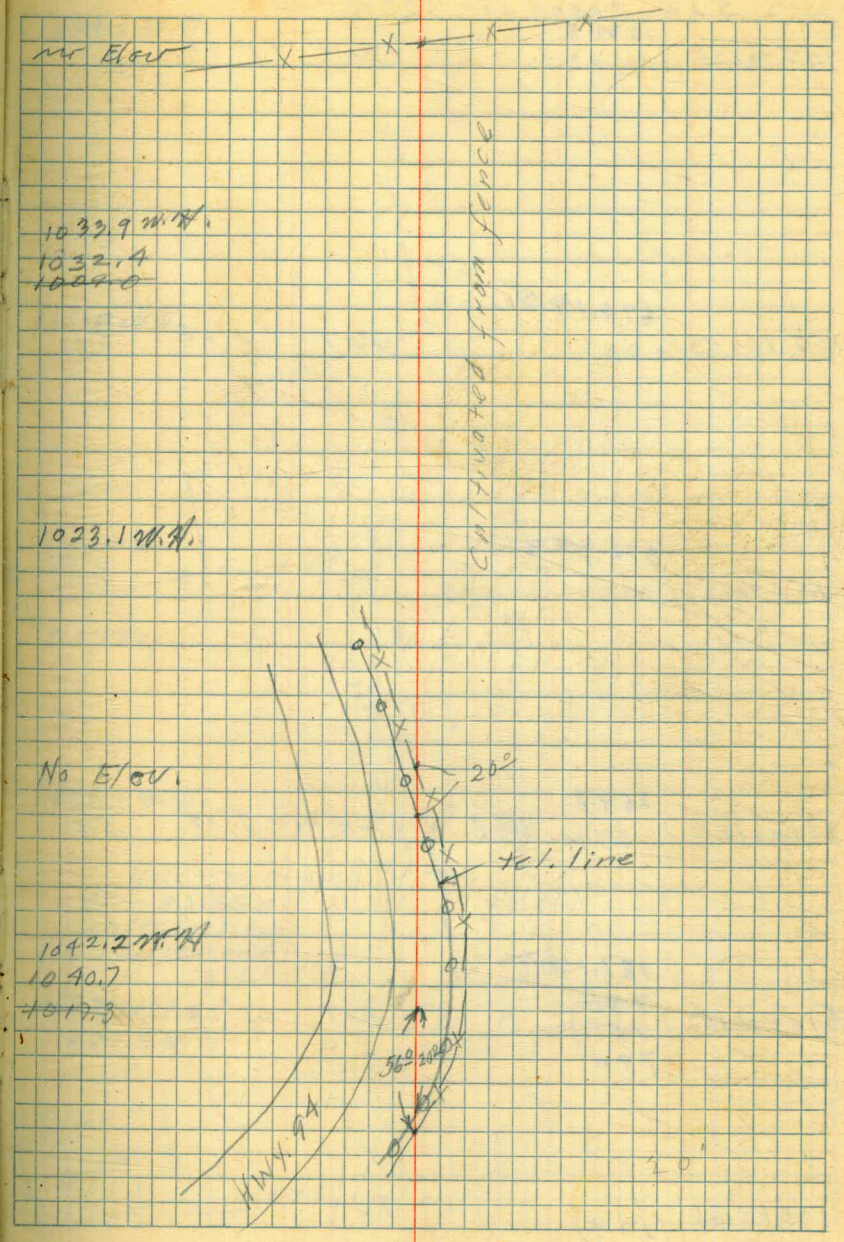
Tilted basalt flows

951.8 W.H.

142 TO 145	(1180)		POT	—	5.0 5.0
142 TO 144	(960)		POT	—	5.0 5.0
142 TO 143	499.5 W.H. (500)	N63 1/4° W	9°37'30" R	−1°55'	5.0 5.0
142 TO 141	167.3 W.H. (171)		POT	−8°28'	5.0 5.0
142 TO 140	289.7 W.H. (293)		POT	−6°08'	5.0 5.0
139 TO 142	649.3 W.H. ~~655.3~~ ~~(660)~~ 654		POT	+1°51'4	5.0 5.0

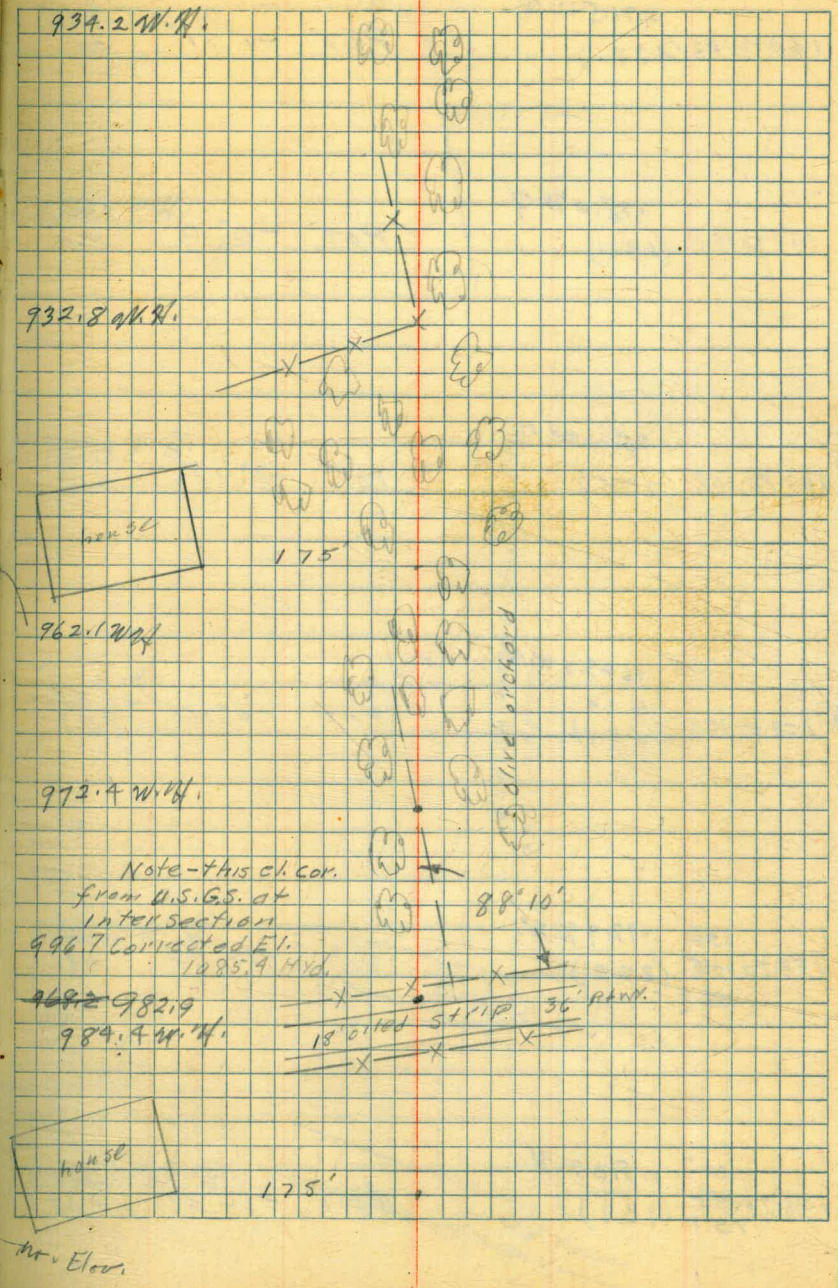


149 TO 150	(180)	N 75 1/4 W	14°35' Lt	—	5.0 5.0
146 TO 149	935 (935)		POT	-0°30'30"	5.1 5.1
146 TO 148	560.4 m.H. (561)		POT	-1°57'	5.1 5.1
146 TO 147	(164)	N 60 3/4 W	2°39'30" Rt	—	5.1 5.1
142 TO 146	1955 (1955)		POT	0° 0'	5.0 5.0

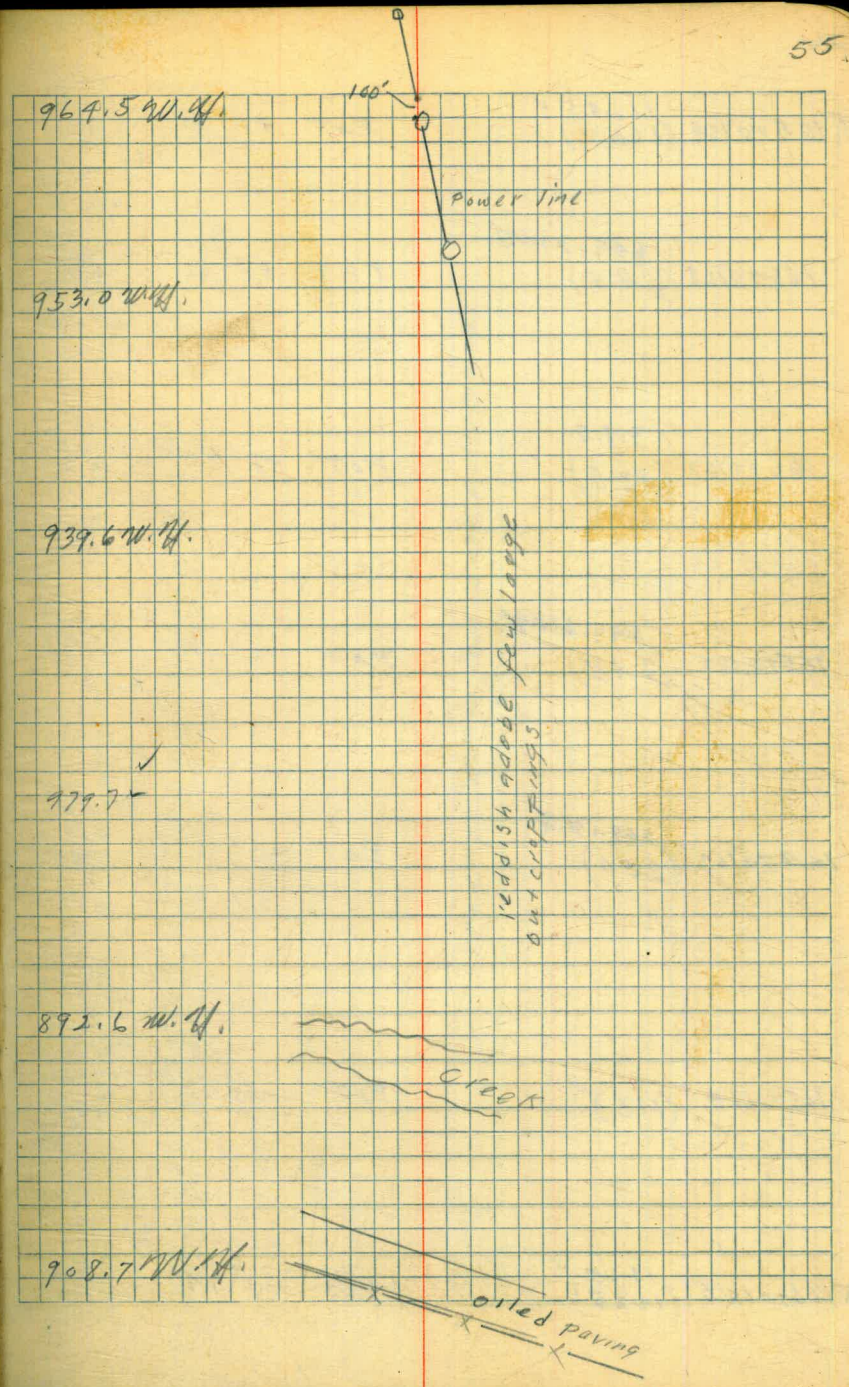


SEE Ahead for 152 TO 160

152 TO 158	1234.8 (1238)		POT −2° 54′	5.1 5.1
152 TO 153	674.1 W.M. (680)		POT −5° 25′	3.1 5.1
152 TO 154	376.9 W.M. (380)		POT −5° 15′	5.0 5.0
152 TO 153	264.8 (267)	N68° W	7° 16′ 30″ Rt. −5° 15′	5.0 5.0
149 TO 152	787.1 W.M. 785 (~~788~~) 790		POT −3° 36′	5.0 5.0
149 TO 151	(219)		POT	—



	471.5 W.H.			
160 To 162	(472)	POT	−1° 51′	5.0 5.0
	178.0 W.H.			
160 To 161	(180)	POT	−6° 0′	13.0 5.0
	251.0 W.H.			
160 To 159	(255)	POT	−7° 17′	13.0 5.0
	1623.8 W.H.			
↑ 152 To 160	1624 (1624)	POT	−0° 36′	5.1 5.1
	156 197.9 W.H.			
158 To ~~155~~	(205)	POT	−10° 15′	8.8 4.8
156?				
	159? 115.3 W.H.			
158 To ~~156~~				
157	(121)	POT	−12° 29′	9.8 4.8



T 165 TO 169	1164.5 (1165) ✓	POT	+1° 10'	5.0 5.0
166 TO 168	644.3 W.H. (645)	POT	+1° 50'	4.8 4.8
166 TO 167	319.5 (325)	POT	-7° 34'	10.8 4.8
165 TO 166	244.6 W.H. (245)	POT	-2° 14'	18.0 5.0
164 TO 163	248.1 W.H. (250)	POT	-5° 0'	5.0 5.0
165 TO 164	(116) ✓	POT	-0° 18'	5.0 5.0
T 160 TO 165	1025 (1025) ✓	POT	-0° 14'	5.1 5.1

997.3 ✓

973.6 W.H.

907.6 W.H.

953.0 W.H.

953.2 W.H.

974.9 W.H.

975.5 ✓

Standard Adobe Sepia Enterprises

175 TO 176	136.9 W.M. (156)	N 74½ W	5°29'30" R	-10° 30'	11.9 4.9
T 169 TO 175	1490 ✓ (1490)		POT	0° 0'	5.9 4.9
172 TO 174	545.5 W.M. (565)		POT	+10° 43'	4.8 4.8
172 TO 173	212.7 W.M. (220)		POT	-10° 30'	4.8 4.8
171 TO 172	(150) ✓		POT	+6° 12'	11.0 5.0
171 TO 170	138.2 145'		POT	-12° 32'	4.9
SEE Ahead for T. #169 TO #175					
169 TO 171	432.1 W.M. (441)	N 80° W	12° 05' L	-8° 09	4.9 4.9

940.1 W.M.

998.3 ✓ 1044.5

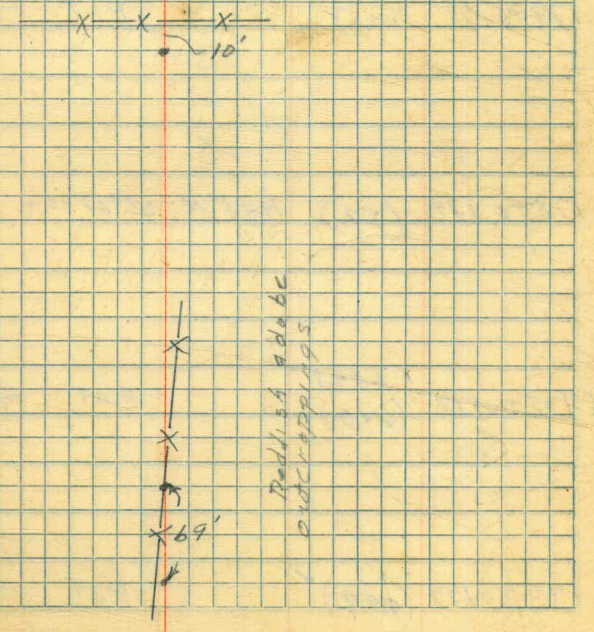
1035.1 W.M.

892.5 W.M.

931.9 W.M.

906.7 W.M.

937.4 W.M.



VEIN 100 FT. from fence
Numerous small openings
Many Boulders

Path 5.4 wide
Outcroppings

		856.6 W.H.			
T 178 ~~175~~ TO 183	858.9 (863)		POT	-4°56'30"	5.0 5.0
179 TO 182	493.4 W.H. (560)		POT	-20°10'	11.1 5.1
179 TO 181	239.7 W.H. (268)		POT	-18°58'	5.1 5.1
179 TO 180	157.2 W.H. (190)		POT	-24°32'	9.1 5.1
178 TO 179	(52)	N49°W	25°31'15"R	0.0	11.0 5.0
T 175 TO 178	609.8 (610)		POT	-1°02'30"	5.9 4.9
175 TO 177	(499)		POT	-0°29'	4.9 4.9

911.9

793.0 W.H.

898.0 W.H.

904.4 W.H.

980.2 W.H.

986.2

994.1 W.H.

VARIATION OF COMPASS FROM TRUE N.

188 TO 189	271.9 W.H. (272)	N 64° W	14° 48' L	+0° 52'	9.2 5.2
183 TO 188	1494.9 W.H. 1494 (1495)		POT	+1° 35'	4.8 4.8
183 TO 187	1161.4 W.H. (1170)		POT	-1° 55'	4.8 4.8
185 TO 186	384.4 W.H. 441		POT	-21° 0'	4.9 4.9
183 TO 185	433.2 W.H. (439)		POT	-6° 37'	4.8 4.8
183 TO 184	208 W.H. (220)		POT	-13° 30'	4.8 4.8

27.6
13.7
41.3

953.3 W.H.

953.2 ✓ Hyd. 1034.6
Tot. Dist.
6053.6

812.0 W.H.

714.0 W.H.

861.6 W.H.

862.5 W.H.

very rocky readings added
numerous small readings
heavy boulders

		941.8 W.M.			
T 192 T 196	943.2 (952)		POT	-5°55'30"	5.2 5.2
192 TO 195	838.9 W.M. (850)		POT	-7°10'	5.2 5.2
192 TO 194	651.2 W.M. (685)		POT	-12°50'	5.2 5.2
192 TO 193	498.5 W.M. (500)	S68°W	47°51'L	-17°45'	5.2 5.2
192 TO 191	147.7 W.M. (153)		POT	-10°43'	5.2 5.2
T 188 TO 192	846.6 ✓ (848)		POT	+2°21'	5.2 5.2
188 TO 190	441.3 (442)		POT	+2°15'	5.2 5.2

890.2 ✓
~~890.8~~

882.8 W.M.

839.6 W.M.

842.8 W.M.

960.0 W.M.

988.0 W.M.
987.5
~~988.1~~

970.5 W.M.

VERY ROCKY HILLSIDE ADOBE

199 TO 204	999.2 W.H. (1003)	POT	-3° 33'	5.2 5.2
199 TO 203	864.9 W.H. (875)	POT	-6° 13'	5.2 5.2
199 TO 202	731.5 W.H. (741)	POT	-6° 31'	7.2 5.2
199 TO 201	409.3 W.H. (424)	POT	-10° 43'	5.2 5.2
199 TO 200	204.7 W.H. (238)	POT	-21° 38'	5.2 5.2
π 196 TO 199	473.0 W.H. 473.2 (490)	POT	-10° 44'	5.4 5.4
196 TO 198	207.3 W.H. (215)	POT	-10° 53'	11.4 5.4
196 TO 197	80.2 W.H. (83)	POT	-10° 30'	5.4 5.4

738.5 W.H.

706.3 W.H.

715.0 W.H.

723.0 W.H.

717.9 W.H.

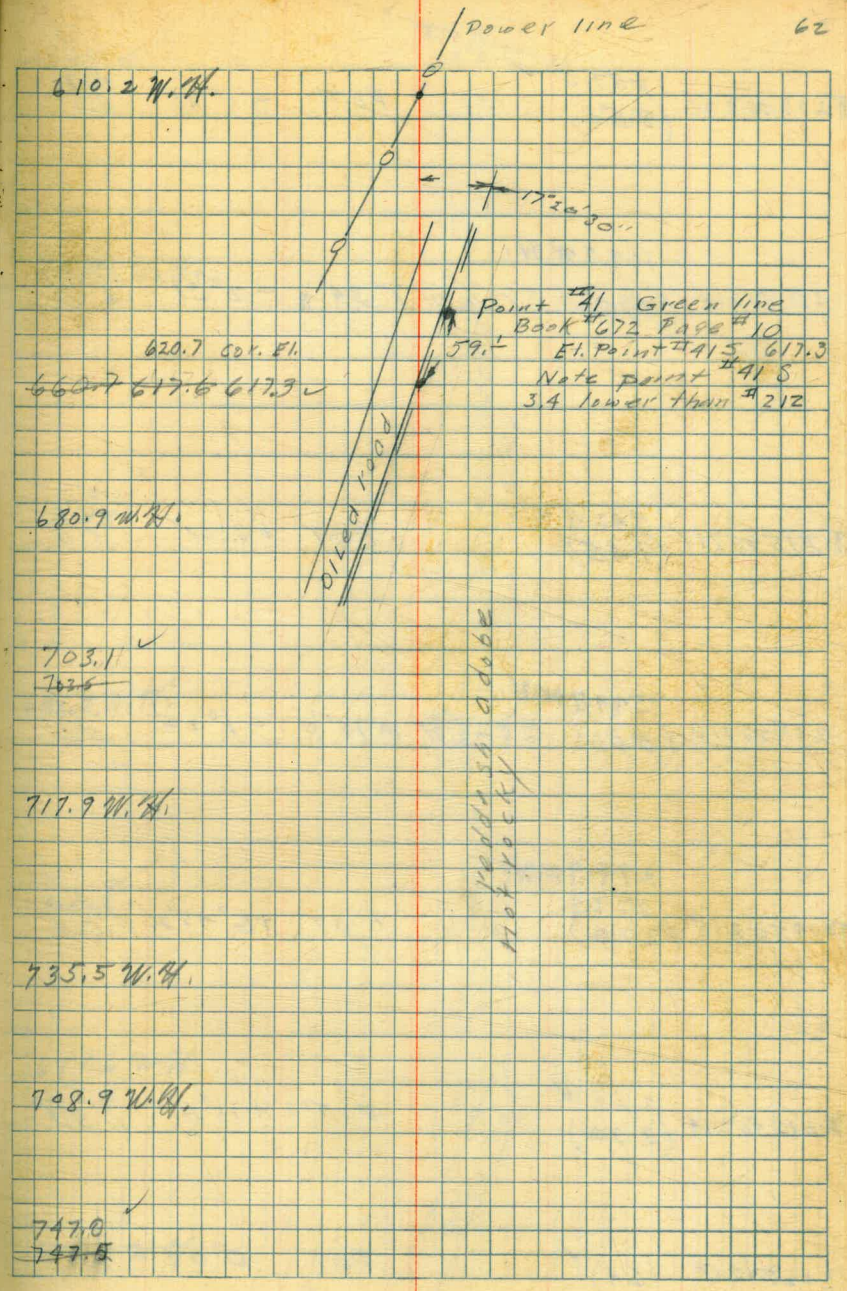
800.5 ✓
801.1 ✓

844.3 W.H.

875.3 W.H.

Vol. XXIII, 1922, Orion

	304.8 W.H.			
212 TO 211	(305)	POT	-1° 20'	5.1 5.1
	723.8 W.H.			
	724.1			
209 TO 212	(734)	POT	-6° 45' 30"	5.0 5.0
	194.5 W.H.			
209 TO 210	(197)	POT	-6° 30'	5.0 5.0
	502.2			
206 TO 209	(506)	POT	-5° 0'	5.1 5.1
	276.9 W.H.			
206 TO 208	(280)	POT	-6° 0'	5.1 5.1
	119.9 W.H.			
206 TO 207	(121)	S 68½° W	0° 23' R -5° 30'	5.1 5.1
	239.0 W.H.			
206 TO 205	(245)	POT	-9° 03'	5.1 5.1
	1353.8 W.H.			
	1354.1			
199 TO 206	(1356)	POT	-2° 16'	5.2 5.2



217 TO 220	857.5 ✓ (858)		POT	−1°25′	4.7 4.7
217 TO 218	169.7 W.M. (170)	589½° W	7°34′ R	−2°31′	4.7 4.7
215 TO 217	942.4 ✓ (945)		POT	+3°09′	5.0 5.0
215 TO 216	549.7 W.M. (550)	582½° W	14°19′ R	−1°22′	5.0 5.0
214 TO 215	274.9 W.M. 277.3 (276)		POT	+6°47′30″	5.0 5.0
212 TO 214	262 ✓ (272)		POT	+11°0′	5.1 5.1
212 TO 213	(64) ✓		POT	0°0′	5.1 5.1

7354 ✓
2346

744.1 W.M.

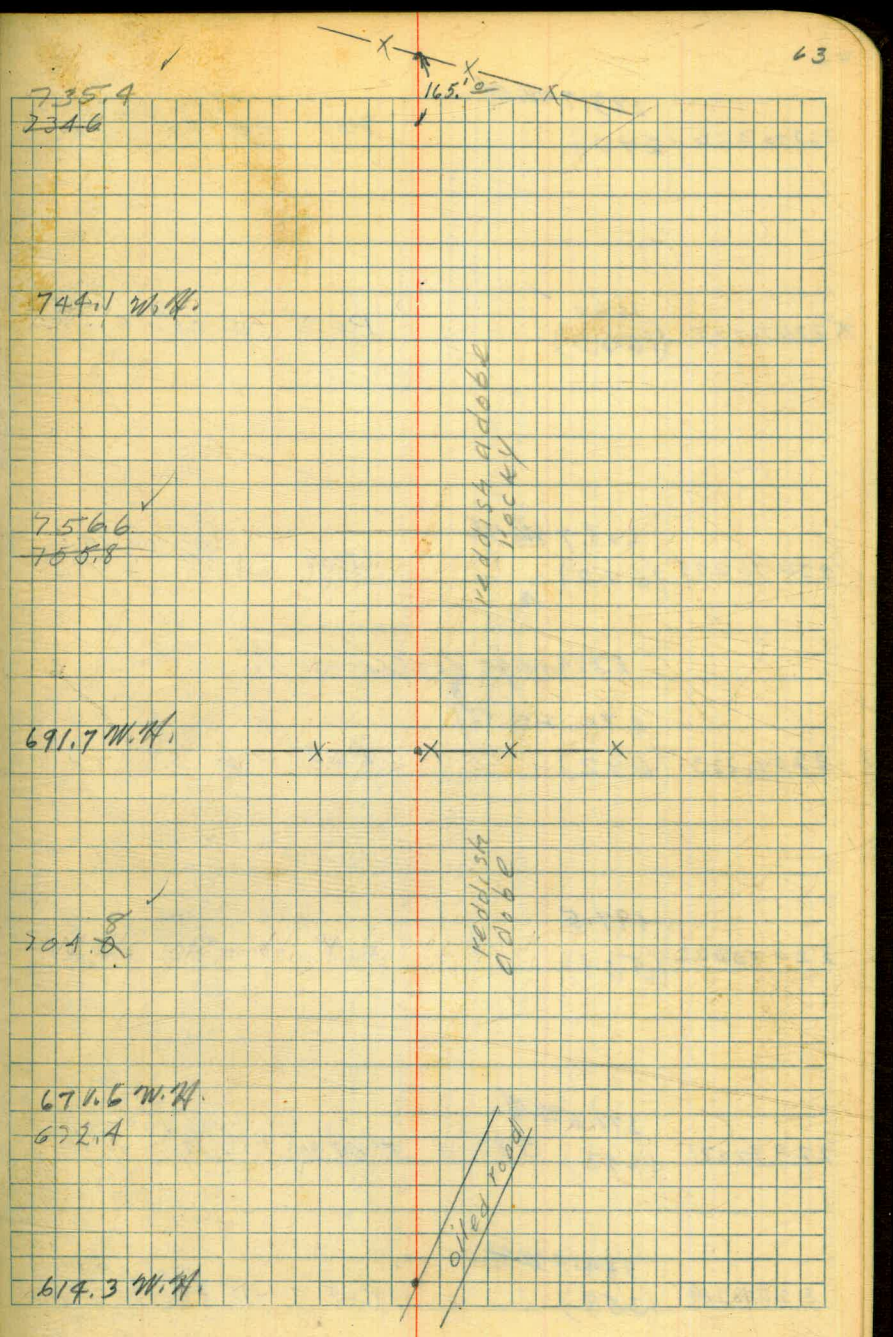
7566 ✓
7558

691.7 W.M.

704.8 ✓

671.6 W.M.
672.4

614.3 W.M.



221 TO 226	283.7 W.H. (290)		POT	-8° 29'	13.2 5.2
220 TO 227	1660 (1660)		POT	-0° 01'	5.1 5.1
220 TO 224	608.7 W.H. (610)		POT	-2° 39'	5.1 5.1
?	Exchange distances				
220 TO 223	674.2 W.H. (682)		POT	-6° 10'	5.1 5.1
220 TO 222	497.5 (504)		POT	-6° 32'	5.1 5.1
220 TO 221	177.5 W.H. (243)	S 85° W	5° 09' 30" L	-13° 19'	5.1 5.1
220 TO 219	344.0 W.H. (358)		POT	-11° 25'	5.1 5.1

684.6 W.H.

734.7

703.9 W.H.

670.3 W.H.

678.4 W.H.

680.9 W.H.

665.9 W.H.

Exchange distances 220 to 225 1660 220 to 224 608.7 220 to 223 674.2 220 to 222 497.5 220 to 221 177.5 220 to 219 344.0

233 TO 232	393.3 W.H. (415)	PDT	−13° 13′	8.1 5.1
233 TO 231	549.1 W.H. (555)	POT	−5° 54′	5.1 5.1
233 TO 230	723.3 W.H. (730)	POT	−5° 29′	5.1 5.1
π 229 TO 233	878.2 W.H. 878.4 (882)	POT	+3° 46′	5.1 5.1
π 227 TO 229	522.7 W.H. 522.9 (523)	POT	−1° 18′	5.2 5.2
227 TO 228	276.4 W.H. (280)	S 69½° W 15° 47′ L	−6° 35′	5.2 5.2
227 TO 225	427.2 W.H. (430)	POT	−4° 40′	5.2 5.1

685.6 W.H.

724.2 W.H.

707.5 W.H.

780.9 ✓

723.1 ✓

~~722.3~~

703.0 W.H.

700.0 W.H.

T 239 TO 240	318.1 (338) ✓		POT	−9° 52′	5.1 5.1
T 238 TO 239	772 (786) ✓	N 89½° W N 74° W	41° 40′ R 41° 40′ Rh. by W.H. in office	−7° 40′	5.1 5.1
T 236 TO 238	696.9 (715) ✓		POT	−9° 14′	5.1 5.1
236 TO 237	~~354.9 W.H.~~ (270)	S 48¼ W	20° 39′ L	−13° 42′	7.1 5.1
236 TO 235	211.1 W.H. (220)		POT	−11° 37′	13.1 5.1
236 TO 234	306.4 W.H. (310)		POT	−6° 11′	5.1 5.1
T 233 TO 236	474A (475) ✓		POT	+2° 01′	5.1 5.1

~~543.3~~ ✓
~~542.5~~

580.5 ✓
~~579.6~~

684.4 ✓
~~683.6~~

733.2 W.H.

745.9 W.H.

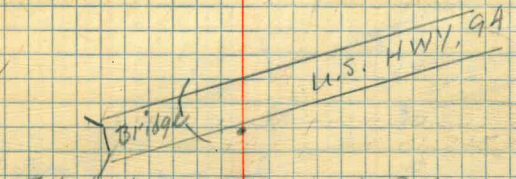
764.1 W.H.

797.3 W.H.
~~797.6~~
~~796.8~~

Shots 45 to 47 inclusive
Shots 48 to 50 inclusive

240 TO 243	1885.9 W.H. 1886.7 (1910) (1730) 1719.2	POT	-6° 26' 6° 24	5.1 5.1
240 TO 242	988 W.H. (1031)	POT	-11° 47'	5.1 5.1
240 TO 241	690.5 W.H. (710)	POT	-11° 41'	5.1 5.1

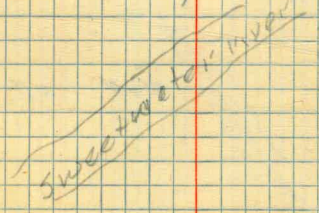
~~316.6~~
~~309.9~~
330.5



Tot. dist 7493' Hyd. 941.7

levels from U.S.G.S. BM. el. 338
make this point el. 315.9

317.2 W.H.



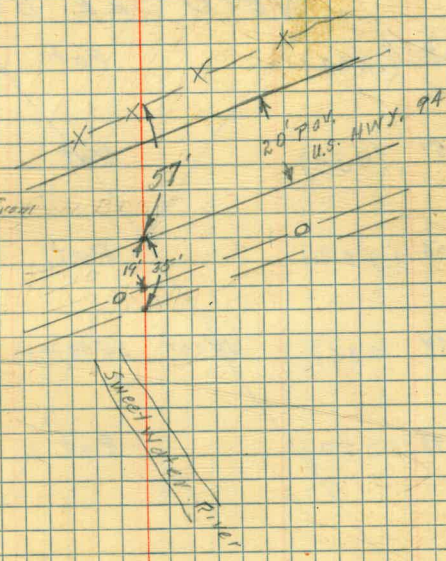
380.5 W.H.

Line Revision from Point #240

℄ 243 to 246	(1320 ~~1310~~)		Pot	+14° 10.5'	5.2 5.2
243 to 245	(640)		Pot	+7° 41'	5.2 5.2
243 to 244	(346)		Pot	+4° 30'	5.2 5.2
℄ 240 to 243	(1816)		Pot	-5° 59'	5.1 5.1
240 to 242	(900)		Pot	-11° 50'	5.1 5.1
240 to 241	(700)	N 80½° W N 13½° W	10° 58' R	-11° 45'	5.1 5.1

631.0

320.0 Corrected el. from B.M. Page #67
~~334.0~~



VOID SEE BOOK 678 Page 1

~~T~~ 247 to 252	(1262)		Pot	+1°23'	5.0 5.0
247 to 251	(930)		Pot	-2°52'	5.0 5.0
247 to 250	(552)		Pot	-4°57'	10.0 5.0
247 to 249	(234)	West	36°59'30"Lt.	-4°20'	5.0 5.0
~~T~~ 247 to 248	(227)		Pot	-10°28'	1.8 1.8
~~T~~ 246 to 247	(48)	N 52° W	11°20' Rt.	0°0'	1.6 5.2

560.6

591.0

631.6

Stadia Location of Control Points
For TOPO of Res. Site.

0 to 3	1272.0 (1293)	S 2°30' E	87°22' Lt.	+7° 27'
0 to 2	1112.9 (1130)	S 1½° W	73°10' Lt.	+ 7° 13'
0 to 1	820.4 (863)	S 4° W	50° 0' Lt.	+ 12° 53'

4.9
4.9

4.9
4.9

1.9
4.9

O

726.9

701.1

748.2

Point 0 = Point # 252 (page 69) El. 560.6

Dulzura Rd.

Levels to Res. Site N.E. Jamul 12-5-44

T.P.	8.05	1048.05		1040.0
T.P.	10.31	1054.21	4.15	1043.90
T.P.	12.11	1066.30	0.02	1054.19
T.P.	13.12	1079 31 ~~1079.76~~	0.11	66.19
T.P.	12.83	1092.62	0.12	79.19
T.P.	12.70	1104.32	0.20	1091.82
T.P.	12.91	1117.43	0.00	1104.52
T.P.	12.49	1129.77	0.15	1117.28
T.P.	12.64	1142.36	0.05	1129.72
T.P.	12.25	1154.61	0.00	1142.36
T.P.	12.70	1167.13	0.18	1154.43
T.P.	0.66	1154.69	13.10	1154.03
T.P.	0.62	1142.41	12.90	1141.79
T.P.	0.11	1129.83	12.69	1129.72
T.B.M. #1	0.11	1124.42	5.52	1124.31
T.P.	11.98	1123.34	13.06	1111.36
T.B.M. #2			9.92	1113.42

Dec. 5, 1944
Soper
18.79
O'Hay
Stephens

71

U.S.G.S. - B.M. N.E. Cor. Inters. by Jamul School

Set Ginney Rt. of Road

Set Ginney 150' S.W. Rd.

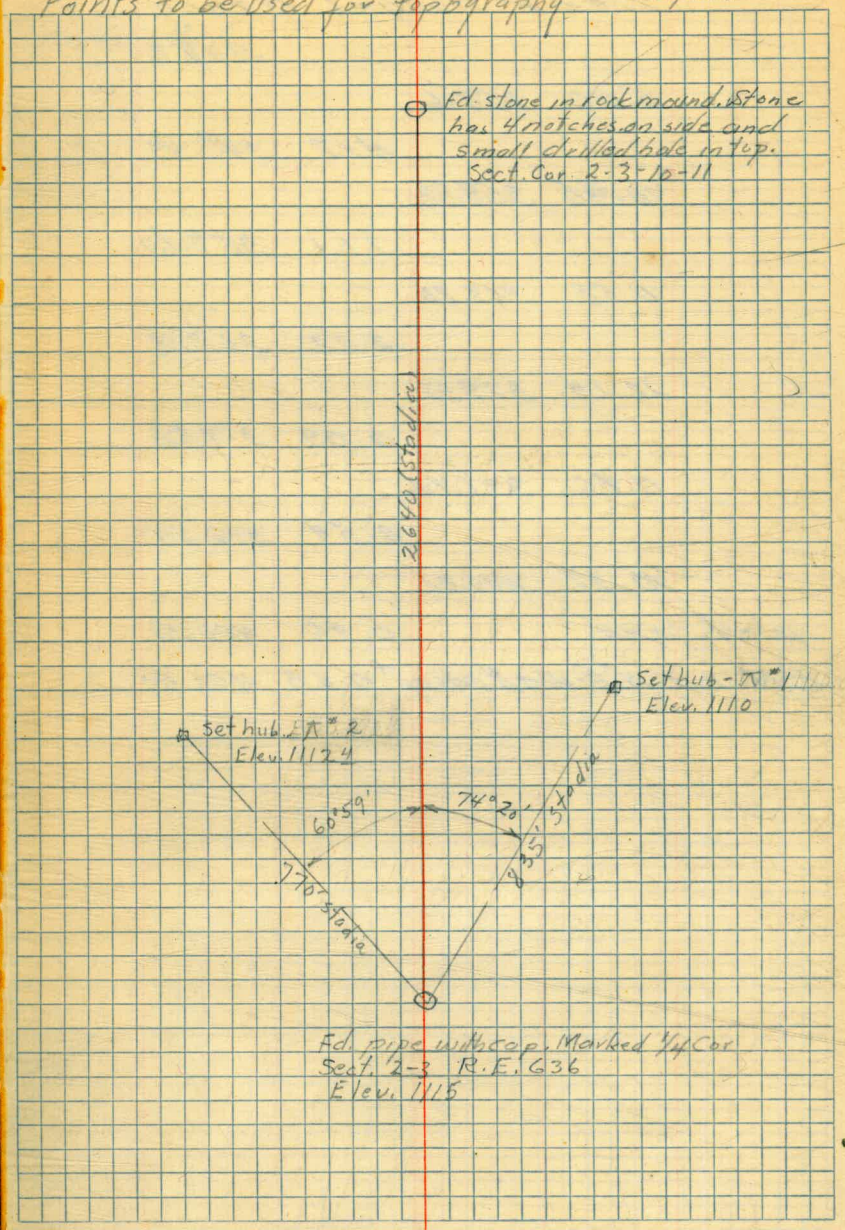
Dolzora R.L.

Res. site near Jamul

Dec. 6, 1944
Sarer
King
Stephens

72

Points to be used for topography



Sept. 22, 1950 Rainey - King

Check levels to well
Near Hodges grade

			347.6
5.00	352.6		
		+1.17	348.43
10.45	358.88		
		1.21	357.67
11.58	369.25		
		2.07	367.18
12.19	379.37		
		0.09	379.28
11.80	391.08		
		0.54	390.54
10.37	400.91		
Well grnd.		0.40	400.51
B.M. on N.E. well casing		+0.68	401.59

U.S.G.S. B.M.

1386
663
667

−22'

20 TO 19	(280)	S 29°E	POT	−15° 45'	4.8 4.8
18 TO 20	667 (667)	N 29°W	48° 50' L	−0° 22'	4.8 4.8
12 TO 18	1906 (1906)	N 20°E	POT	+0° 31'	4.8 4.8
16 TO 17	(132)	N 20°W	POT	−7° 06'	10.7 4.7
16 TO 15	(260)	S 20°W	POT	−5° 45'	15.7 4.7

1389.1
3.1
1392.5

1385.1

Point 7 Green Lime

208°

3.1 higher

53° 57' off Back Tank

1389.4

Radius 1925 Circle

Power line

103'

~~1~~ 24 TO 25	(216)	N 72°30'W	7°20' R	0°-57'	4.8
24 TO 23	(345)	S 79 E	POT	-4°05'	11.8 4.8
~~1~~ 22 TO 24	547 (~~547~~)	N 79 W	32°30'30" L	+0°49'	4.7 4.7
12 TO 21	(~~270~~)	S 46 E	POT	-14°05'	4.7 4.7
~~1~~ 20 TO 22	519 (519)	N 46½° W	18°28' L	-0°22'	4.7 4.7

1389.1

Radio/54 adobe 30 11

1392.7 Ahead
1389.6 Back

Ginney In pass #3
El. 1392.75

HXO 13261
7580 TOTAL DIST.

1384.8

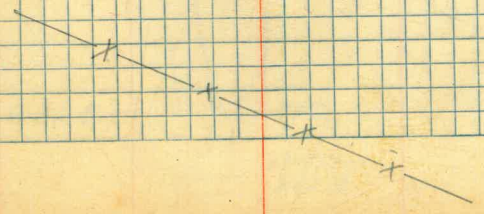
8.6
3.3
11.9
1381.0
1369.1

1300
282
1018

T25TO30	(1381)		POT	-5°25'30"	4.3 4.3
25TO29	(1018)		POT	-9°07'	4.3 4.3
25TO27	(345)		POT	-9°35'	4.3 4.3
25TO26	(176)	N70°W	2°21'R	-10°15'	4.3 4.3

1259.1 HYO. 136578
TOT 9165

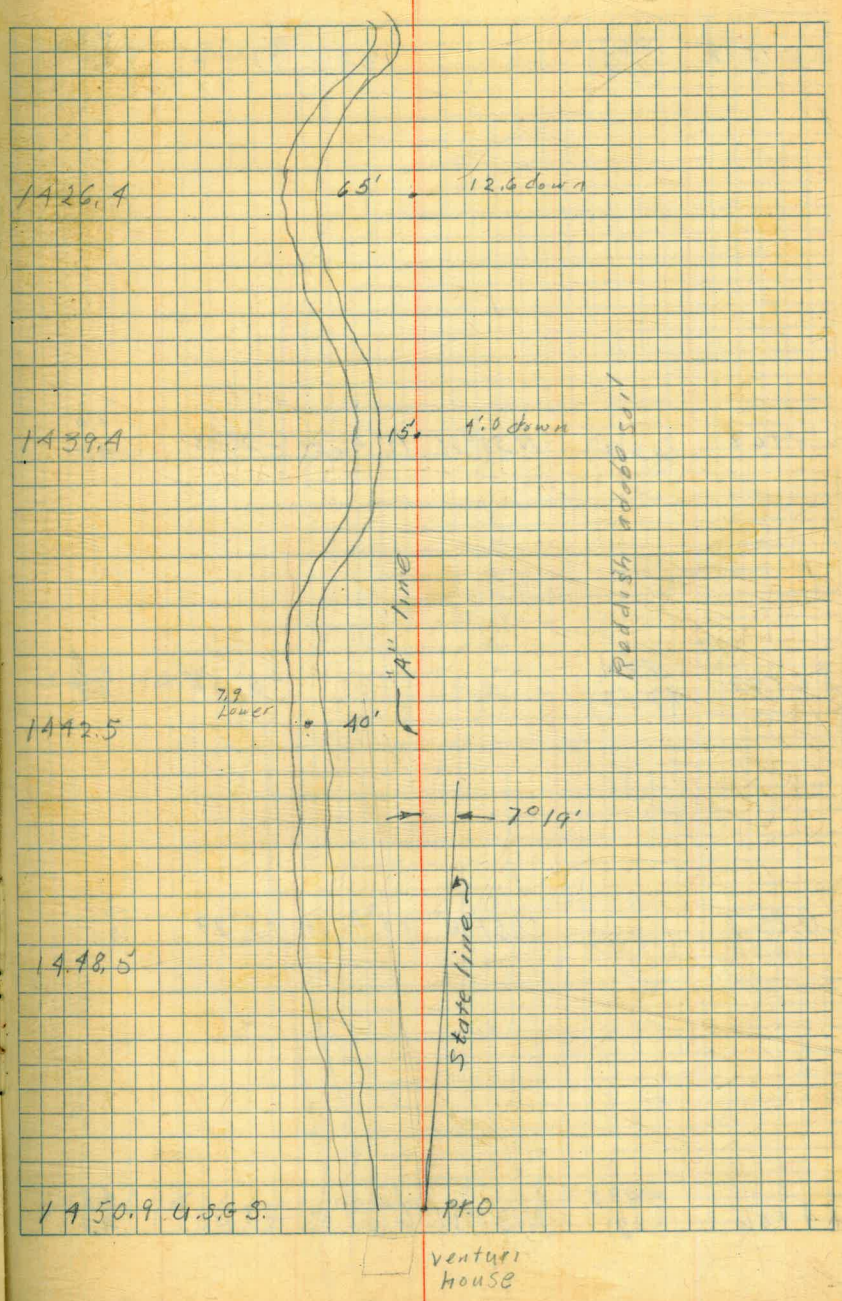
Reading added shallow out stopping
25 TO 1 check



Line "A"

Relocation - Dulzura Weir

				4.8
A TO 5	(147)		POT. -8°20'	4.8
				5.0
3 TO 4	374.5 (375)	N44°W	27°29' Rt. -2° 0'	5.0
				4.8
2 TO 3	206 (206)	N 71°W	28° 18' Lt. 70° 52'	4.8
				4.7
1 TO 2	165.8 (166)	N43°W	12°42' Rt. -2°05'	4.7
				4.6
O TO 1	(280)	N 56°W	-0° 30'	4.9
El. of Pt. O				4.9



8 TO 12	863.1 (864)		POT	-1°56'	4.9 4.9
8 TO 9	(167)	N 38° W	19°46' Rt.	-2°03'	4.9 4.9
6 TO 8	584 (584)		POT	-0°57'	4.8 4.8
6 TO 7	(185)	N 57 W	19°46' Lt	-5°29'	4.8 4.8
4 TO 6	547.6 (548)	N 37° W	6°22' Rt.	-1°36'	4.8 4.8

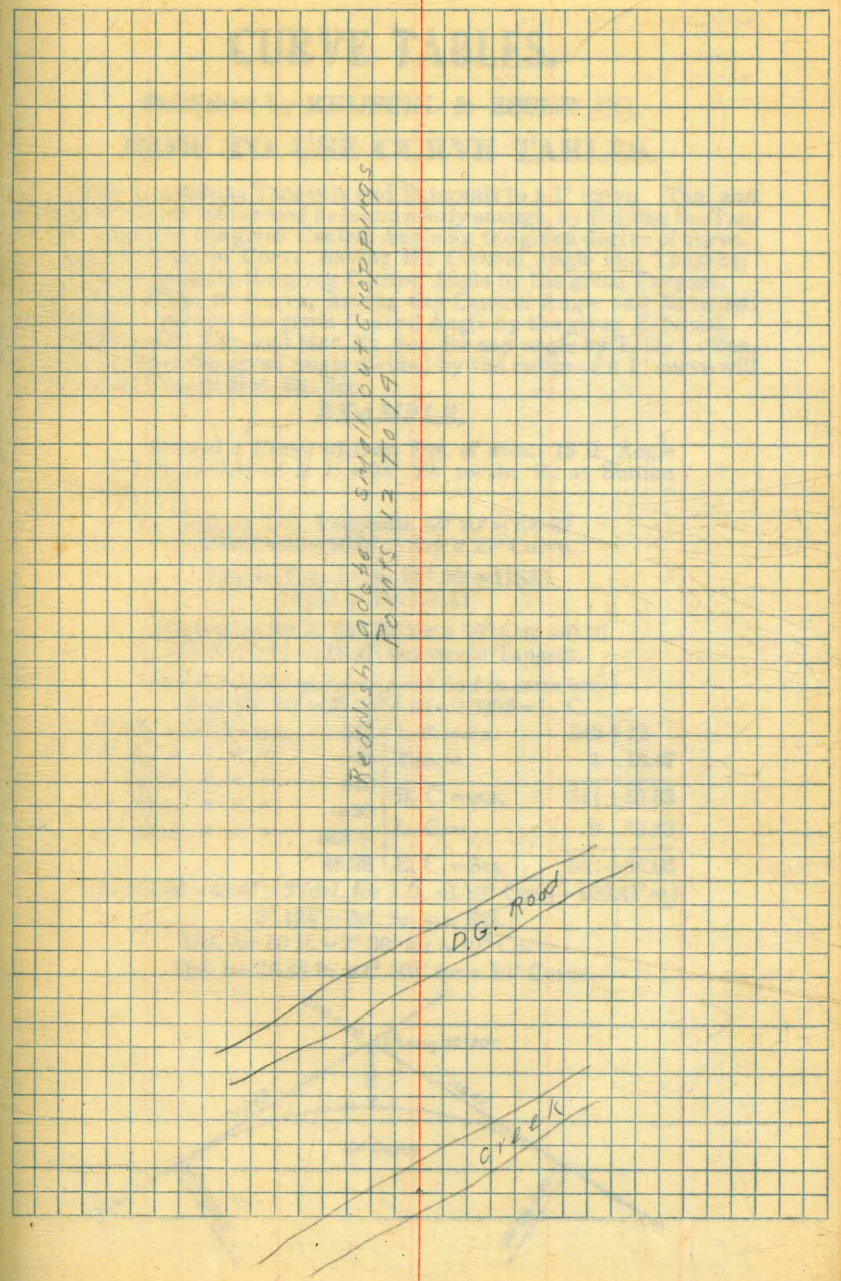
1481.8 1372.2

1401.4

100' 19.7 down

1420.6 1411.1 60' 23.5 down

12 TO 16	1200 (1200)		POT	−0°31′	4.8 4.8
12 TO 14	(748)		POT	−1°30′	4.8 4.8
12 TO 13	(417)	N 20°E	57°27′Rt.	−3°28′	8.8 4.8
12 TO 11	(141)	S 38°E	POT	−3°	12.8 4.8
12 TO 10	(445)	S 38°E	POT	−2°28′	8.8 4.8



CURVE TABLES.

Published by KEUFFEL & ESSER CO.

HOW TO USE CURVE TABLES.

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

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

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

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

EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle of Intersection or I. P. = 23° 20′ to the R. at Station 542+72.

Ext. in Tab. I opposite 23° 20′ = 120.87
120.87 ÷ 12 = 10.07. Say a 10° Curve.

Tan. in Tab. I opp. 23° 20′ = 1183.1
1183.1 ÷ 10 = 118.31.

Correction for A. 23° 20′ for a 10° Cur. = 0.16
118.31 + 0.16 = 118.47 = corrected Tangent.

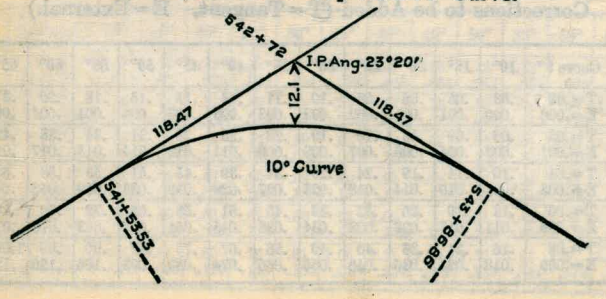
(If corrected Ext. is required find in same way)
Ang. 23° 20′ = 23.33° ÷ 10 = 2.3333 = L. C.

2° 19½′ = def. for sta.	542	I. P. = sta.	542+72
4° 49½′ = " " "	+50	Tan. =	1 .18.47
7° 19½′ = " " "	543	B. C. = sta.	541+53.53
9° 49½′ = " " "	+50	L. C. =	2 .33.33
11° 40′ = " " "	543+	E. C. = Sta.	543+86.86
	86.86		

100 − 53.53 = 46.47 × 3′ (def. for 1 ft. of 10° Cur.) = 139.41′ = 2° 19½′ = def. for sta. 542.

Def. for 50 ft. = 2° 30′ for a 10° Curve.

Def. for 36.86 ft. = 1° 50½′ for a 10° Curve.



Natural Trigonometrical Functions

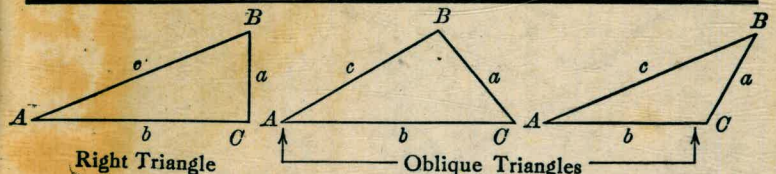
Angle.	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′							° ′
32	.5299	.6249	1.1792	1.887	1.600	.84805	58
10	.5324	.6289	1.1813	1.878	1.590	.84650	50
20	.5348	.6330	1.1835	1.870	1.580	.84495	40
30	.5373	.6371	1.1857	1.861	1.570	.84339	30
40	.5398	.6412	1.1879	1.853	1.560	.84182	20
50	.5422	.6453	1.1901	1.844	1.550	.84025	10
33	.5446	.6494	1.1924	1.836	1.540	.83867	57
10	.5471	.6536	1.1946	1.828	1.530	.83708	50
20	.5495	.6577	1.1969	1.820	1.520	.83549	40
30	.5519	.6619	1.1992	1.812	1.511	.83389	30
40	.5544	.6661	1.2015	1.804	1.501	.83228	20
50	.5568	.6703	1.2039	1.796	1.492	.83066	10
34	.5592	.6745	1.2062	1.788	1.483	.82904	56
10	.5616	.6787	1.2086	1.781	1.473	.82741	50
20	.5640	.6830	1.2110	1.773	1.464	.82577	40
30	.5664	.6873	1.2134	1.766	1.455	.82413	30
40	.5688	.6916	1.2158	1.758	1.446	.82248	20
50	.5712	.6959	1.2183	1.751	1.437	.82082	10
35	.5736	.7002	1.2208	1.743	1.428	.81915	55
10	.5760	.7046	1.2233	1.736	1.419	.81748	50
20	.5783	.7089	1.2258	1.729	1.411	.81580	40
30	.5807	.7133	1.2283	1.722	1.402	.81412	30
40	.5831	.7177	1.2309	1.715	1.393	.81242	20
50	.5854	.7221	1.2335	1.708	1.385	.81072	10
36	.5878	.7265	1.2361	1.701	1.376	.80902	54
10	.5901	.7310	1.2387	1.695	1.368	.80730	50
20	.5925	.7355	1.2413	1.688	1.360	.80558	40
30	.5948	.7400	1.2440	1.681	1.351	.80386	30
40	.5972	.7445	1.2466	1.675	1.343	.80212	20
50	.5995	.7490	1.2494	1.668	1.335	.80038	10
37	.6018	.7536	1.2521	1.662	1.327	.79864	53
10	.6041	.7581	1.2549	1.655	1.319	.79688	50
20	.6065	.7627	1.2577	1.649	1.311	.79512	40
30	.6088	.7673	1.2605	1.643	1.303	.79335	30
40	.6111	.7720	1.2633	1.636	1.295	.79158	20
50	.6134	.7766	1.2661	1.630	1.288	.78980	10
38	.6157	.7813	1.2690	1.624	1.280	.78801	52
10	.6180	.7860	1.2719	1.618	1.272	.78622	50
20	.6202	.7907	1.2748	1.612	1.265	.78442	40
30	.6225	.7954	1.2778	1.606	1.257	.78261	30
40	.6248	.8002	1.2808	1.601	1.250	.78079	20
50	.6271	.8050	1.2838	1.595	1.242	.77897	10

Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

Angle.	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′							° ′
39	.6293	.8098	1.2868	1.589	1.235	.77715	51
10	.6316	.8146	1.2898	1.583	1.228	.77531	50
20	.6338	.8195	1.2929	1.578	1.220	.77347	40
30	.6361	.8243	1.2959	1.572	1.213	.77162	30
40	.6383	.8292	1.2991	1.567	1.206	.76977	20
50	.6406	.8342	1.3022	1.561	1.199	.76791	10
40	.6428	.8391	1.3054	1.556	1.192	.76604	50
10	.6450	.8441	1.3086	1.550	1.185	.76417	50
20	.6472	.8491	1.3118	1.545	1.178	.76229	40
30	.6494	.8541	1.3151	1.540	1.171	.76041	30
40	.6517	.8591	1.3184	1.535	1.164	.75851	20
50	.6539	.8642	1.3217	1.529	1.157	.75661	10
41	.6561	.8693	1.3251	1.524	1.150	.75471	49
10	.6583	.8744	1.3284	1.519	1.144	.75280	50
20	.6604	.8796	1.3318	1.514	1.137	.75088	40
30	.6626	.8847	1.3352	1.509	1.130	.74896	30
40	.6648	.8899	1.3386	1.504	1.124	.74703	20
50	.6670	.8952	1.3421	1.499	1.117	.74509	10
42	.6691	.9004	1.3456	1.494	1.111	.74314	48
10	.6713	.9057	1.3492	1.490	1.104	.74120	50
20	.6734	.9110	1.3527	1.485	1.098	.73924	40
30	.6756	.9163	1.3563	1.480	1.091	.73728	30
40	.6777	.9217	1.3600	1.476	1.085	.73531	20
50	.6799	.9271	1.3636	1.471	1.079	.73333	10
43	.6820	.9325	1.3673	1.466	1.072	.73135	47
10	.6841	.9380	1.3711	1.462	1.066	.72937	50
20	.6862	.9435	1.3748	1.457	1.060	.72737	40
30	.6884	.9490	1.3786	1.453	1.054	.72537	30
40	.6905	.9545	1.3824	1.448	1.048	.72337	20
50	.6926	.9601	1.3863	1.444	1.042	.72136	10
44	.6947	.9657	1.3902	1.440	1.036	.71934	46
10	.6967	.9713	1.3941	1.435	1.030	.71732	50
20	.6988	.9770	1.3980	1.431	1.024	.71529	40
30	.7009	.9827	1.4020	1.427	1.018	.71325	30
40	.7030	.9884	1.4061	1.422	1.012	.71121	20
50	.7050	.9942	1.4101	1.418	1.006	.70916	10
	.7071	1.	1.414	1.414	1.	.70711	45

Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

TRIGONOMETRIC FORMULÆ



Right Triangle — Oblique Triangles

Solution of Right Triangles

For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B, c = \sqrt{a^2 + b^2} = a\sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B, b = \sqrt{(c+a)(c-a)} = c\sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A, b = a \cot A, c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90° - A, a = b \tan A, c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90° - A, a = c \sin A, b = c \cos A,$

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}, C = 180° - (A + B), c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}, C = 180° - (A + B), c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C, \tan \frac{1}{2}(A - B) = \frac{(a-b)\tan \frac{1}{2}(A+B)}{a+b}, c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2}, \sin \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}}, \sin \frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{ac}}, C = 180° - (A+B)$
a, b, c	Area	$s = \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL

Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = 5° 10′. From Table, Page IX. cos 5° 10′ = .9959. Horizontal distance = 319.4 × .9959 = 318.09 ft. Horizontal distance also = Slope distance minus slope distance times (1—cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine 5° 10′ = .9959. 1—.9959 = .0041. 319.4 × .0041 = 1.31. 319.4—1.31 = 318.09 ft.

When the rise is known, the horizontal distance is approximately:—the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance $= 302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.