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DIETZGEN  
4 INCHES



MINING

TRANSIT BOOK

No. 422



ST. LOUIS

No. 43-00 Y

EUGENE DIETZGEN CO.

DRAWING MATERIALS, MATHEMATICAL and SURVEYING INSTRUMENTS

Chicago New York San Francisco New Orleans Pittsburg Toronto

Distances from Center of Roadway for Cross-Sectioning  
Roadway 16 feet wide. Side Slopes 1 on 1.  
For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	0
1	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	1
2	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	2
3	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	3
4	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	4
5	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	5
6	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	6
7	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	7
8	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	8
9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	9
10	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	10
11	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	11
12	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	12
13	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	13
14	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	14
15	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	15
16	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	16
17	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	17
18	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	18
19	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	19
20	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	20
21	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	21
22	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	22
23	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	23
24	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	24
25	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	25
26	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	26
27	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	27
28	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	28
29	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	29
30	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	30
31	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	31
32	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	32
33	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	33
34	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	34
35	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	35
36	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	36
37	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	37
38	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	38
39	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	39
40	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 30.6. For same slopes but other widths of roadbed, correct above figures by one-half difference in width of roadbed; thus in example above, for 20 ft. roadbed distance will be  $30.6 + (20 - 16) \times 2$  or 2 ft. added to  $30.6 = 32$ . For slopes of 1 on 1 1/2 see inside of back cover.

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S 84-09 W CP 18-CP 19

39-12 LT  
78-23 1/2

Major Glynne

No 178

514 6 RT

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105019 32 LT 308

50-41 2 RT 309

46-52 RT 310

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52-58 1/2 RT 312

266-04 1/2 L 313

4-28 1/2 RT 314

2-30 1/2 RT 315

5-4 1/2 RT 316

8-4 RT 317

54-15 RT 318

58-09 1/2 RT 319

2 29 3/4

66-47 RT 320

35-33 RT 321

41-18 RT 322

17-32½ R 323

2

S1°33' R

@ to 321 To # 305

40φ09½ R 324

2

S31°15' E

Chica

H

57-24 L 325

2

10φ53 L 326

2

S74-ASE MAC

56-34½ R 327

2

~~112-56½ R 328~~

148-09 R 328

2

~~145-48 L 329~~

2

185-57½ L 329

2

S65-30 E MAC

34φ52 L 330

2

S83°10' E

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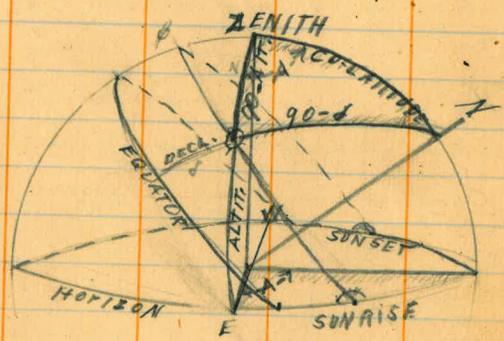
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## Index

Observations on Polaris, Star, Sun etc.	2-11
Survey at Morena Dam	13-46
Cameron Property	47
Levels at Lower Otay	48
Levels - Preliminary Survey for Suspension Bridge - Barrett Sky Valley Rd.	64-66
Road xsecs at horse shoe bend - Morena	
cont. from back " 309	50-52
ties to Morena Lake Prop line	<del>53-54</del>
x-sect " " Dam Tunnels / Fox Puphead	<del>455</del> 57-58

$$\cos \frac{A}{2} = \frac{\sin \frac{1}{2} [Z - \phi + d] \cos \frac{1}{2} [Z - \phi - d]}{\sin Z \cos \phi}$$

- A = Computed Azimuth.
- Z = 90° - Altitude.
- φ = Latitude of place.
- d = Declination of star or Sun.

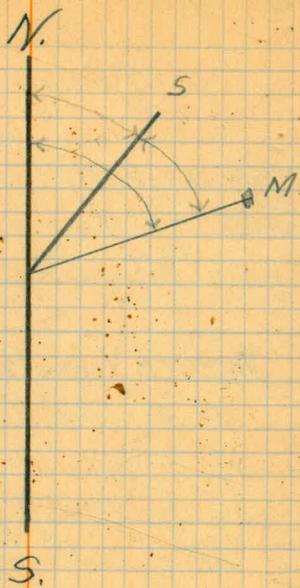


AZ. of SUM

JUNE 22, 1919.

2

SUN	ALT.	H-AZIM	TIME	WATCH
0	40° 45'	25° 35'		8-29-45
0	41° 33'	25° 58'		8-36-45
0	43° 26'	27° 3'		8-43-30
0	44° 2'	28° 43'		8-49-20



# Observation on Polaris

## Example

Date, June 16, 1919  
 Latitude  $37^{\circ}45' N.$  Longitude  $122^{\circ}30' W.$   
 Mark was East of Star Watch, Civil St. Time.

Point	Vernier A	Vernier B	Mean	Deflection Angle	Time
Mark	$0^{\circ} 0'$	$180^{\circ} 0'$	$0^{\circ} 0'$	---	---
Star	$63^{\circ} 17'$	$243^{\circ} 16'$	$63^{\circ} 16' 30''$	$63^{\circ} 16' 30''$	$10^m 12^s$
Star	$63^{\circ} 11'$	$243^{\circ} 10'$	$63^{\circ} 10' 30''$	$63^{\circ} 10' 30''$	$10^m 25^s 50^m$
Mark	$180^{\circ} 0'$	$0^{\circ} 0'$	$0^{\circ} 0'$	---	---
			Mean	$63^{\circ} 13' 30''$	$10^m 18^s$
Mark	$0^{\circ} 0'$	$180^{\circ} 0'$	$0^{\circ} 0'$	---	---
Star	$243^{\circ} 3'$	$63^{\circ} 4'$	$63^{\circ} 3' 30''$	$63^{\circ} 3' 30''$	$10^m 38^s 10^m$
Star	$243^{\circ} 1'$	$63^{\circ} 2'$	$63^{\circ} 2' 30''$	$63^{\circ} 1' 30''$	$10^m 42^s$
Mark	$180^{\circ} 0'$	$0^{\circ} 0'$	$0^{\circ} 0'$	---	---
			Mean	$63^{\circ} 2' 30''$	$10^m 40^s 1$



## Computations

3

- $7^h 56.1^m$  AM Last D.C. (June 16, 1919)  
 $3.91$  - Change in one Day (mean D.C.)  
 $7^h 52.09^m$   
 $.35$  - Zenith Distance for  $32^{\circ} 51' 42''$   
 $32^{\circ} 51.7' \times \frac{15}{8} = 35.055$   
 $7^h 51.74^m$  - U.C. at point of Obs. in local mean time
- $10^m 41^s$  - Watch Time of Observation  
 $1^m 11.46$  - Correct for local mean time (long of Obs. =  $122^{\circ} 86.7'$ )  
 $122.867 - 120 = 2.867$   
 $2.867 \times 4 = 11.468$   
 $11.468 + 1^m D. Light = 1^m 11.468$
- $9^h 28.14^m$  - Local mean time of Observation  
 $7^h 51.35^m$  - Local mean time of D.C. at pt. of Obs.  
 $1^h 36.79^m$  - Mean time triangle =  $1^h 36^m$
- Interpretation  $35.73$
- $35.73$  - Azimuth of  $107.2$   
 $.10$  - Correct for Polar Distance (Table IV)  
 $35.53$  - Azimuth of Polaris East of Meridian =  $35^{\circ} 32''$   
 $63^{\circ} 2' 30''$  - Mean Diffused angle from Mark to the Star (Mark East of Star)  
 $35 \quad 32$   
 $63^{\circ} 38' 2''$  - Angle from North to Mark.

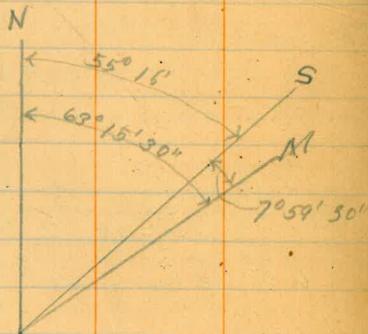
# Observations on a Star (Zenith)

Example

June 16, 1919. Observation at Fort Scott  
Latitude  $37^{\circ}45'N$  Longitude  $122^{\circ}30'W$   
Mark was West of Star Watch corrected Sidereal

Point	Vert L	Vernier A	Vernier B	Mean	Time
Mark		$0^{\circ} 0'$	$180^{\circ} 00'$		11 <sup>m</sup> 5
Star (K)	$32^{\circ} 6'$	$8^{\circ} 24'$	$187^{\circ} 24'$	$8^{\circ} 24'$	$10^m 45^s$
Star (J)	$32^{\circ} 6'$	$187^{\circ} 35'$	$7^{\circ} 35'$	$7^{\circ} 35'$	$10^m 51^s$
Mark		$180^{\circ} 00'$	$0^{\circ} 0'$		
				$7^{\circ} 59' 30''$	$10^m 48^s$

Repeat measurement with  
Telescope Inverted



$32^{\circ} 6' 0''$  = Measured Altitude of Star  
 $1' 36''$  = Correction for refraction  
 $32^{\circ} 4' 24''$  = Measured Altitude corrected for refraction  
 $37^{\circ} 45'$  = Latitude from G.D. Records  
 $44^{\circ} 59' 24''$  = Declination taken from Chart for June 1st  
 $6''$  = Subtracted to June 16th  
 $44^{\circ} 59' 30''$  = Corrected Declination

Formula:  $\cos \frac{A}{2} = \frac{\sqrt{\sin \frac{1}{2}(Z-Q+J) \cos \frac{1}{2}(Z-Q-J)}}{\sin Z \cos \phi}$

A = Azimuth =  
Q = Latitude =  $37^{\circ} 45'$   
Z =  $90^{\circ}$  - Altitude =  $57^{\circ} 54'$   
J = Declination =  $44^{\circ} 59' 30''$

$57^{\circ} 54'$	$57^{\circ} 54'$
$37^{\circ} 45'$	$37^{\circ} 45'$
$20^{\circ} 9'$	$20^{\circ} 9'$
$44^{\circ} 59' 30''$	$44^{\circ} 59' 30''$
$216.5^{\circ} 5' 30'' = Z-Q+J$	$24^{\circ} 50' 30'' = Z-Q-J$
$32^{\circ} 34' 15'' = \frac{1}{2}(Z+Q)$	$-12^{\circ} 25' 15'' = \frac{1}{2}(Z-Q-J)$

$\log \sin \frac{1}{2}(Z-Q+J) = 9.73106$   
 $\log \cos \frac{1}{2}(Z-Q-J) = 9.98971$   
 $\log \sin Z = 9.97205$   
 $\log \cos \phi = 9.10199$   
 $\log \cos \frac{A}{2} = 9.94740 = 27^{\circ} 35' = \frac{A}{2}$

$55^{\circ} 16' = \text{Angle } A = \text{Angle from North to Star clockwise for East Star}$

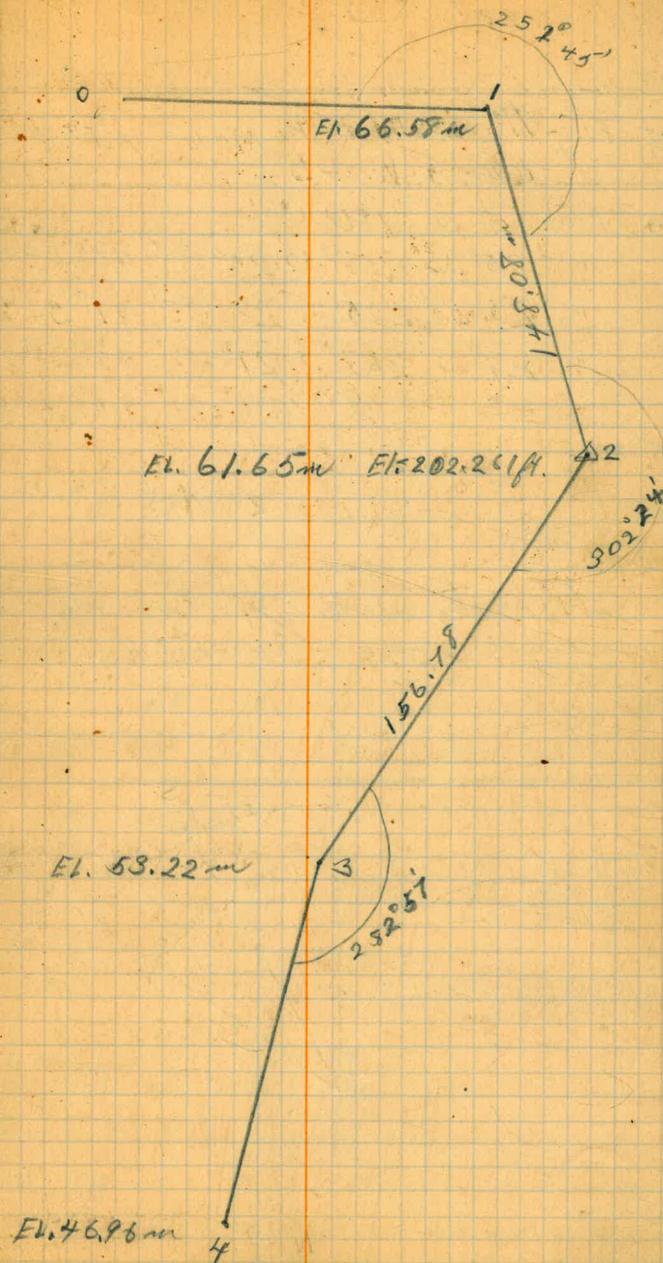
$7^{\circ} 59' 30'' = \text{Angle between Star & Mark}$   
 $63^{\circ} 15' 30'' = \text{Angle from North to Mark}$

8.11  
1.1  
2.1  
3.1  
4.1  
5.1  
6.1  
7.1  
8.1  
9.1  
10.1  
11.1  
12.1

-3.1  
A.1/2 - 2.1

4

Sta	LINE	Stadia	Vert. L	Azimuth	Elev.
1	1-0			0	66.58m
1	Δ-1	1475	-1°43'	251°45'	
2	1-Δ	1485	+1°52'	122°24'	202.261ft. 61.65m
2	Δ-3	157	-3°5'		
3	3-Δ	159	+3°5'	282°57'	53.22m
3	3-4	110.05	-3°16'		
4					46.96m

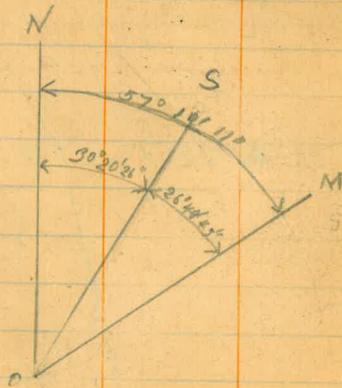


Observations on the Sun

June 22, 1919.

Point	Telescope	Horizontal Angle		Mean	Altitude	Time	
		Vernier A	Vernier B				
Mark	Norm.	0° 0'	180° 0'	--	--	--	
0	"	25° 35'	205° 35'	25° 35'	40° 43'	8-24-45	
0	"	25° 58'	205° 58'	25° 38'	41° 33'	8-36-45	
0	"	27° 3'	207° 3'	27° 3'	43° 26'	8-43-30	
0	"	28° 45'	208° 45'	28° 45'	44° 2'	8-49-20	
Mark		0° 0'	180° 0'	--	--	--	
				Means =	26° 49' 45"	42° 26'	8-34-50

Repeat same observations with  
Telescope Inverted then take Means.



8h 39<sup>m</sup> 50<sup>s</sup> = Average watch (Standard)

--	1 <sup>m</sup>	90 <sup>s</sup>	=	Time of observation D.T.S.
8h 38 <sup>m</sup>	20 <sup>s</sup>	=	Watch error	
8h 10 <sup>m</sup>	--	=	Corrected standard time of observation	
1. 16h 48 <sup>m</sup>	20 <sup>s</sup>	=	Difference in Standard time between of Scott and Greenwich.	
+	1 <sup>m</sup>	32.6 <sup>s</sup>	=	Greenwich mean time of observation
2. 16h 49 <sup>m</sup>	52.6 <sup>s</sup>	=	Equation of time to be applied on June 22 (from Ephemeris)	
3. 23°	26'	51.11"	=	Declination of Sun at Greenwich apparent noon June 22 (Latitude and increasing)
-	10'	5.53"	=	Correction for change of hour angle (apparent noon L 24° 41' 30" = 01. 16.49m 52.6s = 16.815 hr. 26.815 X .01 = 10' 5.53")
4. 23°	16'	45.57"	=	Declination at time of observation
90°	00'	00.00"	=	As declination is North the declination sign is +; hence 90° - (+ decl.) = 90° - that declination
23°	16'	45.57"	=	
5. 66°	43'	14.43"	=	Polar distance of Sun
42°	26'	4.5"	=	Observed mean altitude
-	1'	4.5"	=	Correction for refraction and is always subtracted from table
6. 42°	24'	55.5"	=	Altitude of Sun, corrected for refraction

Corrected altitude = H = 42° 24' 55.6"

Latitude = Q = 37° 45"

Polar distance = P = 23° 16' 45.57"

S - H = 9° 18' 24.98"

S - Q = 13° 58' 20.58"

S - P = 28° 26' 35.01"

Formula:  
 $\tan \frac{1}{2} A = \sqrt{\frac{\sin(S-H) \sin(S-Q)}{\cos S \cos(S-P)}}$

log sin(S-H) = 9.20184

log sin(S-Q) = 9.39270

only cos S = 0.20798

only cos(S-P) = 0.06687

log tan 1/2 A = 2) 18.86639

log tan 1/2 A = 9.433195 = 15° 10' 13" = 1/2 A

7. 30° 20' 26" = Angle A = Angle from Mark to Sun

26° 49' 45" = Mean angle between Sun and Mark.

57° 10' 11" = Angle from Mark to Mark.

110-02 ①

8

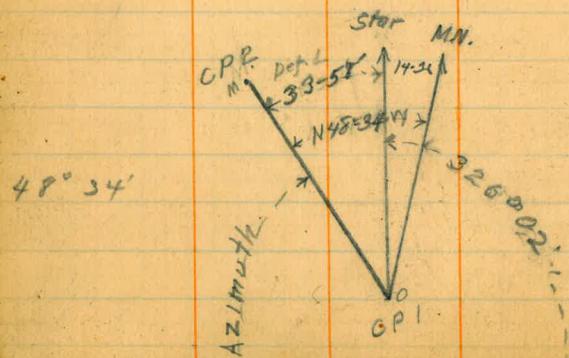
# Observation on Polaris

Date Dec. 15 1923. Observation at Morena D.  
 Latitude  $32^{\circ} 41' N$ . Longitude  $116^{\circ} 33' W$ .  
 Mark West of Star. Watch Correct Std. Time  
 Tel. Direct.

Point	Vernier A	Vernier B	Mean	Deflection Angle	Time
Mark	$0^{\circ} 0'$	$180^{\circ} 0'$	$0^{\circ} 0'$	---	---
Star	33-52	213-53	33-52.7		7-58-50
Star	213-53	33-52	33-52.6		7-58-50
Mark	$180^{\circ} 0'$	$0^{\circ} 0'$	$0^{\circ} 0'$	---	---

Tel. Inverted.	Mean =	Time
Mark	$0^{\circ} 0'$ $179^{\circ} 0'$ $0^{\circ} 0'$	7-58-50
Star	$33^{\circ} 0'$ $212^{\circ} 0'$ $33^{\circ} 0'$ $33^{\circ} 0'$	11-54-22
Star		
Mark		

Mean =



(1) 8h 00.9 PM. = Last U.C. Dec. 1, 1923.  
 8h 00.9 = Change in 12 days (nearest U.C.)  
 Dec. 15, 1923.  
 - 1.27 = Longitude Correction Lon.  $116^{\circ} 33'$   
 7h 59.63 PM. = U.C. at point of observation in  
 Local Mean Time.

(2) 7h 59m 37.8 s = Local mean time of U.C.  
 at point of observation.  
 or Local Mean Time of Obs.  
 13m 48. s = Correction local mean  
 time, Longitude of Obs. =  
 $116^{\circ} 33' = 116.55$   
 (Standard Meridian)  $120 - 116.55$   
 $3.45 \cdot 4m \times 3.45 = 13.8m$   
 13m 48 sec.

7h 45m 49.8 s = Average Watch Time of  
 7h 58m 50 s = Observation.  
 13m =

(3) + 5' = Mean true hour angle  
 $33^{\circ} 53'$  = Mean deflection angle,  
 mark to star.  
 (Mark was West of Star)

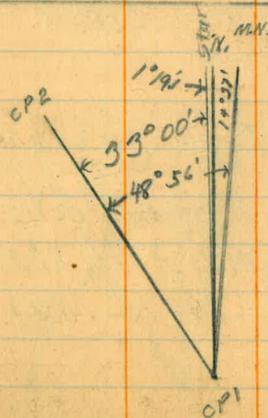
$33^{\circ} 58'$

# Observation on Polaris

Date Jan 12, 1924. Observation at Maroon Pass  
 Latitude  $32^{\circ} 41' N$ . Longitude  $116^{\circ} 33' W$ .  
 Mark West of Star. Watch Correct Std. Time  
 Tel. Direct

Point	Vernier A	Vernier B	Mean	Deflection Angle	Time
Mark	$0^{\circ} 0'$	$179^{\circ} 0'$	$0^{\circ} 0'$	-----	-----
Star	33 0	212 0	33 0	$33^{\circ} 0'$	12-00-00
Star	212 0	33 0	212 0	$33^{\circ} 0'$	12-16-36
Mark	179 0	$0^{\circ} 0'$	0 0	-----	-----

Tel. Inverted Mean  $33^{\circ} 0' 12-8-15$



①  $5h 58.6m =$  Next U.C. Jan 15, 1924.  
 $+ 11.85 =$  Change in 3 days (nearest)  
 $6h 10.45m$  U.C. Jan 13 1924  
 $- 1.27 =$  Long correction Lon.  $116^{\circ} 33'$   
 $6h 9.18m =$  U.C. at point of observation  
 in Local Mean Time

②  $11h 54.38 =$  Average Watch Time of Observation  
 $13.8 =$  Correction to Local Mean Time.  
 $116^{\circ} 33' = 116.55^{\circ}$   
 (Std. Meridian)  $120 - 116.55 = 3.45$   
 $4m \times 3.45 = 13.8m.$

③  $12h 8.18 =$  Average Watch Time of Obs.  
 $- 6 9.18 =$  Local Mean Time of U.C.  
 at point of Obs.  
 $5h 59.m =$  Mean Time Hour Angle

## Interpolation

Hour Angle	Latitudes		
	$32^{\circ}$	$32.685^{\circ}$	$34^{\circ}$
5h 40min	77.6m		79.4m
5h 59m	78.0	79.12m	79.8
6h 8m	78.2		80.0

④ Azimuth =  $79.12' = 1^{\circ} 19.1'$  equals azimuth of Polaris at Latitude of observation station.

⑤  $1^{\circ} 19' 6'' =$  Azimuth of Polaris.  
 $33^{\circ} =$  Mean deflection angle, mark to star  
 $34^{\circ} 19' 6'' =$  Angle from North to mark (counter clock)  
 $14^{\circ} 37' =$  Magnetic Declination  
 $48^{\circ} 56' =$  Magnetic Bearing of Base Line  
 $360^{\circ}$   
 $34^{\circ} 19'$   
 $325^{\circ} 41' =$  Y-azimuth of Base Line.  $M.M.$

20-24 1/2 left Pooling West

to 370.

28° 10' ① LT Pooling E

56° 21' ② - BS. T.S. 24

INST AT 370

SIGHT AT 371

(N 31° 30' W 1710)

SIGHT AT ISLAND

N. 31° E

FROM T.S. -

117°-42 ① To 76.

235°-28 1/2 ②

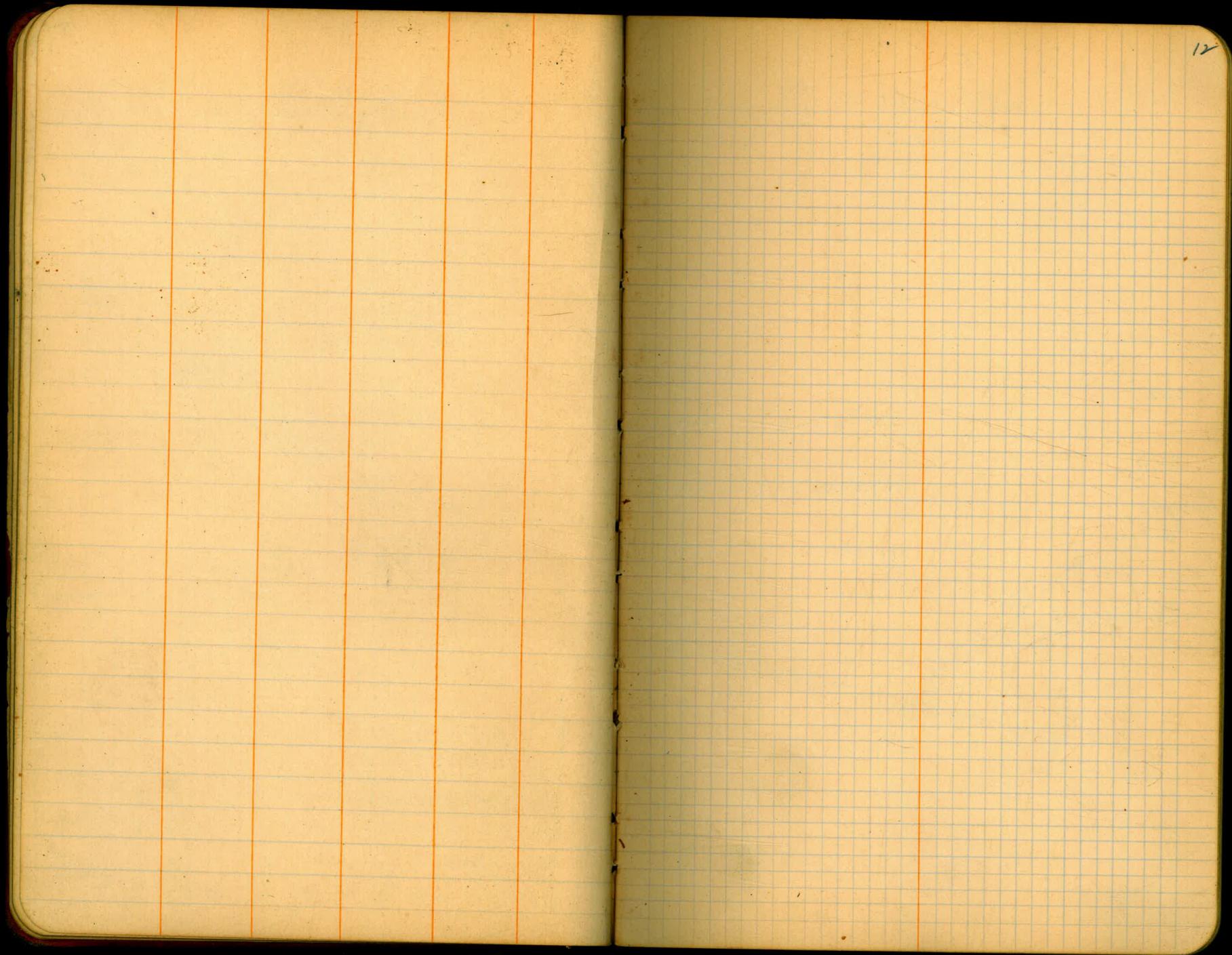
TRUE MAG 75-76  
53° E

42° 18 1/2 ① (ISLAND) INST A 20 To OIL

84° 26 1/2 ②

N 09° 40' E

61° 37 1/2 = 20 to 75 Inst at 76 INST



L R

shlc 1074 w  
Lewis.

304

S79°-37'-15" E 403.00

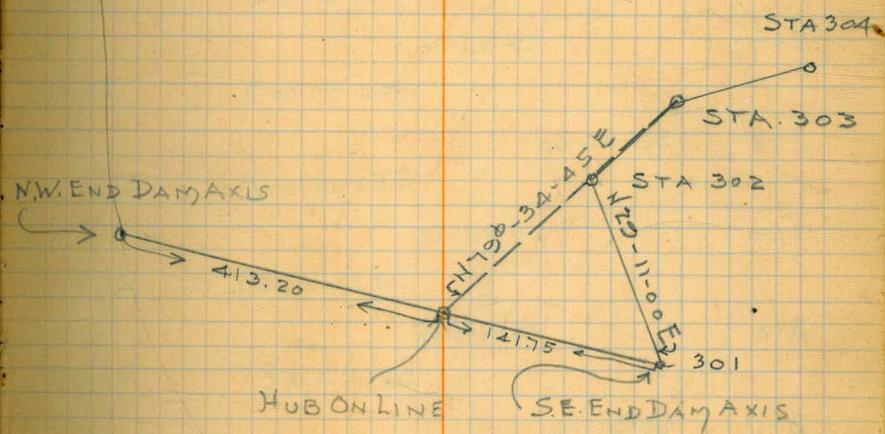
303

N74°-40'-00" E 73.80

302

N29°-11'-00" E 188.10

301  
(=SE.END DAM)



# MORENA

STATION	L	R	C.C
INST. AT HUB AXIS OF DAM			N 34-19-00 W
SIGHT N. END AXIS			
		108-58-45	
			H 74-39-45 E
303		25-43-00	
			S 79-37-15 E
			403.00
304		48-40-45	
			S 30-56-30 E
			248.20
305		02-54-45	
			S 28° 01-45 E
			129.80
306	29-14-15		
			S 57° 16-00 E
			361.90
307		52-39-00	
			S 04-37-00 E
			98.90
308	53-46-00		
			S 58-23-00 E
			112.10
309		25-20-45	
			S 33-02-15 E
			208.20
310		08-41-00	
			S 24-21-15 E
			261.70
311	68-30-00		
			N 87-08-45 E
			110.30
312		26-29-15	
			S 66-22-00 E
			211.30

# 166' Contour Survey 14

SEE PRECEDING PAGE FOR 1ST COURSES

STA.	L	T	S	E
313	133-02-15		S66-22-00	
			N19-24-15W	14700
314		07-11-45		
			N12-12-30W	13570
315		01-16-00		
			N10-56-30W	31800
316		02-51-15		
			N08-05-15W	9260
317		04-22-00		
			N03-43-15W	19000
318		29-37-45		
			N25-54-30E	8170
319		29-34-45		
			N55-29-15E	7660
320		33-23-30		
			N88-52-45E	284.50
321		17-46-30		
			S73-20-45E	383.80
322		02-06-30		
			S71-14-15E	483.40
323		08-46-15		
			S62-28-00E	148.30
324		20-04-45		
			S42-23-15E	127.70

STA.	L	TC		
325	28-42-00		S42-23-15E	
			S71-05-15E	116.00
326	05-26-30		S76-31-45E	110.80
327		28-17-15	S48-14-30E	33.30
328		74-04-30	S25-50-00W	75.50
329	92-58-45		S67-08-45E	296.30
330	17-26-00		S84-34-45E	211.90
331		15-16-15	S69-18-30E	261.10
332	50-52-30		N59-49-00E	108.26
333		41-13-30	S78-57-30E	171.55
334		20-36-00	S58-21-30E	126.51
335	14-39-00		S73-00-30E	108.75
336		01-33-00	S71-27-30E	212.45

(2) - 6P

STA	L	R	
337		19-27-30	S71-27-30E S52-00-00E 155.85
338	24-16-30		S76-16-30E 142.15
339		3 <sup>o</sup> 20-45	S66-55-45E 88.70
340		14 <sup>o</sup> 49-45	S52 <sup>o</sup> 06-00E 314.40
341		15 <sup>o</sup> 52-45	S36 <sup>o</sup> 13-15E 94.60
342	4 <sup>o</sup> 53-30		S41 <sup>o</sup> 06-45E 203.40
343		14 <sup>o</sup> 31-45	S26 <sup>o</sup> 35-00E 188.30
344	20 <sup>o</sup> 25-15		S47-00-15E 84.05
345	10 <sup>o</sup> 19-45		S57 <sup>o</sup> 20-00E 173.70
346	103 <sup>o</sup> 29-00		<del>N11<sup>o</sup>00-00E</del> 182.60
347	5 <sup>o</sup> 56-15		N13 <sup>o</sup> 14-45E 191.70
348	17 <sup>o</sup> 29-15		N04 <sup>o</sup> 14-30W 263.00

~~N19-11-00E~~ X

STA	L	T	No	Value
349	58°-32-15		N04°-14-30W	
			N62°-46-45W	128.33
350		14°-42-45	N48°-04-00W	339.83
351		18°-17'-30"	N29°-46-30W	260.65
352		17°-40-30	N12°-06-00W	141.70
353		53°-53'-00	N41°-47-00E	66.05
354	18°-25-00		N23°-22-00E	123.25
355		15°-32-00	N38°-54-00E	160.50
356		56°-57-30	S84°-08-30E	93.78
357	69°-40-15		N26°-11-15E	75.80
358	75°-34-45		N49°-23-30W	144.12
359		58°-23-00	N08°-59-30E	187.92
360		09°-13-00	N18°-12-30E	182.70
				<del>182.80</del>

-7

	L	TC		
361		6 <sup>h</sup> 57-15	N18 <sup>h</sup> -12-30E	75.83
			N25 <sup>h</sup> -09-45E	75.83
362		39 <sup>h</sup> 11-30		
			N64 <sup>h</sup> 21-15E	66.00
363		07 <sup>h</sup> 58-00		
			N72 <sup>h</sup> -19-15E	223.35
364		02 <sup>h</sup> 41-45		
			N75 <sup>h</sup> -01-00E	276.50
365	78 <sup>h</sup> 22-30			
			N03 <sup>h</sup> -21-30W	134.18
366		41 <sup>h</sup> 38-45		
			N38 <sup>h</sup> -17-15E	254.05
367		05 <sup>h</sup> -35-30		
			N43 <sup>h</sup> -52-45E	205.95
368		44 <sup>h</sup> 39-30		
			N88 <sup>h</sup> -32-15E	194.30
369	29 <sup>h</sup> -11-00			
			N59 <sup>h</sup> -21-15E	271.02
370		35 <sup>h</sup> -57-15		
			S84 <sup>h</sup> -41-30E	233.80
371		83 <sup>h</sup> 32-30		
			S01 <sup>h</sup> -09-00E	305.88
372	30 <sup>h</sup> 10-30			
			S31 <sup>h</sup> -19-30E	295.70

	L	TC	S31 <sup>φ</sup> 19-30E	
373	61 <sup>φ</sup> -38-00		N87 <sup>φ</sup> -02-30E	152.32
374	24 <sup>φ</sup> -32-00		N62 <sup>φ</sup> 30-30E	228.10
375	03 <sup>φ</sup> 23-15		N59 <sup>φ</sup> 07-15E	129.63
376		28 <sup>φ</sup> 42-30	N87 <sup>φ</sup> 49-45E	176.00
377		18 <sup>φ</sup> 16-30	S73 <sup>φ</sup> -53-45E	56.15
378		26 <sup>φ</sup> 53-15	S46 <sup>φ</sup> -54-30E	233.40
379		93 <sup>φ</sup> 45-15	S46 <sup>φ</sup> 50-45W	318.80
380	x	97 <sup>φ</sup> 32-45	S50 <sup>φ</sup> 42-00E	214.25
381		28 <sup>φ</sup> -56-30	S79 <sup>φ</sup> -38-30E	213.80
382		08 <sup>φ</sup> 37-00	S71 <sup>φ</sup> -01-30E	286.00
383		13 <sup>φ</sup> 32-30	S84 <sup>φ</sup> -34-00E	591.35
384		72 <sup>φ</sup> 17-15	N23 <sup>φ</sup> -08-45E	365.18
			(265.18)	(2)

	L	TC	N23°08-45E	
385	17°08-30			
			N06°00-15E	371.15
386	110°14-45		S63°45-00E	225.75
387	18°29-30		S82°14-30E	166.60
388	11°10-00		N86°35-30E	145.20
389	48-46-30		N37°49-00E	118.15
390	46°19-00		N08°30-00W	196.65
391	34°05-00		N25°35-00E	120.85
392	24°16-30		N01°18-30E	91.17
393	39°50-00		N41°08-30E	120.93
394	49°03-15		N07°54-45W	170.62
395	60°24-45		N52°30-00E	115.30
396	01-16-00		N51°14-00E	133.55

11430?

	L	TC		
397 <sup>✓</sup>	44°22-15		N51°-14-00E	
			N06°-51-45E	340.00
398		31°45-00		
			N38°-36-45E	406.45
399	20°-53-45			
			N17°-37-00E	247.00
400		15°-06-00		
			N32°-43-00E	246.00
401	11°-15-30			
			N21°-27-30E	255.78
402	81°-47-45			
			N60°-20-15W	139.60
403		55°-02-15		
			N05°-18-00W	190.90
404		32°-12-30		
			N26°-54-30E	137.60
283		44°-58-30		
			N71°-53-00E	191.30
282		26°-47-30		
			S81°-19-30E	100.60
281	82°-50-00			
			N15°-50-30E	227.50
280	113°-38-00			
			S82°-12-30W	161.50

	L	$\tau$		
279			S82°-12-30W	
		107°-23-00		132.15
			N09°-35-30E	138.45
278		12°-07-45		
			N21°-43-15E	157.60
277	06°-54-45			
			N14°-48-30E	149.45
276		62°-26-45		
			N77-15-15E	118.11
275	103°-34-00			
			N26-18-45W	243.00
274		59°-41-30		
			N33°-22-45E	316.00
273	18°-55-45			
			N14°-27-00E	196.20
272		94°-44-15		
			S70°-48-45E	65.75
271		73°-56-45		
			S03°-08-00W	132.00
270	145°-10-00			
			N37°-58-00E	194.95
269		31°-24-00		
			N69°-22-00E	171.90
268	75°-07-45			
			N05°-45'-45"W	226.40

	L	$\bar{r}$	N05-45-45W	
267		60°-01-00		
			N54°-15-45E	296.30
266	64°-53-30			
			N10°-37-45W	270.00
265		07°-49-00		
			N02°-48-45W	184.20
264		59°-09-45		
			N56°-21-00E	97.87
263	78°-10-15			
			N21°-49-15W	162.53
262		59°-17-15		
			N37°-28-00W	89.88
261	14°-54-15			
			N22°-33-15E	374.72
260		15°-08-45		
			N37°-42-00E	458.60
259		46°-50-15		
			N84°-32-15E	170.10
258		13°-24-15		
			S82°-03-30E	339.00
257		10°-35-00		
			S71°-28-30E	390.50
256	73°-48-30			
			N34°-43-00E	234.10

X 195

N37-28-00E X

	L	TZ	N34-43-00E	
255		79 <sup>o</sup> 13-00	S66 <sup>o</sup> -04-00E	245.15
254		107 <sup>o</sup> 46-30	N06 <sup>o</sup> 09-30E	175.45
253		28 <sup>o</sup> 10-15	N34 <sup>o</sup> 19-45E	230.80
252		06 <sup>o</sup> 31-00	N40 <sup>o</sup> 50-45E	274.60
251		37 <sup>o</sup> 27-15	N03 <sup>o</sup> 23-30E	273.50
250		21 <sup>o</sup> 00-15	N24 <sup>o</sup> 23-45E	179.60
249		88 <sup>o</sup> 53-00	N64 <sup>o</sup> 29-15W	147.00
248		84 <sup>o</sup> 47-30	N20 <sup>o</sup> 18-15W	309.00
247		05 <sup>o</sup> 51-30	N14 <sup>o</sup> 26-45E	200.40
246		12 <sup>o</sup> 04-00	N02 <sup>o</sup> 22-45E	138.10
245		25 <sup>o</sup> 44-30	N23 <sup>o</sup> 21-45W	121.40
244		40 <sup>o</sup> 18-00	N16 <sup>o</sup> 56-15E	213.50

N20<sup>o</sup>-18-15E X

	L	R	
		✓	N16 <sup>φ</sup> -56-15E
243		16 <sup>φ</sup> 44-00	
			N33 <sup>φ</sup> -40-15E 225.00
242		12 <sup>φ</sup> 23-30	
			N46 <sup>φ</sup> -03-45E 133.40
241	83 <sup>φ</sup> -56-45		
			N37 <sup>φ</sup> -53-00W 117.20
240		57 <sup>φ</sup> 00-15	
			N19 <sup>φ</sup> 07-15E 71.20
239		09 <sup>φ</sup> 03-00	
			N28 <sup>φ</sup> -10-15E 318.20
238	19 <sup>φ</sup> -57-45		
		✓	N08 <sup>φ</sup> -12-30E 283.00
237		15 <sup>φ</sup> 59-45	
			N24 <sup>φ</sup> -12-15E 370.00
236	11 <sup>φ</sup> 24-45		
			N12 <sup>φ</sup> -47-30E 234.10
235		18 <sup>φ</sup> 09-30	
			N30 <sup>φ</sup> -57-00E 194.50
234	01 <sup>φ</sup> -19-00		
			N29 <sup>φ</sup> -38-00E 176.60
233	03 <sup>φ</sup> 52-45		
			N25-45-15E 244.80
232		06 <sup>φ</sup> 14-15	
			N32 <sup>φ</sup> 00-00E <del>252.00</del>

352

	L	T		
			N32 <sup>+</sup> -00-00E	
231	102 <sup>+</sup> -48-30		N70 <sup>+</sup> -48-30W	323.00
230	84 <sup>+</sup> -00-30		S25 <sup>+</sup> -11-00W	469.50
229	10 <sup>+</sup> -25-15		S35 <sup>+</sup> -36-15W	274.85
228	07 <sup>+</sup> -50-15		S43 <sup>+</sup> -26-30W	217.85
227	46 <sup>+</sup> -15-45		S02 <sup>+</sup> -49-15E	110.10
226	21 <sup>+</sup> -18-45		S18 <sup>+</sup> -29-30W	112.10
225	02 <sup>+</sup> -38-00		S21 <sup>+</sup> -07-30W	158.40
224	0 <sup>+</sup> -10-45		S20 <sup>+</sup> -57-45W	273.50
223	00 <sup>+</sup> -31-00		S21 <sup>+</sup> -27-45W	338.60
222	52 <sup>+</sup> -07-30		S73 <sup>+</sup> -35-15W	122.50
221	35 <sup>+</sup> -57-00		N70 <sup>+</sup> -27-45W	326.70
220	133 <sup>+</sup> -37-45		S24 <sup>+</sup> -05-30E	183.40

	L	$\pi$	S24 $\phi$ -05-30 E	
219			32 $\phi$ -15-45	
			S08 $\phi$ -10-15 W	13130
218			29 $\phi$ -54-00	
			S38 $\phi$ -04-15 W	13990
217			54 $\phi$ -34-45	
			v. N87 $\phi$ -21-00 W	41700
216			16 $\phi$ -57-00	
			N70 $\phi$ -24-00 W	9360
215			66 $\phi$ -58-15	
			S42 $\phi$ -37-45 W	14900
214			59 $\phi$ -03-00	
			S16 $\phi$ -25-15 E	26530
213			53 $\phi$ -41-45	
			S37 $\phi$ -16-30 W	119.20
212			51 $\phi$ -15-00	
			S88 $\phi$ -31-30 W	30705
211			48 $\phi$ -49-30	
			N42 $\phi$ -39-00 W	24330
210			30 $\phi$ -31-45	
			N73 $\phi$ -10-45 W	309.90
209			136 $\phi$ -01-30	
			S29 $\phi$ -12-15 W	334.75
208			100 $\phi$ -48-15	
			S71 $\phi$ -36-00 W	111.35
			<u>S29<math>\phi</math>-12-15 E</u>	<u>X</u>

S71<sup>φ</sup>-36-00W

207

39<sup>φ</sup>22-00N69<sup>φ</sup>-02-00W 272.70

206

109<sup>φ</sup>44-00S01<sup>φ</sup>-14-00W 250.60

205

16<sup>φ</sup>00-00S14<sup>φ</sup>-46-00E 359.35

204

28<sup>φ</sup>20-30S13<sup>φ</sup>-34-30W 134.18

203

64<sup>φ</sup>12-30S77<sup>φ</sup>-47-00W 153.62

202

34<sup>φ</sup>58-00N67<sup>φ</sup>-15-00W 459.05

201

30<sup>φ</sup>22-30N36<sup>φ</sup>-52-30W 179.35

200

125<sup>φ</sup>49-00S17<sup>φ</sup>-18-30W 211.40

199

43<sup>φ</sup>10-00S60<sup>φ</sup>-28-30W 301.30

198

118<sup>φ</sup>52-45S58<sup>φ</sup>-24-15E 258.40

197

63<sup>φ</sup>40-15S05<sup>φ</sup>-16-00W 217.31

196

13<sup>φ</sup>50-15S08<sup>φ</sup>-34-15E 419.80

	L	$\pi$	
			S08 $^{\phi}$ -34-15E
195		93-48-45	S85 $^{\phi}$ -14-30W 257.50
194	112 $^{\phi}$	30-30	
			S27 $^{\phi}$ -16-00E 216.65
193		114-12-15	
			S86 $^{\phi}$ -56-15W 305.00
192		29 $^{\phi}$ -38'-00	
			N63 $^{\phi}$ -25-45W 90.40
191		24 $^{\phi}$ -24-30	
			N39 $^{\phi}$ -01-15W 236.70
190	65 $^{\phi}$	28-15	
			S75 $^{\phi}$ -30-30W 241.55
189		109 $^{\phi}$ -21-00	
			N04 $^{\phi}$ -51-30E 182.50
188	82 $^{\phi}$	51-00	
			N77 $^{\phi}$ -59-30W 109.10
187		67 $^{\phi}$ -12-30	
			N10 $^{\phi}$ -47'-00W 312.15
186	32 $^{\phi}$	13-45	
			N43 $^{\phi}$ -00-45W 157.30
185		19 $^{\phi}$ -58-00	
			N23 $^{\phi}$ -02-45W 89.65
184		41 $^{\phi}$ -05-00	
			N18 $^{\phi}$ -02-15E 128.90

260 - 192 = 1369.6' N 65-48W

	L	R	
183			✓ N18°-02-15E 94°-02-15
182			N76°-00-00 W 183.40 61°-05-30
181			N14°-54-30 W 150.30 19°-32-45
180			N04°-38-15 E 166.50 63°-53-30
179			✓ N59°-15-15 W 499.70 2°-53'
178			N62°-08-15 W 343.95 10°-41'45"
177			N59°-26-30 W 534.64 27°-20'
176			N24°-06-30 W 327.48 11°-30'
175			N35°-36'-30" W 365.15 9°-13-30"
174			N26°-23'-00 W 234.85 16°-22'
173			N42°-45'-00 W 223.20 01°-33'
172			N44°-18'-00 W 417.00 14°-23'
			N29°-55'-00 W 377.80

	L	TC	
171		17°-13'	N 29°-55' W N 12°-42'-00" W 198.60
170	51°-37'		N 64°-19'-00" W 133.03
169	14°-07'		N 78°-26'-00" W 188.72
168		26°-15'	N 52°-11'-00" W 117.78
167	13°-32'-30"		N 65°-43'-30" W 293.50
166		31°-36'-15"	N 34°-07'-15" W 139.00
165	59°-26'-45"		S 86°-26'-00" W 164.63
164		9°-23'-30"	N 84°-10'-30" W 162.95
163		83°-27'-15" <sup>30"</sup>	N 00°-43'-00" W 226.66
162	86°-04'-30"		N 86°-47'-30" W 141.30
161		95°-48'-30"	N 09°-01'-00" E 152.54
160	65°-06'-15"		N 56°-05'-15" W 247.40

	L	$\tau$	
159		$76^\phi-11-45$	$N56^\phi-05-15W$
158	$45^\phi-32-30$		$N20^\phi-06-30E$ 30405
157	$24^\phi-08-00$		$N25^\phi-26-00W$ 240.97
156		$02^\phi-36-45$	$N49^\phi-34-00W$ 274.50
155		$25^\phi-20-15$	$N46^\phi-57-15W$ 220.50
154		$23-52-15$	$N21^\phi-37-00W$ 285.88
153	$54^\phi-19-00$		$N02^\phi-15-15E$ 323.58
152		$13^\phi-56-30$	$N52^\phi-03-45W$ 229.95
151	$10^\phi-33-30$		$N38^\phi-07-15W$ 30407
150	$22^\phi-30-00$		$N48^\phi-40-45W$ 140.58
149		$03^\phi-54-45$	$N71^\phi-10-45W$ 167.37
148		$09^\phi-02-30$	$N67^\phi-16-00W$ 267.85
			$N58^\phi-13-30W$ 332.62

	L	T	$\theta$	
			N 58-13-30 W	
147	127 $^{\circ}$ -13-30		S 05 $^{\circ}$ -27-00 E	283.30
146	55 $^{\circ}$ -06-30		S 60 $^{\circ}$ -33-30 E	242.32
145 $\frac{1}{2}$	02 $^{\circ}$ -05-45		S 58 $^{\circ}$ -27-45 E	159.33
145	31 $^{\circ}$ -48-45		S 26 $^{\circ}$ -39-00 E	135.95
144	42 $^{\circ}$ -12-30		S 15 $^{\circ}$ -33-30 W	335.30
143	22 $^{\circ}$ -53-00		S 07 $^{\circ}$ -19-30 E	398.37
142	24 $^{\circ}$ -53-30		S 17 $^{\circ}$ -34-00 W	182.88
141	26 $^{\circ}$ -00-00		S 08 $^{\circ}$ -26-00 E	293.05
140	16 $^{\circ}$ -02-30		S 24 $^{\circ}$ -28-30 E	276.42
139	39 $^{\circ}$ -16-15		S 63 $^{\circ}$ -44-45 E	301.05
138	11 $^{\circ}$ -47-00		S 51 $^{\circ}$ -57-45 E	186.40
137	69 $^{\circ}$ -04-45		S 17 $^{\circ}$ -07-00 W	257.28
136	72 $^{\circ}$ -22-00		S 55 $^{\circ}$ -15-00 E	109.27

	L	TC		
135		$46^{\phi}-26-15$	$S55^{\phi}-15-00E$	10727
134		$76^{\phi}-58-15$	$S08^{\phi}-48-45E$	16605
133		$60^{\phi}-40-45$	$S68^{\phi}-09-30W$	22980
132		$47^{\phi}-35-45$	$S07^{\phi}-28-45W$	19085
131		$14^{\phi}-44-15$	$S55^{\phi}-04-30W$	20314
130		$21^{\phi}-09-00$	$S69^{\phi}-48-45W$	16740
129		$18^{\phi}-38-00$	$S48^{\phi}-39-45W$	22883
128		$05^{\phi}-34-15$	$S30^{\phi}-01-45W$	17813
127		$18^{\phi}-51-15$	$S24^{\phi}-27-30W$	17546
126		$16^{\phi}-15-45$	$S43^{\phi}-18-45W$	35910
125		$15^{\phi}-26-30$	$S59^{\phi}-34-30W$	22168
124		$20^{\phi}-17-00$	$S44^{\phi}-08-00W$	22857
			$S64^{\phi}-25-00W$	28995

L TC

S64<sup>φ</sup>-25-00W

123	51 <sup>φ</sup> -39-00	S12 <sup>φ</sup> -46-00W	134.00
122	94 <sup>φ</sup> -25-45	S81 <sup>φ</sup> -39-45E	194.70
121	87 <sup>φ</sup> -43-45	S06 <sup>φ</sup> -04-00W	304.20
120	04 <sup>φ</sup> -24-30	S10 <sup>φ</sup> -28-30W	267.90
119	42 <sup>φ</sup> -23-15	V. S52 <sup>φ</sup> -51-45W	223.55
118	142 <sup>φ</sup> -05-30	S89 <sup>φ</sup> -13-45E	237.80
117	87 <sup>φ</sup> 00-00	S02 <sup>φ</sup> -13-45E	337.92
116	53 <sup>φ</sup> 31-45	S51-18-00W	307.23
115	58 <sup>φ</sup> -58-30	N69 <sup>φ</sup> -43-30W	118.80
114	107 <sup>φ</sup> -40-00	S02 <sup>φ</sup> -36-30W	161.20
113	36 <sup>φ</sup> -01-30	S33 <sup>φ</sup> -25-00E	214.58
112	92 <sup>φ</sup> -38-30	S59 <sup>φ</sup> -13-00W	187.10

	L	T		
111	117 <sup>φ</sup> -52-45		S59 <sup>φ</sup> -13-00W	11710
			S58 <sup>φ</sup> -39-45E	11430
110		83 <sup>φ</sup> -14-00		
			S24 <sup>φ</sup> -34-15W	9135
109		53 <sup>φ</sup> -37-00		
			S78-11-15W	19220
108	06 <sup>φ</sup> -12-30			
			S71 <sup>φ</sup> -58-45W	28760
107		26 <sup>φ</sup> -40-45		
			N81 <sup>φ</sup> -20-30W	21657
106	24 <sup>φ</sup> -45-14			
			S73 <sup>φ</sup> -54-15W	23165
105	122 <sup>φ</sup> -40-45			
			S48 <sup>φ</sup> -46-30E	27480
104	54 <sup>φ</sup> -56-15			
			N76 <sup>φ</sup> -17-15E	34350
103		20 <sup>φ</sup> -27-45		
			S83 <sup>φ</sup> -15-00E	31005
102		83 <sup>φ</sup> -52-15		
			S00 <sup>φ</sup> -37-15W	20601
101	106 <sup>φ</sup> -40-45			
			N73 <sup>φ</sup> -56-30E	13800
100		34 <sup>φ</sup> -00-00		
			S72 <sup>φ</sup> -03-30E	26350

	L	TC		
			S72 <sup>φ</sup> -03-30E	
99		07-53-30	S64 <sup>φ</sup> -10-00E	9880
98		43 <sup>φ</sup> 23-00	S20 <sup>φ</sup> -47-00E	32315
97		07 <sup>φ</sup> -25-15	S13 <sup>φ</sup> -21-45E	12250
96½		16 <sup>φ</sup> -02-30	S02 <sup>φ</sup> -40-45W	17730
96		43 <sup>φ</sup> 32-15	S46 <sup>φ</sup> -13-00W	16510
95	0 <sup>φ</sup> -20-30		S45 <sup>φ</sup> -52-30W	7180
94	106 <sup>φ</sup> -11-45		S60 <sup>φ</sup> -19-45E	18027
93		62 <sup>φ</sup> -23-00	S02 <sup>φ</sup> -03-45W	10682
92		47 <sup>φ</sup> -20-45	S49 <sup>φ</sup> -24-30W	16450
91		09 <sup>φ</sup> -53-15	S59 <sup>φ</sup> -17-45W	23300
90	132 <sup>φ</sup> -50-15		S73 <sup>φ</sup> -32-30E	25900
89		87 <sup>φ</sup> -29-30	S13 <sup>φ</sup> -57-00W	10385
88		22 <sup>φ</sup> 17-15	S36 <sup>φ</sup> -14-15W	12270

CORRECT.

	L	TR	
			S36 <sup>φ</sup> -14-15W
87	89 <sup>φ</sup> -44-15		
			S53 <sup>φ</sup> -30-00E 17690
86	49 <sup>φ</sup> -43-00		
			S03 <sup>φ</sup> -47-00E 31100
85	02 <sup>φ</sup> -09-45		
			S05 <sup>φ</sup> -56-45E 51980
84	26 <sup>φ</sup> -04-15		
			S32 <sup>φ</sup> -01-00E 21765
83	01 <sup>φ</sup> -20-00		
			S33 <sup>φ</sup> -21-00E 27535
82	81 <sup>φ</sup> -56-00		
			N44 <sup>φ</sup> -43-00E 33390
81	104 <sup>φ</sup> -07-00		
			S11 <sup>φ</sup> -10-00E 24810
80	17 <sup>φ</sup> -03-15		
			S05 <sup>φ</sup> -53-15W 32722
79	133 <sup>φ</sup> -12-45		
			N52 <sup>φ</sup> -40-30E 50260
78	80 <sup>φ</sup> -23-15		
			S46 <sup>φ</sup> -56-15E 14215
77	32 <sup>φ</sup> -45-45		
			S14 <sup>φ</sup> -10-30E 20790
76	13 <sup>φ</sup> -09-15		
			S01 <sup>φ</sup> -01-15E 22300

	L	T		
			S01 <sup>φ</sup> 01-15E	
75		68 <sup>φ</sup> -01-45	S67 <sup>φ</sup> -00-30W	68.50
74		75 <sup>φ</sup> -29-45	S08 <sup>φ</sup> -29-15E	118.96
73		00 <sup>φ</sup> -33-00	S09 <sup>φ</sup> 02-15E	122.98
72		95 <sup>φ</sup> -55-30	S86 <sup>φ</sup> 53-15W	105.27
71		87 <sup>φ</sup> -18-30	S00 <sup>φ</sup> 25-15E	76.67
70		24 <sup>φ</sup> -30-15	S24 <sup>φ</sup> 05-00W	102.15
69		30 <sup>φ</sup> -36-45 <sup>φ</sup>	S54 <sup>φ</sup> -41-45W	104.30
68		147 <sup>φ</sup> -19-00	N87 <sup>φ</sup> -21-45E	201.00
67		109 <sup>φ</sup> -44-30	S17 <sup>φ</sup> -06-15W	134.30
66		10 <sup>φ</sup> -31-30	S27 <sup>φ</sup> -37-45W	131.48
65		51 <sup>φ</sup> -53-00	S79 <sup>φ</sup> -30-45W	120.85
64		101 <sup>φ</sup> -07-15	S21 <sup>φ</sup> -36-30E	157.78

L R S21°-36-30 E

63 36°-39-00  
S15°-02-30W 10595

62 105°-58-30  
N89°-04-00E 11370

61 34°-43-15  
S03°-47-15E 56020

60 28°-02-00  
S24-15-45E 17368

59 33°-09-00  
S08°-54-15W 19680

58 22°-45-30  
S31-38-45W 24265

57 43°-05-15  
S14°-47-45W 10740

56 16°-21-30  
N88°-54-45W 6660

55 56°-42-00  
N32°-08-45W 12770

54 06°-13-45  
N25°-55-00W 14600

53 109°-21-15  
S44°-43-45W 17685

52 61°-04-15  
N74°-12-00W 16160

32°-04-00  
N42°-08-00W 18390

S03-47-15W (5)

S74-44-00W  
CORRECT UP = S74-47-45 CORRECT  
N88-50-45W

	L	TC		
			N42 <sup>φ</sup> 08-00W	
51		19 <sup>φ</sup> 32-30		
			N22 <sup>φ</sup> 35-30W	101.40
50	110 <sup>φ</sup> 32-30			
			S46 <sup>φ</sup> 52-00W	302.65
49		06 <sup>φ</sup> 59-30		
			S53 <sup>φ</sup> 51-50W	348.10
48		57 <sup>φ</sup> 26-15		
			N68 <sup>φ</sup> 42-15W	348.90
47	01 <sup>φ</sup> 49-30			
			N70 <sup>φ</sup> 31-45W	277.50
46		17 <sup>φ</sup> 10-00		
			N53 <sup>φ</sup> 21-45W	36.20
45		44 <sup>φ</sup> 27-45		
			N08 <sup>φ</sup> 54-00W	76.10
44	72 <sup>φ</sup> 58-00			
			N81 <sup>φ</sup> 52-00W	99.30
43		44 <sup>φ</sup> 13-00		
			N37 <sup>φ</sup> 39-00W	82.40
42½	01 <sup>φ</sup> 41-15			
			N39 <sup>φ</sup> 20-15W	76.30
42		45 <sup>φ</sup> 15-30		
			N05 <sup>φ</sup> 55-15E	200.70
41	33 <sup>φ</sup> 37-15			
			N27 <sup>φ</sup> 42-00W	156.60
40		23 <sup>φ</sup> 27-30		
			N04 <sup>φ</sup> 14-30W	172.50

	L	R	
			N04°-14-30W
39	151°-00-30		S24°-45-00W 287.75
38		88°-38-45	
			N66°-36-15W 289.00
37		34°-54-45	
			N31°-41-30W 143.60
36	38°-28-30		
			N70°-10-00W 152.25
35		52°-31-00	
			N17°-39-00W 165.00
34	45°-57-00		
			N63°-36-00W 81.85
33		63°-51-30	
			N00°-15-30E 124.60
32	56°-23-00		
			N56°-07-30W 122.15
31		20°-25-15	
			N35°-42-15W 210.40
30		06°-00-00	
			N29°-42-15W <del>240.55</del> <del>215.55</del>
29	01°-32-30		
			N31°-14-45W 179.00
28	14°-15-00		
			N45°-29-45W 247.00

- 77° 315.35 Correct

	L	TC		
			N45-29-45W	
27		23 <sup>φ</sup> -23-45		
			N22 <sup>φ</sup> -06-00W	197.10
26		27 <sup>φ</sup> -11-45		
			N49 <sup>φ</sup> -17-45W	287.80
25		134 <sup>φ</sup> -36-30		
			S03 <sup>φ</sup> -54-15E	233.95
24		06 <sup>φ</sup> -50-45		
			S02 <sup>φ</sup> -56-30W	228.70
23		01-06-15 <sup>φ</sup>		
			S01 <sup>φ</sup> -50-15W	375.80
22		29 <sup>φ</sup> -15-45		
			S31 <sup>φ</sup> -06-00W	171.80
21		15 <sup>φ</sup> -01-45		
20 1/2		01 <sup>φ</sup> -45-15	S46 <sup>φ</sup> -07-45W	61.40
			S47 <sup>φ</sup> -53-00W	118.90
20		11 <sup>φ</sup> -02-45		
			S58 <sup>φ</sup> -55-45W	126.2 <sup>5</sup> / <sub>6</sub>
19		P.O.T.		
			S58 <sup>φ</sup> -55-45W	153.70
18		26 <sup>φ</sup> -21-45		
			S85 <sup>φ</sup> -17-30W	222.90
17		154 <sup>φ</sup> 12-45		
			S68 <sup>φ</sup> -55-15E	376.45
16		47 <sup>φ</sup> -36-00		
			S21 <sup>φ</sup> -19-15E	195.25

	L	R	
			S21 <sup>φ</sup> -19-15E
15		02 <sup>φ</sup> -03-00	S19 <sup>φ</sup> -16-15E 14150
14	11 <sup>φ</sup> -30-15		S30 <sup>φ</sup> -46-30E 19795
13		56 <sup>φ</sup> -02-00	S25 <sup>φ</sup> -15-30W 29190
12	67 <sup>φ</sup> -52-00		S42 <sup>φ</sup> -36-30E 25470
11		49 <sup>φ</sup> -34-00	S06 <sup>φ</sup> -57-30W 16320
10	26 <sup>φ</sup> -58-30		S20 <sup>φ</sup> -01-00E 15620
9		14 <sup>φ</sup> -01-45	S05 <sup>φ</sup> -59-15E 11190
8		131 <sup>φ</sup> -23-15	N54 <sup>φ</sup> -36-00W 30950
7	12 <sup>φ</sup> -40-00		N67 <sup>φ</sup> -16-00W 11760
6		09 <sup>φ</sup> 04-30	N58 <sup>φ</sup> -11-30W 16110
5	133 <sup>φ</sup> -56-15		S12 <sup>φ</sup> -07-45E 16070
4		17 <sup>φ</sup> -29-00	S05 <sup>φ</sup> -21-15W 11460

L. R.

S05-21-15W

3

81<sup>φ</sup>-05-45S86<sup>φ</sup>-27-00W 209.10

2

45<sup>φ</sup>-33-15S40<sup>φ</sup>-53-45W 369.10

1

09<sup>φ</sup>-27-00

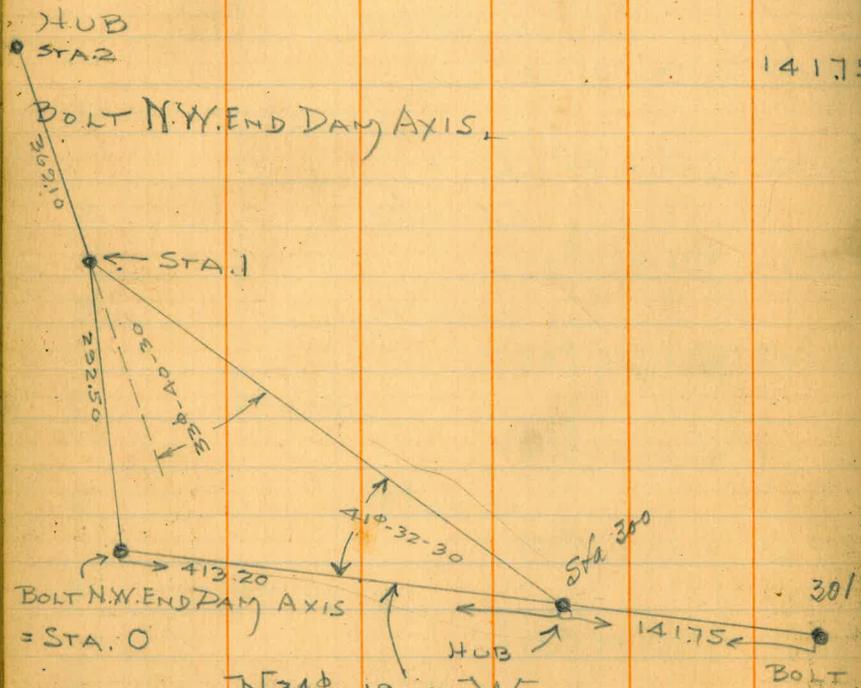
367.50

0

S50-20-45W 232.50 (2)

413.20

14175

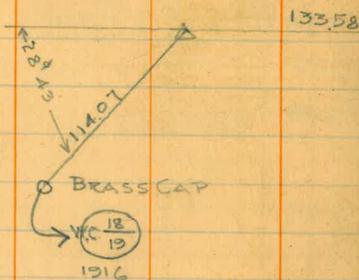


# CAMERON PROPERTY

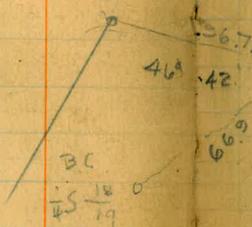
47.

WEST LINE TRACT 50 N0°00'W

16-20'-00"  
ACTUAL ANGLE TO STAR



STA 386



STA 387

BRASS CAP

1920

397.87  
48.02  
53.35  
117.85  
118.00  
130.38  
133.81  
143.66  
144.76  
145.88  
147.87

SURVEY



OBS OF POLARIS AT E. ELONG. AUG. 8TH. 1924.

REDUCTION NOT MADE. POLAR DIST. UNKNOWN

1317.05  
829.85  
487.10

340	2257.5
274	967.2
312.9	129.03
1322.10	
186.16	
1135.94	

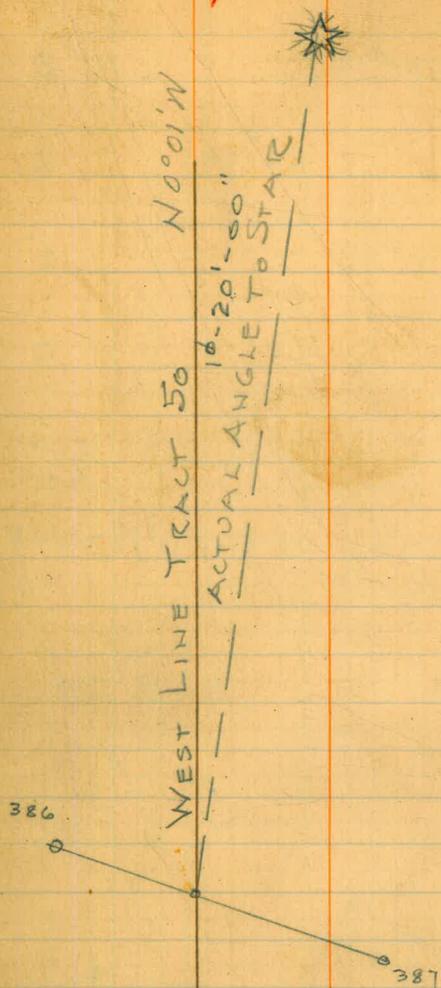
149.56 June 1-1947

142.83 July 1-1947

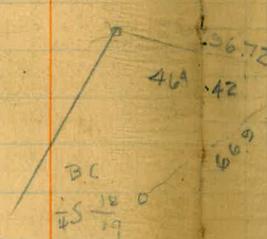
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0W0000W0000  
0W0000W0000  
0400404040  
1111111111

# CAMERON PROPERTY

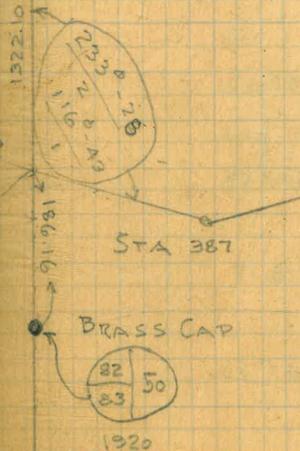
47.



STA 386



W.L. TRACT 50



BRASS CAP



1317

850.53'

STA. 398

1317.05

EAST BY U.S. SURVEY

BRASS CAP



STA. 397

OBS OF POLARIS AT E. ELONG. AUG. 8TH. 1924.  
 REDUCTION NOT MADE. POLAR DIST. UNKNOWN

1317.05  
 829.85  
 487.10

340	2257.5
274	967.2
312.9	129.03
1322.10	
184.16	
1135.94	

March 16-1925

Crowell  
Lauterbach

48

Levels at Lower Otay.

+	-	H.L.	Elev.
12.02	0.64	147.34	135.32 = Water in Lake.
	0.61		146.73
12.17		158.90	
	0.21		158.69
6.70		165.39	
	4.91		160.48 = Top of Air Shaft.
	4.10		161.29 = Spike in side of Road at saddle.
	0.33		165.06
12.27		177.33	
	0.53		176.80
12.25		189.05	
	0.42		188.63
12.45		201.08	
	0.10		200.98
12.81		213.79	
	0.61		213.18
12.92		226.10	
	0.22		225.88
9.14		235.02	
	9.65		225.37 = Bottom of Domestic water supply Tank.
	0.0		235.02 = Top of Tank.

135.32	165.39
12.02	0.33
147.34	165.06
0.61	12.27
146.73	177.33
12.17	0.53
158.90	176.80
0.21	12.25
158.69	189.05
6.70	0.42
165.39	188.63
4.91	12.45
160.48	201.08
	0.10
165.39	200.98
4.10	12.81
161.29	213.79
	0.61
	213.18
	12.92
	226.10
	0.22
	225.88
	9.14
	235.02
	9.65
	225.37

+	-	H. I.	Elev.	
0.10		161.39	161.29	= spike at Saddle
	12.19		149.20	
0.28		149.48		
	13.00		136.48	
0.16		136.64		
	12.15		124.49	
0.19		124.68		
	12.69		111.99	
0.10		112.09		
	12.33		99.76	
0.03		99.79		
	12.90		86.89	
0.07		86.96		
	13.03		73.93	
0.05		73.98		
	12.77		61.21	
0.51		61.72		
	9.95		51.77	= Tap 40" Pipe
	12.02		49.70	= $\phi$ pipe
	6.82		54.90	= cement floor S.E. cor. Filter House, (outside)

161.29
<u>0.10</u>
161.39
<u>12.19</u>
149.20
<u>0.28</u>
149.48
<u>13.00</u>
136.48
<u>0.16</u>
136.64
<u>12.15</u>
124.49
<u>0.19</u>
124.68
<u>12.69</u>
111.99
<u>0.10</u>
112.09
<u>12.33</u>
99.76
<u>0.03</u>
99.79
<u>12.90</u>
86.89
<u>0.07</u>
86.96
<u>13.03</u>
73.93
<u>0.05</u>
73.98
<u>12.77</u>
61.21
<u>0.51</u>
61.72
<u>9.95</u>
51.77
<u>12.02</u>
49.70
<u>6.82</u>
54.90

61.72
<u>12.02</u>
49.70
<u>6.82</u>
54.90

Stadia x sees at horsehoe bend (cont)

1/13/40

Hill  
Soper  
Brooks

L & R

50.

cont. from book 309/80

Sta.	Dist.	Hor. Δ	Vert. Δ	H.I.	Elev.
9+29					164.2
Pt. 1	18.0	90°	0°	5.0	164.2
" 2	48' (51')	"	+13°24'	"	175.7
" 3	69' (75')	"	+16°42'	"	184.8
9+88					164.1
Pt. 1	7.0	95° off back tang.	0°	5.2	164.1
" 2	27' (27')	"	+9°30'	"	168.5
" 3	38' (41')	"	+16°48'	"	175.4
" 4	83' (101')	"	+25°18'	5.2 H.I. 10.2 rod	184.3
9+88					164.1
Pt. 1	6.0	Bisec. Δ	0°	5.2	164.1
" 2	28' (28')	"	+9°00'	"	168.5
" 3	108' (119')	"	+17°52'	"	199.1
10+24					164.2
Pt. 1	13.0	90°	0°	5.1	164.2
" 2	26' (30')	"	+22°08'	"	174.7
" 3	39' (43')	"	+18°46'	"	177.3
" 4	62' (72')	"	+22°10'	5.1 H.I. 10.1 rod	179.3
10+67					163.8
Pt. 1	15.0	Bisec. Δ	0°	5.0	163.8
" 2	25.0	"	0°	"	163.8
" 3	45' (47')	"	+11°34'	"	173.0
" 4	83' (88')	"	+16°08'	"	181.9
" 5	82' (95')	"	+19°56'	"	193.6

"V" Dist.

0

+ 11.5

+ 20.6

0

+ 4.4

+ 11.3

+ 39.0 + 20.2

0

+ 4.4

+ 34.7

0

+ 10.5

+ 13.1

+ 25.2 + 15.1

0

0

+ 9.2

+ 18.1

+ 29.8

9+29 } -18'-  
} road

7'-6'- } 9+88

10+24 } -13'-

10+67 } -15'-

(cont.)

Sta.	Dist.	Hor. Δ	Vert. Δ	H.I. rod	Elev.
11+41					164.2
Pt. 1	15.0	Bisec. Δ	0	5.0	164.2
" 2	22' (26')	"	+22°01'	"	173.3
" 3	43' (49')	"	+20°18'	"	180.1
" 4	67' (77')	"	+21°12'	5.0 H.I. 11.0 rod	184.2
" 5	75' (84')	"	+19°08'	5.0 H.I. 11.0 rod	184.2
12+30					161.9
Pt. 1	3.0	90°	+2.0 above sta.		163.9
" 2	18.0	"	+2.0 " "		163.9
" 3	31 (34')	"	+15°50'	4.8	170.8
" 4	50' (54')	"	+15°30'	"	175.8
" 5	65' (71')	"	+17°12'	"	182.0
13+05					164.7
Pt. 1	13.0	90°	0°	4.6	164.7
" 2	22' (25')	"	+18°46'	"	171.4
" 3	41' (48')	"	+22°52'	"	181.9
13+70					167.3
Pt. 1	15.0	Bisec. Δ	0°	4.9	167.3
" 2	23' (26')	"	+19°48'	"	175.6
" 3	49' (58')	"	+22°52'	"	188.1
14+15					168.2
Pt. 1	18.0	90°	0°	5.0	168.2
" 2	39' (45')	"	+20°42'	"	183.1
" 3	49' (55')	"	+19°16'	"	185.3

V Dist.

11+41

-15'-  
road

0

+ 9.1

+ 15.9

+ 26.0 + 20.0

+ 26.0 + 20.0

12+30

-18'-

+ 2.0

+ 2.0

+ 8.9

+ 13.9

+ 20.1

same slope 20' further

13+05

-13'-

0

+ 6.7

+ 17.2

same slope 20' further

13+70

-15'-

0

+ 8.3

+ 20.8

Top of huge boulder

14+15

-18'-

0

+ 14.9

+ 17.1

same slope 10' further

(cont.)

Sta.	Dist.	Hor. A	Vert. A	H.I. Rod	Elev
14+80					174.3
Pt. 1	10.0	90°	0°	5.1	174.3
" 2	15' (19')	"	+25°30'	"	181.7
" 3	44' (53')	"	+23°40'	"	193.8
15+14					176.1
Pt. 1	8.0	98° alt back-sing	0°	5.1	176.1
" 2	16' (20')	"	+24°24'	"	183.9
" 3	29' (34')	"	+21°34'	"	187.7
" 4	51' (61')	"	+23°36'	"	198.5

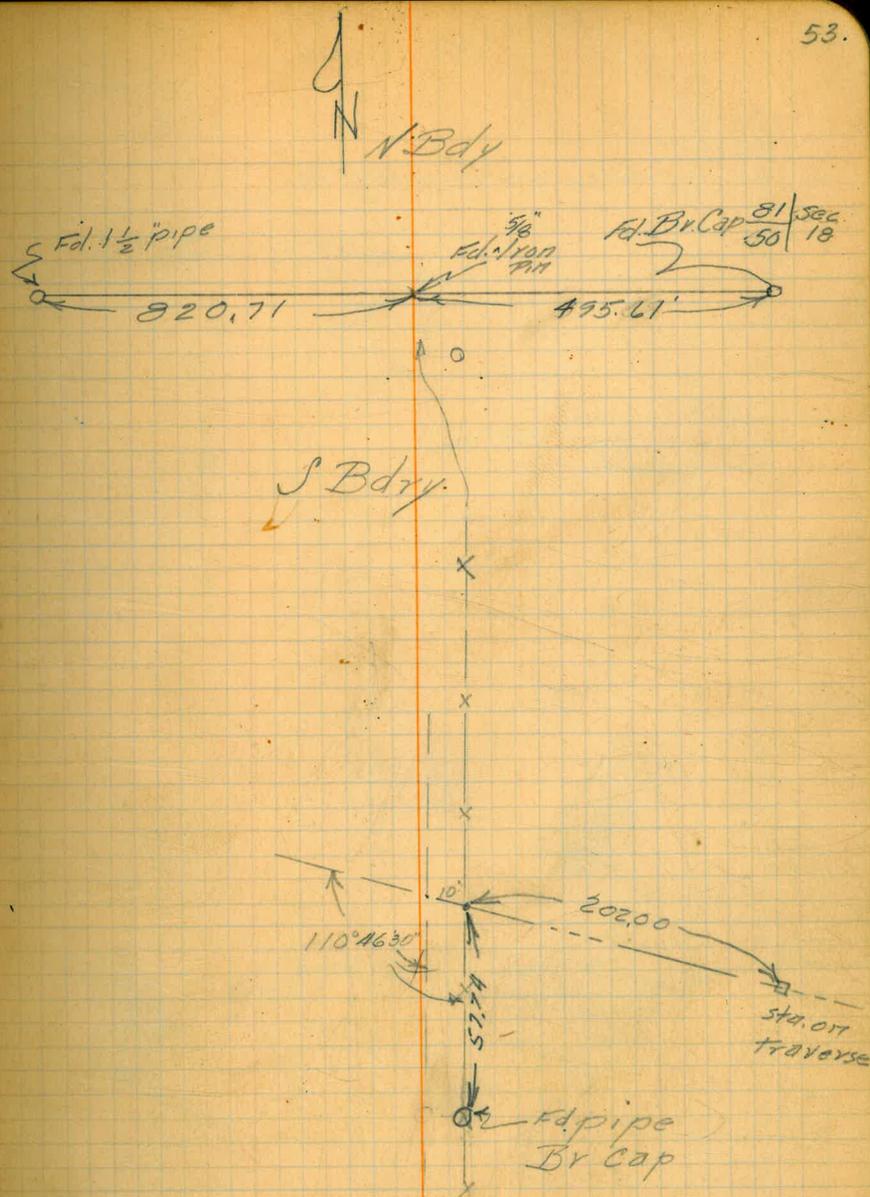
"V" Dist.

L &amp; R

	0	14+80 } -7'-10'-
+	7.4	
+	19.5	
	0	15+14 } -8'-8'-
+	7.8	
+	11.6	
+	22.4	

Raimy MORENA DAM  
King  
Hieron May 8-9 1947  
Wette

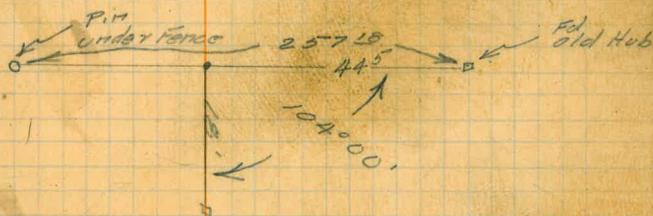
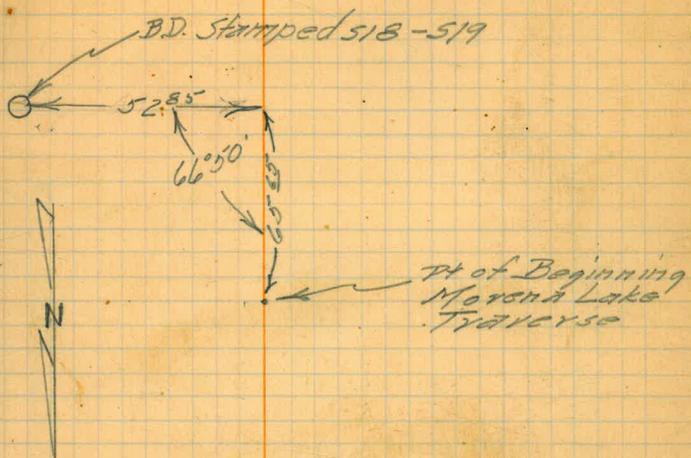
53.



Raney  
King  
Baker

June 7, 1947

54



Nov. 16, 1950 King  
Baker  
West

55.

fd 2" pipe in conc. block



WEST LINE  
1246.51  
TRACT 50

fd 1 1/2" pin under fence

63° 15'

212.96

125° 03'

75° 58' 30"

9.75  
1" pipe  
BE.  
2058

Set 2" x 2"



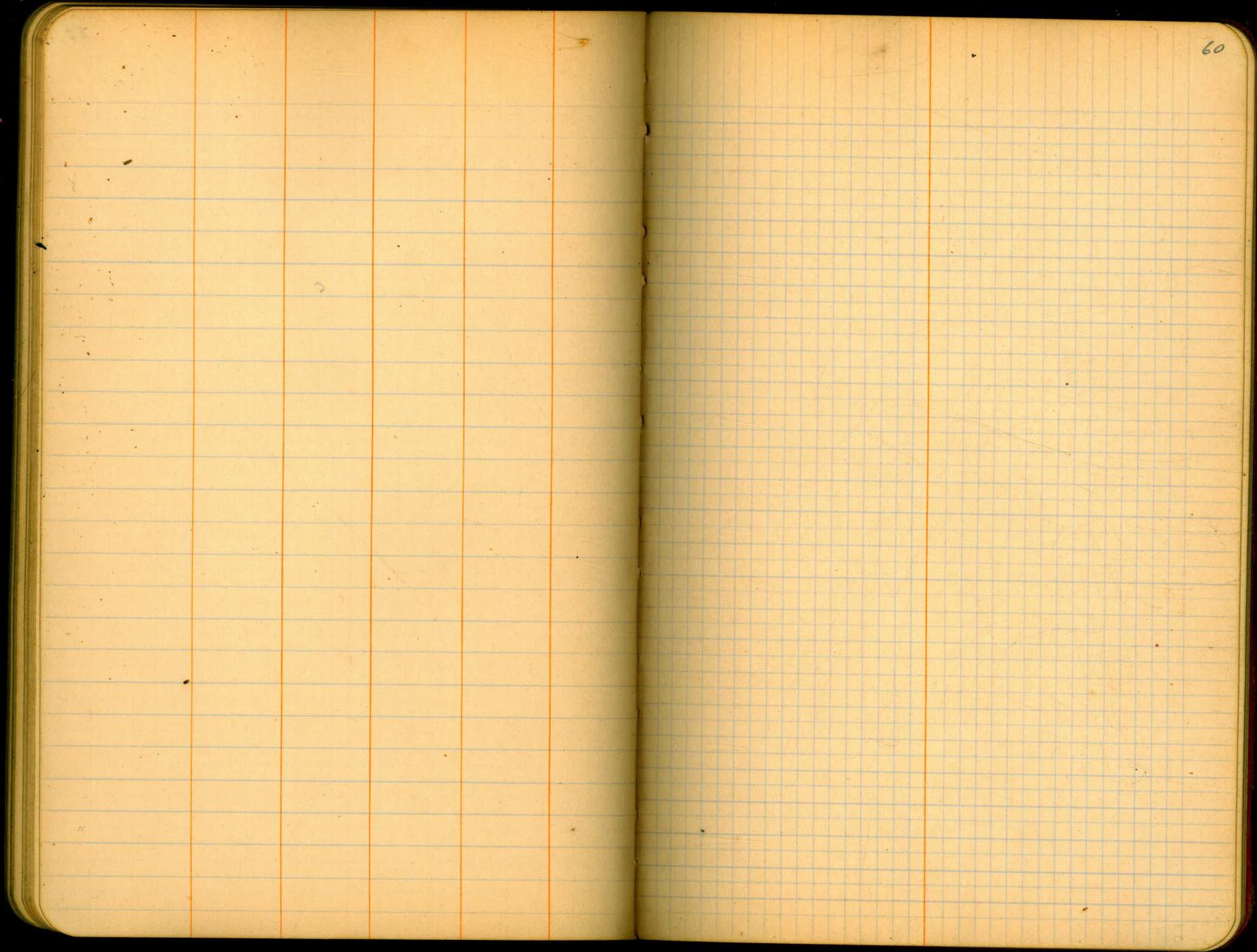
Cross section for  
Bulkhead in Morera  
Diversion tunnel  
clockwise downstream

57

0°00'	5.12
17°	5.16
27°	5.35
28°	5.70
35°30'	5.80
44°	6.08
48°	5.84
65°30'	5.00
72°30'	4.76
75°30'	4.53
78°	4.23
86°	4.10
105°	3.80
148°	2.63
158°	2.70
180°	2.70
195°	2.56
223°	2.85
247°	3.98
259°	3.58
268°30'	3.75
278°	4.03
281°	4.21
287°	4.45

287°30'	4.53
295°	4.83
297°	4.78
298°	4.70
298°30'	4.89
316°	5.47
318°	5.98
332°	5.52
341°30'	5.58
356°	5.34





60







LEVELS PREL. SURVEY FOR  
SUSPENSION BRIDGE BARRET LAKE  
SKY VALLEY ROAD

EAST APPROACH

T.P. KEEL ON <sup>5.50</sup> ROCK NEA 163.11  
<sub>168.61</sub>

0+00 153.7

= WATERS EDGE

+08 12.0 156.6

+25 8.2 160.4

+50 4.4 164.2

+75 4.3 164.3

+89  
1 4.2 164.4

+18 5.1 163.5

+50 11.2 157.4

+75 11.2 157.4

2 9.9 158.7

+25 7.7 160.9

+50 5.5 163.1

LEVELS

64

LEVEL 40 L+R

		16861		
2+75			0.5	168.1
	11.13	17839	0.35	167.26
3+00			80	170.39
+25			86	169.8

(62) NORTH

8 HIGHER  
200 ft new  
+15 ft

WEST END SUS BRIDGE SURVEY

	612	177.49		171.37
0+00				153.7
+30			13.6	163.9
+50			38	167.7
+64			60	171.5
+75			44	173.1
1			33	174.2
+50			1.3	176.2
	865	184.84	130	176.19
2			5.3	179.5
+50			108	174.0

L R

-15<sup>00</sup>  
30

-3<sup>0</sup>

-5<sup>00</sup>  
30

-5<sup>0</sup>

-10<sup>0</sup>

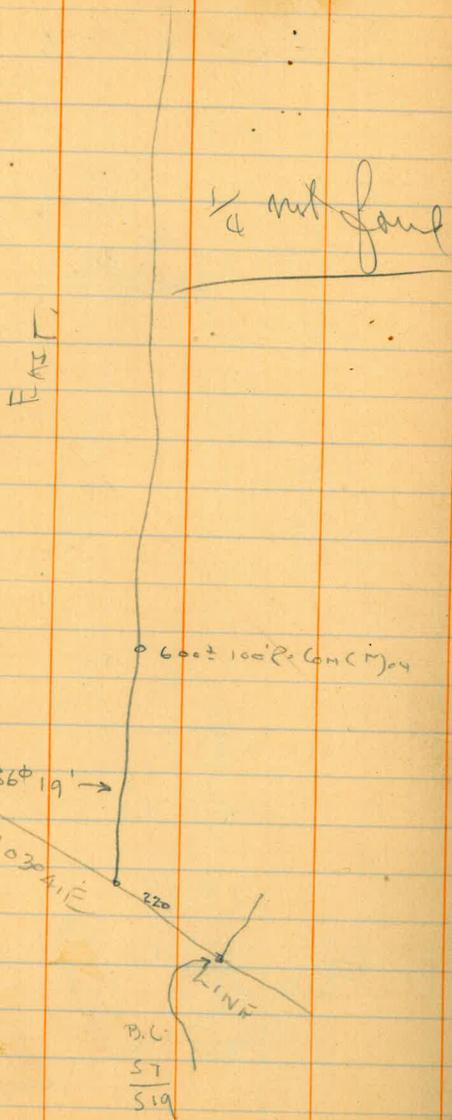
-15<sup>0</sup>

300 of new track at 110<sup>0</sup>

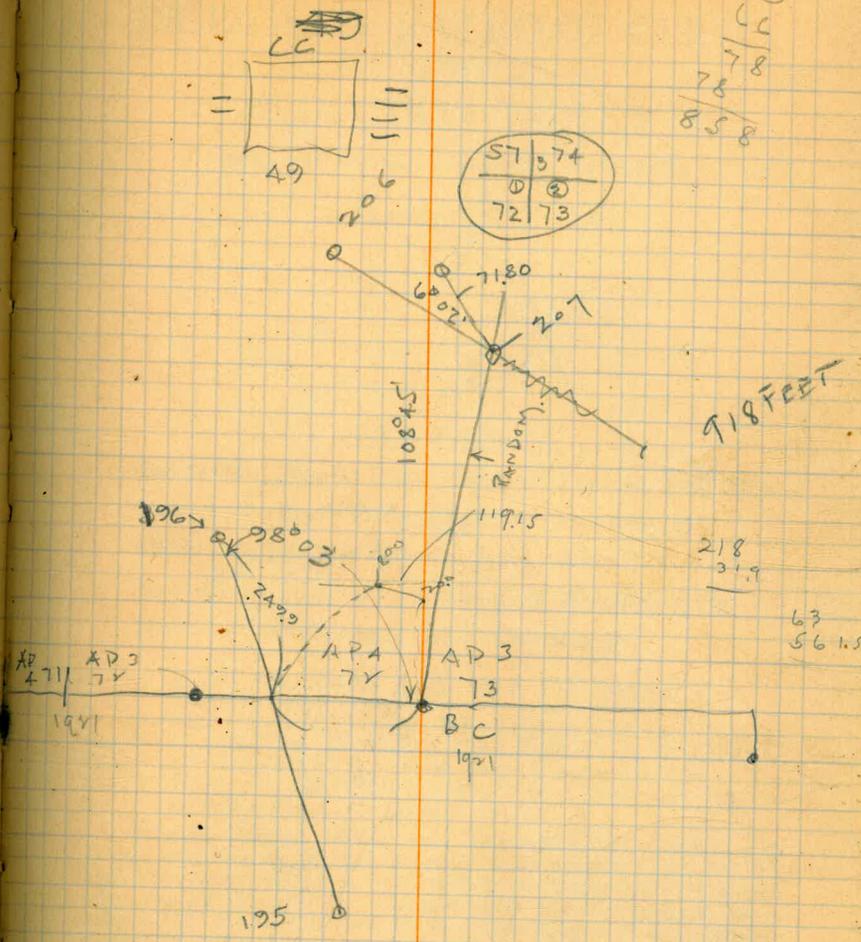




RANDOM EAST FROM TWP. LINE

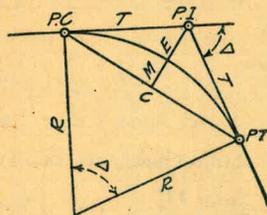


23 69



# DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES

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### CURVE FORMULAS

- Radius =  $R = \frac{50}{\sin \frac{D}{2}}$  (1) Degree of Curve = D and  $\sin \frac{D}{2} = \frac{50}{R}$  (2)
- Tangent =  $T = R \tan \frac{\Delta}{2}$  (3) Length of Curve =  $L = 100 \frac{\Delta}{D}$  (4)
- Middle ordinate =  $M = R(1 - \cos \frac{\Delta}{2})$  (5) =  $R \text{vers} \frac{\Delta}{2}$  (6)
- External =  $E = T \tan \frac{\Delta}{4}$  (7) =  $R \div \cos \frac{\Delta}{2} - R$  (8) =  $R \text{exsec} \frac{\Delta}{2}$  (9)
- Long Chord =  $C = 2 R \sin \frac{\Delta}{2}$  (10) Δ = Central Angle

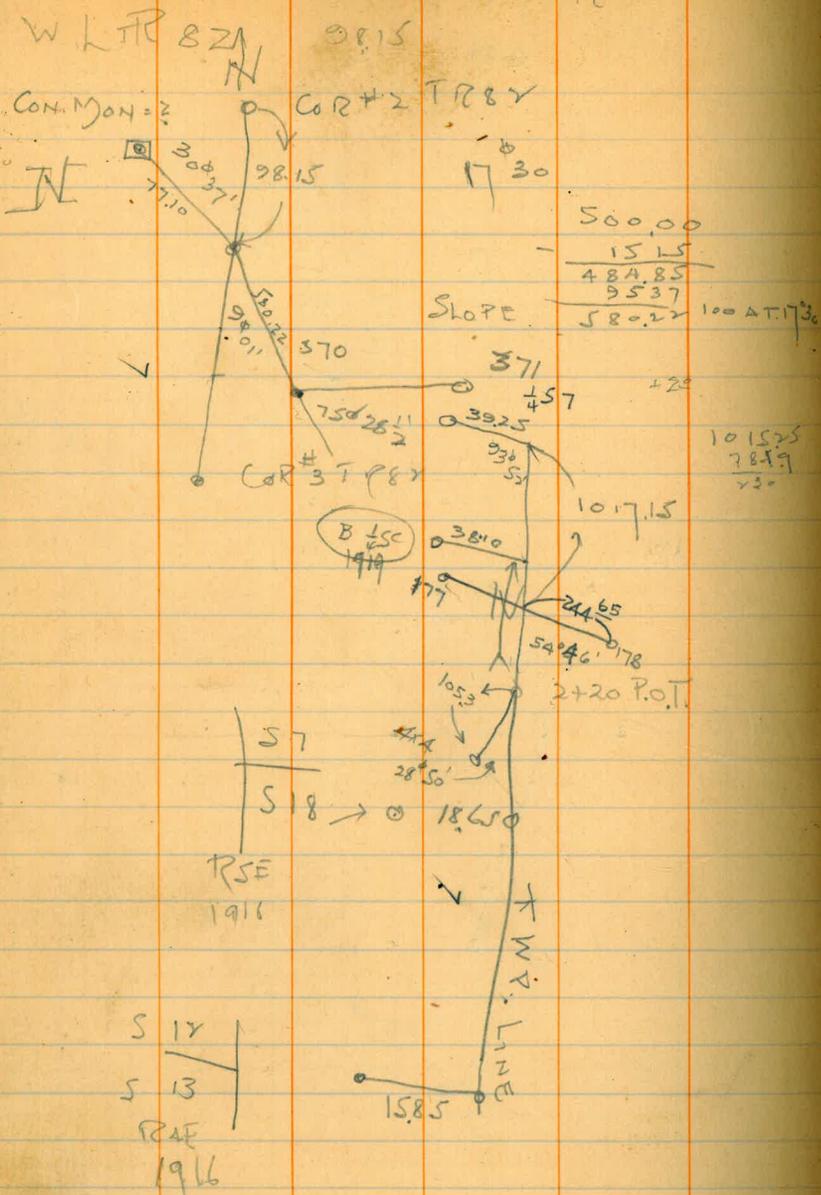
### EXPLANATION AND USE OF TABLES

**Stations.**—Given P. I. = Sta. 161 + 60.35 to find Sta. of P. C. and P. T. Δ = 62° 10' D = 8° 20'. From Table IV for 1° curve T = 3454.1 and  $\div 8\frac{1}{3} = 414.49$  ft. From Table V correction = .36 or T = 414.85 ft. P. C. = Sta. P. I. - T = 157 + 45.50. Also from (4) L = 746.00 and P. T. = Sta. P. C. + L = 164 + 91.50.

**Offsets.**—Tangent offsets vary (approximately) directly with D and with square of the distance. Thus tangent offset for Sta. 158 on above curve is 2.16 ft. found as follows. From Table III tangent offset for 100 ft. = 7.27 ft. Distance = 158 - Sta. P. C. = 54.50, hence offset =  $7.27 (54.50 \div 100)^2 = 2.16$  ft. Also square of any distance divided by twice the radius equals (approximately) the distance from tangent to curve. Thus  $(54.50)^2 \div (2 \times 688.26) = 2.16$  ft.

**Deflections.**—Deflection angle =  $\frac{1}{2}$  D for 100 ft.,  $\frac{1}{4}$  D for 50 ft., etc. For c ft. = (in minutes)  $.3 \times C \times D$  or = defl. for 1 ft. from Table III  $\times C$ . For Sta. 158 of above curve =  $.3 \times 54.5 \times 8\frac{1}{3} = 136.2'$  or 2° 16.2', or =  $2.50 \times 54.5 = 136.2'$  from Table III. For Sta. 159 deflection angle = 2° 16.2' + 8° 20'  $\div 2 = 6^\circ 26.2'$ , etc.

**Externals.**—May be found in similar manner to tangents. Thus E for curve above is 115.37 For from Table IV for 1° curve E = 960.6 for 8° 20' =  $960.6 \div 8\frac{1}{3} = 115.27$  and from Table V correction = .10 or E = 115.37 Or suppose Δ = 32° and E is measured and found to be 42 ft. What is D? From Table IV E = 230.9 and  $\div 42 = 5.5$  or D = 5° 30'.





88-46 177-32 1/2 L - 579-15w  
 334 420-30 (84-59) R 557-10E

680-01 1300-01 L N 80-15w  
 353

62-51 125-43 1/2 LT  
 334-353 To. SXC. N. 16-20 E

AT SX SIGHT 19 SXC  
 TO 334 RT 112-06 W POS (SXC)  
 TO 324 159-11 RT (SXC-10w)

QUARTZ 169-19 R (S73-W)  
 171 3 1/2 R TO BEGIN (S75-20w)

500-231 R  
 100-45 1/2  
 AT 19 N-S  
 11-5  
 61-10

78-27 1/2

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1 1/2.  
 For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.7	9.8	10.0	10.1	10.3	10.4	10.6	10.7	10.9	1
2	11.0	11.2	11.3	11.5	11.6	11.8	11.9	12.1	12.2	12.4	2
3	12.5	12.7	12.8	13.0	13.1	13.3	13.4	13.6	13.7	13.9	3
4	14.0	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.4	4
5	15.5	15.7	15.8	16.0	16.1	16.3	16.4	16.6	16.7	16.9	5
6	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4	6
7	18.5	18.7	18.8	19.0	19.1	19.3	19.4	19.6	19.7	19.9	7
8	20.0	20.2	20.3	20.5	20.6	20.8	20.9	21.1	21.2	21.4	8
9	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	9
10	23.0	23.2	23.3	23.5	23.6	23.8	23.9	24.1	24.2	24.4	10
11	24.5	24.7	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	11
12	26.0	25.2	26.3	26.5	26.6	26.8	26.9	27.1	27.2	27.4	12
13	27.5	27.7	27.8	28.0	28.1	28.3	28.4	28.6	28.7	28.9	13
14	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	14
15	30.5	30.7	30.8	31.0	31.1	31.3	31.4	31.6	31.7	31.9	15
16	32.0	32.2	32.3	32.5	32.6	32.8	32.9	33.1	33.2	33.4	16
17	33.5	33.7	33.8	34.0	34.1	34.3	34.4	34.6	34.7	34.9	17
18	35.0	35.2	35.3	35.5	35.6	35.8	35.9	36.1	36.2	36.4	18
19	36.5	36.7	36.8	37.0	37.1	37.3	37.4	37.6	37.7	37.9	19
20	38.0	38.2	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.4	20
21	39.5	39.7	39.8	40.0	40.1	40.3	40.4	40.6	40.7	40.9	21
22	41.0	41.2	41.3	41.5	41.6	41.8	41.9	42.1	42.2	42.4	22
23	42.5	42.7	42.8	43.0	43.1	43.3	43.4	43.6	43.7	43.9	23
24	44.0	44.2	44.3	44.5	44.6	44.8	44.9	45.1	45.2	45.4	24
25	45.5	45.7	45.8	46.0	46.1	46.3	46.4	46.6	46.7	46.9	25
26	47.0	47.2	47.3	47.5	47.6	47.8	47.9	48.1	48.2	48.4	26
27	48.5	48.7	48.8	49.0	49.1	49.3	49.4	49.6	49.7	49.9	27
28	50.0	50.2	50.3	50.5	50.6	50.8	50.9	51.1	51.2	51.4	28
29	51.5	51.7	51.8	52.0	52.1	52.3	52.4	52.6	52.7	52.9	29
30	53.0	53.2	53.3	53.5	53.6	53.8	53.9	54.1	54.2	54.4	30
31	54.5	54.7	54.8	55.0	55.1	55.3	55.4	55.6	55.7	55.9	31
32	56.0	56.2	56.3	56.5	56.6	56.8	56.9	57.1	57.2	57.4	32
33	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6	58.7	58.9	33
34	59.0	59.2	59.3	59.5	59.6	59.8	59.9	60.1	60.2	60.4	34
35	60.5	60.7	60.8	61.0	61.1	61.3	61.4	61.6	61.7	61.9	35
36	62.0	62.2	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.4	36
37	63.5	63.7	63.8	64.0	64.1	64.3	64.4	64.6	64.7	64.9	37
38	65.0	65.2	65.3	65.5	65.6	65.8	65.9	66.1	66.2	66.4	38
39	66.5	66.7	66.8	67.0	67.1	67.3	67.4	67.6	67.7	67.9	39
40	68.0	68.2	68.3	68.5	68.6	68.8	68.9	69.1	69.2	69.4	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 41.9. For same slopes but other widths of roadbed correct above figures by one-half difference in width of roadbed; thus in example above for 20 ft. roadbed distance will be 41.9 + (20-16) ÷ 2 or 2 ft. added to 41.9 = 43.9. For slopes of 1 on 1 see inside of front cover.