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COORDINATES OF A B D & E

LINE	BEARING		DIST.
AE	S 0° 20' 00" E	✓	5258.80
ED	N 32° 29' 45" E	✓	1791.21
DB	N 0° 11' 31" E	✓	2394.85
BA	N 36° 02' 37" W	✓	1673.61
DA	N 14° 50' 11" W	✓	3877.33
EB	N 13° 43' 45" E	✓	4020.35

BEARING OF LINE $\overline{AE}$ TAKEN FROM SOLAR OBSERVATION
DIST " " " " " USBLM INFO.

6372797
306
6373103

437
-7
305.9

1795960
144 08 54
35.5106

T.767649
175
T.7676669
292
6
175.2

293
-7
2051

1795960
130 13 38
49°46' 22"

.8827994
36
.8828030

1795.960
1324 04
4719 56

9650811
53
9650864 88
.6
528

8664505
116
8664621
194
6
1164

$$\frac{\overline{AE}}{130°13'38''} = \frac{\overline{BE}}{\sin 35°42'37''}$$

$\overline{BE}$ =

Log 5258.80	=	3.720 8867
Log Sin 35°42'37"	=	T.766 1799
Log csc 130°13'38"	=	0.117 1970
		3.604 2636 = Log 4020.35

$\overline{AB}$ =

Log 5258.80	=	3.720 8867
Log Sin 14°03'45"		T.385 5708
Log csc 130°13'38"		0.117 1970
		3.223 6545 = Log 1673.61

$\overline{AD}$ =

Log 5258.80	=	3.720 8867
Log Sin 32°49'45"	=	T.734 1083
Log csc 132°40'04"		0.133 5379
		3.588 5329 = Log 3877.33

$\overline{DE}$ =

Log 5258.80	=	3.720 8867
Log Sin 14°03'11"	=	T.398 7217
Log csc 132°40'04"	=	0.133 5379
		3.253 1463 = Log 1791.21

Log 1791.21 =	3.2531465	3.2531465	
Log Cos 32°29'45" =	$\bar{1}$.9260493	$\bar{1}$.7301669	Log Sin
	3.1791958	2.9833134	

7696531
203
7696734
6
289
·7
2033

Log 2394.85	3.3792783	3.3792783	
Log Cos 0°11'31"	$\bar{1}$.9999976	$\bar{3}$.5250521	Log Sin
	3.3792759	0.9043314	

Log 1673.61	3.2236543	3.2236543
Log Cos 36°02'37"	$\bar{1}$.9077173	$\bar{1}$.7696734
	3.1313716	2.9933277

9077280
(0)
907717 3153
·7
107.1

Log 5258.80	3.7208867	3.7208867
Log Cos 0°20"60"	$\bar{1}$.9999927	$\bar{3}$.7647537
	3.7208794	1.4856404

	Dist	BEARING	LAT N	LAT S	DEP E	DEP W	COORD N	COORD E
E							0.00	0.00
	1791.21	N 32° 29' 45" E	1510.76 -2		962.31 -2			
D							1510.74	962.29
	2394.85	N 0° 11' 31" W	2394.84 -2			8.02 +3		
B							3905.56	954.24
	1673.61	N 36° 02' 37" W	1353.23 -2			984.75 +2		
A							5258.77	-50.53
	5258.80	S 0° 20' 06" E		5258.71 +6	30.59 -6			
E			5258.83	5258.71	992.90	992.77	0.00	0.00

11,118.47

		N – LAT	– S	E DEP	– W	COORD N	E
K						0.00	0.00
5096.52	N 0° 02' 00" E	+.23 ✓ 5096.57	—	+1.89 ✓ 2.97		5096.75	1.08
F							
1383.44	S 30° 45' 57" W		-.07 1188.80		+.51 707.67	3908.02	707.10
G							
2760.00	S 7° 47' 02" W		-.13 2735.10		+1.02 369.83	1173.05	1077.95
J							
1593.58	S 42° 35' 42" E		-.07 1173.12	-.60 1078.55		0.00	0.00
K							
10,833.54		5096.52	5097.02	1081.52	1077.50		
			.50		4.02		

$$\frac{FG}{\sin GKF} = \frac{FK}{\sin FGK}$$ .046

.37

Log 5096.52 = 3.7072737
Log SIN 10°15'21" = T.2505266
Log CSC 139°00'42" = 0.1831588
3.1409591 = Log 1383.44

$$\frac{JK}{\sin JFK} = \frac{FK}{\sin FJK}$$

Log 5096.52 = 3.7072737
Log SIN 15°22'41" = T.4235520
Log CSC 121°59'37" = 0.0715483
3.2023740 = Log 1593.58

Log 5096.52	3.7072737	3.7072737	
Log Cos 0°02'	T.9999999	$\bar{4}$.7647561	Log Sin
	3.7072736	0.4720298	29.65
5096.52			

Log 1383.44	3.1409591	3.1409591	
Log Cos 30°45'57	T.9341484	T.7088716	707.67
	3.0751075	2.8498307	

9341359
875
9341484 | 25
7
875

Log 2760.00	3.4409091	3.4409091	
Log Cos 7°42'02"	T.9960657	T.1270911	Log Sin
	3.4369738	2.5680002	
	2735.10	369.83	

7088468
248
7088716 | 354
7
2478

0600
311
1557
2
31 | 1.4

Log 1593.58	3.2023740	3.2023740	
Log Cos 42°35'42"	T.8669699	T.8304679	
	3.0693439	3.0328419	
	1173.09	1078.55	

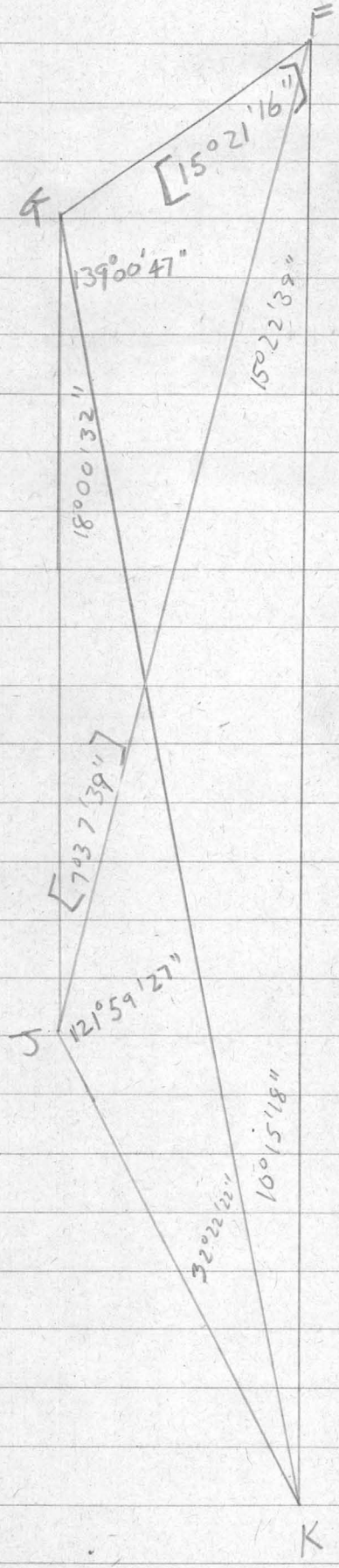
8670125
39
19586
2
38.6

8669738
39

229
2
45.8

.1270600

1557
2
31.4



∠ GKF (CALC)	15°21'16"	
	15°22'39"	179°59'60"
	139°00'47"	169 44 42
	169°44'42"	10°15'18"

∠ JKG (CALC.)	18°00'32"	179°59'60
	7°37 39	147°37'38
	121°59'27"	32°22'22"
	147°37'38"	

JGF 157°01'19"

[157°01'05"] 14"

Σ INTERIOR ANGLES (ADJUSTED FOR Σ ∡'S AT G)

JKG	32° 22' 22"	
GKF	10° 15' 20"	
KFJ	15° 22' 39"	
JFG	[15° 21' 16"]	
FGK	139° 00' 40" *	
KGJ	18° 00' 25" *	
GJF	[7° 37' 39"]	
FJK	121° 59' 39"	
	360° 00' 00"	O.K. ✓

Σ OPPOSITE ∡

KGJ	18°00'25" * -2"	JFK	15°22'39" +2"
GJF	[7°37'39"]	GKF	10°15'20" +1"
	25°38'04"		25°38'59"
			5"
FJK	121°59'39" -2"	JFG	[15°21'16"]
JKG	32°22'22" -1"	FGK	139°00'40" * +2"
	154°22'01"		154°21'56"
			5"

Σ Log Sins

GJF	[7° 37' 39"]	T.1229761	157	—
JKG	32° 22' 21"	T.7286958	33	33
KFJ	15° 22' 41"	T.4235520	78	78
FGK	139° 00' 42" *	T.8168412	24	—
		Σ.0920651		
JGK	18° 00' 23" *	T.4901313	65	—
KJF	121° 59' 37"	T.9284517	13	13
FKG	10° 15' 21"	T.2505266	116	116
JFG	[15° 21' 16"]	T.4229007	77	—
		0920103		
		715	563	240
				=2"

USE THESE ∡'S

$\overline{FK}$ 5096.52

$$\frac{\overline{FK}}{\sin FJK} = \frac{\overline{JF}}{\sin JKF} \qquad \frac{\overline{JF}}{\sin JGF} = \frac{\overline{JG}}{\sin JFG}$$

$$\overline{JG} = \overline{FK}\left(\frac{\sin JFG}{\sin JGF}\right)\left(\frac{\sin JKF}{\sin FJK}\right)$$

Log 5096.52 = 3.7072737

Log Sin 15°21'16" = $\bar{1}$.4229007

Log Sin 42°37'42" = $\bar{1}$.8307426

2.9609170

$\bar{1}$.5200071

3.4409099

Log Sin 157°01'05" $\bar{1}$.5915554

Log Sin 121°59'37" $\bar{1}$.9284517

$\bar{1}$.5200071

2760.01

380
.7
2660

1795960
1570105
225855

5306
248
5554
17959

Log 5096.52 = 3.7072737

Log Sin 32°22'21" = $\bar{1}$.7286958

Log Sin 30°43'57" = $\bar{1}$.7084469

3.1444164

$\bar{1}$.7034889

.4409075

Log Sin GJK 129°37'16" $\bar{1}$.8866477

Log Sin FGK 139°00'42" $\bar{1}$.8168412

$\bar{1}$.7034889

3.4409574

1795960
1293718
502244

~~2760.31~~

174 174
4 3
69.6 52.2

2759.99

~~2760.24~~

7084221
248
7084469

354
7
2478

AVE 2760.00

161 16 48
123 17

139 59 06
40 01 33
180 00 39

359 59 60
180 00 39
179 59 21

1 1
123 17 23
18 00 32
~~15 43 24~~
157 01 ~~79~~
19

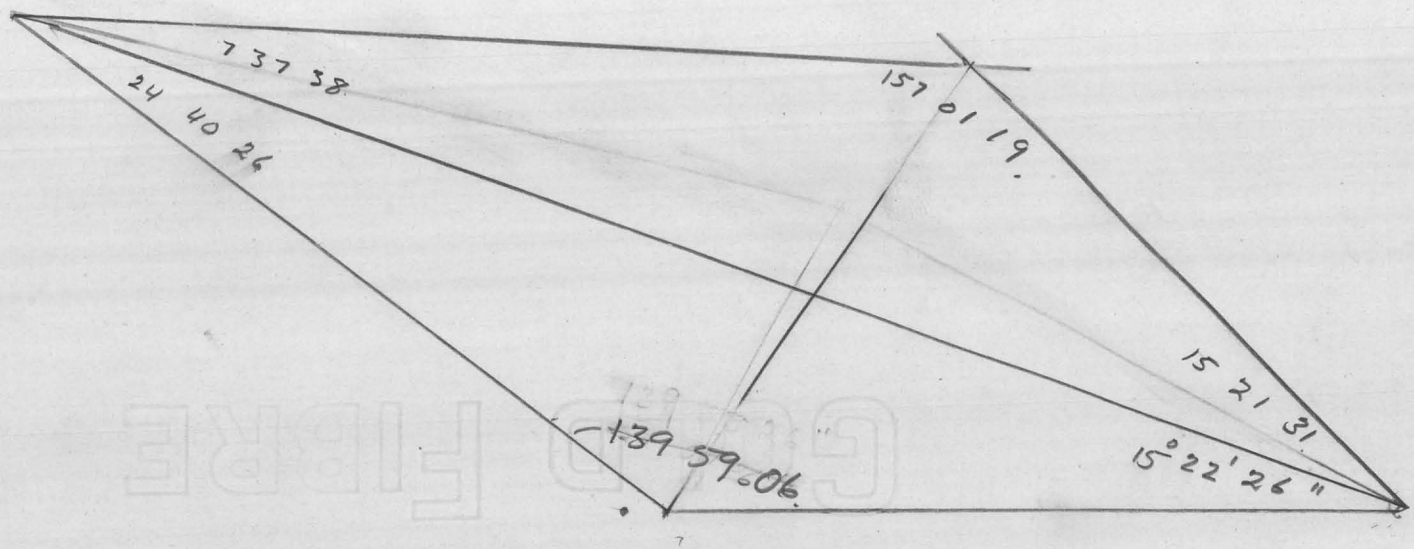
1 1
157 01 19
7 37 38
15 21 31
180 00' ~~88~~
28

139 59 06
24 40 26
15 22 26
~~121~~ 58"
01

2 1
~~138 58 26~~
24 40 26
15 22 26
180 01 18
180 00 28
360 01 46

13"
8 / 106
8
26

106



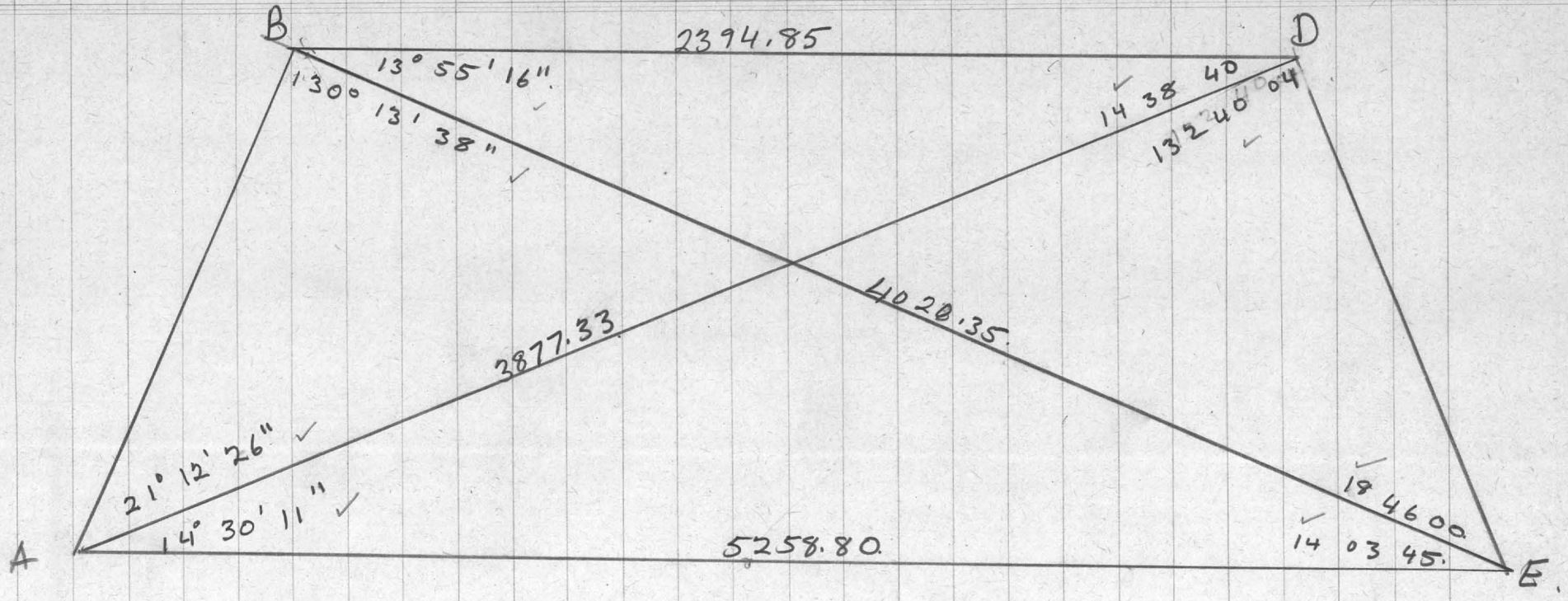
$$\frac{GH}{\sin GJH} = \frac{JG}{\sin JHG}$$

$$\sin JHG = \frac{JG \sin GJH}{GH}$$

	3.4406080
	9.7278410
	13.1684490
	3.2078686
	9.9605804

16

189	59	60
65°	57′	20″
114	02	40



△ ABE

	1	2	
	130	13	38
	14	03	45
	14	30	11
	21	12	26
	180°	00	00"

△ ADE

	2	1	
	14	30	11
	132	40	04
	18	46	00
	14	03	45
	180	00	00

△ ABD

	2	2	
	21	12	26
	130	13	38
	13	55	16
	14	38	40
	180°	00	00

△ BDE

	3	1	
	13	55	16
	14	38	40
	132	40	04
	18	46	00
	180	00	00

DAE	14 30 11	ADB	14 38 40
AEB	14 03 45	EBD	13 55 16
	28 33 56		~~28 33 56~~
			28 33 56.

179 59 60
130 13 38
49 46 22

BAD	21 12 26	BED	18 46 00
EBA	130 13 38	ADE	132 40 04
	151 26 04		~~150 86 04~~
			151 26 04

179 59 60
132 40 04
47 19 56

E L Sin.

DAE	9.3986891-10 81	AEB	9.3856549 84.
BED	9.5074712-10 62	EDA	9.8664621 19
ADB	9.4028113-10 81	DBE	9.3812698 85
EBA	9.8828029-10 18	BAD	9.5583990. 54
	1917858 242		242
	38.1917745-40		38.1917858 -40
	113		

$\frac{113}{484} < .25'$

$\overline{AE} = 5258.80$

Log 5258.80 = 3.7208867

Log Sin EBA = 9.8828029 - 10

Log sin BAE = 9.7661799 - 10

$$\frac{5258.80}{\sin 130^\circ 13' 38''} = \frac{\overline{BE}}{\sin 35^\circ 42' 37''}$$

$\overline{BE} = 3.7208867 = 4020.35'$

9.7661799 - 10

13 4870666 - 10

9.8828029 - 10

Log BE = 3.6042637

BED Log Sin 18° 46' 00" = 9.5074712

BOE Log Sin 147° 18' 44" = 9.7324427

32 41' 16"

$$\frac{\overline{BE}}{\sin BDE} = \frac{\overline{BD}}{\sin BED}$$

$\overline{BD} =$ 3.6042637

9.5074712

13.1117349

9.7324427

Log BD = 3.3792922 2394.93' Ans

$$\frac{\overline{AE}}{\sin ADE} = \frac{\overline{AD}}{\sin AED}$$

Log $\overline{AE}$ = 3.7208867

Log Sin ADE = 9.8664621

Log Sin AED = 9.7341083

32 49 45

$\overline{AD} =$ 3.7208867 = 3877.33'

9.7341083

13.4549950

9.8664621

Log $\overline{AD}$ = 3.5885329

Log $\overline{AD}$ = 3.5885329

Log Sin BAD = 9.5583990
35°51'06"

Log Sin ABD. 9.7676669

$$\frac{\overline{BD}}{\sin BAD} = \frac{\overline{AD}}{\sin ABD}$$

$\overline{BD}$ = 3.5885329
9.5583990
13.1469319
− 9.7676669
3.3792650

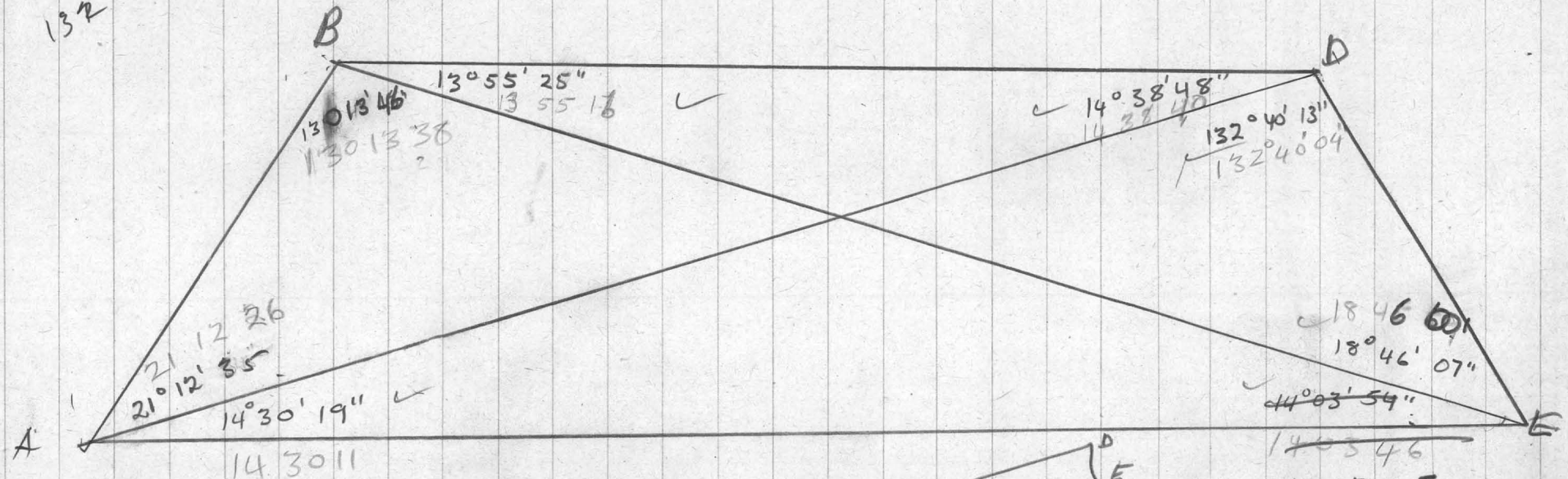
$\overline{BD}$ 2394.78

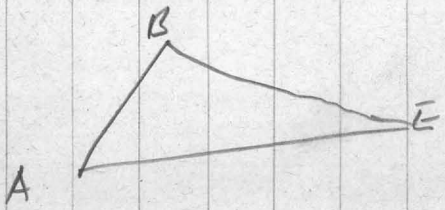
diff = 0.15 ft

Avg 2394.85

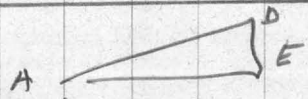
△		Obs.	Point 1st Adj.	2nd Adj. Adj Seward	2nd Adj. Reeves
Ⓐ	DAE	14 30 22	14° 30' 18"	14° 30' 11"	14 30 18
	JAK	1° 14 45	1° 14 41		
	KAB	11 09 37	11 09 33		
	BAD	21 12 25	21 12 21	21 12 26	21 12 35
	EAC	0 21 48	0° 21' 43		
	Total	48 29 27 diff=21'			
	JAC	48 29 06			
Ⓑ	DBE	13 55 26	13 55 26	13 55 16	13 55 26
	EBA	130 13 33	130 13 33	130 13 38	130 13 47
	Total ~~DBA~~	144 08 59 diff=0			
	DBA	144 08 59			
Ⓓ	XDE	143 20 28	143 20 24		
	EDC	105 47 32, 132 40 34	105 47 28 132 40 26	132 40 04	132 40 12
	CDA	26 53 02	26 52 58		
	ADB	14 38 55	14 38 50	14 38 40	14 38 47
	BDX	69 20 22	69 20 18		
	Total	360 0' 19" diff=19"			
	XDX	360 00 00			
E.	AEB	14 03 55	14 03 53 2	14 03 45	14 03 55
	BED	18 46 21	18 46 18 3	18 46 00	18 46 06
	DEF	13 38 58	13 38 56 2		
	FEG	3 20 49	3 20 46 3		
	GEH	14 54 18	14 54 16 2		
	HEJ	8 38 47 diff=15"	8 38 44 3		
		73 23 08			
	AEJ	73 22 53			

105 ~~47~~ 32
26 53 02
131 100 34
132 40 34

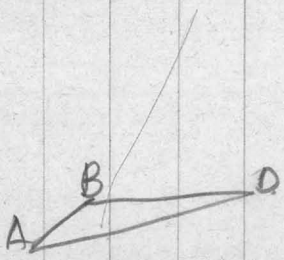




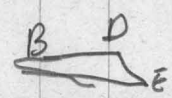
1	2	
130	13	38
14	03	45
14	30	11
21	12	26
180	00'	~~131~~ ~~[illegible]~~" 00



2	1	
14	30	11"
132	40	04
18	46	00
14	03	45
180	00'	00"

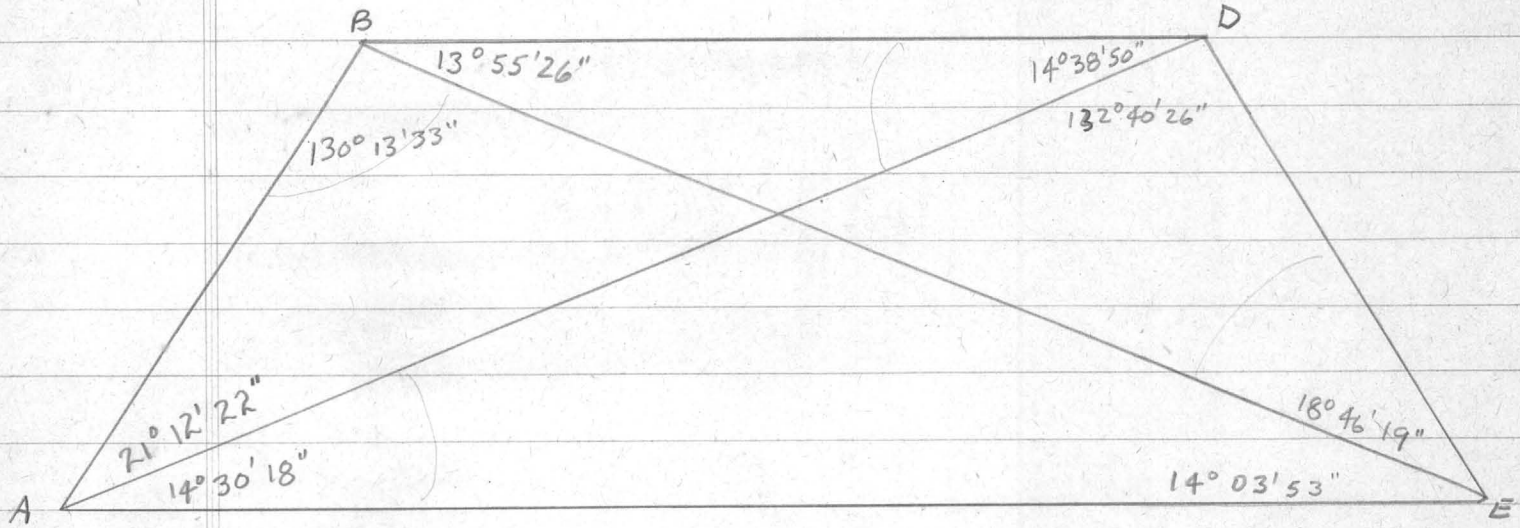


2	2	
21	12	26
130	13	38
13	55	16
14	38	40
180	~~119~~ 00'	~~30~~ 00"



13	55	16
14	38	40
132	40	04
18	46	00
~~177~~	~~178~~	~~119~~
~~179~~	~~59~~	~~00~~
180	00	00

105° 47'
26° 52' 39"
132° 40' 26"



D IS ADJUSTED

ADJUSTMENT OF ANGLES AT "A"

DAE = 14° 30' 22" JAC = 48° 29' 06"

JAK = 1° 14' 45"

KAB = 11° 09' 37" DIFFERENCE = 21" 3.5" / 6)21, 18, 3

BAD = 21° 12' 25"

EAC = 0° 21' 48" DAE = 14° 30' 18"

48° 29' 27" BAD = 21° 12' 22"

ADJUSTMENT OF ANGLES AT "B"

DBE = 13° 55' 26" DBA = 144° 08' 59"

EBA = 130° 13' 33"

144° 08' 59" NO ADJUSTMENT

ADJUSTMENT OF ANGLES AT "E"

AEB 14° 03' 55" -2 AEJ 73° 22' 53" +3

BED 18° 46' 21" -2

DEF 13° 38' 58" -2 DIFF = 15" 2.14 / 7)15, 14, 10, 7, 30

FEG 3° 20' 49" -2 AEB = 14° 03' 53"

GEH 14° 54' 18" -2 BED = 18° 46' 19"

HEJ 8° 38' 47" -2

73° 23 08"

26 53 [illegible]
105 47 32
132 40 34

DAE	14° 30' 10"	BAD	21° 12' 14"
+		+	
AEB	14° 03' 45"	EBA	130° 13' 25"
=	28° 33' 55"	=	151° 25' 39"
ADB	14° 38' 42"	BED	18° 46' 11"
+		+	
DBE	13° 55' 19"	EDA	132° 40' 18"
	28° 34' 01"		151 26' 29"

12.5
4) 50
48

1.5
4) 6
9
20

ADJUSTED VALUES

DAE =	14° 30' 12"	BAD =	21° 12' 26"
AEB =	14° 03' 46"	EBA =	130° 13' 38
ADB =	14° 38' 40"	BED =	18° 45' 59"
DBE =	13° 55' 18"	EDA =	132° 40' 05"

CHECKS O.K. w/ FRANK'S WORK USED HIS VALUES

O.K.

Σ LOG SIN O.K. = Σ LOG SIN O.K.

		DIFF 1"				DIFF 1"
DAE	$\bar{1}.3987543$	81 -1"	AEB	$\bar{1}.3856465$	84 +1"
+			+		
BED	$\bar{1}.5075145$	62 -1"	EDA	$\bar{1}.8664447$	19 -1"
+			+		
ADB	$\bar{1}.4028758$	81 -1"	DBE	$\bar{1}.3813463$	85 +1"
+			+		
EBA	$\bar{1}.8827887$	18 +1"	BAD	$\bar{1}.5584434$	54 +1"
		242			242
	$\bar{2}.1919333$			$\bar{2}.1918809$	
	$\bar{2}.1918809$				
	.0000524				

O.K.

.0000065
8) .0000524
48
44

$\frac{524}{484} = 1"$

FINAL ADJUSTED VALUES (DIFF FROM OBSERVED ANGLES)

DAE	14° 30' 18"	(-4")	AEB	14° 03' 55"	(0)
BED	18° 46' 06"	(-15")	EDA	132° 40' 12"	(-18")
ADB	14° 38' 47"	(- 8")	DBE	13° 55' 26"	(0)
EBA	130° 13' 47"	(+14")	BAD	21° 12' 35"	(+10")
	176 127 118			180 110 128	

COMPUTATION OF LINE $\overline{BD}$ FROM $\overline{AE}$ & QUAD AEDB

USING FINAL ADJUSTED ANGLES

$$\frac{\overline{AE}}{\sin(EBA)} = \frac{\overline{BE}}{\sin(BAD + DAE)}$$

$$\frac{\overline{BD}}{\sin(BED)} = \frac{\overline{BE}}{\sin(ADB + EDA)}$$

$$\therefore \quad \overline{BD} = \overline{AE}\,\frac{\sin(\overset{+6''}{BAD + DAE})(\sin \overset{-15''}{BED})}{\sin(\underset{+14''}{EBA})\,\sin(\underset{-26''}{ADB + EDA})}$$

$\overline{AE} = 5258.80$

BAD =	21° 12' 35"	
DAE =	14° 30' 18"	
BAE	35° 42' 53"	(+6")

ADB =	14° 38' 47"	
EDA =	132° 40' 12"	
BDE =	147° 18' 59"	(-26")

		Log Sin	
Log 5258.80	3.7208867	130° 13' 47"	T. 8827869
Log Sin 35° 42' 53"	T.7662268	147° 18' 59"	T. 7323935
Log Sin 18° 46' 06"	T.5075083		T.6151804
	2.9946218		
	T.6151804		
	3.3794414	= Log	2395.75' = $\overline{BD}$

293 619
3 .6
879 3714

179 59 60
130 13 47
49 46 13

178
3
53.4

179 59 60
147 18 59
32 41 01

$$\frac{\overline{AE}}{\sin(EDA)} = \frac{\overline{DA}}{\sin(AEB + BED)}$$

$$\frac{\overline{BD}}{\sin(BAD)} = \frac{\overline{AD}}{\sin(EBA + DBE)}$$

$$\overline{BD} = \overline{AE}\,\frac{\sin(\overset{+10''}{BAD})\,\sin(\overset{-15''}{AEB + BED})}{\sin(\underset{+19''}{EBA + DBE})\,\sin \underset{-18''}{EDA}}$$

AEB	14° 03' 55"
DED	18° 46' 06"
AED	32° 50' 11"

EBA	130° 13' 47"
DBE	13° 55' 26"
	144° 09' 13"

Log 5258.80	3.7208867	Log Sin	144° 09' 13"	T.7676116
Log Sin 21° 12' 35"	T.5584478	Log Sin	132° 40' 12"	T.8664466
Log Sin 32° 50' 11"	T.7341932			T.6340582
	3.0135277			
	T.6340582			
	3.3794695	= Log	2395.90 = $\overline{BD}$	

179 59 60
144 09 13
35 50 47

291
7
203.7

179 59 60
132 40 12
47 19 48

194
8
155.2

COMPUTATION OF LINE $\overline{BD}$ FROM $\overline{AE}$ & QUAD AEDB

USING UNADJUSTED (OBSERVED) ANGLES

1795960
130 1333
49 4627

178
7
123.6

293
7
205.1
1887
2092

7994
124
7118

1795960
1471925
32°40'35"

2917
164
3081

326
6
195.6

1795960
1440859
35°51'01"

1795960
132 40 30
41 19 30

Log 5258.80 = 3.7208867

Log Sin 35°42'47" = $\bar{1}$.7662092

Log Sin 18°46'21" = $\bar{1}$.5076013

2.9946972

$\bar{1}$.6151199

3.3795773 = Log

Log Sin 130° 13' 33" $\bar{1}$.8828118

Log Sin 147° 19' 25" $\bar{1}$.7323081

$\bar{1}$.6151199

2396.50 = $\overline{BD}$

N.G.

Log 5258.80 = 3.7208867

Log Sin 21°12'25" = $\bar{1}$.5583936

Log Sin 32°50'26" = $\bar{1}$.7342420

3.0135223

$\bar{1}$.6340640

3.3794583 = Log

Log Sin 144° 08' 59" $\bar{1}$.7676523

Log Sin 132° 40' 30" $\bar{1}$.8664117

$\bar{1}$.6340640

2395.84 = $\overline{BD}$

UNADJUSTED VALUES

2396.50
2395.84
.34

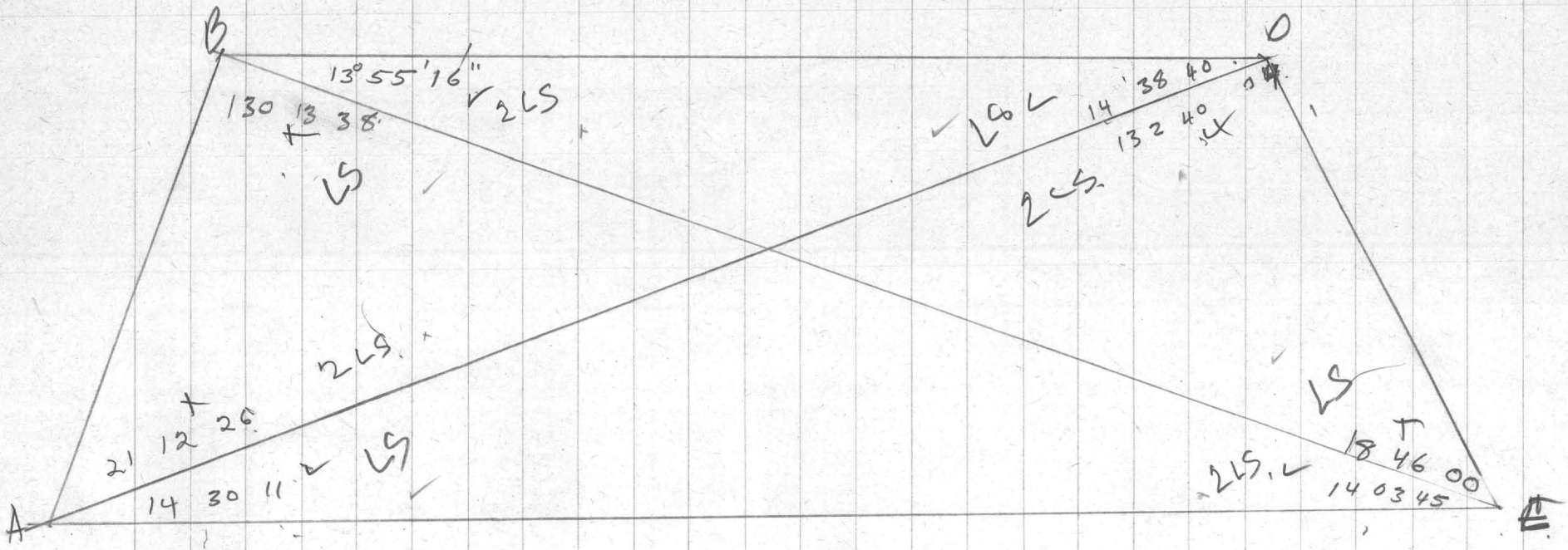
AVE = 2396.17

ADJUSTED VALUES

2395.75
2395.90
165

AVE = 2395.82

DIFF = 0.35'

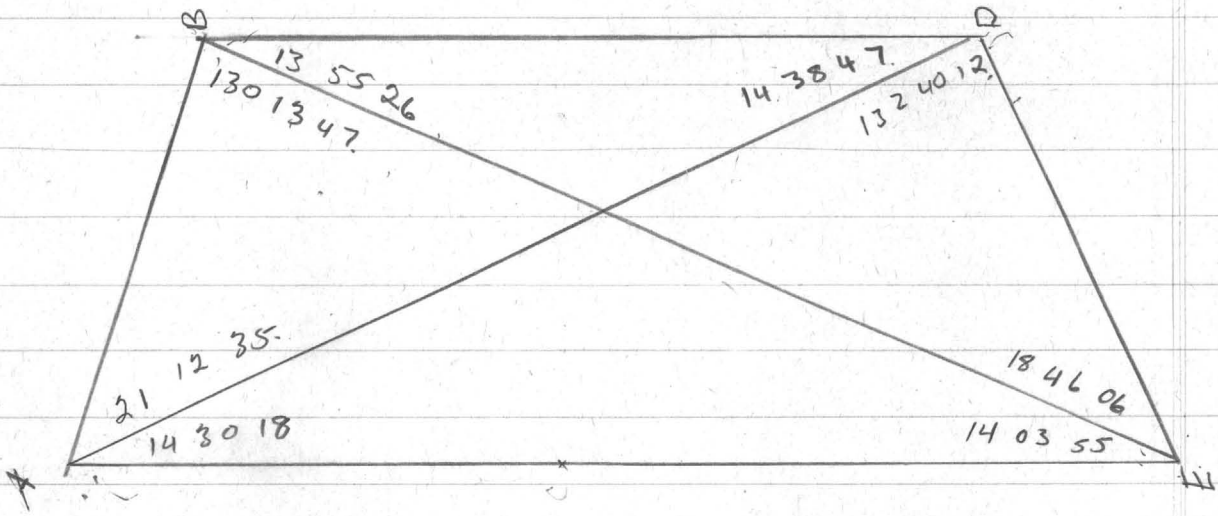

B
D
A
E
13°55'16"
2LS
130 13 38
LS
2LS
14 38 40
132 40
2LS
2LS
21 12 26
14 30 11
LS
LS
18 46 00
2LS
140345

Solution of quad. Reeves values

14 30

4	4	
176	127	118
180	110	128
	241	246
360	01'	06"
		6"

Solution of △ Reeves values



ABE

130	13	47
14	03	55
14	30	18
21	12	35
179	58	155
180°	0'	35"

BDE

3		
13	55	26
14	38	47
132	40	12
18	46	06
	179	91
180°	0'	31"

ABD

2		
21	12	35
130	13	47
13	55	26
14	38	47
178	118	155
180	0'	35

ADE

14	30	18
132	40	12
18	46	06
14	03	55
178	119	91
180	1[illegible]'	31"

Log Sin

DAE = $\bar{1}.3986810$
733
$\bar{1}.3987543$ ✓

814
.9
732.6

AEB = $\bar{1}.3856129$
336
$\bar{1}.3856465$ ✓

840
.4
3360

ADB = $\bar{1}.4028113$
645
$\bar{1}.4028758$ ✓

.802
.8
641.6

.806
.8
644.8

DBE = $\bar{1}.3813038$
425
$\bar{1}.3813463$ ✓

BAD $\bar{1}.5584207$
217
$\bar{1}.5584434$ ✓

543
.8
4344

543
4
2172

EBA $\bar{1}.8827816$
71
$\bar{1}.8827887$ ✓

188
.4

1795960
1301346
49°46'14"

BED $\bar{1}.5074712$
433
$\bar{1}.5075145$ ✓

619
4333

EDA .8664311
136
.8664447 ✓

194
1356

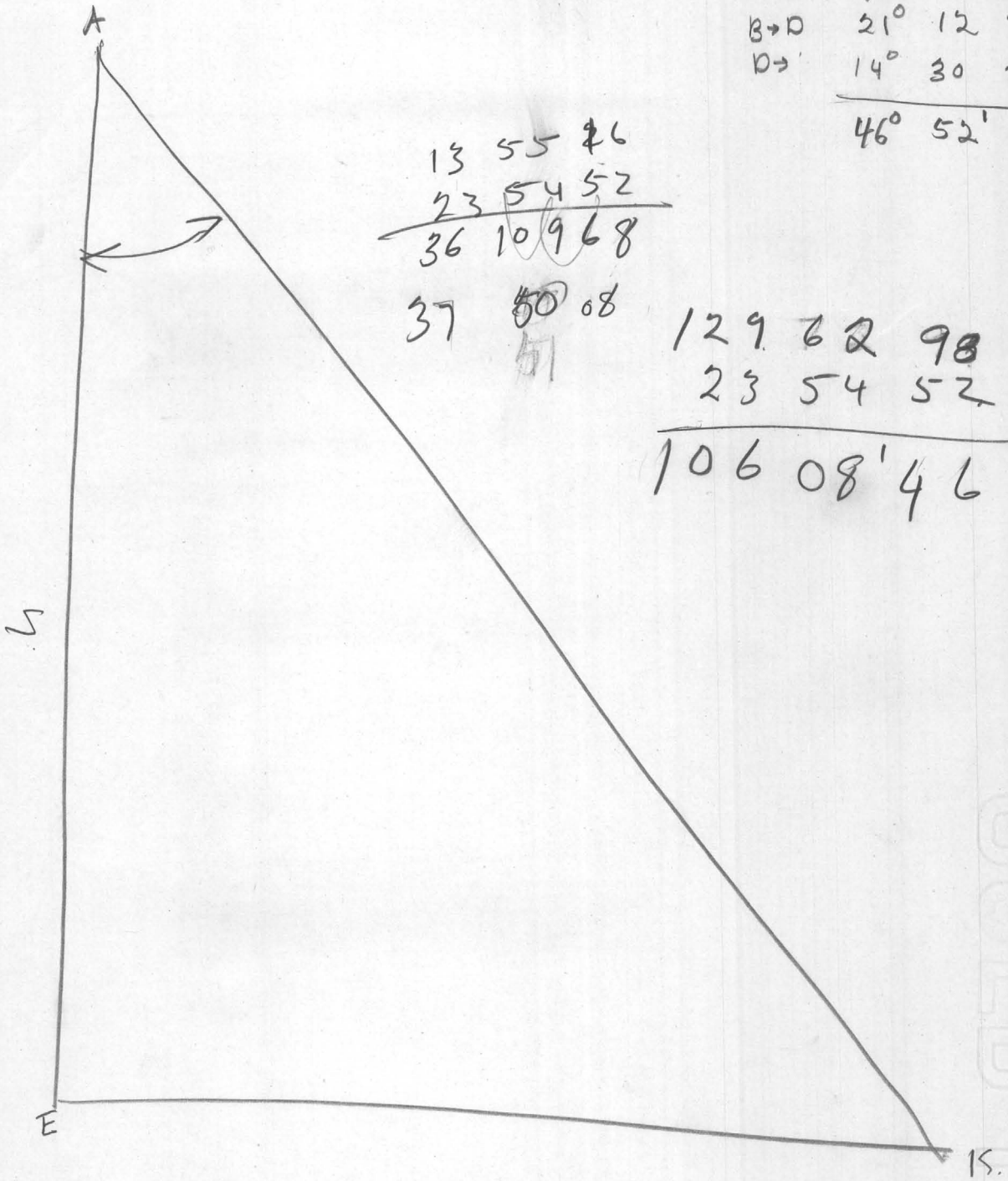
1795960
1324013
47°19'47"

7217117
7208867
8250

3794695
8250
3802945

2400.4

K→B	11°	09'	43"
B→D	21°	12	25
D→	14°	30	21
	46°	52'	29



13 55 16
23 54 52
36 10 9 68

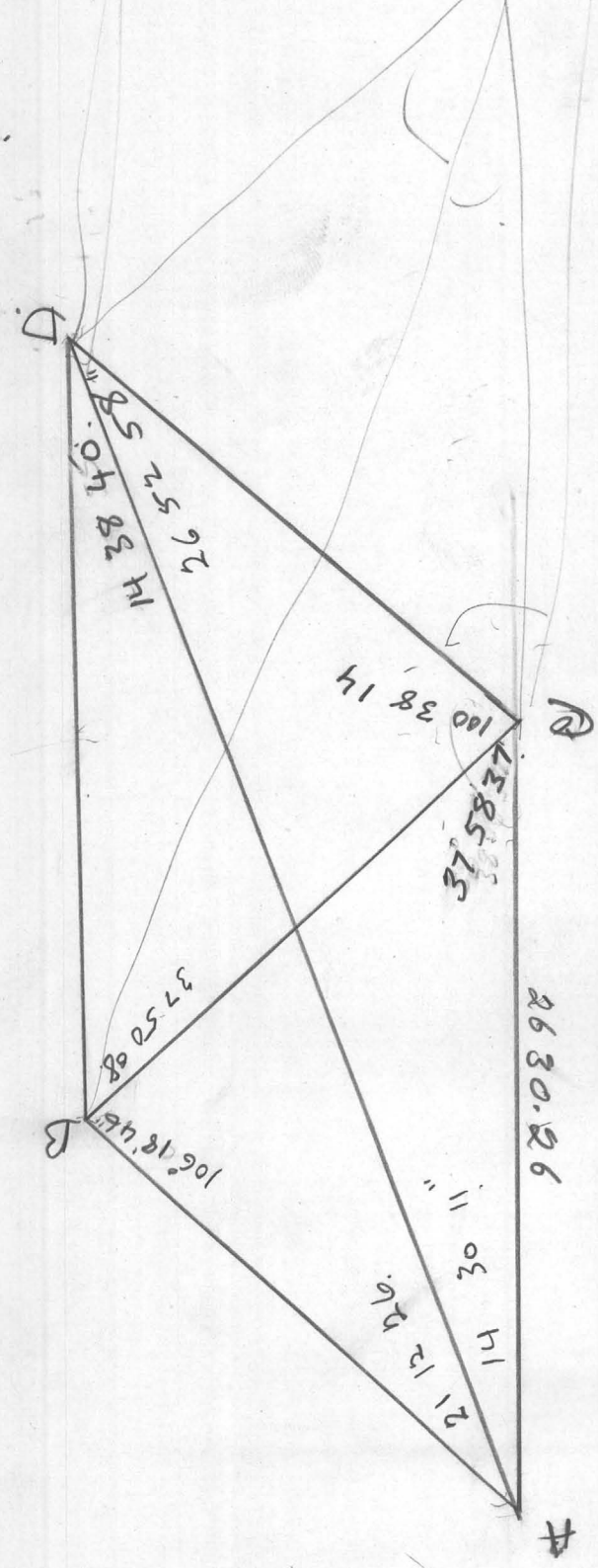
37 50 08
51

129 62 98
23 54 52
106 08' 46

$\cos A = \frac{E.A}{AK}$

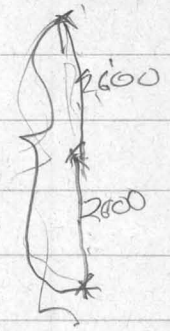
GOLD FIBRE

1°	14'	42
11	09	33
21	12	22
14	30	18
47	06'	~~115~~ 55



BAD	21°	12'	25"
DAE	14°	30'	21"
AEB	14°	03'	55"
EBA	130°	13'	33"
	180°	60'	14"

5200



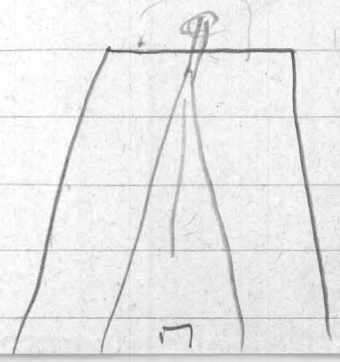
13°	55'	26"
~~23°~~	~~54'~~	~~52"~~
130°	13'	33
143°	08'	59"

3	2	
105°	47	32"
26	53	02
14	38	55
69	20	22
143	20	28
360	~~180~~ 0'	139 19"

26	53	02
14	38	55
41	~~91~~ 31	57

41	31	57
69	20	22
110	52	19

5



7	37	38
24	40	26
97	19	01
167	42	03
56	14	58
351	152	126
6	25	54
3	3	
360	180	180
	2	00

40	01	33
139	59	06
179	59	21
360	120	00
	00	

7	37	38	26	01	03
24	40	26	54	58	58
97	19	01			
167	42	03			
56	14	58			
351	152	126			
6	25	54			
3	3				
360	180	180			
	2	00			

1 1
18 00 32
15 43 24
123 17 23
157 01 19

139 59 06
40 01 33
180 00 39
359 60 78

360 01

95''.

15 21 31
157 01 19
7 37 38
179 59 88
180 00 28.

139 39

15 22 26
139 59 06
24 40 26
178 121 58

180 01 58
179 59 37
95
360 01 35

161 16 48
15 22 00
3 20 49
179 58 97
37

179 59 37

~~$\sin^2 + \cos^2 = 1$~~

~~$\cos^2_{45} = (1 - \sin^2_{45})$~~

$1 - 2\log \sin 45'$

11
5.2

[9.9999628 − 10]

2627.90

8.1169262 − 10
3.4196452
11.5365714 − 10

1.5365714
2

34.41

28

1428
1316
112
367

~~34~~

1.5365714
2

3.0731428
6.8392160

~~9.9123588~~

2

8
1

~~4.9~~

$\triangle ABD = 180^\circ\ 0'\ 14''$

$\triangle ABE = 180^\circ\ 0'\ 14''$

$\triangle BDE = 180^\circ\ 01'\ 03''$

Closures pt

AES = 73 22 53 = -15"

E 73 23 08"

356 237 ~~247~~

360 01 07"

66"

356 237 246

360. 01' 6"

48 07 00
49 49 56
98 06 56

41 42 02
56 14 54
97 56 56

56 14 54
58 29 59
114 44 53

59
23
82

48 07 00
58 29 59
73 23 01
~~49 49 56~~
180 00 00

41 42 02
56 14 54
58 29 59
23 33 05
180 00 00

48 07 00

73 22 56
2

48 07 00
58 29 59
106 36 59

179 59 60
106 36 59
73 23 01

59

72 82 61
~~73 23 01~~
49 59 56
23 23 05

1 2
41 42 02
56 14 54
58 29 59
23 23 05
179 60 00

~~4806~~

48 06 55

73 22 56

23 33 05

41 42 07

186 45 03

56 14 58

243 00 01

359 59 60

186 45 03

173 14 57

48 06 55

23 33 05

α

160 0000

41 4207

23 3305

143 00 01

$2\alpha =$ 359 59 60

243 00 01

116 59 59

58 29 59

2) 116 59 59

10 58 119

16 10

19

18

73	22	56
23	33	05
49	59	51

41	42	07
56	14	58
97	57	05

97 57 05

73	22	56
23	33	05
49	59	51

48	06	55
48	06	55
97	56	46

97 56 46

73	22	56
23	33	05
72	82	56
23	33	05
49	49	51
48	06	55
97	56	46

58	29	59
48	06	55
73	22	56
		170
179	59	50

58	29	59
56	14	58
144	44	57
41	42	07
23	33	05
~~210~~	~~00~~	~~09~~
180	00	09

5475.30
2.97
5478 27

52

Log sin 48' = 8.1449532-10

3. ~~622~~

3.7386220
8.1449532 - 10
11.8835752 - 10

Log 5478 → 3.7386220
Log cos 48' 9.9999577
13.7385797 - 10

5477.47

76.4848

5096.52
172.45
5268.97

48'

Error

5478.00

x = 76.48' H.

48

5477.47

E

1004
6884
120

5096.52

5096.52
76.48
5173.00

5096
16
5112

$\cancel{x^2 = a^2 + b^2}$

6905830

$\cancel{2 \log x = 2 \log a + 2 \log}$

2×10^3

2×10^3

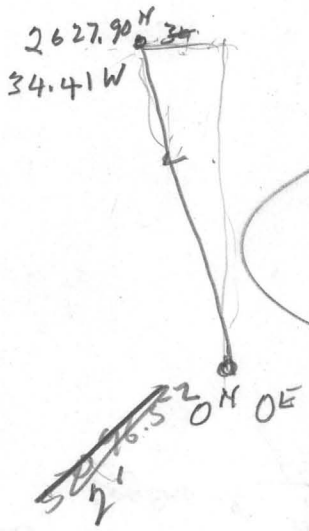
4×10^6

1183.43
6905832.8
6907015.43

5497.80
34.41
546339

8392895
9.3
6.83929043

3.41964521



2627.90
2630.76
525866

$\cancel{5096.52}$
$\cancel{267.20}$
$\cancel{5363.72}$

4196419
33
4196452

0713
99
0812

O.K. FOR TEMP & LENGTH

.99997

82.382	.018 + .001	82.363	82.390	82.371	82.369	620
39.000			39.002			61°
182.634			182.650			64°
165.632			165.684			60°
45.718			45.718			57°
53.048			53.052			58°
295.990		295.990	296.002		295.993	57°
272.970			272.950 (30LB)			52°

273
192
81

.039
.522
.561

1.67
300) 5.00

125
24
500
430 0

225
24
900
450
54

2.66
3
7.98
64
25

5/300

01.65 LB/100FT
= .0165 LB/FT

2.661
3
7.983

(5)(300)
(.025)(.3125) 28 × 10^6

15 × 10^2
.21875 10^6

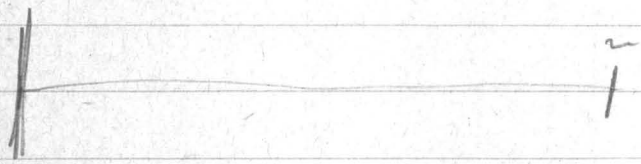
.0068.57142 × 10^-4

.000133
300
.039900

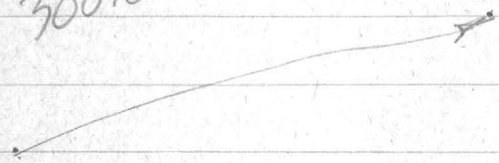
300.030

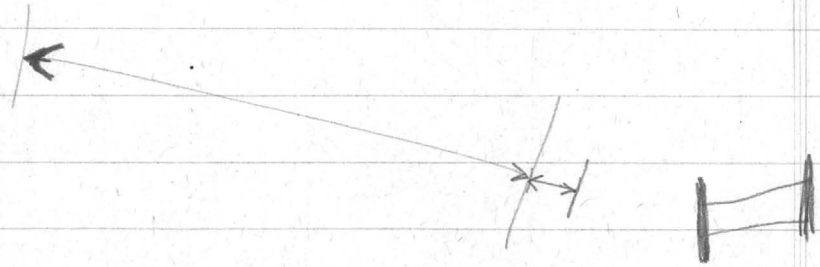
2661

2.4
9
.216



300.02





698.268
697.911
.013
.357

299.981 225
.013 24
900
450
5400

325
3
975

2275
3
68.25

2925 × 10 5
.00002925
300
.00877500

299.990
.011
299.979

7.
5.9319 ×10⁻⁴
.0035 ×10⁻⁴

		20LB		15LB	
	TEMP. CORR/300'	LENGTH	COEFFICIENT	LENGTH	COEFFICIENT
64°	.013	300.003	1.00001	299.994	.99998
63°					
62°	.009	299.999	1.00000	299.990	.99997
61°	.007	299.997	.99999	299.988	.99996
60°	.005	299.995	.99998	299.986	.99995
58°	.001	299.991	.99997	299.982	.99994
57°	-.001	299.989	.99996	299.980	.99993
52°	-.011	299.979	.99993	299.970	.99990

$$\frac{(10)(272.970)}{(28{,}000{,}000)(.3125)(.025)}$$

3125
16) 50
48
20

$$\frac{(2.7297)\times 10^3}{(28)(.3125)(2.5)\times 10^4} = \frac{.012478 \times 10^{-1}}{.0}$$

.78125

21875 .012

272.674
.012
272686

$$\frac{(.02661)^2(L^3)}{24(400)} \quad \frac{(.0007080921)\cancel{1000000}}{9600} \quad .0737596$$

9600

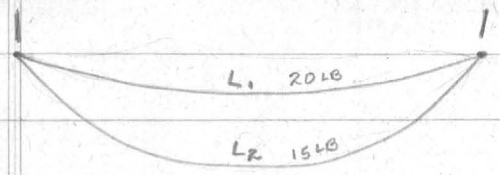
272.833
12
272.845

87
11
70

		Dist	Sag Corr		Temp & Length Cor	
	20 LB	82.382	-.007	82.375	82.375	0
	15 LB	82.390	-.013	82.377	82.375	
	20 LB	39.000	-.002	38.998	38.998	-1
	15 LB	39.002	-.003	38.999	38.997	
Unscrp	20 LB	182.634	-.177	182.457	182.459	-128
	15 LB	182.650	-.315	182.335	182.331	
60°	20 LB	45.718	-.003	45.715	45.714	-3
	15 LB	45.718	-.005	45.713	45.711	
57°	20 LB	53.048	-.004	53.044	53.042	-2
	15 LB	53.052	-.008	53.044	53.040	
58°	20 LB	295.990	—	295.990	295.981	+3
	15 LB	296.002	—	296.002	295.984	
52°	20 LB	272.970	-0.221	272.749	272.730	+115
	30 LB	272.950	-0.098	272.852	+.012 → 272.845	

20
15

400
225



$(L_1 - SAG_1)1.00000 =$ TRUE LENGTH

$(L_2 - SAG_2).9999x =$ "

$$L_1 - SAG_1 = L_2(.9999x) - SAG_2(.9999x)$$

$$L_1 - (.9999x)L_2 = SAG_1 - (.9999x)SAG_2$$

$$= SAG_1 - SAG_2$$

$$\frac{1}{59{,}000} \qquad \frac{.05}{25000}$$

$$\frac{(5)(182.6)}{(.3125)(.025)\ 28 \times 10^6} \quad \frac{1.67}{2.66}$$

.05

$$\frac{1554.77 \quad 10^{-2}}{.581875 \ \cancel{\times 10^6}} \qquad .002672$$

FROM S. TO N.		ONE PART IN.
121.195	121.200	24,239
303.755	303.740	20,250
468.395	468.405	46,839
566.870	566.880	56,687
862.520	862.595	12,3217
1135.305	1135.350	25,230
1387.715	1387.710	277,543
1673.260	1673.185	22,369
1951.945	1951.830	16,972
2175.340	2175.245	22,897
2430.800	2430.720	30,384

DISCREPENCIES IN

FROM N. TO S.

			PROBABLE ERROR	P.E. OF MEAN IN ONE PART PER 1	ACC. DIST. ONE PART IN.	INDIV. DIST. ONE PART.
255.460	+.015	255.475	.007	36,495	17,031	17,031
478.855	+.035	478.890	.017	28,169	13,682	11,170
757.540	-.005	757.535	.002	378,769	141,508	6,966
1043.085	-.075	1043.010	.036	28,974	13,908	4,076
1295.495	-.125	1295.370			10,364	5,047
1568.280	-.155	1568.125			10,117	9,092
1863.930	-.090	1863.840			20,709	4,548
1962.405	-.090	1962.315			21,804	∞
2127.045	-.065	2126.980			32,723	6,586
2309.605	-.080	2309.520			28,869	9,127
2430.800	-.080	2430.720			30,384	24,239

DISCREPENCIES .015
.020
.040
.070
.050
.030
.065
.000
.025
.020
.005

.340 AVE = .031"

.0075

AVE DIST = 220.980'

1/7,128

	Slope Dist	V ∡	Cos.	H Dist	Slope D.	V ∡	Cos	H Dist
1/4 2/1								
	256.290	4° 36'20"	.99677	255.460 ✓	255.722	2° 30'55"	.99904	255.475 ✓
BL-1								
	224.155	4° 43'20"	.99660	223.395 ✓	223.650	2° 38'30"	.99894	(223.410) 223.415
BL-2								
	279.492	4° 21'20"	.99711	278.685 ✓	278.952	2° 41'30"	.99890	278.645 ✓
BL-3								
	286.320	4°13'00"	.99729	285.545	285.782	2° 40'00"	.99892	285.475
BL-4								
	253.000	3°54'20"	.99767	252.410	252.490	1°51'20"	.99948	252.360
BL-5								
	273.245	3°20'00'	.99831	272.785	272.840	1°26'20"	.99969	272.755
BL-6								
	296.255	3°40'00"	.99795	295.650	295.880	1°55'20"	.99944	295.715
BL-7								
	99.148	6°41'00"	.99320	98.475	98.510	1°29'40"	.99966	98.475
BL-8								
	166.115	7°39'20"	.99111	164.640	165.190	4°34'40"	.99681	164.665
BL-9								
	182.560	0°18'20"	.99999	182.560	182.815	3°09'00"	.99849	182.540
BL-10								
	121.592	4° 37'30"	.99675	121.195	121.200	0° 10'20"	1.00000	121.200
PROP. COR								
				2430.800				2430.720

1/30,384

Sag Cor $= \frac{w^2 L^3}{24 P^2} =$

Temp Cor $6.5 \times 10^{-6} L (T - T_0)$

$6.5 \times 10^{-6} \times 299.99 \times (70-57)$

6.5
13
195
65
845

299.99
13
300.06

.000845

$$\frac{GH}{\sin 30^\circ 43' 57''} = \frac{2640.00}{\sin 123\ 17\ 15}$$

$\overline{GH} = 1613.87$

~~1613.87~~

~~3.2078686~~

$$\frac{GH}{\sin HJG} = \frac{GJ}{\sin JHF}$$

$$\sin JHF = \frac{\sin HJG \quad \overline{GJ}}{\overline{GH}}$$

$13^\circ\ 57$

Log Sin JHF = 9.7278410

3.4406080

13.1684490

3.2078686

9.9605804

180

60 00 50 +

STATION CLOSURES – ADJUSTED VALUES FOR STATION

STATION A

DAE = 14° 30' 18" JAC = 48° 29' 09"

JAK = 1° 14' 42"

KAB = 11° 09' 33'

BAD = 21° 12' 22"

EAC 0° 21' 44"

STATION B

DBE = 13° 55' 26" DBA 144° 08' 59"

EBA = 130° 13' 33"

STATION C NO ANGLES OBSERVED

STATION D

ADB 14° 38' 48"

BDX 69° 20' 19"

XDE 143° 20' 25"

EDC 105° 47' 29"

CDA 26° 52' 59"

STATION E.

AEB	14° 03' 53"	AEJ = 73° 22' 56"
BED	18° 46' 19"	
DEF	13° 38' 56"	
FEG	3° 20' 47"	
GEH	14° 54' 16"	
HEJ	8° 38' 45"	

STATION F.

KFM	0° 00' 13"
HFJ	15° 22' 26"
JFG	15° 21' 31"
GFE	15° 22' 00"
EFK	313° 53' 50"

STATION G.

FGM	123° 17' 23"
MGK	15° 43' 24"
KGJ	18° 00' 32"
JGE	41° 41' 53"
EGF	161° 16' 48"

STATION H

KHJ = 40° 01' 33"

JHF = 139° 59' 06"

KHF = 180° 00' 39"

61 15

STATION J,	XJA	6° 25' 54"
	AJG	56° 14' 58"
	GJF	7° 37' 38"
	FJH	24° 40' 26"
	HJK	97° 19' 01"
	KJX	167° 42' 03"

STATION X	JXE	107° 40' 12"
	EXD	16° 20' 21"
	DXA	64° 55' 22"
	AXJ	171° 04' 05"

ADJUSTMENT TO 360°

21° 12' 22"	=	21° 12' 14"
14° 30' 18"	=	14° 30' 10"
130° 13' 33"		130° 13' 25"
13° 55' 26" ✓		13° 55' 19"
14° 38' 50"		14° 38' 42"
132° 40' 26"		132° 40' 18"
18° 46' 19"		18° 46' 11"
14° 03' 53"		14° 03' 45"
360° 01' 07"		

$8\overline{)63} = 7 \times 8 + 7$

FINAL ADJUSTED VALUES

A

DAE	14° 30' 11"	JAC	
JAK			
KAB			
BAD	21° 12' 26"		
EAC			

B

DBE	13° 55' 16"	DBA	144° 08' 54"
EBA	130° 13' 38"		

C

D

ADB	14° 38' 40"	
BDX		
XDE		
EDC		132° 40' 04"
CDA		

E	AEB	14° 03′ 45″		
	BED	18° 46′ 00″		
	DEF			
	FEG			
	GEH			
	HEJ			
F	KFH		KFJ	15° 22′ 45″
	HFJ	15° 22′ 36″		
	JFG	15° 21′ 16″		
	GFE			
	EFK			
G	FGH	123° 17′ 26″	JGH	33° 43′ 39″
	HGK			
	KGJ	18° 00′ 20″	JGF =	157° 01′ 05″
	JGE		FGK =	139° 00′ 45″
	EGF			
H	KHJ		GHF	25° 58′ 42″
	JHF	139° 57′ 09″	JHG	113° 58′ 27″
	KHF			

J	XJA		KJF	121° 59' 38"
	AJG			
	GJF	7° 37' 39"		
	FJH	24° 40' 15"		
	HJK			
	KJX			
X	JXE			
	EXD			
	DXA			
	AXJ			
K	JKG	32° 22' 23"		
	FKG	10° 15' 24"		

1	2	
1°	14'	45''
11	09	37
21	12	25
14	30	21
0	21	48
48°	28'	56''
48°	28'	66''

1		
13	55	26
130	13	33
144	08'	59
14	38	50
21	12	25
180	~~0~~ 2	14

1	2	
14°	03'	55''
130°	13'	33''
14	30	21
21	12	25
180	~~0~~'	14

14'

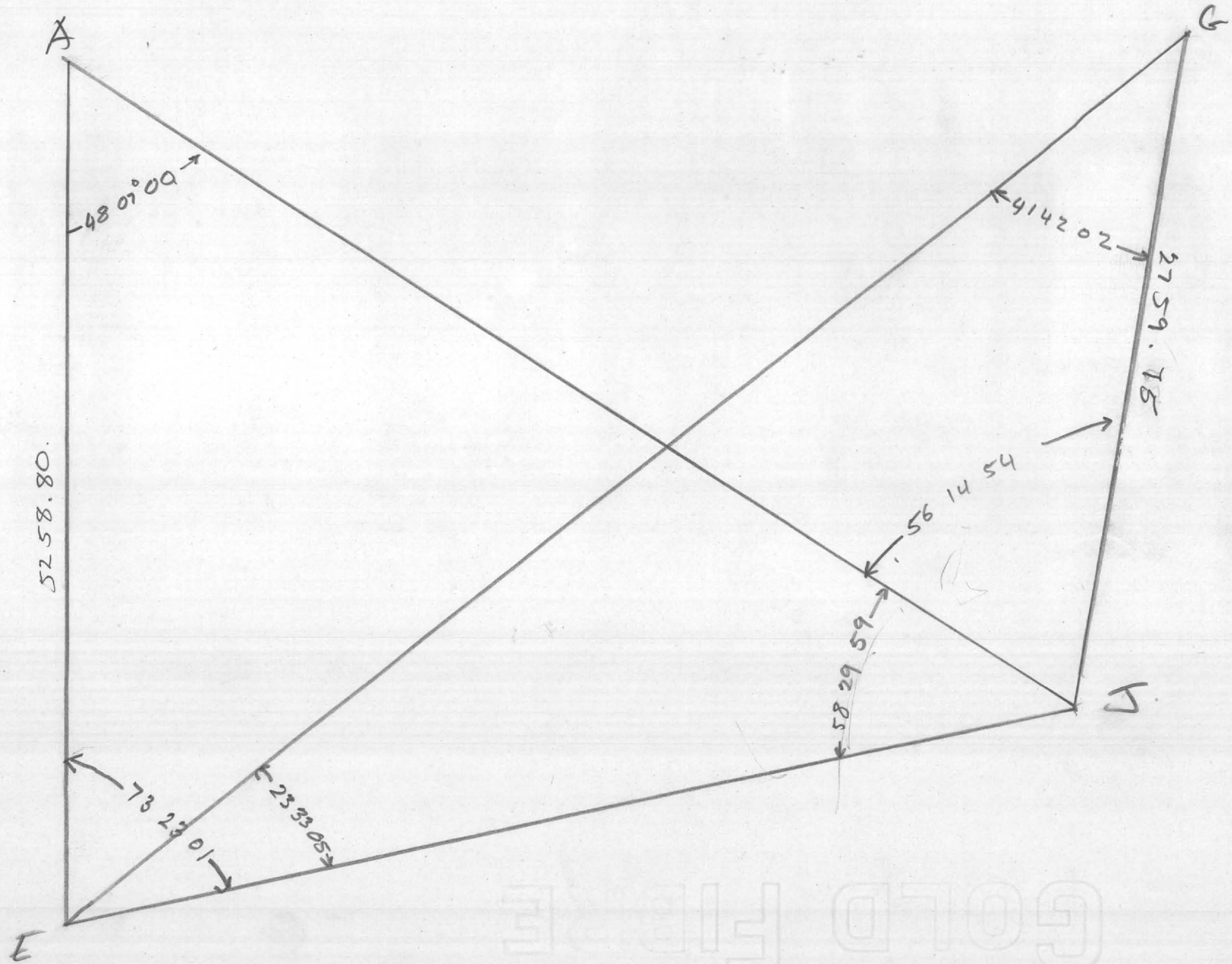
4	3	
105	47	28
26	52	58
14	38	50
18	46	21
13	55	26
180	~~241~~ 01	03''

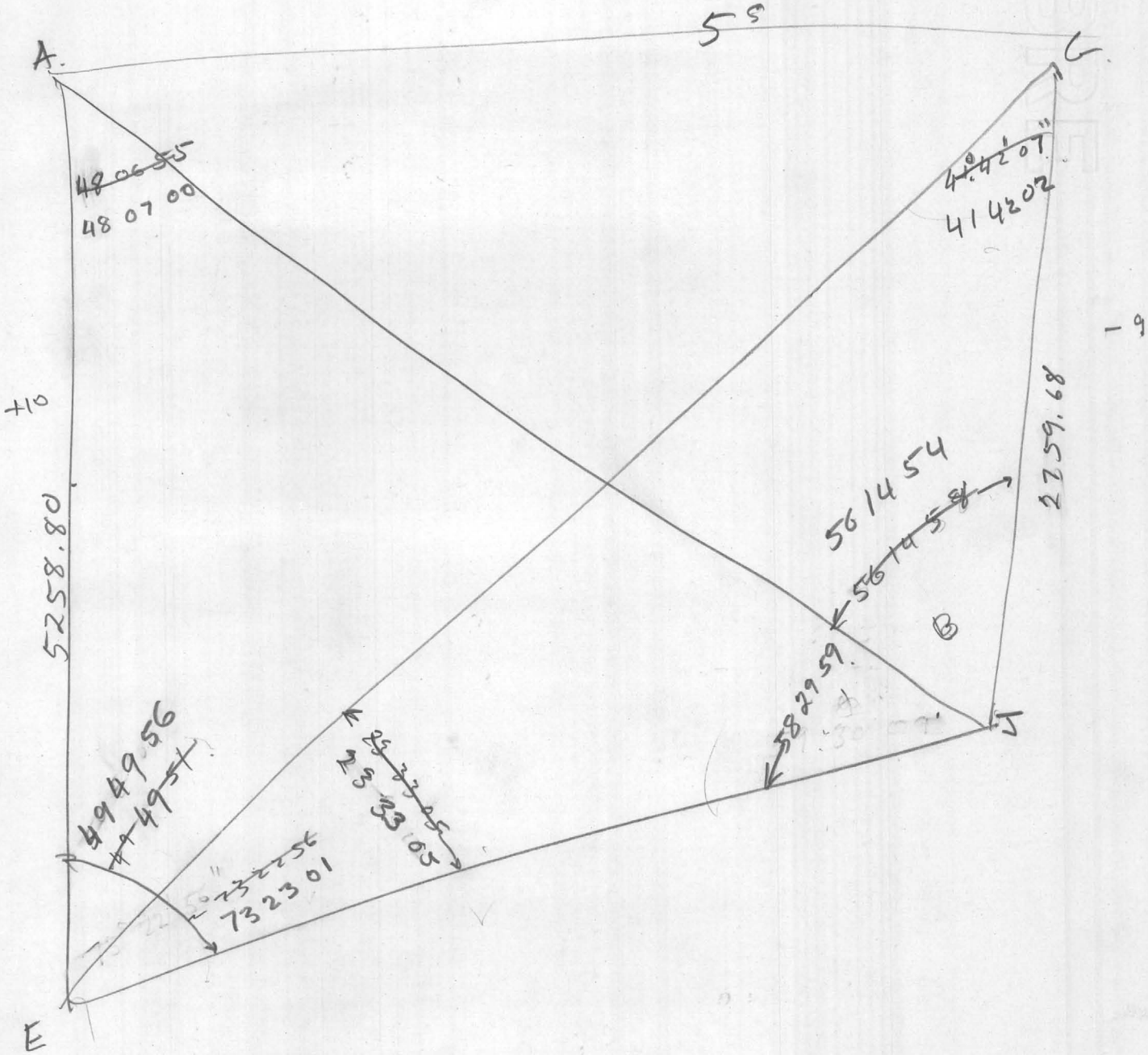
183

3	3	
18	46	21
14	03	55
105	47	28
26	52	58
14	30	21
180	~~0~~ 1	03''

1136 52
1320 00
2456.52

3	4	
14	03	55
18	46	21
13	38	58
3	20	49
14	54	18
8	38	47
73	23	08"


A
G
E
J
48 07 00
41 42 02
3759.15
5258.80
56 14 54
58 29 59
73 23 01
23 33 05



A.
5 s
C
~~48 06 55~~
48 07 00
~~41° 42' 07"~~
41 42 02
-9
+10
5258.80
2259.68
56 14 54
~~56 14 58~~
B
58 29 59
J
~~49 49 56~~
~~49 49 51~~
~~23 33 05~~
23 33 05
~~73 22 56~~
73 23 01
E

H

$$\begin{array}{r} 179\ 59\ 60 \\ 157\ 00\ 51 \\ \hline 22\ 59\ 09 \end{array}$$

$$\frac{40\ 69\ 33}{\sin 157\ 00\ 51} = \frac{JG}{\sin 15\ 21\ 25}$$

9.591

$$\begin{array}{r} 5803 \\ 447 \\ \hline 6250 \end{array}$$

$$\begin{array}{r} 673 \\ 619 \\ \hline 54 \end{array}$$

2759

$$\begin{array}{r} 58\ 30'\ 09 \\ 56\ 14\ 58 \\ \hline 114\ 45'\ 07'' \end{array}$$

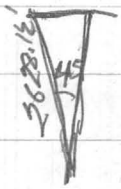
$$\begin{array}{r} 107\ 40\ 12 \\ 20\ 15\ 14 \\ \hline 127\ 55\ 26'' \end{array}$$

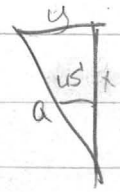
$$\begin{array}{r} 58\ 29\ 69 \\ 6\ 25\ 54 \\ \hline 52\ 04'\ 15 \end{array}$$

$$\begin{array}{r} 179\ 59\ 60 \\ 127\ 55\ 26 \\ \hline 52\ 04\ 34 \end{array}$$

$$\begin{array}{r} 58\ 30\ 00 \\ 56\ 14\ 58 \\ \hline 114\ 44\ 58 \end{array}$$

OE





$\frac{x}{a} = \cos 45^\circ$

$x = a \cos 45'$

$\text{Log } x = \text{Log } a + \text{Log } \cos 45'$

~~49~~

$$
\begin{array}{r}
4196419 \\
33 \\
\hline
3.4196452 \\
9.9999628 - 10 \\
\hline
\cancel{1}3.4196080 - \cancel{10} \\
2 \\
\hline
6.8392160
\end{array}
$$

$O^{n} - O$

$$
\begin{array}{r}
2627.90 \\
2630.76 \\
\hline
5258.66
\end{array}
$$

N

$GJ = 2759.68$

$$\frac{EJ}{\sin 41^\circ 42' 07''} = \frac{GJ}{\sin 23^\circ 33' 05''}$$

Log 2759.68 =

$$\frac{EJ}{\sin \quad ''} = \frac{XJ}{\sin 20^\circ 15' 14''}$$

$$\frac{EJ}{\sin 48\,07\,00} = \frac{5258.80}{\sin 58\,29\,59}$$

$\overline{EJ} = 4591.88$

Log 5258.80 = 3.7208867

Log sin 48°07'00" = 9.8718681

13.5927548

Log Sin 58 29 59 = 9.9307645

Log EJ = 3.6619903

$$\frac{\overline{GJ}}{\sin 23\,33\,05} = \frac{\overline{EJ}}{\sin 41°42'02''}$$

Log EJ = 3.6619903

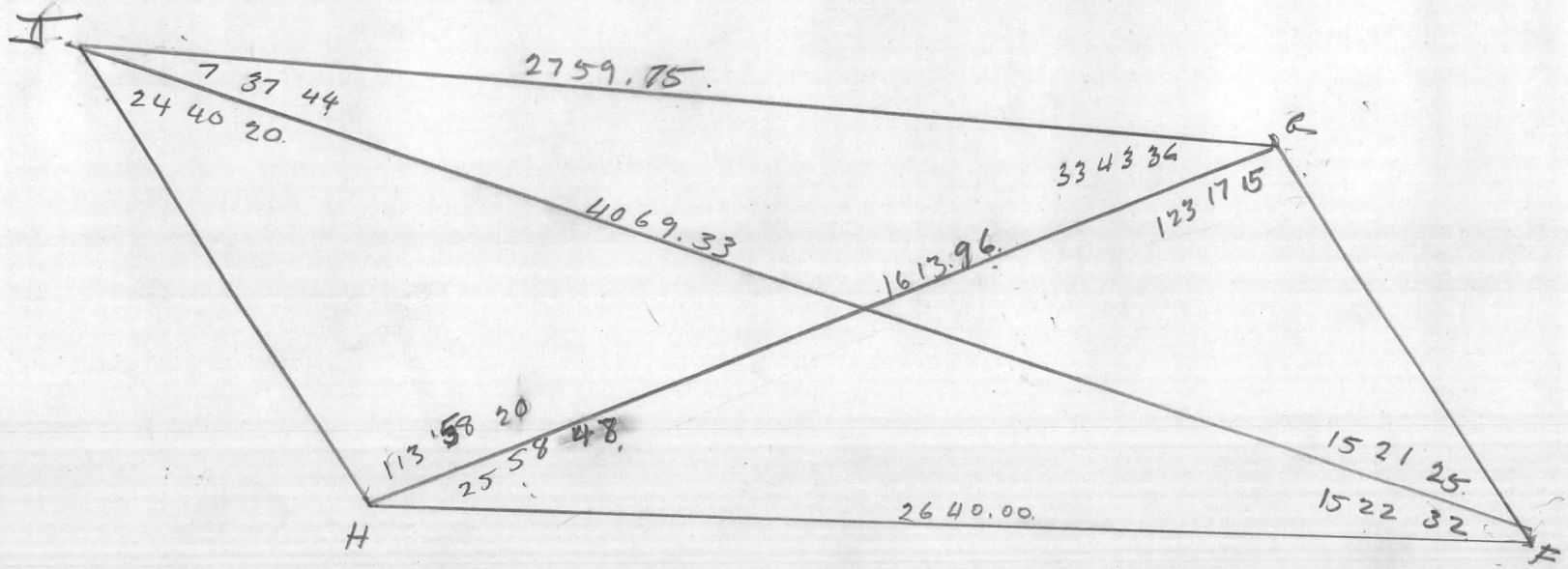
Log sin 23°33'05" 9.6015945

13.2635848

Log Sin 41°42'02" = 9.8229768

Log GJ 3.4406080

GJ = 2758.09



33 43 36
123 17 15
157 00 51

33	43	42
7	37	38
41	21	~~80~~ 20

25	58	54
15	22	26
41	21	20

~~130 13 38~~
~~21 12 26~~
~~151 26 04~~

~~182 40 04~~
~~[illegible] 46 00~~
~~154 26 04~~

24	40	26
113	58	14
138	38	40

15	21	31
123	17	09
138	38	40

			diff
Log Sin 33 43 42 =	9.744 4931	31.5	–
24 40 26 =	9.620 6076	45.8	–
25 58 54 =	9.641 5569	43.2	–
15 21 31 =	9.4230158	76.6	
	38.4296734	-40 197.1	

4034
2700

Log Sin 123 17 09 =	9.922 1767	+ 13.8
7 37 38 =	9.122 9601	157.3
113 58 14 =	9.960 8294	9.4
15 22 26 =	9.423 4372	76.6
	38.429 4034	257.1

257.1
197.1
454.2

$\frac{2700}{454} = 5.9''$

2nd Approx.

Log Sin 33 43 36 =	9.744 4742	31.6
24 40 20 =	9.620 5801	45.8
25 58 48 =	9.641 5310	43.2
15 21 25 =	9.422 9698	76.7
	38 429 5551	

551
438
113

Log Sin 123 17 15	9.922 1822	13.8
7 37 44	9.123 0547	157.2
113 58 20	9.960 8238	9.4
15 22 32	9.423 4831	76.5
	38-429 5458	

$\frac{113}{454.2} < .25''$

$$\frac{\overline{JF}}{\sin JHF} = \frac{\overline{HF}}{\sin HJF}$$

$\overline{JF} =$ Log 2640.00 = 3.4216039

Log sin 139 57 08" = 9.8084987

13.2301026

Log Sin 24 40 20 = 9.6205801

Log $\overline{JF}$ = 3.6095225

$\overline{JF}$ = 4069.33

$$\frac{JF}{\sin JGF} = \frac{JG}{\sin GFJ}$$

$\overline{JG}$ = Log $\overline{JF}$ = 3.6095225

Log Sin 15 21 25 9.4229698

13.0324923

Log Sin 157°00'51" 9.5916250

Log $\overline{JG}$ = 3.4408673

$\overline{JG}$ = 2759.73

$$\frac{HG}{\sin HFG} = \frac{HF}{\sin HGF}$$

Log HF = 3.4216039

Log Sin 30 43 57 = 9.7084469

13.1300508

Log Sin 123 17 15" 9.9221684 9.9221684

Log HG = 3.2078924

766
158

$\overline{HG}$ = 1613.96

$$\frac{\overline{JG}}{\sin JHG} = \frac{\overline{HG}}{\sin HJG}$$

Log $\overline{HG}$ = 3.2078924

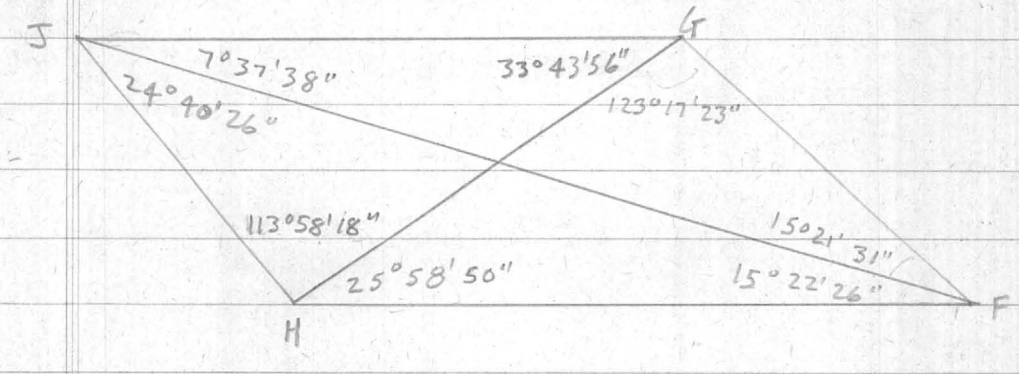
Log sin 113 58 20 = 9.9608238

13.1687162

Log sin. 32 18 04 = 9.7278410

3.4408752

$\overline{JG}$ = 2759.78



GHF CALC. =

123° 17' 13"	179 59 60
15° 21' 31"	154 01 10
15° 22' 26"	25° 58' 50"
154° 01' 10"	

JHG CALC =

24° 40' 26"	179° 59' 60"
15° 22' 26"	40° 02' 52"
40° 02' 52"	138° 16' 08"
	25° 58' 50"
	113° 58' 18"

Σ INTERIOR ANGLES

HJF =	24° 40' 26"	− 3"
FJG =	7° 37' 38"	− 4"
JGH =	33° 43' 56"	− 3"
HGF =	123° 17' 23"	− 4"
JFG =	15° 21' 31"	− 3"
HFJ =	15° 22' 26"	− 4"
GHF =	25° 58' 50"	− 3"
JHG =	113° 58' 18"	− 4"
	360° 00' 28"	

$8\overline{)28}$ = 3.5, 24

Σ OPPOSITE ANGLES

FJH	24° 40' 23" + 2"	JFG ~~HGF~~	15° 21' 28" − 2"
JHG	113° 58' 14" + 3"	FGH	123° 17' 19" − 3"
	138 38' 37"		138° 38' 47"

10"

FJG	7° 37' 34" − 5	GHF	25° 58' 47" + 5
JGH	33° 43' 53" − 4	HFJ	15° 22' 22" + 4
	41° 21' 27"		41° 21' 09"

18"

			Diff 1"	
Log Sin	24° 40' 25"	T. 6206030	46	* −9
	25° 58' 53"	T. 6415526	43	−9
	15° 21' 26"	T. 4229774	77	−9
	33° 43' 49"	T. 7445151	32	−9
		4296481		
Log Sin	113° 58' 17"	T. 9608266	9	+9
	15° 22' 26"	T. 4234372	77	+9
	123° 17' 16"	T. 9221670	14	+9
	7° 37' 29"	T. 1228188	157	+9
		4292496	455	

3985

~~T~~ ADJUSTED VALUES

HJF = 24° 40' 16"

FJG = 7° 37' 38"

JGH = 33° 43' 40"

HGF = 123° 17' 25"

JFG = 15° 21' 17"

HFJ = 15° 22' 35"

GHF = 25° 58' 44"

JHG = 113° 58' 26"

2D ADJUSTMENT - Log Sines

24° 40' 16"	T. 6205617	+1	113° 58' 26"	T. 9608182	+1
25° 58' 44"	T. 6415137	−1	15° 22' 35"	T. 4235060	+1
15° 21' 17"	T. 4229084	−1	123° 17' 25"	T. 9221546	+1
33° 43' 40"	T. 7444868	−1	7° 37' 38"	T. 1229603	+1
	4294706			4294391	

FINAL ADJUSTED VALUES

HJF	24° 40' 15"	(-11")
FJG	7° 37' 39"	(+1")
JGH	33° 43' 39"	(-17")
HGF	123° 17' 26"	(+3")
JFG	15° 21' 16"	(-12")
HFJ	15° 22' 36"	(+13")
GHF	25° 58' 42"	(-1'57")
JHG	113° 58' 27"	
	139° 57' 09"	

15 43 24
18 00 32
33° 43' 56"

$$\overline{JG} = \overline{HG}\,\frac{\sin JHG}{\sin HJG} \quad ; \quad \overline{HG} = \overline{HF}\,\frac{\sin HFG}{\sin HGF}$$

$$\overline{JG} = \overline{HF}\left(\frac{\sin JHG}{\sin HJG}\,\frac{\sin HFG}{\sin HGF}\right)$$

Log ($\overline{HF}$ = 2640)	3.4216039	Log Sin HGF (123°17'26")	$\bar{1}$.7221560
Log Sin (JHG = 113°58'27")	$\bar{1}$.9608173	Log Sin HJG (32°17'54")	$\bar{1}$.7278077
Log Sin (HFG = 30°43'52")	$\bar{1}$.7084292		$\bar{1}$.6499637
	3.0908504		
	$\bar{1}$.6499637		
	3.4408867 = Log	2759.86	

$$\overline{JG} = \overline{JF}\,\frac{\sin JFG}{\sin FGJ} \quad ; \quad \overline{JF} = \overline{HF}\,\frac{\sin JHF}{\sin HJF}$$

$$\overline{JG} = \overline{HF}\left(\frac{\sin JFG}{\sin FGJ}\,\frac{\sin JHF}{\sin HJF}\right)$$

Log 2640	3.4216039	Log Sin 157°01'05"	$\bar{1}$.5915554
Log Sin 15°21'16"	$\bar{1}$.4229007	Log Sin 24°40'15"	$\bar{1}$.6205571
Log Sin 139°57'09"	$\bar{1}$.8084962		$\bar{1}$.2121125
	2.6530008		
	$\bar{1}$.2121125		
	3.4408883	2759.87	

$\bar{1}$.6205342
229
620571

.5915306
248
554

179 59 60
157 01 05
22 58 55

25 58 42
113 58 27
139 57 09

123 17 26
33 43 39
157 01 05

$\bar{1}$.4228547
460
9007
9767
6
4602

179 59 60
139 57 09
40 02 51

7 37 38
157 01 19
15 21 31
180 60 88
28

24 40 26
139 59 06
15 22 26
178 121 58
180 01' 58"

39
3) 118
9
28
27
10

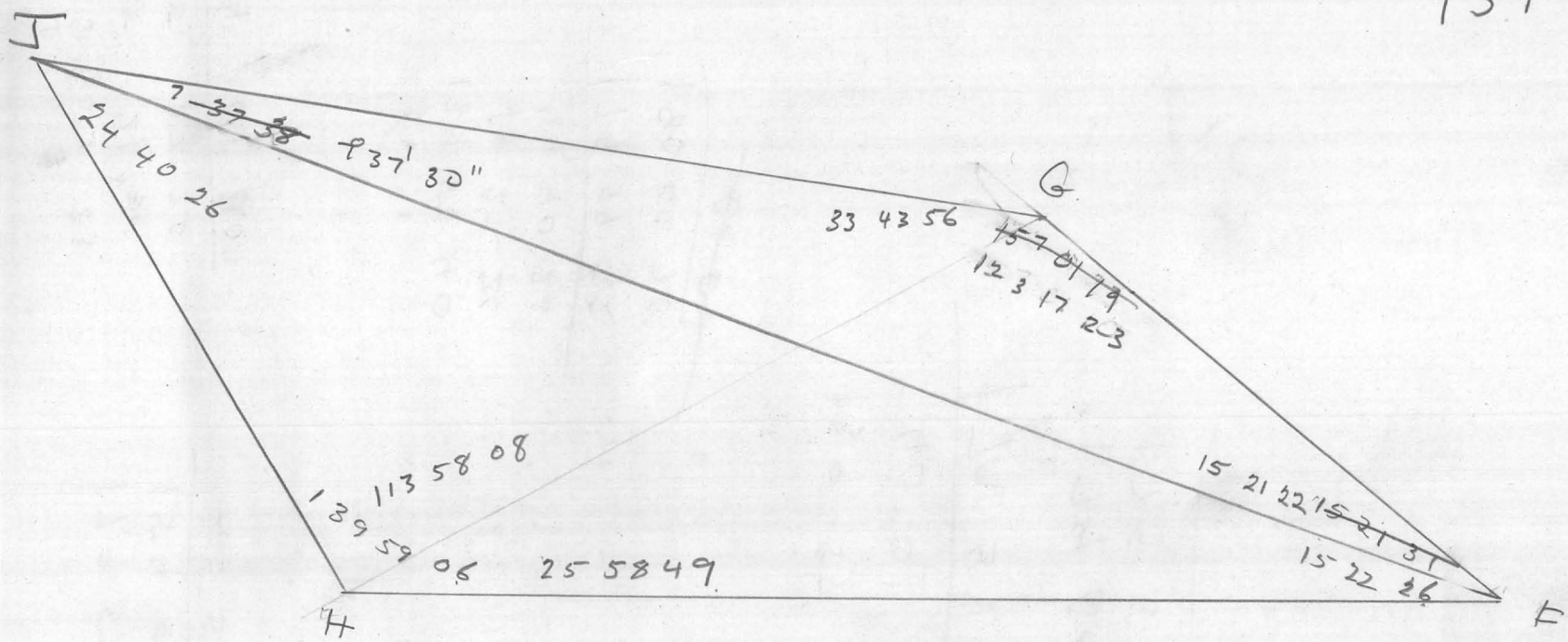
18 00 32
15 43 24
33 43 56

2 1
7 37 30
24 40 26
33 43 56
66 121 112
01 52

179 59 60
66 01 52
113 58' 08'

1 1
123 17 23
15 22 26
15 21 22
154 01 11

179 59 60
154 01 11
25 58 49
113 58 08
139 116 57"
56



2	2	
33	43	56
7	37	38
24	40	26
66	02	00"

1	1	
123	17	23
15	21	31
15	22	26
154	01'	20"

179	59	60
154	01	20
25	58	40

179	80	00
66	02	00
113	58	00
25	58	40
139	56	40
		28
139	57	08

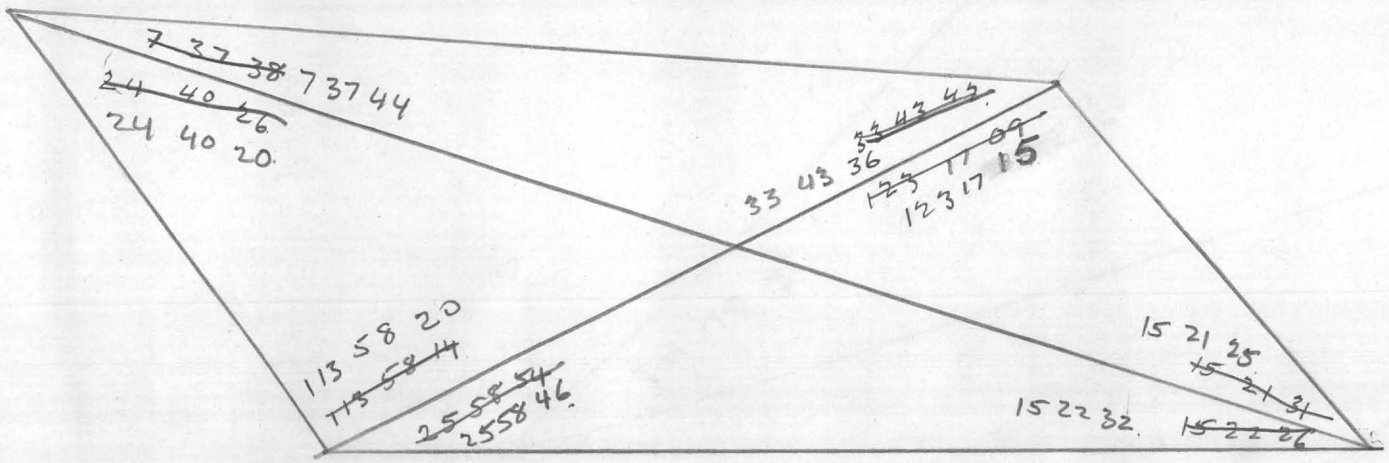
1	1	
139	56	40
15	22	26
24	40	26
179	59	32
180	00	28
	~~00~~	~~00~~

-28'

2	2	
7	37	38
33	43	56
123	17	23
15	21	31
180	00	28'

139	57	08
40	01	33
179	58	41

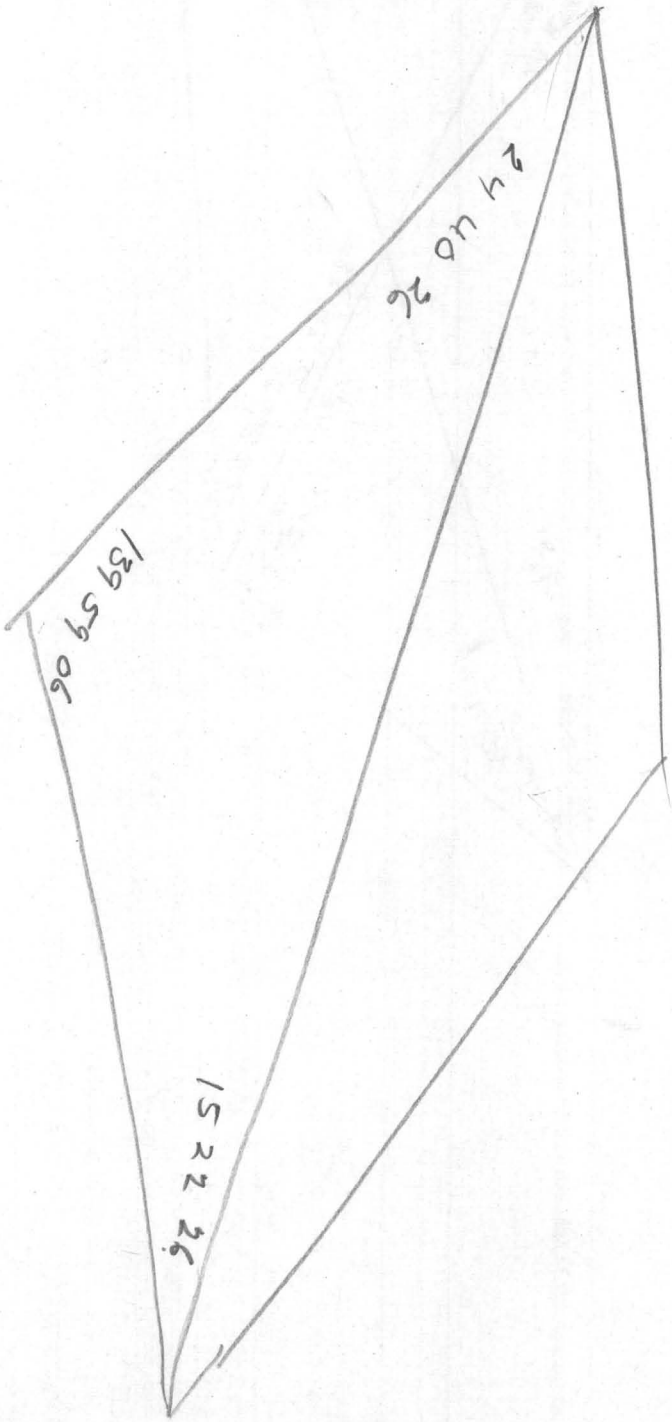
179	59	60
179	58	41
		19


~~7 37 38~~ 7 37 44
~~24 40 26~~
24 40 20.
~~33 43 43~~
33 43 36
~~123 17 09~~
123 17 15
113 58 20
~~113 58 14~~
~~25 58 54~~
25 58 46.
15 21 25
~~15 21 31~~
15 22 32.
~~15 22 26~~

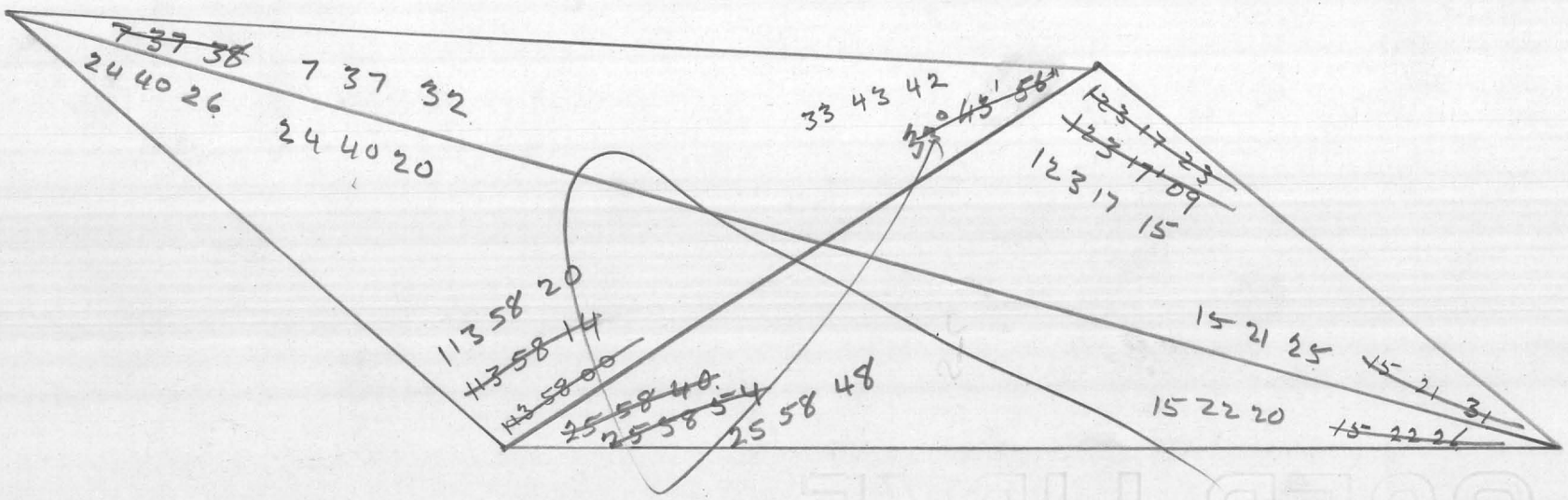
$$
\begin{array}{rrr}
8^\circ & 38' & 47'' \\
14 & 54 & 18 \\
3 & 20 & 49 \\
\hline
25 & 112' & 114'' \\
-6 & 38 & 40 \\
\hline
19 & 74 & 74 \\
20 & \cancel{75}\ 15 & 14 \\
 & & 14
\end{array}
$$

20 15 14

$$
\begin{array}{rrr}
8 & 38 & 47 \\
14 & 54 & 18 \\
\hline
23^\circ & 33 & 05
\end{array}
$$



$$
\begin{array}{rrr}
15 & 22 & 26 \\
139 & 59 & 06 \\
24 & 40 & 26 \\
\hline
18^\circ & 01' & 59''
\end{array}
$$


7 37 38
7 37 32
24 40 26
24 40 20
33 43 42
12 3 17 15
15 21 25
15 22 20
11 3 58 20
25 58 48

.800
-.720
1520
.760

.04
.04
.0016

$$E = 0.6745\sqrt{\frac{.0032}{1}}$$

.03875

.00030625 — .017
.00061250

4125
.00005625
.00011250

.02475

.0025
.0000625
.0001250

.00000625
.00001250
1118

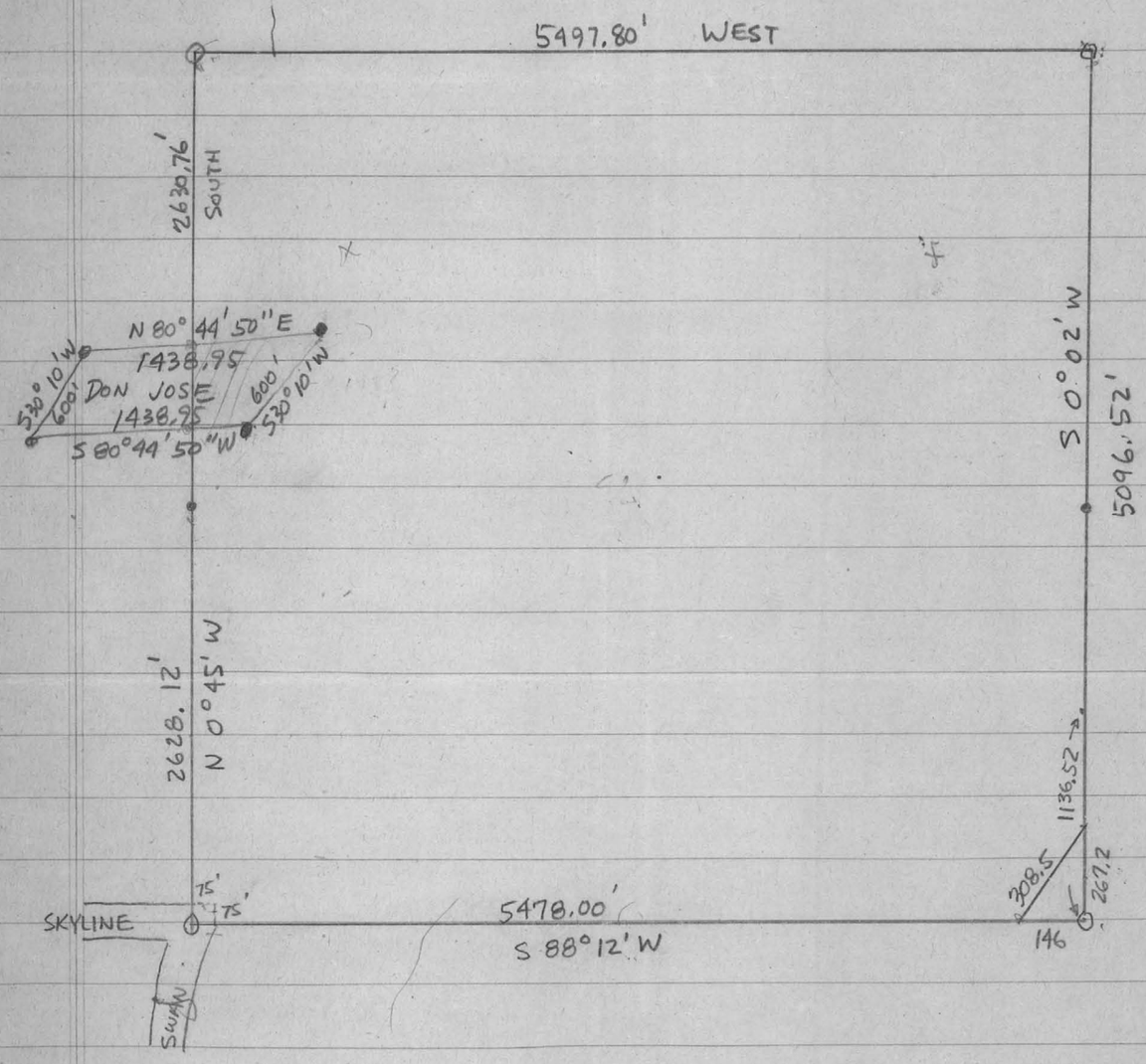
.000025
.00005
.00236
.003536

.00140625
.00281250
.010607

.005625
.011250

.01
.01
.0001

Book 87 Recorders Office



1320.66

1516.02

Don Jose et Al Book 34 P 294
Recorded 2/12/43
by Dora Carpenter taxes pd 1960.

From USMM Nº 3969
N 19°45' 30" W 2582.2' to SW Pemberton
NE Lone Star thence 1497' S69°59'E
to SW Cor of Don Jose.

See Book 102 Pantented Mines for
desc of group. ~~(down stairs)~~

U.S. Pat. Mines Mineral Survey # 3969 -
Pat 1022599 - 058119 Sta Catalina Min. Dist.

T13S R14E

Pat

1-24-40

BK 226 P393

All exc 44/100 Ac. SE Cor.
& Pt Don Jose M.C

40
19.86
19.82
~~79.68~~

39.86
66
23916
23916
2630.76

39.82
66
23892
23892
2628.12

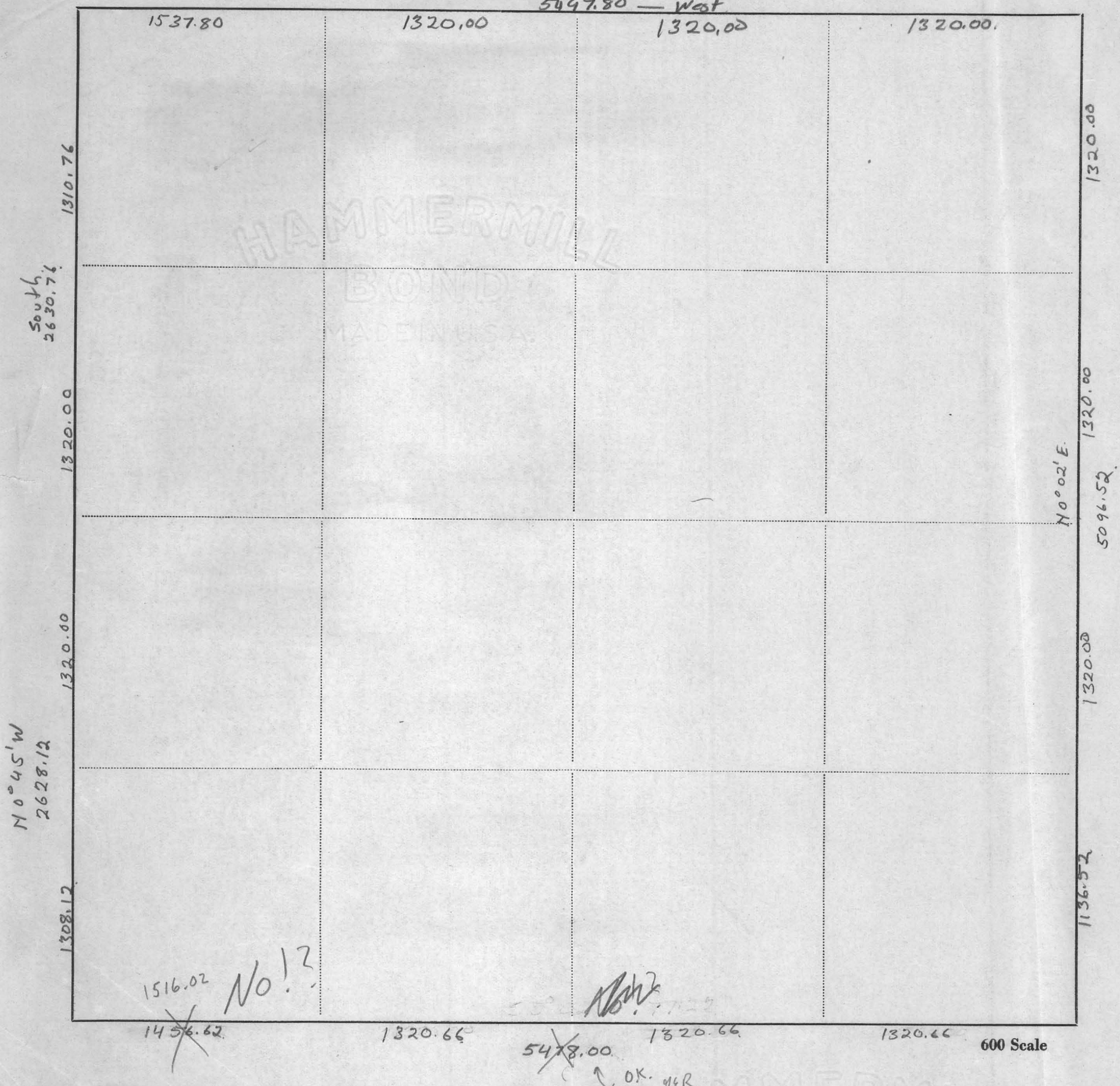
77.22
66
46332
46332
5096.52

County

Sec. 2 T. 13 S R. 14 E

From B&C. Plat.

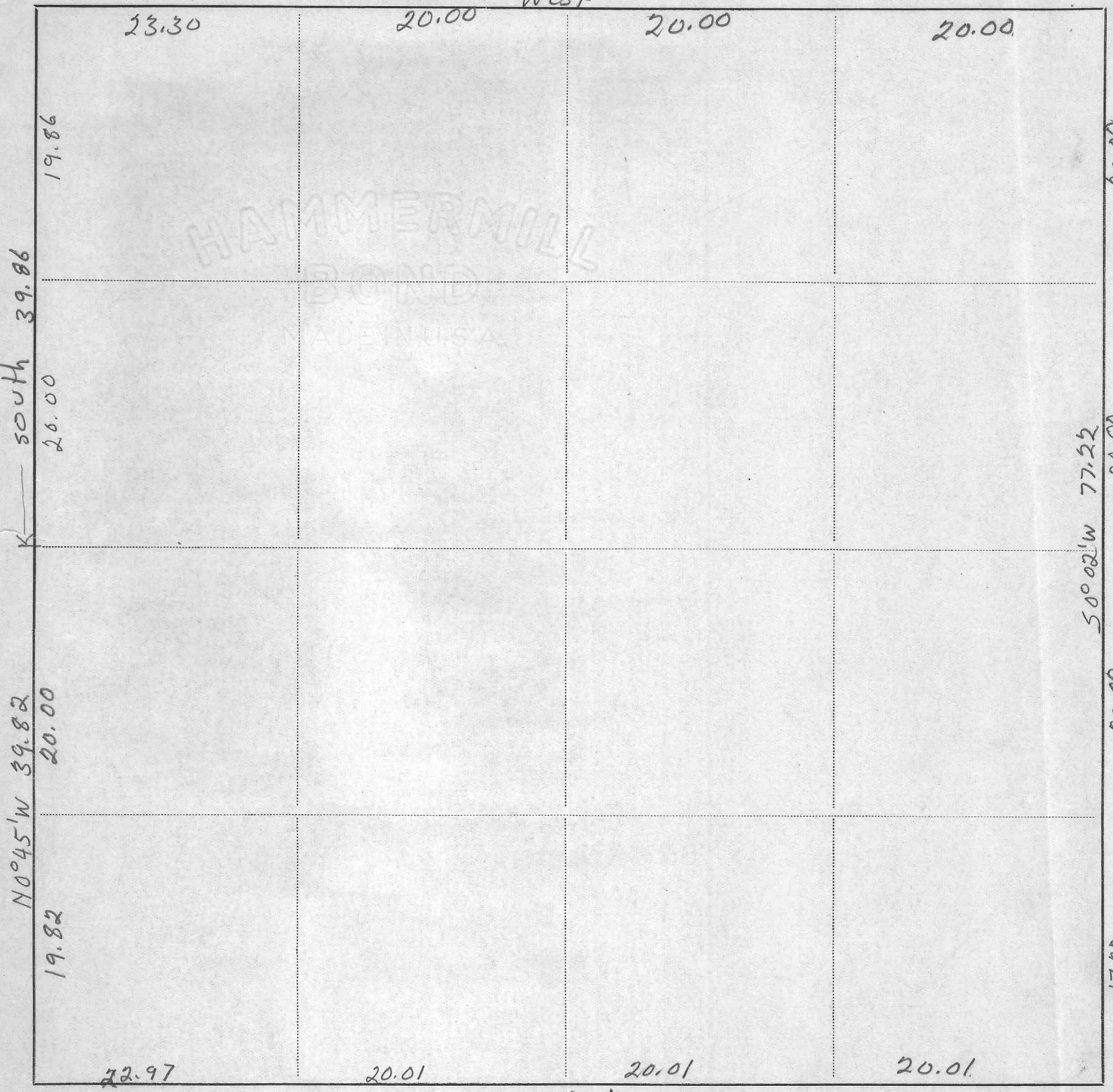
5497.80 — West



County

Sec. 2 T. 13S West R. 14E

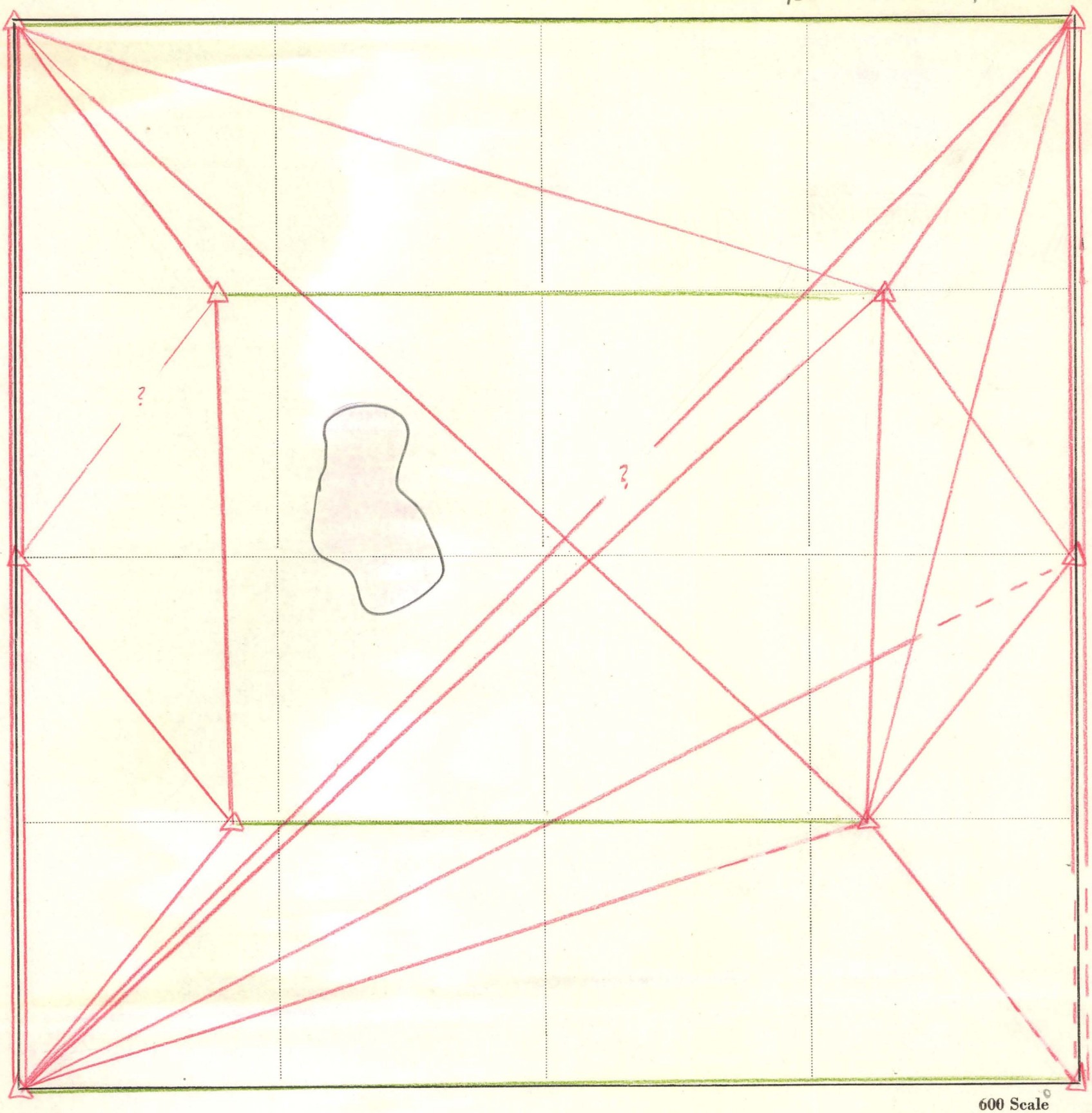
From Plat



600 Scale

County

Sec. T. R. Benders C.C.

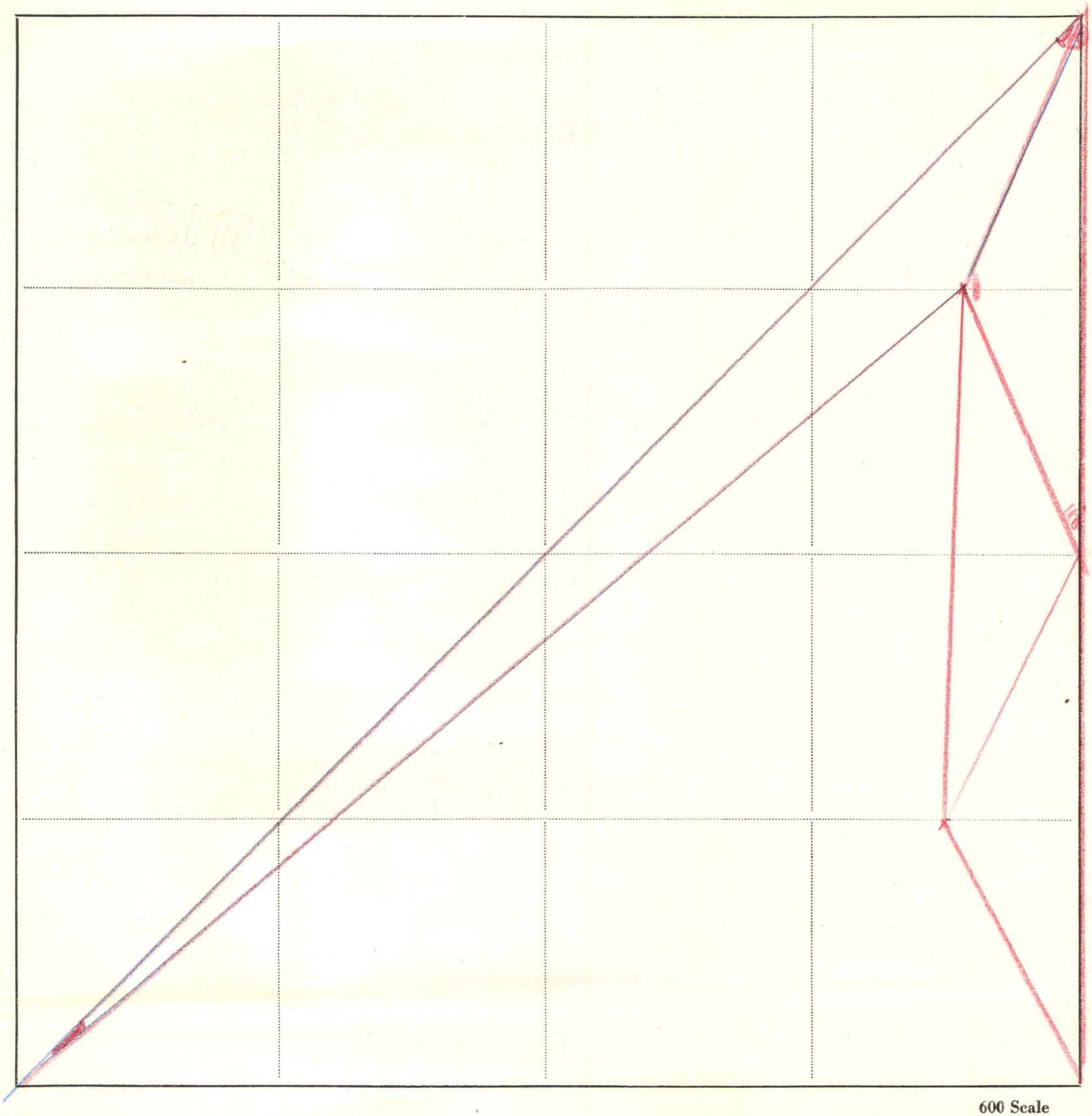


600 Scale

LINES VISIBLE LINES NOT VISIBLE

County

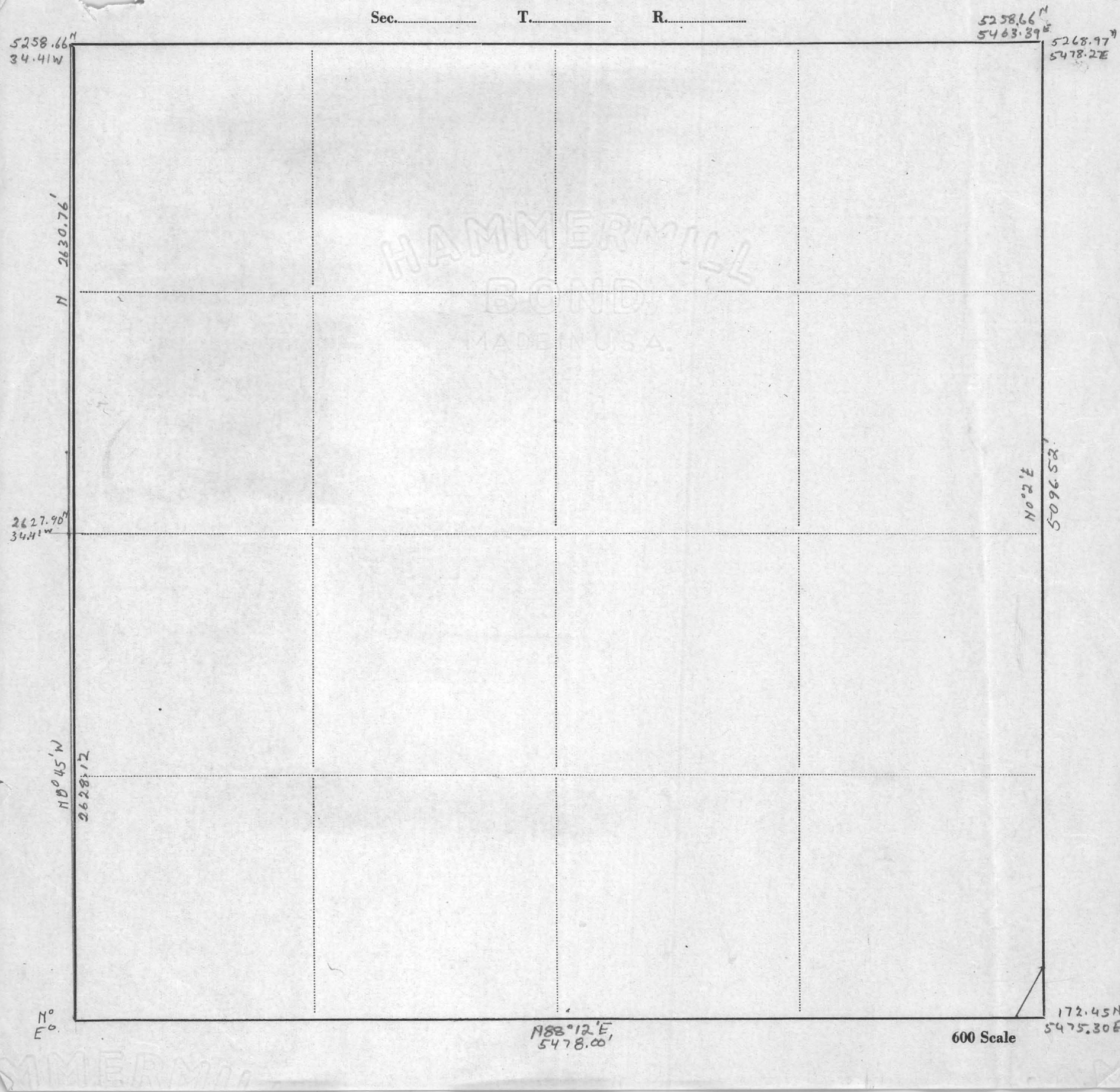
Sec. T. R.



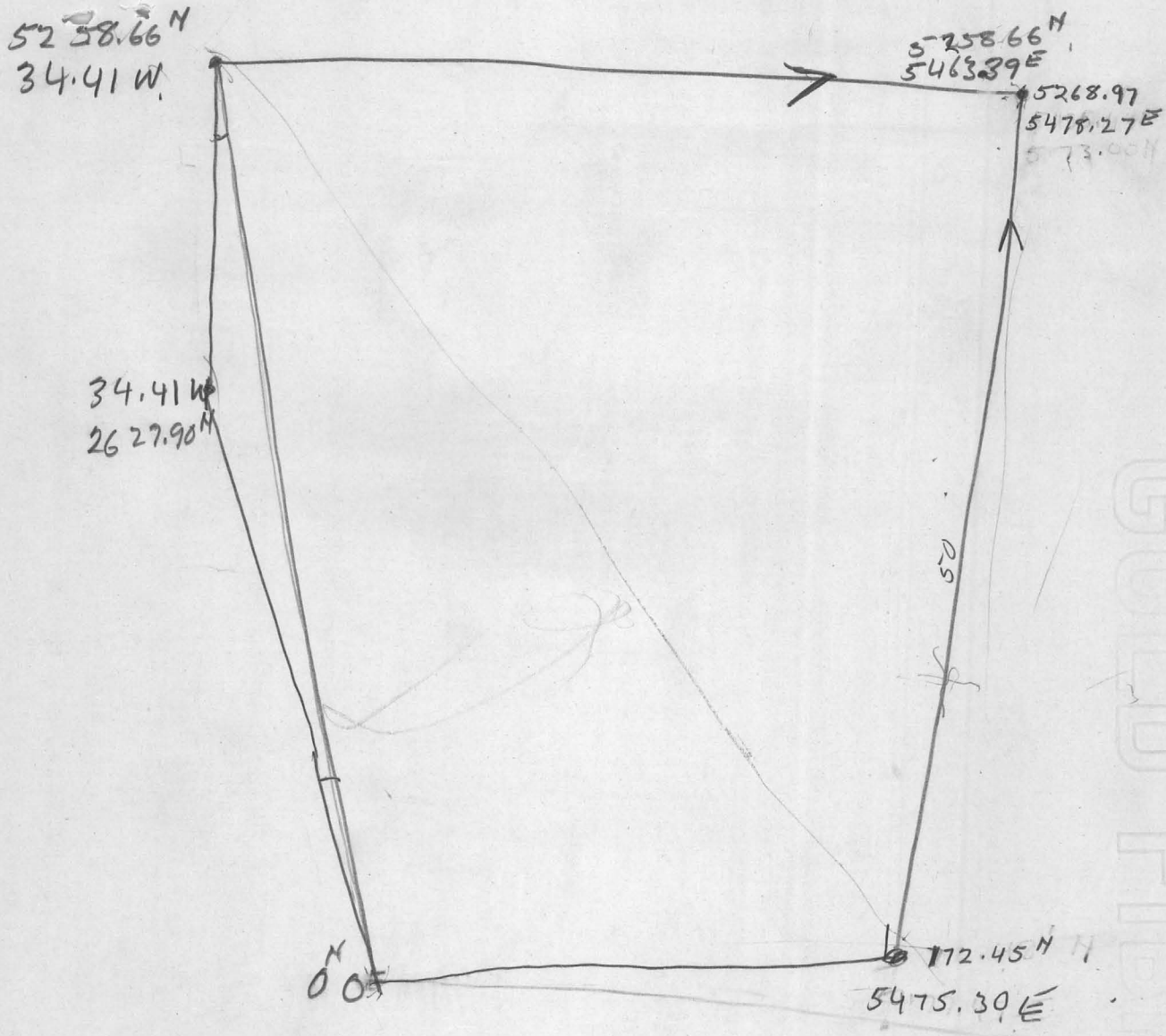
600 Scale

County

Sec. T. R.



600 Scale



5258
5172
086

5096
76
5172

$x =$ Log 5478.00 = 3.7386220

+ Log Sin 1°48' = 8.4970784 − 10

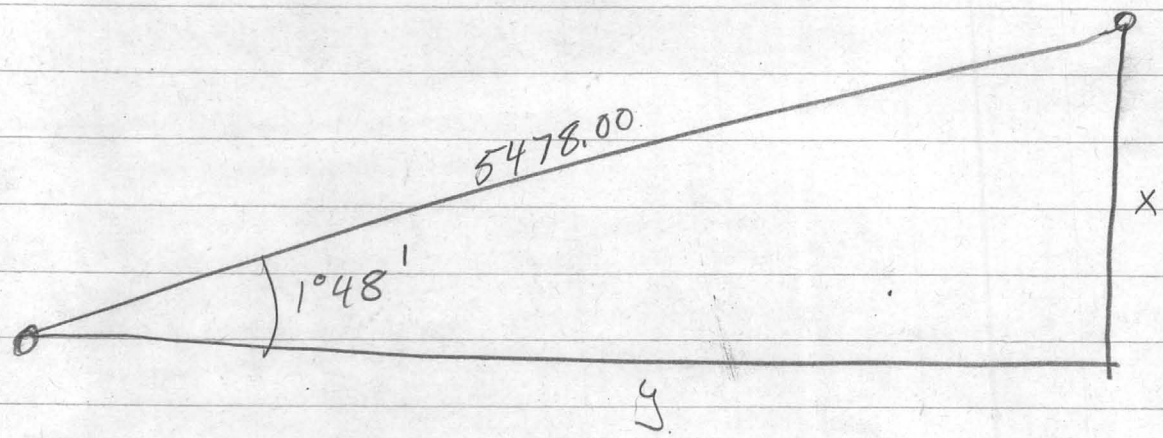
12.2357004 − 10 = 172.45'

$Y =$ 3.7386220

+ Log Cos 1°48' 9.9997856 − 10

13.7384076 − 10

$y = 5475.30$



6907.

192
34
226

5258.66
5173.00
85.66 N error

141.3
4417580
2) 4417721.3
2208861

2208860
3.7208861
2) 7.4417721.3
6
14
16

17.05' E error

$a = 2628.12$
$b = 2630.76$

$C = 179°15'$

$c = \sqrt{a^2+b^2-2ab\cos C}$

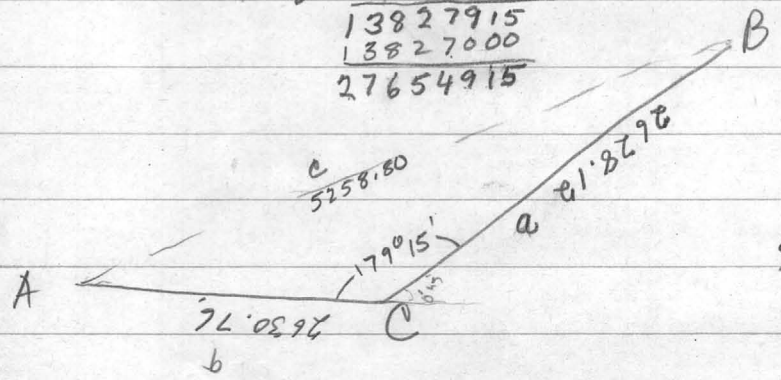
$\text{Log } a = 3.4196452$
6.8392904
$\text{Log } b = 3.4200812$

$\text{Log}\cos C = 9.9999628 - 10.$

$\text{Log } 2ab\cos C = 7.1407192$
$2ab\cos C = -13827000$

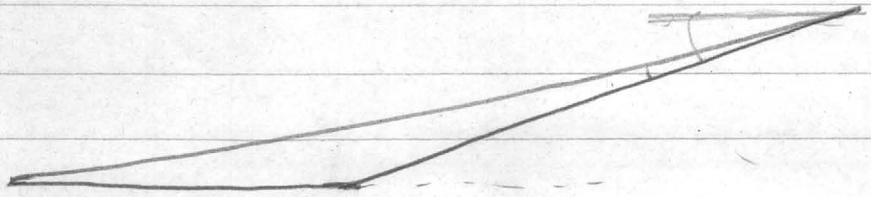
$2\text{Log } a = 6.8392904;\ a^2 = 6907015.$
$2\text{Log } b = 6.8401624\ \ b^2 = 6920900.$
13827915
13827000
27654915

$c = \text{Log}^{-1}\ 3.7208861 = 5258.80$



$\sin A = \frac{a}{c}\sin C = .4997565 \sin C$

9.6987585 − 10.
8.1169634 − 10
17.8157219 − 10
$C = 0°22'30''$



0°22' 30''
179 15
179 37

180 00
179°37'

6

10	10'	25"
61°	02'	20
10°	10'	22"

10^{150} 10^{20}

22
6) 140
12
20

122

21° 12' 22"
144 08 59

130	13	46	
14	03	54	
21	12	34	ABE
14	30	19	
179	59	53	

1			
21	12	34	
130	13	46	A B D
13	55	25	
14	38	48	
179	59	53	

719 59 12"

3	1	2	
13	55	25	
14	38	48	BDE
132	40	13	
18	46	07	
180°	0	33"	

2			
14	30	19	ADE
132	40	13	
18	46	07	
14	03	54	
180	0'	33"	

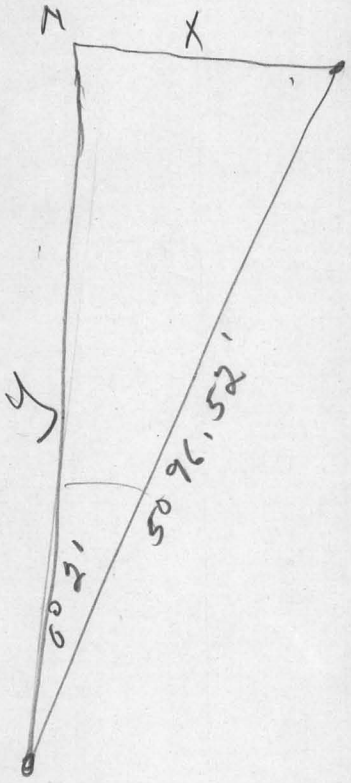
$$x = \text{Log } 5096.52 = 3.7072737$$
$$+\text{Log sin } 0°02' = 6.7647561 - 10$$
$$10.4720298 - 10$$

$$x = 2.9656 = 2.97'$$
$$5477.47$$
$$5480.44$$

$$y = \text{Log } 5096.52 = 3.7072737$$
$$\text{Log cos } 0°02' = 9.9999999$$
$$13.7072736 - 10$$

$$y = 5096.52$$
$$76.48$$
$$5173.00$$

$$5475.30$$
$$2.97$$
$$5478.27$$



County

Sec. T. R.

A 5288.77 N
50.53 W

F. 5471.29 E
5262.81 N

B 3905.56 N
954.24 E

G 4074.08 N
4763.11 E

C

H

D 1510.74 N
962.29 E

J 1339.11 N
4392.26 E

E 90

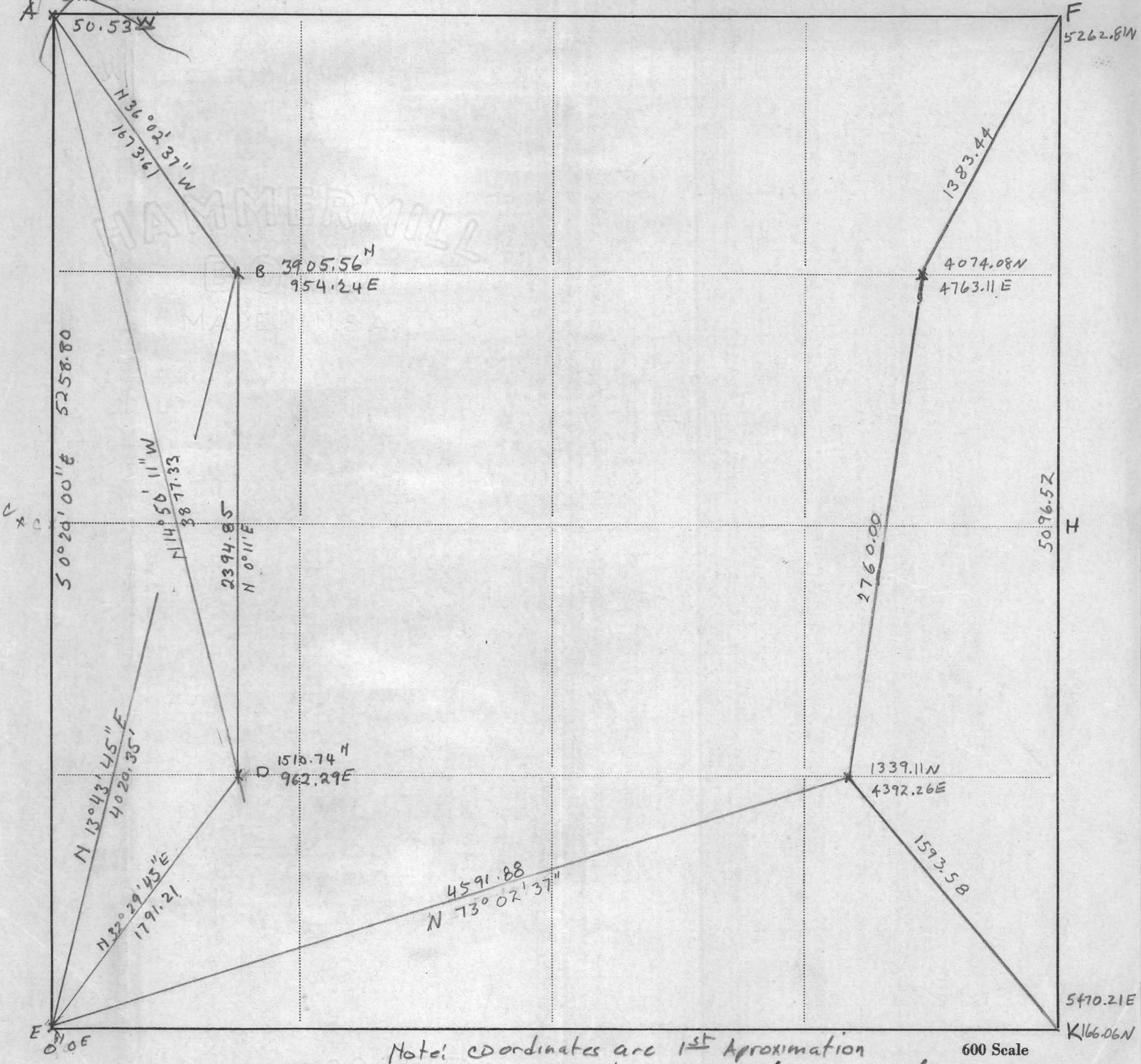
K

600 Scale

166.06 N
5470.92 E

Pima County Ariz. T. McF. & J.

Sec. 2 T. 13 S R. 14 E



Note: coordinates are 1st Aproximation
probable error ± 1.5'

600 Scale

Geoex
FAS.

RESULTS OF SOLAR OBSERVATION FOR BEARING OF LINE FROM E TO A, PONTATOC PROJ.

1ST	QUADRANT	SET	N 0° 20' 00" W
2D	"	"	N 0° 20' 02" W

AVERAGE OF 2 SETS N 0° 20' 01" W

1ST	CENTER	SHOT	ERECT	N 0° 19' 35" W
2D	"	"	"	N 0° 19' 25" W
3D	"	"	"	N 0° 18' 10" W
4TH	"	"	"	N 0° 18' 55" W
			AVE	N 0° 19' 01" W

1ST	CENTER	SHOT	INV.	N 0° 22' 10" W
2D	"	"	"	N 0° 21' 45" W
3D	"	"	"	N 0° 21' 00" W
4TH	"	"	"	N 0° 21' 45" W
			AVE	N 0° 21' 40" W

AVERAGE OF 8 CENTER SHOTS N 0° 20' 20" W

DECLINATION 0000 GCT 16 DEC 60 = -23° 18' 27"
VARIATION PER HOUR 69"

USE 23° 17' 30" FOR

LATITUDE = 32° 19' 25" TEMP ASSUMED 10°C

SET 1. QUADRANTS

V ∢
22° 45' 20"
23° 35' 20"
46° 20' 40"
AVE 23° 10' 20"
2' 07"
23° 8' 13" SAY 23°08' 15"

H ∢
140° 59' 10"
142° 03' 40"
283° 02' 50"
AVE 141 31' 25'

LOG TAN 23° 08' 15" = $\bar{1}$.6307430
LOG TAN 32° 19' 25" = $\bar{1}$.8012326
$\bar{1}$.4319756 = Log .270381
.508850
Log .779231 = .8916663 = Log Cos 38°48'35"

LOG SIN 23°17'30" = $\bar{1}$.5970498
LOG SEC 23° 08' 15" = 0.0364178
LOG SEC 32° 19' 25" = 0.0731219
$\bar{1}$.7065895 = Log .508850

179 60 00
38 48 35
141° 11 25"

141 31' 25"
141° 11' 25"
N0°20'00"

SET No. 2. QUADRANTS

V ∢
23° 50' 20"
23° 34' 00"
46° 84' 20"
AVE 23° 42' 10"
21' 01"
23° 40' 09" SAY 23° 40' 10"

H ∢
141° 51' 50"
142° 50' 55"
284 42 45"
AVE = 142° 21' 22"

LOG TAN 23°40' 10" = $\bar{1}$.6418046
LOG TAN 32° 19' 25" = $\bar{1}$.8012326
$\bar{1}$.4430372 = Log .277356
.510898
Log .788254 = $\bar{1}$.8966662 = Log Cos 37° 58' 40"

LOG SIN 23° 17' 30" = $\bar{1}$.5970498
LOG SEC 23° 40' 10" = 0.0381629
LOG SEC 320 19' 25" = 0.0731219
$\bar{1}$.7083346 = Log .510898

179 59 60
37° 58' 40"
142 01 20

142°21' 22"
142° 01' 20"
N0° 20' 02" W

22 25
20 02
42 27 AVE 2 QUADS = 20' 01"

SHOT No. 3 CENTER

V ∢
24° 00' 55"
21' 01"
23° 58' 54" SAY 23°58' 55"

H ∢ = 142°51'00"

LOG TAN 23°58'55" = $\bar{1}$.6482148
LOG TAN 32° 19' 25" = $\bar{1}$.8012326
$\bar{1}$.4494474 = Log .281480
.512130
.793610 = $\bar{1}$.8996071 = Log Cos 37°28'35"

LOG SIN 23° 17' 30" = $\bar{1}$.5970498
LOG SEC 23° 58' 55" = 0.0392089
LOG SEC 320 19' 25 = 0.0731219
= .7093806 = .512130

179 59 60
37°28' 35"
142° 31' 25"

142°51'00"
142° 31' 25"
N0° 19' 35" W

SHOT No. 4 CENTER V∡ = 24° 05' 15"
2' 01"
24° 03' 14" SAY 24° 03' 15"

H∡ = 142° 57' 55"

LOG TAN 24° 03' 15" = $\bar{1}$.649 6872
LOG TAN 32° 19' 25" = $\bar{1}$.801 2326
$\bar{1}$.4509198 .282436
.512419
Log .794855 = $\bar{1}$.9002879 = Log Cos 37°21'30"

LOG SIN 23°17' 30" = $\bar{1}$.5970498
LOG SEC 24°03' 15" = 0.0394529
LOG SEC 32°19' 25" = 0.0731219
.7096246 = .512419

179 59 60
37 21 30
142° 38' 30"

142° 57' 55"
142 38 30'
N 0° 19' 25" W

SHOT No. 5 CENTER V∡ = 24° 10' 55"
2' 01"
24° 08' 54" SAY 24° 08' 55"

H∡ = 143° 05' 55"

LOG TAN 24° 08' 55" = $\bar{1}$.6516077
LOG TAN 32° 19' 25" = $\bar{1}$.801 2326
$\bar{1}$.4528403 = .283688
.512796
Log .796484 = .9011771 = Log Cos 37°12'15"

LOG SIN 23°17' 30" = $\bar{1}$.5970498
LOG SEC 24°08' 55" = 0.0397731
LOG SEC 32° 19' 25" = 0.0731219
$\bar{1}$.7099448 = .512796

179 59 60
37 12 15
142° 47' 45"

143° 05' 55"
142° 47 45"
N 0° 18' 10" W

SHOT No. 6 CENTER V∡ = 24° 16' 30"
2 01
24°14 30"

H∡ = 143° 15' 40"

LOG TAN 24° 16' 30" = $\bar{1}$.6534944
LOG TAN 32° 19' 25" = $\bar{1}$.801 2326
$\bar{1}$.4547270 = .284923
.513170
Log .798093 = $\bar{1}$.9020535 = Log Cos 37°03'05"

LOG SIN 23°17' 30" = $\bar{1}$.5970498
LOG SEC 24° 14' 30" = 0.0400900
LOG SEC 32° 19' 25" = 0.0731219
$\bar{1}$.7102617 .513170

179 59 60
37 03 05
142° 56' 55"

143° 15' 40"
142° 56' 55"
N 0° 18' 55" W

19' 35"
17' 25"
18' 10"
18' 55"
4 | 76 05
19' 01" = AVE OF 4 ERECT

SHOT No 7 CENTER V∡ = 24° 24' 05"
2' 01"
24° 22' 04" SAY 24° 22' 05"

H∡ = 143° 31' 35"

LOG TAN 24° 22' 05" = $\bar{1}$.656 0484
LOG TAN 32° 19' 25" = $\bar{1}$.801 2326
$\bar{1}$.457 2810 = Log .286603
.513682
Log .800285 = .9032447 = Log Cos 36°50'35"

LOG SIN 23°17' 30" = $\bar{1}$.5970498
LOG SEC 24° 22' 05" = 0.0405227
LOG SEC 32° 19' 25" = 0.0731219
$\bar{1}$.7106944 = Log .513682

179 5960
36° 50' 35
143° 09' 25"

143° 31' 35
143° 09' 25'
N 0° 22' 10' W

SHOT No. 8 CENTER V∡ = 24° 29' 40" / 2 = 24° 27' 40" H∡ = 143° 40' 30"

Log TAN 24° 27' 40" = $\bar{1}$.6579224
Log TAN 32° 19' 25" = $\bar{1}$.8012326
$\bar{1}$.4591550 = Log .287843
.514061
Log .801904 = $\bar{1}$.9041224 = Log Cos 36° 41' 15"

Log SIN 23° 17' 30" = $\bar{1}$.5970498
Log SEC 24° 27' 40" = 0.0408429
Log SEC 32° 19' 25" = 0.0731219
$\bar{1}$.7110146 = Log .514061

179 59 60
36 41 15
143 18' 45"

143 40' 30"
143 18' 45"
N0°21' 45" W

SHOT No. 9 CENTER V∡ = 24° 35' 15" / 2 = 24° 33' 15" H∡ = 143° 49' 05"

Log TAN 24° 33' 15" $\bar{1}$.6597911
Log TAN 32° 19' 25" $\bar{1}$.8012326
$\bar{1}$.4610237 = Log .289084
.514442
.803526 = Log .9049999 = Log Cos 36° 31' 55"

Log SIN 23° 17' 30" = $\bar{1}$.5970498
Log SEC 24° 33' 15" = 0.0411644
Log SEC 32° 19' 25" = 0.0731219
.7113361 = Log .514442

179 59 60
36 31 55
143 28 05

143° 49' 05"
143° 28' 05"
N0° 21' 00" W

SHOT No. 10 CENTER V∡ = 24° 38' 45" / 2 = 24° 36' 45" H∡ = 143° 55' 45"

Log TAN 24° 36' 45" = $\bar{1}$.6609600
Log TAN 32° 19' 25" = $\bar{1}$.8012326
$\bar{1}$.4621926 = Log .289863
.514681
Log .804544 = .9055498 = Log Cos 36° 26' 00"

Log SIN 23° 17' 30" = $\bar{1}$.5970498
Log SEC 24° 36' 45" = 0.0413667
Log SEC 32° 19' 25" = 0.0731219
$\bar{1}$.7115384 = Log .514681

179 59 60
36 26 00
143 34 00

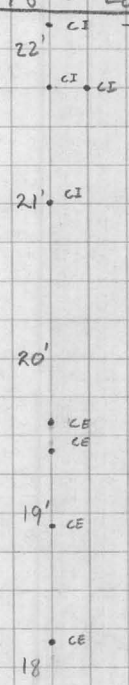
143° 55' 45"
143° 34' 00"
N0° 21' 45" W

AVE 4 INVERTED

22 10
21 45
21 00
21 45
4) 86 40
21' 40"

AVE 8 CENTER SHOTS

21' 40 INV
19' 01 ER
2) 40' 41
20' 20"



SPREAD CEN. INV. = 1'10"

SPREAD CEN. ER = 1'25"

AVERAGES OF 1ST E, 1ST INV 20'52"
2D E 2D INV 20'35"
3D E 3D I 19'35"
4TH E 4TH I 20'20"

SPREAD = 1'17"

TR. MK. REG. U.S. PAT. OFF

ORIGINAL COPR. 1910 BY J. O. PARKER

Dec 15/60

Solar Observation

Ins at E BS to A

TIME	INST	SUN	HA	VA
9.41	E	☉	140°59'10"	67°14'40"
9.44	I	☉	322°03'40"	293°35'20"
9.45	I	☉	321°51'50"	293°50'20"
9.47	E	☉	142°56'55"	66°26'0"
9.48	E	☉	142°51'[illegible]	65°59'5"
9.48	E	☉	142°54'[illegible]	65°54'45"
9.49	E	☉	143°5'55"	65°49'5"
9.50	E	☉	143°15'40"	65°43'30"
9.51	I	☉	323°31'35"	294°24'5"
9.52	I	☉	323°40'30"	294°29'40"
9.53	I	☉	323°49'5"	294°35'15"
9.53	I	☉	323°53'45"	294°38'45"

LEFAX, PHILADELPHIA 7, PA., MADE IN U.S.A.

DECLINATION

1. LCT _____
2. CORR _____
3. GCT _____
4 DEC 0000 GCT _____
5. VAR/HR _____
6 HOURS FROM 0000 GCT _____
7. TOTAL VAR (5x6) _____
7. DEC (4+7) _____ Log Sin DEC _____

Log TAN LAT LATITUDE _____ Log SEC LAT _____

ALTITUDE

VER. ANGLE 1. _____
2. _____
AVE _____

TEMP _____ CORR _____

_____ Log TAN h h _____ Log SEC h _____

SUM _____ = Log _____ SUM _____

Log _____ =

Log SUM _____ = _____

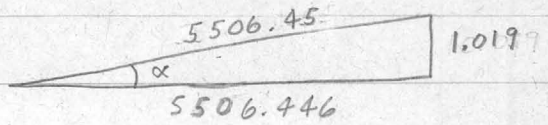
= Log Cos _____ = A_Z

SIDES-2

COMPUTATION OF SIDES OF SECTION

SIDE AF

	LAT	DEP
F	5261.933	5474.567
A	5260.914	− 31.879
	1.019	5506.446



$(5506.446)^2 = 30320947.550916$ .455 11017.

N =

~~α = 0° 06' 1.6"~~

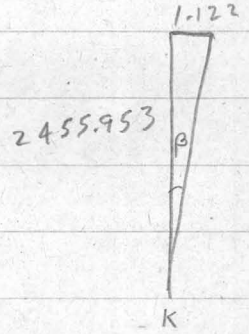
~~BEARING AF = N 89° 53' 44" E~~

α = 0° 00' 38"

BEAR AF = N 89° 59' 22" E

SIDE HK

H	2624.024	5473.032
K	168.71	5471.91
	2455.314	1.122



$2455.313^2 =$ 6028566.

$1.122^2 =$ 1.258884

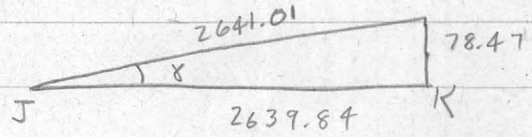
$\sqrt{} = 2455.313$

$\beta = 0°01'34''$

BEAR KH = N 0° 01' 34" E

SIDE 1/4 COR - K

	LAT	DEP
K	168.71	5471.91
1/4 COR	90.24	2832.07
	78.47	2639.84



$2639.84^2 =$

```
6968755.2256
   6157.5409
-----------
6974912.7665
```

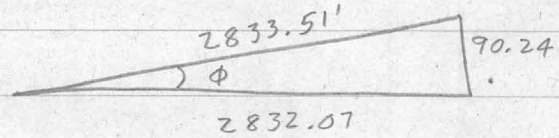
.01 933
.00 881

γ 1° 42' 12"

BEARING JK = N 88° 17' 48" E

SIDE E - 1/4 COR

1/4 COR	90.24	2832.07
E	0.00	0.00
	90.24	2832.07



$2832.07^2 = 8020620.4849$

$90.24^2 = 8143.2576$

8028763.7425

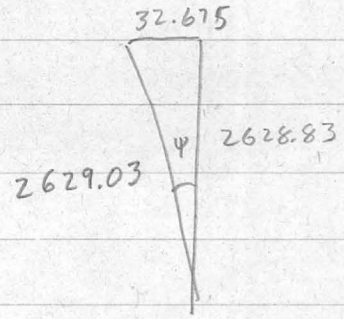
3.50	722
3.51	778

$\phi = 1^\circ 49' 30''$

BEARING E - 1/4 COR = N 88° 10' 30" E

SIDE E - C

	LAT	DEP
C	2628.83	-32.675
E	0.00	0.00
	2628.83	-32.675



$2628.83^2 =$ 6910747.1689

$32.675^2 =$ 1067.6556

6911814.8245

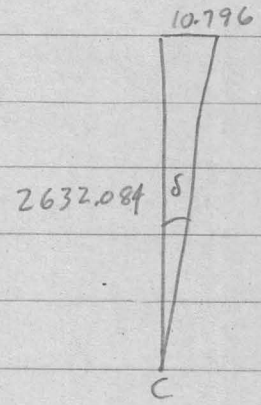
9.00 641
9.05 903
9.03 798

$\psi = 0°42'42''$

BEAR EC = N 0°42'42" W

SIDE C A

	LAT	DEP
A	5260.914	-31.879
C	2628.83	-32.675
	2632.084	0.796



~~$2632.084^2 = 69278.66.2$~~
~~$10.796^2 = 116.6$~~
~~$69279.82.8$~~

2.11	003
2.10	950
2.09	897

$\sqrt{\ } = 2632.08$

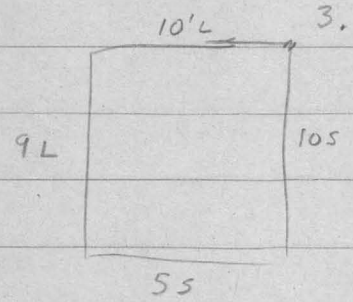
~~$\delta = 0°14'06''$~~ $0°01'2''$

BEAR CA = N 0°01'02" E

	TRIANGULATION			U.S. SURVEY	
	DIST (FT)	DIST (CHAINS)	DIFF	DIST (FT)	DIST (CHAINS)
A					
	5506.455	83.43	+ 8.65	5497.80	83.30
F					
	2637.909	39.96	−2.09'	2640.00	40.00
H					
	2455.31	37.20	−1.21'	2456.52	37.22
K					
	2641.01	40.01	−0.31'	2641.32	40.02
1/4 COR					
	2833.51	42.93	−3.17'	2836.68	42.98
E					
	2629.03	39.83	+0.91'	2628.12	39.82
C					
	2632.08	39.88	+ 1.32'	2630.76	39.86
A					

AVE = 2.52'

ALGEBRAIC SUM = −4.10'



.4
.760 ← 30
.761 ← 20
.8

.735 ± .059
.73 ± .06

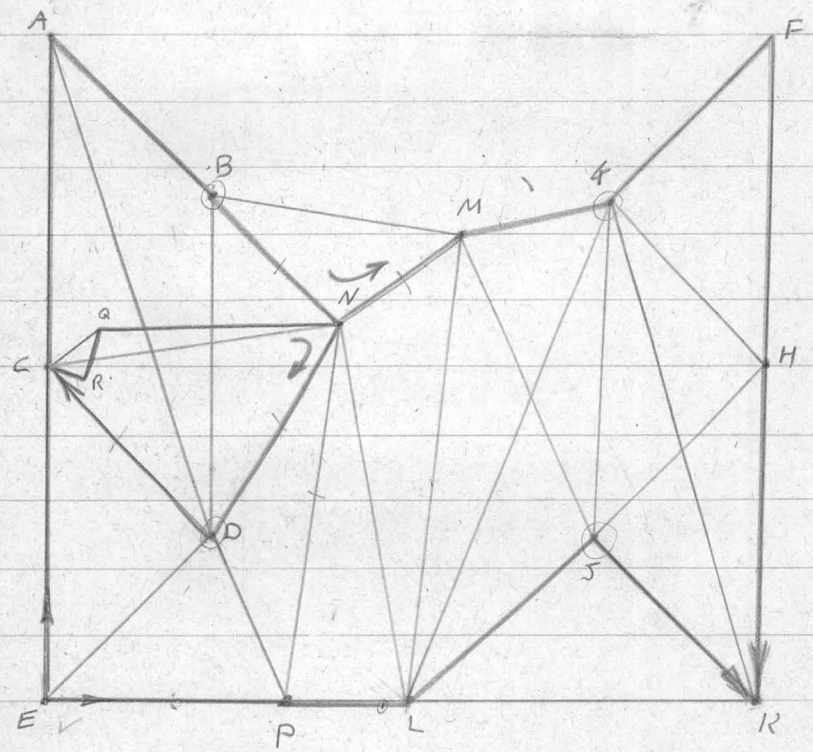
.635
.735 ± .1
.835

1/41,000

1/25,000

CO: ORDINATES

COMPUTATION OF CO-ORDINATES



	N	E
E	0.000	0.000
C_1	2894.925	-38.738
A	5260.914	-31.879
B	3907.466	953.686
N	2664.988	1449.831
M	3873.376	3178.047
G	4074.019	4767.536
F	5261.933	5474.567
H	2624.024	5473.032
K_1	197.763	5343.164

	N	E
E	0.000	0.000
P	312.047	2028.120
L	103.466	2969.442 ←
J	1340.805	4393.688
K_1	197.761	5343.167
	CHECK .002 ✓	CHECK .003 ✓

C_1	2894.925 ✓	−38.738
R	2809.704 ✓	326.219 ✓
Q	3352.231 ✓	642.143 ✓
N	2664.993 ✓ +.005	1449.825 ✓ −.006
D	1512.376 ✓	962.354 ✓
C_1	2894.925 ✓	−38.741 ✓
	CHECK .000	CHECK +.003

K_1	197.76	5343.17
	− 29.05	+ 128.74
K	168.71	5471.91

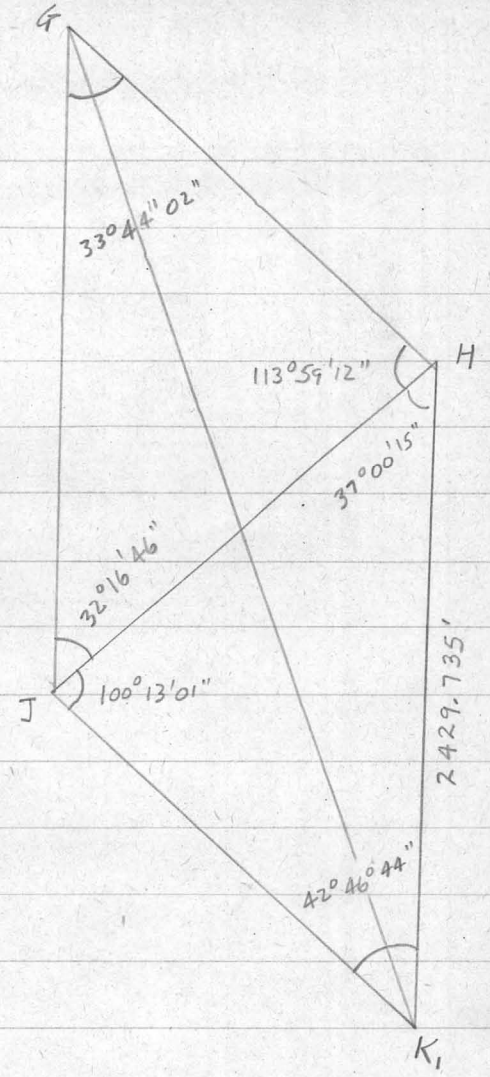
L	103.47	2969.44
	− 13.23	− 137.37
1/4 COR	90.24	2832.07

C_1	2894.92	−38.738
	− 266.09	+ 6.063
C	2628.83	−32.675

SIDES-1

COMPUTATION OF SIDES OF FIGURES

LATITUDES & DEPARTURES



$$\left(\frac{2429.735}{\sin 100°13'01''}\right) \sin 37°00'15'' = JK$$

Log 2429.735 = 3.3855598
Log sin 37°00'15" = $\bar{1}$.1795050
3.1650648
Log sin 100°13'01" 1.9930583
3.1720065 = Log 1485.954 = JK

sin 79°46'59"

$$\left(\frac{2429.735}{\sin 100°13'01''}\right) \sin 42°46'44'' = JH$$

MACHINE COMPS.

Log 2429.735 = 3.3855598
Log sin 42°46'44" = $\bar{1}$.8319791
3.2175389
Log sin 100°13'01" $\bar{1}$.9930583
3.2244806 = Log 1676.793 = JH ✓

$$\left(\frac{1676.793}{\sin 33°44''02''}\right) \sin 32°16'46'' = HG$$

Log 1676.793 = 3.2244806
Log Sin 32°16'46" = $\bar{1}$.7275812
2.9520618
Log Sin 33°44'02" $\bar{1}$.7445561
3.2075057 = ~~Log~~ 1612.517 = HG

$$\left(\frac{1676.793}{\sin 33°44''02''}\right) \sin 113°59'12'' = GJ$$

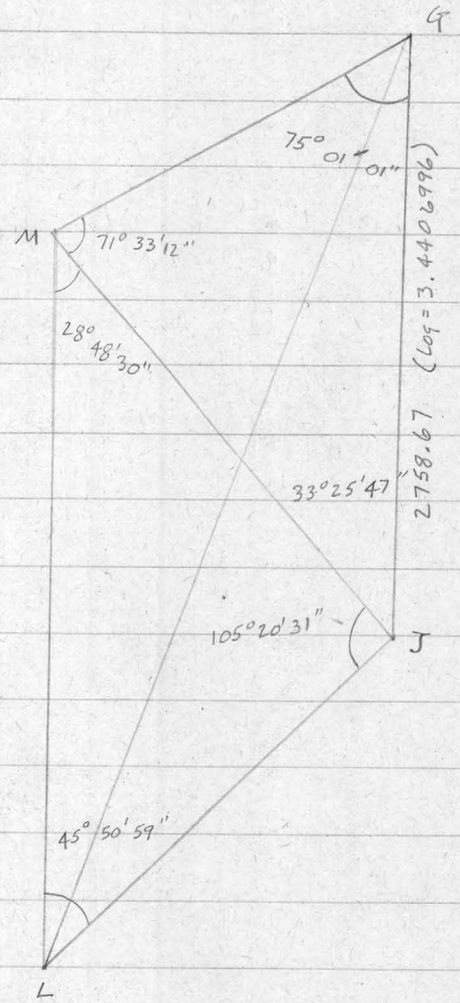
MACHINE COMPS

Log 1676.793 = 3.2244806
Log Sin 113°59'12" = $\bar{1}$.9607751
3.1852557
Log Sin 33°44'02" $\bar{1}$.7445561
3.4406996 = ~~Log~~ 2758.661 = GJ

1795960
113 59 12
66°00'48"

		Dist	Log Dist / Log Cos	Log Dist / Log Sin	Lat	Dep
K_1						
	N 3°03'50"E	2429.735	3.3855598 $\bar{1}$.9993788 3.3849386	3.3855598 $\bar{2}$.7279827 2.1135425	+ 2426.261	+ 129.868
H						
	N 25°56'43"W	1612.517	3.2075057 $\bar{1}$.9538622 3.1613679	3.2075057 $\bar{1}$.6409905 2.8484962	+ 1449.995	− 705.496
G						
	S 7°47'19"W	2758.661	3.4406996 $\bar{1}$.9959750 3.4366746	3.4406996 $\bar{1}$.1319990 2.5726986	− 2733.211	− 373.850
J						
	S 39°42'54"E	1485.954	3.1720065 $\bar{1}$.8860575 3.0580640	3.1720065 $\bar{1}$.8054799 2.9774864	− 1143.044	+ 949.479
K_1						
					+ 0.001	+ 0.001

~~MAKE DEP. K1H = +129.87~~



$$\left(\frac{2758.661}{\sin 71°33'12''}\right) \sin 33°25'47'' = GM$$

Log 2758.661 = 3.4406996
Log sin 33°25'47" = $\bar{1}$.7410836
3.1817832
Log sin 71°33'12" = $\bar{1}$.9770916
3.2046916 = ~~Log~~ 1602.103 ~~1609.50~~ = GM

$$\left(\frac{2758.661}{\sin 71°33'12''}\right) \sin 75°01'01'' = MJ$$

MACHINE CAMPS

Log 2758.67 = 3.4406996
Log sin 75°01'01" = $\bar{1}$.9849782
3.4256778
Log sin 71°33'12" $\bar{1}$.9770916
3.4485862 = Log 2809.214 = MJ

$$\left(\frac{MJ}{\sin 45°50'59''}\right)\left(\sin 28°48'30''\right) = JL$$

Log MJ = 3.4485862
Log Sin 28°48'30'' = $\bar{1}$.6829399
3.1315261
Log Sin 45°50'59'' $\bar{1}$.8558312
3.2756949 = Log 1886.659 = JL

$$\left(\frac{MJ}{\sin 45°50'59''}\right) \sin 105°20'31'' = ML$$

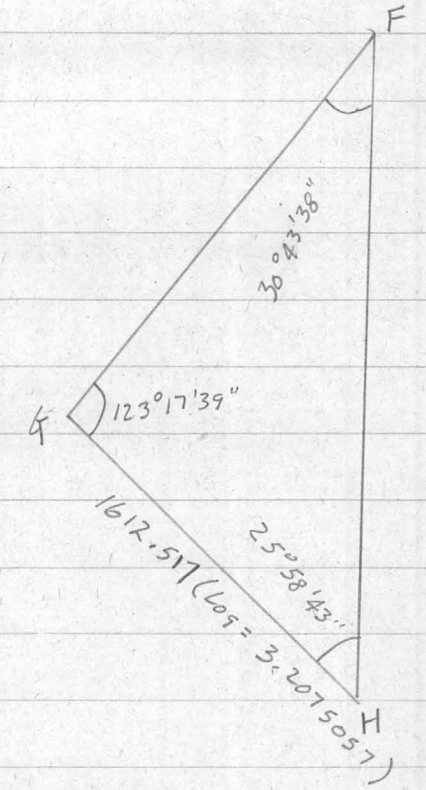
MACHINE Comps

179 59 60
105 20 31
74°39'29''

Log MJ = 3.4485862
Log Sin 105°20'31'' = $\bar{1}$.9847410
3.4332272
Log Sin 45°50'59'' = $\bar{1}$.8558312
3.5769960 = Log 3775.675 = ML

		DIST	Log DIST Log COS	Log DIST Log SIN	LAT	DEP
J	N 7° 47'19" E	2758.661	—	—	+2733.211	+373.850
G	S 82° 48'20" W	1602.103	3.2046916 ✓ $\bar{1}$.0977328 2.3024244	3.2046916 $\bar{1}$.7965672 3.2012588	−200.643	−1589.489
M	S 3° 10'02" W	3775.675	3.5769960 ✓ $\bar{1}$.9993362 3.5763322	3.5769960 $\bar{2}$.7423347 2.3193307	−3769.908	−208.607
L	N 49° 01'01" E	1886.659	3.2756949 ✓ $\bar{1}$.8167951 3.0924900	3.2756949 $\bar{1}$.8778914 3.1535863	+1237.339	+1424.246
J					+0.00	+0.00
					−.001	.000

232
3
189.6



$$\left(\frac{GH}{\sin 30°43'38''}\right) \sin 25°58'43'' = FG$$

$$\begin{array}{rl} \text{Log } GH = & 3.2075057 \\ \text{Log Sin } 25°58'43'' & \bar{1}.6415094 \\ \hline & 2.8490151 \\ \text{Log Sin } 30°43'38'' & \bar{1}.7083796 \\ \hline & 3.1406355 = \text{Log } FG = 1382.401 \end{array}$$

$$\left(\frac{GH}{\sin 30°43'38''}\right) \sin 123°17'39'' = FH$$

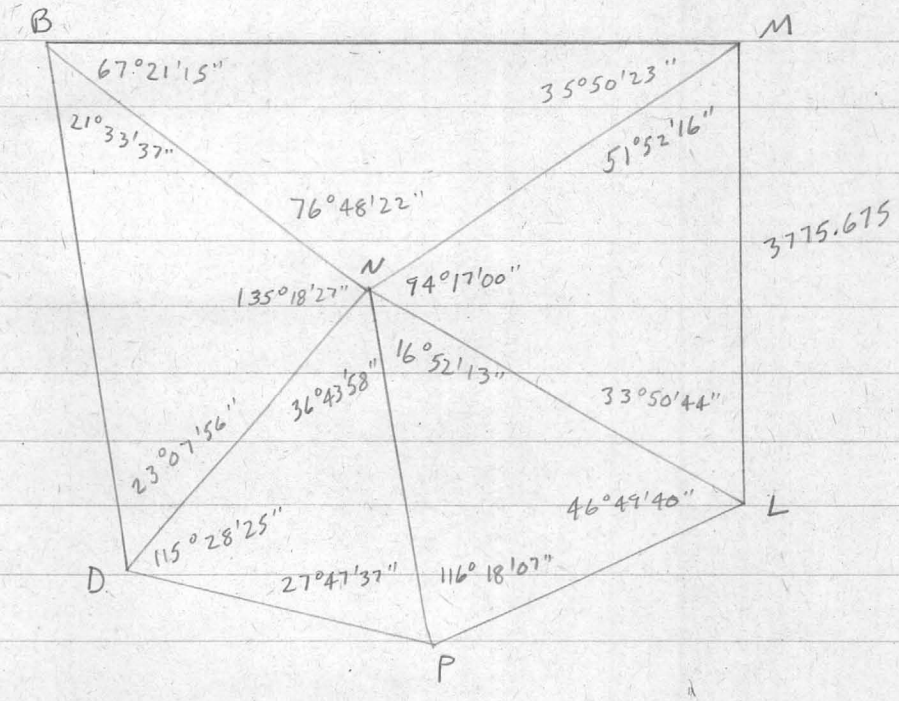
1795960
123 1739
56 42 21

$$\begin{array}{rl} \text{Log } GH = & 3.2075057 \\ \text{Log Sin } 123°17'39'' = & \bar{1}.9221353 \\ \hline & 3.1296410 \\ \text{Log Sin } 30°43'38'' = & \bar{1}.7083796 \\ \hline & 3.4212614 = \text{Log } 2637.909 = HF \end{array}$$

MACHINE COMPS

		DIST	LOG DIST LOG COS	LOG DIST LOG SIN	LAT	DEP
F						
	S 30°45'38"W	1382.401	3.1406355 $\bar{1}$.9341510 3.0747865	3.1406355 $\bar{1}$.7088044 2.8494399	− 1187.914	− 707.031
G						
	S25°56'43"E	1612.517	3.2075057 $\bar{1}$.9538622 3.1613679	3.2075057 $\bar{1}$.6409905 2.8484962	− 1449.995	+ 705.496
H						
	N0°02'00"E	2637.909	3.4212614 $\bar{1}$.9999999 3.4212615	3.4212614 $\bar{4}$.7647561 0.1860175	+ 2637.909 0.00	+ 1.535 0.00
F						

MACHINE COMPS



$$\left(\frac{3775.675}{\sin 94°17'00''}\right) \sin 51°52'16'' = NL = 2978.354$$

$$\left(\frac{3775.675}{\sin 94°17'00''}\right) \sin 33°50'44'' = NM = 2108.775$$

$$\left(\frac{2108.775}{\sin 67°21'15''}\right) \sin 76°48'22'' = BM = 2224.623$$

$$\left(\frac{2108.775}{\sin 67°21'15''}\right) \sin 35°50'23'' = NB = 1337.876$$

$$\left(\frac{1337.876}{\sin 23°07'56''}\right) \sin 135°18'27'' = BD = 2395.112$$

$$\left(\frac{1337.876}{\sin 23°07'56''}\right) \sin 21°33'37'' = DN = 1251.462$$

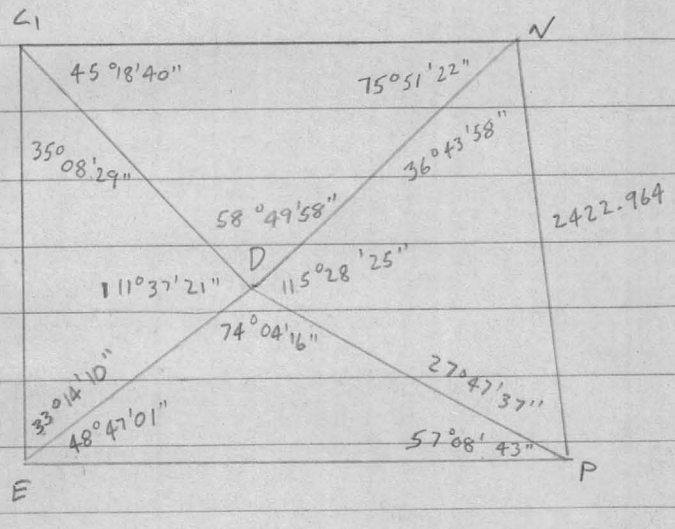
$$\left(\frac{1251.462}{\sin 27°47'37''}\right) \sin 36°43'58'' = DP = 1605.186$$

$$\left(\frac{1251.462}{\sin 27°47'37''}\right) \sin 115°28'25'' = PN \quad 2422.964$$

$$\left(\frac{2422.964}{\sin 46°49'40''}\right) \sin 16°52'13'' = PL \qquad 964.154$$

$$\left(\frac{2422.964}{\sin 46°49'40''}\right) \sin 116°18'07'' = LN \qquad 2978.358 \quad \text{AGAINST} \quad 2978.354$$

			LAT	DEP
L				
	N 3° 10' 02" E	3775.675	+ 3769.908	+ 208.607
M				
	S 55° 02' 18" W	2108.775	- 1208.388	- 1728.216
N				
	N 21° 46' 04" W	1337.876	+ 1242.478	- 496.145
B				
	S 0° 12' 27" E	2395.112	- 2395.096	+ 8.674
D				
	S 41° 36' 06" E	1605.186	- 1200.324	+ 1065.760
P				
	S 77° 30' 22" E	964.154	- 208.581	+ 941.322
L			-.003	+.002



$$\left(\frac{2422.964}{\sin 115°28'25''}\right) \sin 36°43'58'' = DP = 1605.185 \checkmark$$

$$\left(\frac{2422.964}{\sin 115°28'25''}\right) \sin 27°47'37'' = DN = 1251.461 \checkmark$$

$$\left(\frac{1251.461}{\sin 45°18'40''}\right) \sin 58°49'58'' = C_1N = 1506.219$$

$$\left(\frac{1251.461}{\sin 45°18'40''}\right) \sin 75°51'22'' = C_1D \quad 1706.937$$

$$\left(\frac{1706.937}{\sin 33°14'10''}\right) \sin 111°37'21'' = C_1E = 2895.184$$

697
.184
.463

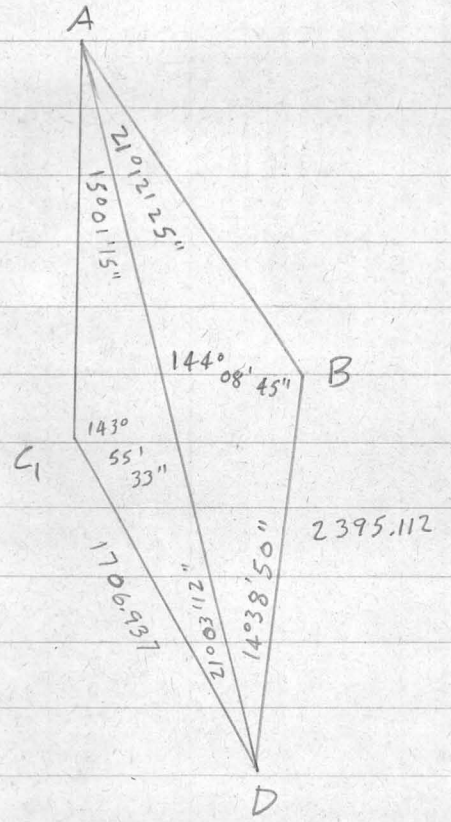
$$\left(\frac{1706.937}{\sin 33°14'10''}\right) \sin 35°08'29'' = ED = 1792.598$$

$$\left(\frac{1792.598}{\sin 57°08'43''}\right) \sin 74°04'16'' = EP = 2051.985$$

$$\left(\frac{1792.598}{\sin 57°08'43''}\right) \sin 48°47'01'' = DP = 1605.191$$

CHECK .006

			LAT	DEP
P				
	N 13° 48' 29" W	2422.964	+ 2352.942	− 578.288
N				
	S 22° 55' 29" W	1251.461	− 1152.617	− 487.471
D				
	N 35° 54' 29" W	1706.937	+ 1382.549	− 1001.095
C_1				
	S 0° 46' 00" E	2895.184	− 2894.925	+ 38.738
E				
	N 81° 15' 11" E	2051.985	+ 312.047	+ 2028.120
P			− .004	+ .004



$$\left(\frac{2395.112}{\sin 21°12'25''}\right) \sin 14°38'50'' = AB = 1674.264$$

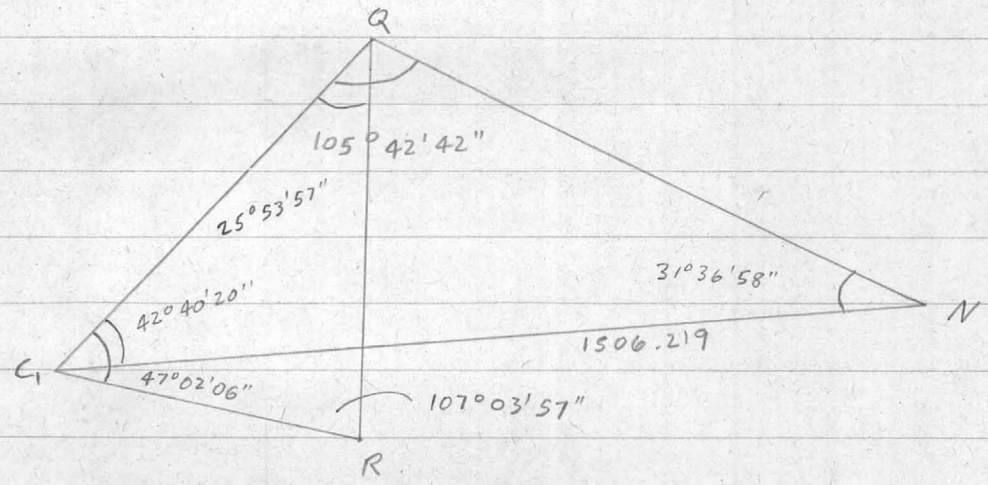
$$\left(\frac{2395.112}{\sin 21°12'25''}\right) \sin 144°08'45'' = AD = 3878.156$$

$$\left(\frac{3878.156}{\sin 143°55'33''}\right) \sin 21°03'12'' = AC_1 = 2365.999$$

$$\left(\frac{3878.156}{\sin 143°55'33}\right) \sin 15°01'15'' = C_1D = 1706.943$$

CHECK .006

			LAT	DEP
B				
	N36° 03' 42" W	1674.264	+ 1353.448	- 985.565
A				
	S 0° 09' 58" W	2365.999	- 2365.989	- 6.859'
C_1				
	S 35° 54' 29" E	1706.937	- 1382.549	+ 1001.095
D				
	N 0° 12' 27' W	2395.112	+ 2395.096	- 8.674
B				
			+.006	-.003



$$\left(\frac{1506.219}{\sin 105°42'42"}\right) \sin 42°40'20" = QN = 1060.545$$

$$\left(\frac{1506.219}{\sin 105°42'42"}\right) \sin 31°36'58" = QC_1 = 820.245$$

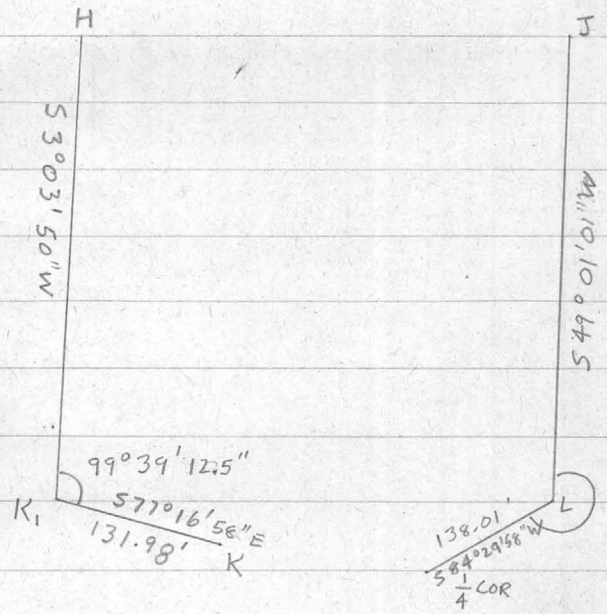
$$\left(\frac{820.245}{\sin 31°36'58"}\right) \sin 42°40'20" = QN = 1060.545 \checkmark$$

$$\left(\frac{820.245}{\sin 107°03'57"}\right) \sin 25°53'57" = C_1R = 374.775 \checkmark$$

$$\left(\frac{820.245}{\sin 107°03'57"}\right) \sin 47°02'06" = RQ = 627.877'$$

$$\left(\frac{627.877'}{\sin 47°02'06"}\right) \sin 25°53'57" = 374.775 \checkmark$$

			LAT	DEP
N				
	1060.545	N 49° 36' 11" W	+ 687.317	- 807.682
Q				
	820.245	S 56° 06' 31" W	- 457.385	- 680.882
C_1				
	374.775	S 76° 51' 23" E	- 85.221	+ 364.957
R				
	627.877	N 30° 12' 34" E	+ 542.606	+ 315.924
Q				
	820.245	S 56° 06' 31" W	- 457.385	- 680.882
C_1				
	1506.219	S 81° 13' 09" E	- 229.932	+ 1488.565
			0.000	0.000
N				



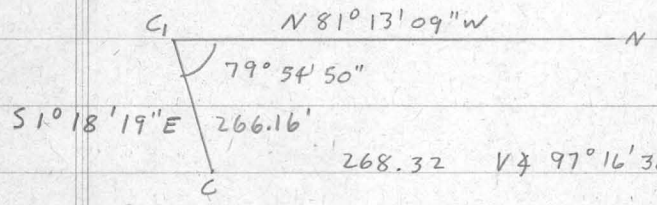
183° 03' 50"
99° 39' 12.5"
180
462 43' 02.5"
360
102° 43' 02.5"

R 29°01'01"
215° 28' 57.5
180°
624 29' 58.5
360
264°29'58"

138.41' V∡ 94°20'

SUPPORT - 56'

(138.41) cos 4°20' = 138.01



268.32 V∡ 97°16'30"

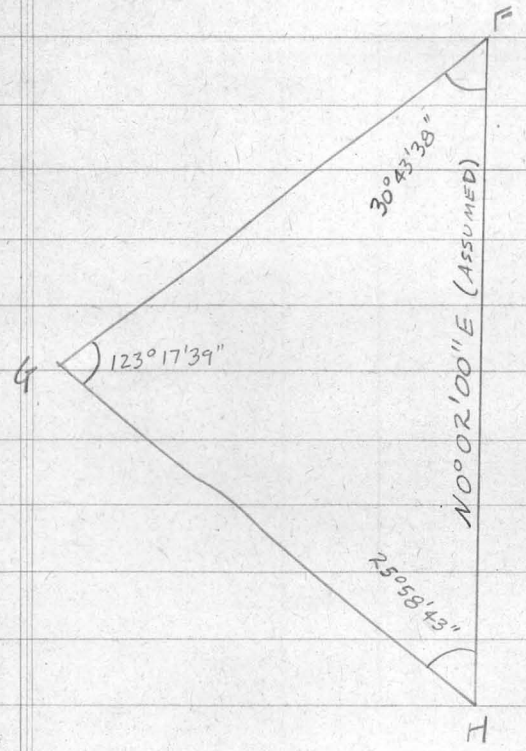
268.32 cos 7°16'30" = 266.16

278° 46' 51"
79° 54' 50"
180°
538° 41' 41"
360
178° 41' 41"

			LAT	DEP
K_1-K	S 77°16' 58" E	131.98'	- 29.05 ✓	+ 128.74 ✓ ✓
L - 1/4 COR	S 84° 29' 58" W	138.01"	- 13.23 ✓	- 137.37 ✓ ✓
C_1 - C	S 1°18' 19" E	266.16'	- 266.09 ✓	+ 6.063 ✓

BEARINGS

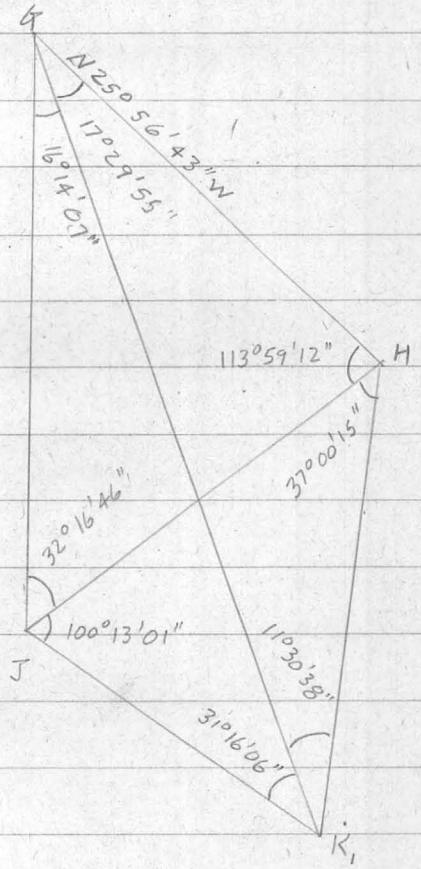
COMPUTATION OF BEARINGS - MAIN NET & WING TRIANGLES



Az HF = 0° 02' 00" (ASSUMED)
< HFG 30° 43' 38"
180° 00' 00"
210° 45' 38" = Az FG BEAR FG = S 30° 45' 38" W

Az FG = 210° 45' 38"
< FGH = 123° 17' 39"
180°
514° 03' 17"
360
154° 03' 17" = Az GH BEAR GH = S 25° 56' 43" E

Az GH = 154° 03' 17"
< GHF = 25° 58' 43"
180°
360° 02' 00" = Az HF BEAR HF = N 0° 02' 00" E ✓



Az GH = 334° 03' 17"
< HGK1 17° 29' 55"
180°
531° 33' 12"
360
171° 33' 12" = Az GK1 BEAR GK1 = S 08° 26' 48" E

Az GK1 = 171° 33' 12"
< GK1H 11° 30' 38"
180°
363° 03' 50" = Az K1H BEAR K1H = N 3° 03' 50" E

Az K1H 03° 03' 50"
< K1HJ 37° 00' 15"
180°
220° 04' 05" = Az HJ BEAR HJ = S 40° 04' 05" W

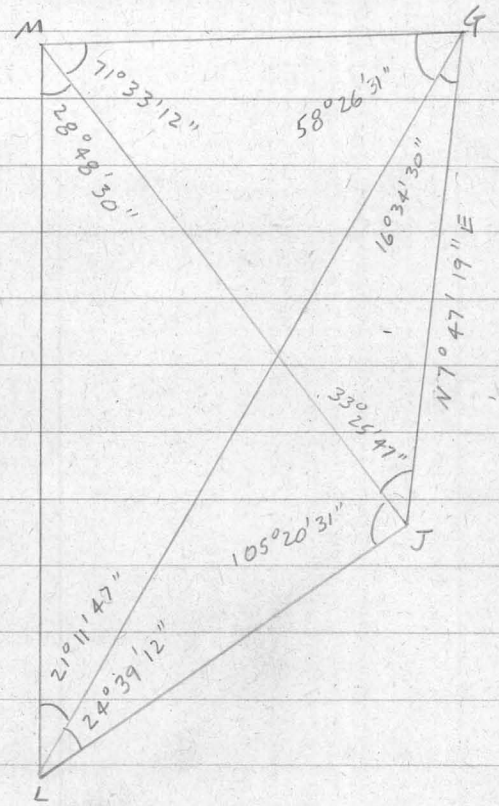
Az HJ 220° 04' 05"
< HJK1 100° 13' 01"
180°
500° 17' 06"
360°
140° 17' 06" = Az JK1 BEAR JK1 = S 39° 42' 54" E

Az JK_1 = 140° 17' 06"
< JK_1G = 31° 16' 06"
180°
351° 33' 12" = Az K_1G BEAR K_1G = N 08° 26' 48" W ✓

Az K_1G = 351° 33' 12"
< K_1GJ = 16° 14' 07"
180°
547° 47' 19"
360°
187° 47' 19" = Az GJ BEAR GJ = S 7° 47' 19" W ✓

Az GJ = 187° 47' 19"
< GJH = 32° 16' 46"
180°
400° 04' 05"
360°
40° 04' 05" = Az JH BEAR JH = N 40° 04' 05" E ✓

Az JH 40° 04' 05"
< JHG 113° 59' 12"
180°
334° 03' 17" = Az HG BEAR HG = N 25° 56' 43" W ✓



Az GJ = 07° 47' 19"
< JGL 16° 34' 30"
180°
204° 21' 49" = Az GL BEAR GL = S 24° 21' 49" W

Az GL 204° 21' 49"
< GLJ 24° 39' 12"
180°
409° 01' 01"
360°
049° 01' 01" = Az LJ BEAR LJ = N 49° 01' 01" E

Az LJ 49° 01' 01"
< LJM 105° 20' 31"
180°
334° 21' 32" = Az JM BEAR JM = N 25° 38' 28" W

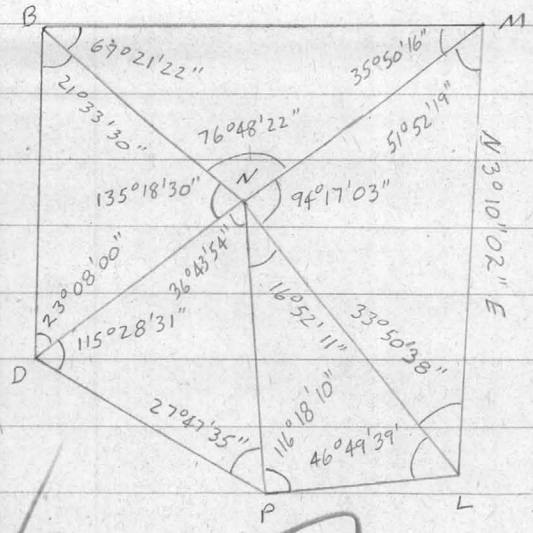
Az JM 334° 21' 32"
< JML 28° 48' 30"
180°
543° 10" 02"
360°
183° 10" 02" = Az ML BEAR ML = S 3° 10" 02" W

AZ ML 183° 10' 02"
∠ MLG 21° 11' 47"
180°
384° 21' 49"
360
24° 21' 49" = AZ LG BEAR LG = N24°21'49"E ✓

Az LG 24° 21' 49"
∠LGM 58° 26' 31"
180°
262°48°20" = AZ GM BEAR GM = S 82°48'20" W

Az GM 262°48'20"
∠GMJ 71° 33'12"
180°
514°21.32"
360°
154°21' 32" = AZ MJ BEAR MJ = S 25°38'28"E ✓

Az MJ 154°21'32"
∠MJG 33°25'47"
180°
367°47'19" = Az JG BEAR GJ = N7°47'19"E ✓



Az ML = 3° 10' 02"
< LMN 51° 52' 19"
180°
235 02' 21" = Az MN BEAR MN = S 55°02'21" W

Az MN 235° 02' 21"
< MNL 94° 17' 03"
80
509° 19' 24"
360
149° 19' 24" = Az NL BEAR NL = S 30° 40' 36" E

Az NL 149° 19' 24"
< NLM 33° 50' 38"
180°
363 10' 02" = Az LM BEAR LM = N 3°10'02" E ✓

Az LN 329° 19' 24"
< LNP 16° 52' 11
180°
526° 11' 35"
360
166° 11' 35" = Az NP BEAR NP = S 13° 48' 25" E

Az NP 166° 11' 35"
< NPL 116° 18' 10"
180°
462° 29' 45"
360°
102° 29' 45" = Az PL BEAR PL = S 77° 30' 15" E

AZ PL 102° 29' 45"
< PLN 46° 49' 39"
180°
329 19' 24" = AZ LN BEAR N 30° 40' 36" W ✓

AZ PN 346° 11' 55"
< PND 36° 43' 54"
180°
562 55' 29"
360
202° 55' 29" = AZ ND BEAR ND 52.2° 55' 29" W

AZ ND 202° 55' 29"
< NDP 115° 28' 31
180°
498 24' 00"
360
138° 24' 00" = AZ DP BEAR DP = S 41° 36' 00" E

AZ DP 138° 24' 00"
< DPN 27° 47' 35"
180°
346° 11' 35" = AZ PN BEAR PN = N 13° 48' 25" W ✓

AZ DN 22° 55' 29"
< DNB 135° 18' 30"
180°
338° 13' 59" = AZ NB BEAR NB = N 21° 46' 01" W

AZ NB 338° 13' 59"
< NBD 21° 33' 30"
180°
539 47' 29"
360
179° 47' 29" = AZ BD BEAR BD = S 0° 12' 31" E

AZ BD 179° 47' 29"
< BDN 230 08' 00"
180°
382 55' 29"
360
22° 55' 29" = AZ DN BEAR DN = N 22° 55' 29" E ✓

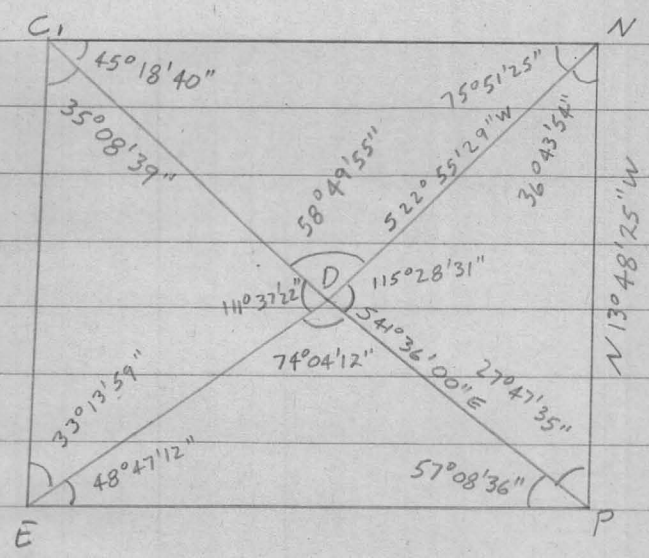
VOID

Az BN 158° 13' 59"
< BNM 76° 48' 22"
180°
415 02' 21"
360
550 02' 21" = Az NM BEAR NM = N 55° 02' 21" E ✓

Az NM 55° 02' 21"
< NMB 350 50' 16"
180°
270 52' 37" = Az MB BEAR MB = N 89° 07' 23" W

Az MB 270° 52' 37"
< MBN 67° 21' 22"
180°
518 13' 59"
360
158 13' 59" = Az BN BEAR BN = S 21° 46' 01" E ✓

0/10



Az PN 346° 11' 35"
< PND 36° 43' 54"
180°
562 55' 29"
360
202° 55' 29" Az ND BEAR ND S 22° 55' 29" W ✓

Az ND 202° 55' 29"
< NDP 115 28 31
180
498 24' 00"
360
138° 24' 00" Az DP BEAR DP S 41° 36' 00" E ✓

Az DP 138° 24' 00"
< DPN 27° 47' 35"
180°
346° 11' 35" Az PN BEAR PN N 13° 48' 25" W ✓

Az PD 318° 24' 00"
< PDE 74° 04' 12"
180°
572 28' 12"
360
212° 28' 12" Az DE BEAR DE S 32° 28' 12" W

Az DE 212° 28' 12"
∠DEP 48° 47' 12"
180°
441° 15' 24"
360°
81° 15' 24" Az EP BEAR EP N 81° 15' 24" E

Az EP 81° 15' 24"
∠EPD 57° 08' 36"
180°
318° 24' 00" Az PD BEAR PD N 41° 36' 00" W ✓

Az ED 32° 28' 12"
∠EDC₁ 111° 37' 22"
180°
324° 05' 34" Az DC₁ BEAR DC N 35° 54' 26" W

VOID

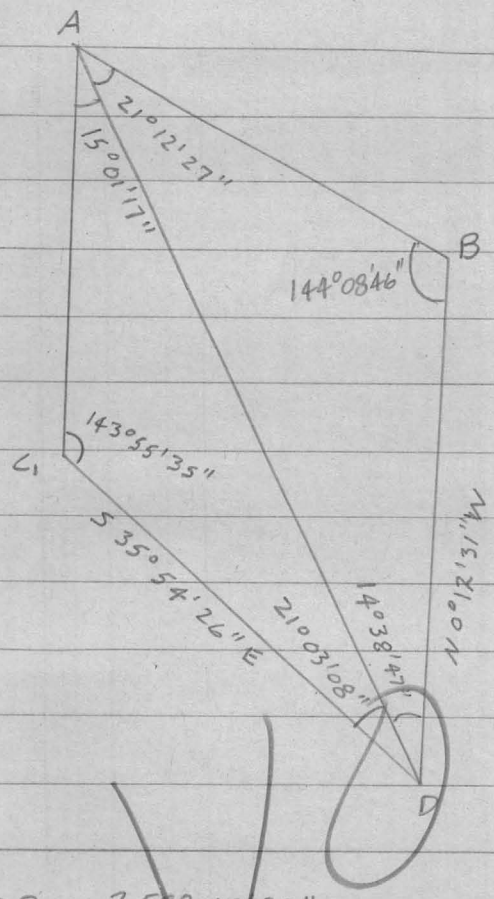
Az DC 324° 05' 34"
∠DC₁E 35° 08' 39"
180°
539° 14' 13"
360
179° 14' 13" = Az C₁E BEAR C₁E S 0° 45' 47" E

Az C₁E 179° 14' 13"
∠C₁ED 33° 13' 59"
180°
392 28' 12"
360
32° 28' 12" Az ED BEAR ED N 32° 28' 12" E ✓

Az DN 22°55'29"
∠DNC₁ 75°51'25"
180°
278°46'54" AZ NC₁ BEAR NC₁ N81°13'06"W

Az NC₁ 278°46'54"
∠NC₁D 45°18'40"
180°
504 05'34'
360
144° 05'34' AZ C₁D BEAR C₁D S35°54'26"E ✓

AzC₁D 144°05'34"
∠C₁DN 58°49'55"
180°
382 55'29'
360
22°55'29' AZ DN BEAR DN N22°55'29"E ✓



Az DB	359° 47' 29"		
∠ DBA	144° 08' 46"		
	180°		
	683° 56' 15"		
	360°		
	323° 56' 15"	Az BA	BEAR BA N 34° 03' 45" W

Az BA	323° 56' 15"		
∠ BAD	21° 12' 27"		
	180		
	525° 08' 42"		
	360°		
	165° 08' 42"	Az AD	BEAR AD S 14° 51' 18" E

Az AD	165° 08' 42"		
∠ ADB	14° 38' 47"		
	179° 47' 29"		
	180		
	359° 47' 29"	Az DB	BEAR DB N 0° 12' 31" W ✓

Az DA 345°08'42"

∠DAC₁ 15° 01' 17"

180°

540° 09' 59"

360°

180° 09' 59" Az AC₁ BEAR AC₁ S 0°09'59"W

Az AC₁ 180° 09' 59"

∠AC₁D 143° 55' 35"

180°

504 05' 34"

360°

144° 05' 34" Az C₁D BEAR C₁D S 35° 54'26"E ✓

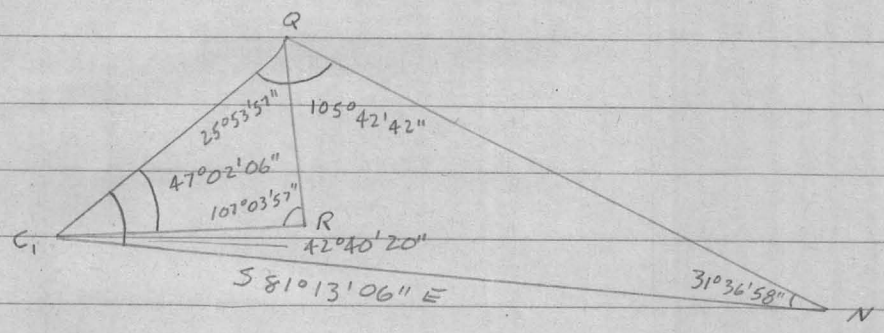
VOID

AZ C₁D 144° 05'34"

∠C₁DA 21° 03' 08"

180°

345°08' 42" Az DA BEAR DA N 14°51' 18"W ✓



Az C_1N 98°46'54"

C_1NQ 31° 36' 58
180°
310° 23' 52"

Az NQ BEAR NQ N 49° 36' 08" W

Az NQ 310° 23' 52"
$\angle NQC_1$ 105° 42' 42"
180°
596 06' 34"
360°
236° 06' 34"

Az QC_1 BEAR QC_1 S 56° 06' 34" W

Az QC_1 236° 06' 34"
$\angle QC_1R$ 47° 02' 06"
180°
463 08' 40"
360
103° 08' 40"

Az C_1R BEAR C_1R S 76° 51' 20" E

Az C_1R 103° 08' 40"
$\angle C_1RQ$ 107° 03' 57"
180°
390 12' 37'
360
30° 12' 37'

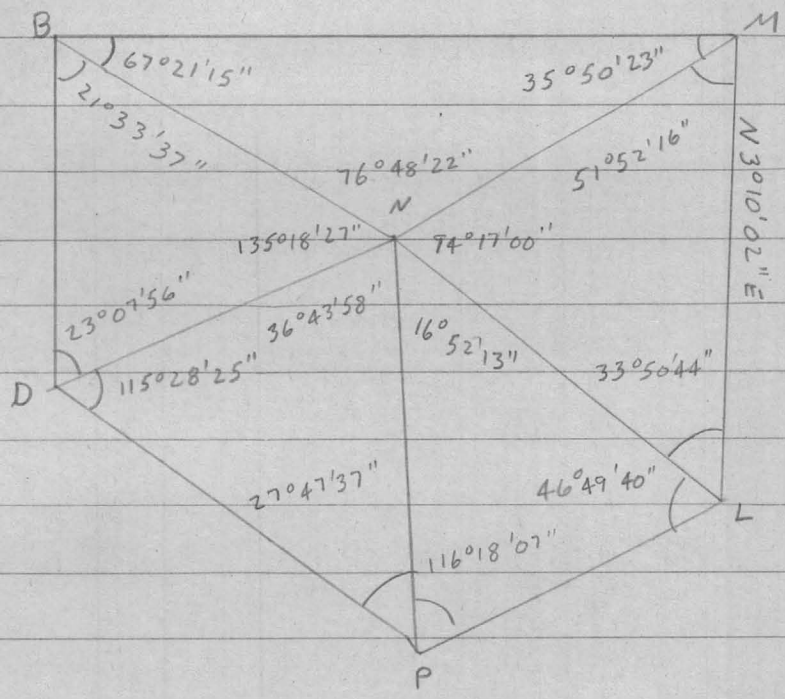
Az RQ BEAR RQ N30° 12' 37" E

Az RQ 30° 12' 37"
$\angle RQC_1$ 25° 53' 57"
180°
236° 06' 34"

Az QC_1 BEAR QC_1 S 56° 06' 34" W ✓

Az QC_1 236° 06' 34"
∠ QC_1N 42° 40' 20"
1800
458 46' 54"
360
98° 46' 54" Az C_1N BEAR C_1N S 81° 13' 06" E

VOID



Az ML = 3°10'02"

∠LMN 51°52'16"

180°

235 02' 18" = Az MN BEAR MN = S 55°02'18" W

∠MNL 94° 17' 00"

180°

509° 19' 18

360

149° 19' 18" = Az NL BEAR NL = S 30° 40' 42" E

∠NLM 330 50' 44"

180

363° 10' 02" = Az ML BEAR ML = N3° 10' 02" E ✓

Az NL 149°19'18"

∠LNP 16° 52' 13"

166° 11' 31" = Az NP BEAR NP = S13° 48' 29" E

∠PND 36° 43' 58"

202° 55' 29" = Az ND BEAR ND = S 22° 55' 29" W

∠DNB 135° 18' 27"

338 13' 56" = Az NB BEAR NB = N 21° 46' 04" W

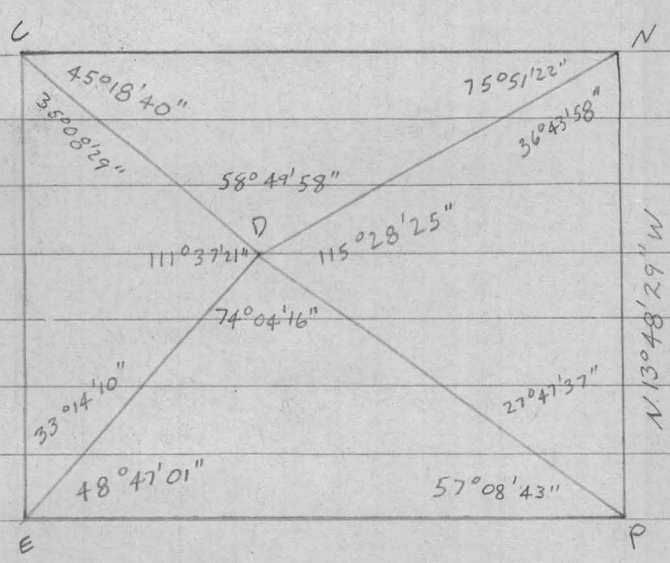
∠BNM 76° 48' 22"

415° 02" 18"

360

55° 02" 18" = Az NM BEAR NM = N 55° 02' 18" E ✓

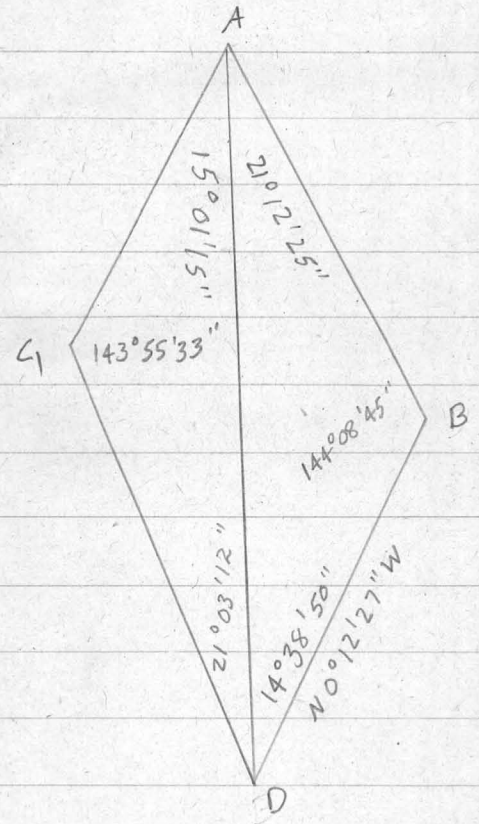
AZ ML	3° 10' 02"		
∠LMN	51° 52' 16"		
∠NMB	35° 50' 23"		
	180°		
	270° 52' 41"	= Az MB	BEAR MB = N89°07'19" W
∠MBN	67° 21' 15"		
∠NBD	21° 33' 37"		
	180°		
	539 47 33"		
	360		
	179° 47' 33"	= Az BD	BEAR BD = S0°12'27" E
∠BDN	230 07' 56"		
∠NDP	1150 28' 25"		
	318° 23' 54"		
	180		
	138° 23' 54"	= Az DP	BEAR DP = S41°36'06" E
∠DPN	27° 47' 37"		
∠NPL	116° 18' 07"		
	180°		
	462 29' 38"		
	360		
	102° 29' 38"	= Az PL	BEAR PL = S77°30'22" E
∠PLN	46° 49 40"		
∠NLM	330 50' 44"		
	180°		
	363° 10' 02" ✓		



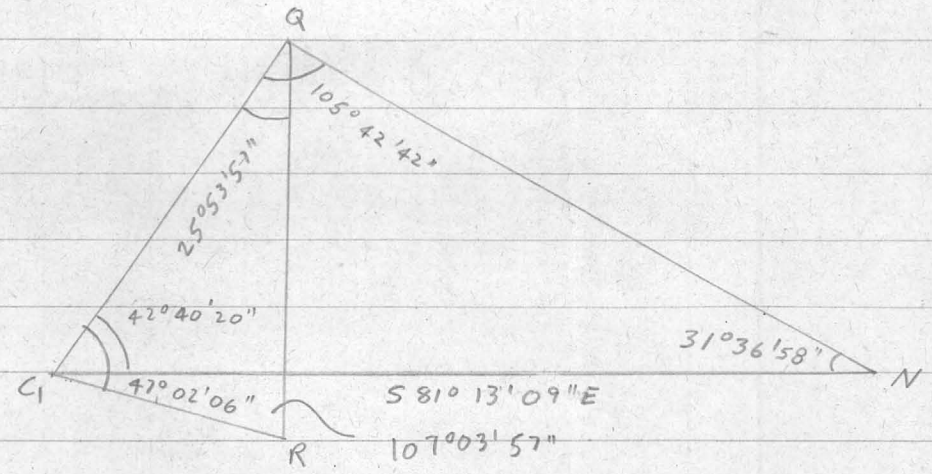
Az PN =	346° 11' 31"		
∠ PND	36° 43' 58"		
	180°		
	562 55' 29"		
	360		
∠ NDP	202° 55' 29"	= Az ND	BEAR ND = S 22° 55' 29" W
	115° 28' 25"		
	180°		
	498° 23' 54"		
	360		
	138° 23' 54"	= Az DP	BEAR DP = S 41° 36' 06" E
∠ PDE	74° 04' 16"		
	212° 28' 10"	= Az DE	BEAR DE = S 32° 28' 10" W
∠ EDC,	111° 37' 21"		
	324° 05' 31"	= Az DC,	BEAR DC, = N 35° 54' 29" W
∠ C,DE	58° 49' 58"		
	382 55' 29"		
	360		
	22° 55' 29"	= Az DN	BEAR DN = N 22° 55' 29" W ✓

Az PN =	346° 11' 31"		
∠ PND	36° 43' 58"		
∠ DNC	75° 51' 22"		
	180°		
	638° 46' 51		
	360		
	278° 46' 51"	= Az NC,	BEAR NC, = N 81° 13' 09" W
∠ NCD	45° 18' 40"		
∠ DCE	35° 08' 29"		
	180°		
	539° 14' 00		
	360		
	179° 14' 00"	= Az C,E	BEAR C,E = S 0° 46' 00" E

	179° 14' 00"		
∠ CED	33° 14' 10"		
∠ DEP	48° 47' 01"		
	180		
	441 15' 11		
	360		
	81° 15' 11"	= Az EP	BEAR EP = N 81° 15' 11" E
∠ EPD	57° 08' 43"		
∠ DPN	27° 47' 37"		
	166 11' 31"		
	180		
	346° 11' 31"	= Az PN	BEAR PN = N 13° 48' 29" W ✓



AZ DB =	359° 47' 33"		
∠ DBA	144° 08' 45"		
	180°		
	683 56' 18"		
	360		
	323° 56' 18"	= AZ BA	BEAR BA = N36°03'42"W
∠ BAD	21° 12' 25"		
∠ BAC	15° 01' 15"		
	180°		
	540° 09' 58"		
	360		
	180°09' 58"	= AZ AC1	BEAR AC1 = S 0°09'58"W
∠ AC1D	143° 55' 33"		
	180°		
	144° 05' 31"	= AZ C1D	BEAR C1D = S35°54'29"E
∠ C1DA	21° 03' 12"		
∠ ADB	14° 38' 50"		
	179° 47' 33"	= AZ DB	BEAR DB = S 0°12' 27" E



Az C_1N	98° 46' 51"		
∠ C_1NQ	31° 36' 58"		
	180°		
	310° 23' 49"	= Az NQ	BEAR NQ = N 49° 36' 11" W
∠ NQC_1	105° 42' 42"		
	180°		
	596 06' 31"		
	360		
	236° 06' 31"	= Az QC_1	BEAR QC_1 = S 56° 06' 31" W
∠ QC_1R	47° 02' 06"		
	180°		
	463 08' 37"		
	360		
	103° 08' 37"	= Az C_1R	BEAR C_1R = S 76° 51' 23" E
∠ C_1RQ	107° 03' 57"		
	180°		
	390° 12' 34"	= Az RQ	BEAR RQ = N 30° 12' 34" E
	360		
	30° 12' 34"		
∠ RQC_1	25° 53' 57"		
	180°		
	236 06' 31"	= Az QC_1	BEAR QC_1 = S 56° 06' 31" W ✓
∠ QC_1N	42° 40' 20"		
	180°		
	458 46' 51"		
	360		
	98° 46' 51"	= Az C_1N	BEAR C_1N = S 81° 13' 09" E ✓

ANGLES - 11

FINAL ADJUSTED VALUES OF ANGLES

MAIN NET

STA					
A	C_1AB	N			
	BAD	21° 12' 25	+1		
	DAC_1	15° 01' 15"	-2"		
B	MBN	67°21' 25"	-9"		
	NBD	21°33' 37"	-2"		
	DBA	144° 08' 45"	+1		
	ABM	N			
C_1	AC_1N	(S) 98° 36' 55"	+1"	AC_1D	143°55' 33"
	NC_1D	45° 18' 40"	-1"		
	DC_1E	35° 08' 29"	-7		
	EC_1A	N			
D	ADB	14° 38' 50"	+4		
	BDN	23° 07' 56"	-5"		
	NDP	115° 28' 25"	-7"	C_1DN	58° 49' 58"
	C_1DA	21° 03' 12"	+1	C_1DB	35° 42' 02"
	PDE	74° 04' 16"	+3		
	EDC_1	111° 37' 21"	+4		
E	C_1ED	33° 14' 10"	+15"		
	DEP	48° 47' 01"	-12"		
	PEC_1	N			

F	HFG	30°43' 38"	—
	GFH	N	
G	FGH	123° 17' 39"	—
	HGK₁	17° 29' 55"	-1
	K₁GJ	16° 14' 07"	+11"
	JGL	16° 34' 30"	+1"
	LGM	58° 26' 31	-5
	MGF	N	
H	K₁HJ	37°00' 15"	-4"
	JHG	113° 59' 12"	-9"
	GHF	25° 58' 43"	-1"
	FHK₁	N	
J	MJG	33° 25'47"	-1"
	GJH	32° 16'46"	+9"
	HJK₁	100° 13'01"	-11"
	K₁JL	N	
	LJM	105° 20'31"	-10"
K₁	GK₁H	11° 30'38"	—
	JK₁G	31°16'06"	+8"
	HK₁J	N	

L	MLG	21° 11' 47	+1
	GLJ	24° 39' 12"	-1"
	JLP	N	
	PLN	46° 49' 40"	-1"
	NLM	33° 50' 44"	+9"
M	GMJ	71° 33' 12"	+9"
	JML	28° 48' 30"	-1"
	LMN	51° 52' 16"	—
	NMB	35° 50' 23"	+4"
	BMG	N	
N.	BNM	76° 48' 22"	—
	MNL	94° 17' 00"	+4"
	LNP	16° 52' 13"	+3"
	C,NB	59° 27' 05"	-5"
	PND	36° 43' 58"	+2"
	DNC,	75° 51' 22"	-4"
P	NPL	116° 18' 07"	-4"
	LPE	N	
	EPD	57° 08' 43"	+5
	DPN	27° 47' 37"	—

DNB = 135°18'27" -9"

AVE DIFF ADJUSTED VALUE FROM STA. ADJ VALUES 4"

WING TRIANGLES TO CLAIM CORS.

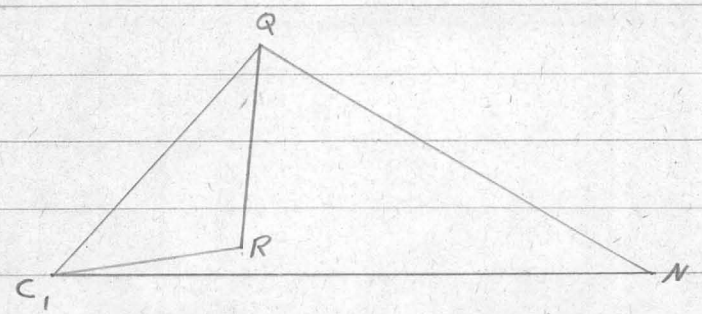
N	C_1NQ	31° 36' 58"	—			
	QNC_1	N				
C_1	QC_1N	42° 40' 20"	−1"			
	NC_1Q	N				
	QC_1R	47° 02' 06"	+5"			
	RC_1Q	N				
R	C_1RQ	107° 03' 57"	+6"			
	QRC_1	N				
Q	NQR	(S) 79° 48' 45"	−4"	NQC_1	105° 42' 42"	+1"
	RQC_1	25° 53' 57"	+5"			
	C_1QN					

N INDICATES ANGLE IS EXTERIOR TO MAIN SCHEME AND IS NOT USED TO ADJUST OR CALCULATE EXCEPT FOR STATION CLOSURES.

(S) INDICATES ANGLE NOT USED IN ADJ. OR CALCULATION, BUT IS THE DIFFERENCE OF TWO ANGLES SO USED.

ANGLES 10

CLOSURES - WING TRIANGLES TO CLAIM CORNERS

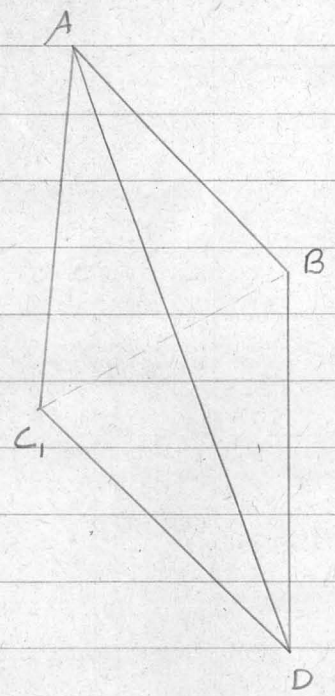


Σ TRIANGLE	C_1QR	ADJ. VALUES
QC_1R	47° 02' 00.83"	47° 02' 06"
C_1RQ	107° 03' 51.25"	107° 03' 57"
RQC_1	25° 53' 52.22"	25° 53' 57"
	179° 59' 44.30"	
	−15.70	+ 5.23"/ANG

Σ TRIANGLE	QC_1R	
QC_1N	42° 40' 18.75"	42° 40' 20"
C_1NQ	31° 36' 57.50"	31° 36' 58"
NQC_1	105 42' 41.11"	105° 42' 42"
	179 59' 57.36	
	−2.64	+ 0.88 /ANG

ANGLES - 9

ADJUSTMENT PARTIAL QUAD ABDC,



NOT NECESSARY QUAD WILL BE IN IF TRIANGLES ARE.

Σ QUAD ABDC

C_1DB^*	35° 41' 55'
DBA	144° 08' 43.54"
BAC_1	36° 13' 41.12"
AC_1D	143° 55' 34.58"
	359° 59' 54.24"
	−5.76"

Σ ANGLE C_1DB

C_1DA	21° 03' 10.83
ADB	14° 38' 45.83
	35° 41' 56.66"
	−5.34

+ 2.67"/ANG

ADJ TO EQUAL C_1DB^*

$C_1DB^* = 35°42'02"$

Σ TRIANGLE BAD

BAD	21° 12' 23.89"
ADB	14° 38' 48.50
DBA	144° 08' 43.54"
	179° 59' 55.93"
	− 4.07

+1.36"/ANG

Σ TRIANGLE D_1AC_1

DAC_1	15° 01' 17.23
AC_1D	143° 55' 34.58"
C_1DA	21° 03' 13.50"
	180° 00' 05.31"

− 1.77"/ANG

Σ ANGLE C_1DB

C_1DA	21° 03' 11.73"
ADB	14° 38' 49.86"
	35 42' 01 59"

= + 0.20" /ANG

Σ TRIANGLE BAD

BAD	21° 12' 25.24"	+ .10"
ADB	14° 38' 50.06"	
DBA	144° 08' 44.90"	-.10"
	180° 00' 00.20"	

Σ TRIANGLE DAC_1

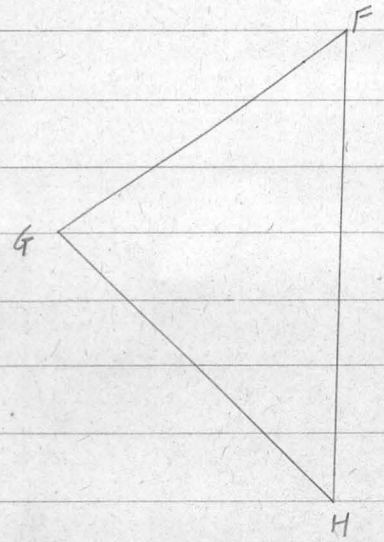
DAC_1	15° 01' 15.46"	-.10"
AC_1D	143° 55' 32.81"	-.10"
C_1DA	21° 03' 11.93"	—
	180° 00' 00.20"	

Σ ADJUSTED ANGLES

BAD	21° 12' 25"	DAC_1	15° 01' 15"
ADB	14° 38' 50"	AC_1D	143° 55' 33
DBA	144° 08' 45"	C_1DA	21° 03' 12" —

ANGLES - 8

ADJUSTMENT OF WING TRIANGLE FGH

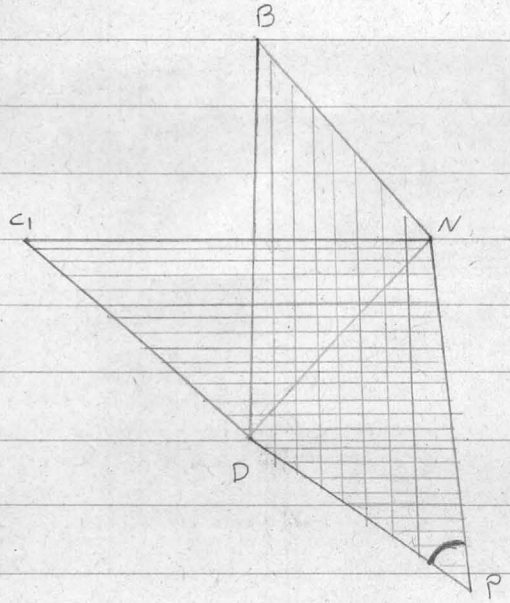


	After Sta. Closure	Adj. Values to nearest second
GHF	25° 58' 43.75"	25° 58' 43"
HFG	30° 43' 37.92"	30° 43' 38"
FGH	123° 17' 38.89"	123° 17' 39"
	180° 00' 00.56"	180° 00' 00"
	-0.19"/ang	

ANGLES 7-A

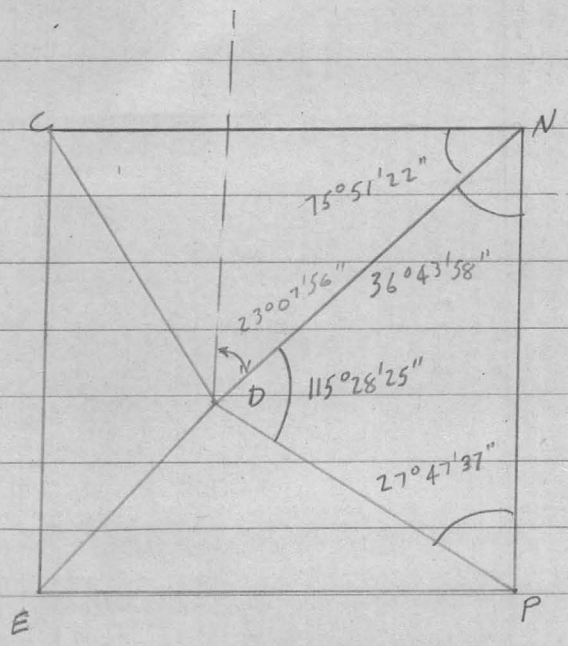
RESOLUTION OF OVERLAPPING FIGURES AND

SOLUTION FOR GNPED



NDP	FROM 5 SIDE CENTRAL POINT	=	115° 28' 25	-7"	FROM STA. ADJ. ANGLE
NDP	" 4 " " "	=	115° 28' 28"	-4"	" " " "
DPN	FROM 5 SIDE CENTRAL POINT	=	27° 47' 38"	+1	FROM STA ADJ ANG
DPN	" 4 " " "	=	27° 47' 33"	-4"	" " " "
PND	FROM 5 SIDE CENTRAL POINT	=	36° 43' 5.8"	+2"	FROM STA ADJ ANG
PND	" 4 " " "	=	36° 43' 59"	+3"	" " " "
DNC1	FROM 5 SIDE CENTRAL POINT	=	75° 51' 22"	-4"	FROM STA ADJ ANG
DNC1	" 4 " " "	=	75° 51' 07"	-19"	" " " "
BDN	FROM 5 SIDE CENTRAL POINT	=	23° 07' 56"	-5"	FROM STA ADJ ANG
BDN	" 4 " " "	=	23° 08' 01"	0"	" " " "

HOLD 5 SIDED C.P.



Σ	$C_1DN^{(3)}$	58° 49' 57.49	+4.01"
	NDP*	115° 28' 25"	
	PDE	74° 04' 13.33	+1.34"
	EDC_1	111° 37' 17.50"	+1.34"
		360° 59 53.32"	
		-06.68"	

CED	33° 13' 55.00"
DEP	48° 47' 13.34"
EPD	57° 08' 37.92"
DPN *	27° 47' 37"
PND *	36° 43' 58"
DNC₁ *	75° 51' 22"
NC₁D	45° 18' 41.04"
DC₁E	35° 08' 36.04"
	360° 00' 01.34"

- 0.26"/ANGLE

Σ TRIANGLES

EDC₁	111° 37' 18.84"	
C₁ED	33° 13' 54.74"	
DC₁E	35° 08' 36.04"	
	49.62"	
	-10.38	= + 3.46"/ANG

PDE	74° 04' 14.67	
DEP	48° 47' 13.08"	
EPD	57° 08' 37.66"	
	05.41	- 1.80"/ANG

NDP *	115° 28' 25"
DPN *	27° 47' 37"
PND *	36° 43' 58"
	00"

$C_1DN^{(3)}$	58° 50' 01.50"	− 3.40
DNC_1*	75° 51' 22"	
NC_1D	45° 18' 41.04"	− 1.14
	04.54"	

Σ Log Sines

DNC*	75° 51' 22"	.9866308	5.3
DC_1E	35° 08' 39.50"	.7601493	30.0 −6.10
DEP	48° 47' 11.28"	.8763676	18.4 −10.92
DPN*	27° 47' 37"	.6686542	39.9
		.2918019	
NC_1D	45° 18' 39.90"	.8518302	20.8 +9.66
C_1ED	33° 13' 58.20"	.7388143	32.1 +6.26
EPD	57° 08' 35.86"	.9242949	13.6 +7.12
PND*	36° 43' 58"	.7767620	28.2
		.2917014	
		.0001005	
		.0000201 / ANGLE	

2D ADJUSTMENT

$C_1DN^{(3)}$	58° 49' 58.10"	1.04"
NDP*	115° 28' 25"	
PDE	74° 04' 12.87"	+.35
EDC₁	111° 37' 22.30"	+.35
	58.27	
	-1.73	
CED	33° 14' 04.46"	
DEP	48° 47' 00.36"	
EPD	57° 08' 42.98"	
DPN*	27° 47' 37"	
PND*	36° 43' 58"	
DNC₁*	75° 51' 22"	
NC₁D	45° 18' 49.56"	
DC₁E	35° 08' 32.80"	
	07.16"	-1.43"/ANG
	15.92"	

Σ TRIANGLES

EDC₁	111° 37' 22.65"	
C₁ED	33° 14' 13.03"	
DC₁E	35° 08' 31.37"	-2.35/ANG
	7.05"	
PDE	74° 04' 13.22"	
DEP	48° 46 58.93"	
EPD	57° 08' 41.55"	
	53.70"	
	-6.30"	+2.10"/ANG

$C_1DN^{(3)}$	58° 49' 59.14"	−.78"
DNC_1 *	75° 51' 22"	
NC_1D	45° 18' 39.90"	−.26"
	01.04"	

Σ Log Sines

DNC*	75° 51' 22"	.9866308	
DC_1E	35° 08' 29.02"	.7601179	29.9
DEP	48° 47' 01.03"	.8763477	18.4
DPN*	27° 47' 37"	.6686542	
		.2917506	
NC_1D	45° 18' 39.64"	.8518297	20.8
C_1ED	33° 14' 10.68"	.7388545	32.1
EPD	57° 08' 43.65"	.9243055	13.6
PND*	36° 43' 58"	.7767620	
		.2917517	
		.0000011	
		.0000002.5 / ANG.	

ADJUSTED VALUES TO NEAREST SECOND

C_1DN	58° 49' 58"	—
NDP	115° 28' 25"	—
PDE	74° 04' 16"	
EDC_1	111° 37' 21"	
	360° 00' 00"	
C_1ED	33° 14' 10"	
DEP	48° 47' 01"	
EPD	57° 08' 43"	
BPN	27° 47' 37"	—
PND	36° 43' 58"	—
DNC_1	75° 51' 22"	—
NC_1D	45° 18' 40"	—
DC_1E	35° 08' 29"	
	360° 00' 00"	

ALTERNATE INTERIORS - PARTIAL QUAD $BNDC_1$

NC_1D	45° 18' 40"	CNB	59° 27' 05"
CDB	35° 42' 02"	NBD	21° 33' 37"
	81° 00 42"		81° 00' 42"

SUM OF ANGLES DNB & C_1DN

DNC_1	75° 51' 22"	C_1DB	35° 42' 02"
+		+	
C_1NB	59° 27' 05"	BDN	23° 07' 56"
=		=	
DNB	135° 18' 27"	C_1DN	58° 49' 58"

ANGLES-7

RESOLUTION OF OVERLAPPING QUADS BDPLMN AND GNPED WITH NEW SOLUTION AND VALUES FOR BDPLMN

VOID

FROM 5 SIDE CENTRAL POINT

NBD	21° 33' 34"
C_1NB	59° 27' 07"
	81° 00' 41"

FROM 4 SIDE CENTRAL POINT

NC_1D *	45° 18' 40"
C_1DB	35° 41' 55"
	81° 00' 35"

HOLD 4 SIDE CENTER POINT AS ADJUSTED

HOLD FOLLOWING ANGLES

NDP = 115° 28' 31"

DPN = 27° 47' 35"

PND = 36° 43' 54"

DNC_1 = 75° 51' 25"

BDN = 23° 08' 00"

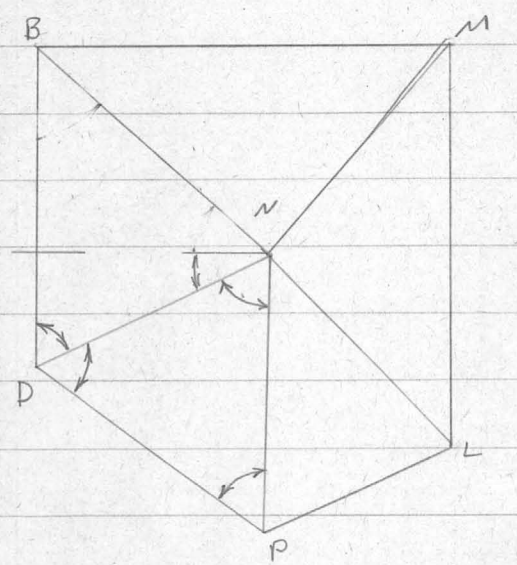
NC_1D = 45° 18' 40"

C_1DB = 35° 45' 51"

~~NBD 21° 33' 31"~~

~~C_1NB = 59° 27' 07"~~

→ DNB = 135° 18' 32"



ARROWS INDICATE ANGLES TO BE HELD.

ΣN	BNM	76° 48' 22.08"
	MNL	94° 16' 56.25"
	LNP	16° 52' 09.58"
	PND*	36° 43' 54"
	DNB	135° 18' 35.83"
		359 59' 57.74"
		−2.26"

+0.57" /ANG

Σ INTERIOR ANGLES

BDN*	23° 08' 00"
NDP*	115° 28' 31"
DPN*	27° 47' 35"
NPL	116° 18' 11.25"
PLN	46° 49' 40.50"
NLM	33° 50' 34.67"
LMN	51° 52' 15.50"
NMB	35° 50' 18.84"
MBN	67° 21' 24.37"
NBD	21° 33' 38.54
	540° 00' 09.67"

= −1.38 /ANG

Σ INDIVIDUAL TRIANGLES

DNB

DNB'	135° 18' 36.40	−6.78
NBD	21° 33' 37.16	−6.78
BDN*	23° 08' 00'	—
	180° 00' 13.56	

BNM

BNM	76° 48' 22.65	
MBN	67° 21' 22.99"	
NMB	35° 50' 17.46	
	180° 00' 03.01"	
		− 1.00"/ANG

MNL

MNL	94° 16' 56.82'	
NLM	33° 50' 33.29"	
LMN	51° 52' 14.12"	
	179° 59' 44.23"	
	−15.77	+ 5.15"/ANG

LNP

LNP	16° 52' 10.15"	
PLN	46° 49' 39.12"	
NPL	116° 18' 09.87'	
	179 59' 59.14"	+0.27"/ANG
	−0.86	

PND

PND*	36° 43' 54"
NDP*	115° 28' 31"
DPN*	27° 47' 35"
	180° 00' 00"

BNM	76° 48' 22	✗
MNL	94° 17' 03"	✓
LNP	16° 52' 11"	✓
PND*	36° 43' 54"	✓
DNB	135° 18' 30"	✗
	360° 00' 00"	

BDN*	23° 08' 00"	✗
NDP*	115° 28' 31"	✓
DPN*	27° 47' 35"	✓
NPL	116° 18' 10"	✓
PLN	46° 49' 39"	✓
NLM	33° 50' 38"	✓
LMN	51° 52' 19"	✓
NMB	35° 50' 16"	✗
MBN	67° 21' 22"	✗
NBD	21° 33' 30	✗
	540° 00' 00"	

ALTERNATE INTERIORS OF PARTIAL QUAD $BNDC_1$

NBD	21° 33' 30"	NC_1D	45° 18' 40"
C_1NB	59° 27' 05"	C_1DB	35° 41' 55"
	81° 00' 35"		81° 00' 35"

SUM OF ANGLES DNB AND C_1DN

DNC_1*	75° 51' 25"	C_1DB	35° 41' 55"
+		+	
C_1NB	59° 27' 05"	BDN	23° 08 00
=		=	
DNB =	135° 18' 30"	C_1DN*	58° 49' 55"

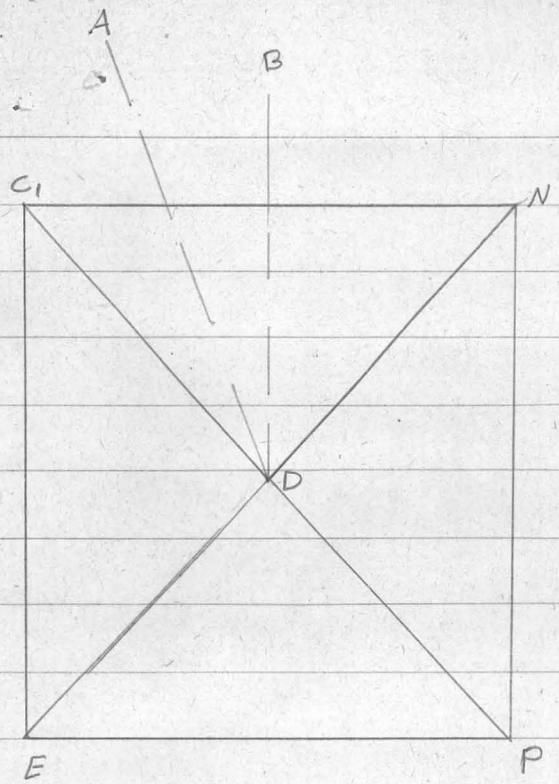
ANGLES - 6

ADJUSTMENT OF ANGLES

CENTRAL POINT QUAD GNPED

RECOMPUTED USING LOGARITHMIC RESIDUALS

SEE "ANGLES 7-A"



Σ D	C_1DN*	58° 49' 57.49	Σ 3 ANGLES – TRIPLE ADJUSTMENT
	NDP	115° 28' 31.66"	
	PDE	74° 04' 13.33"	
	EDC_1	111° 37' 17.50"	
		359° 59' 59.98"	

Σ INTERIOR ANGLES

C_1ED	33° 13' 55.00"	
DEP	48° 47' 13.34"	
EPD	57° 08' 37.92"	
DPN	27° 47' 37.09"	
PND	36° 43' 56.25"	
DNC_1	75° 51' 26.25"	
NC_1D	45° 18' 41.04"	
DC_1E	35° 08' 36.04"	
	360° 00' 02.93"	
	+2.93	– 0.37 / ANGLE

Σ INDIVIDUAL TRIANGLES

EDC₁

EDC₁	111° 37' 17.50"		+ 4.05
C₁ED	33° 13' 54.67"		+ 4.05
DC₁E	35° 08' 35.67"		+ 4.05
	179° 59' 47.84"	−12.16"	

PDE

PDE	74° 04' 13.33"		− 1.28
DEP	48° 47' 12.97"		− 1.28
EPD	57° 08' 37.55"		− 1.28
	180° 00' 03.85"	+ 3.85"	

NDP

NDP	115° 28' 31.66"		− 1.42
DPN	27° 47' 36.72"		− 1.42
PND	36° 43' 55.88"		− 1.42
	180° 00' 04.26"	+ 4.26"	

C₁DN

C₁DN*	58° 49' 57.49"		− 2.42
DNC₁	75° 51' 25.88"		− 0.81
NC₁D	45° 18' 40.67"		− 0.81
	180° 00' 04.04"	+ 4.04"	

Σ Log Sines

		Log Sin		Diff = 1"	
DNC	75° 51' 25.07"	$\bar{1}$.9866324		5.3"	25.09"
DCE	35° 08' 39.72"	$\bar{1}$.7601505		30.0	4.43"
DEP	48° 47' 11.69"	$\bar{1}$.8763683	−	18.4	7.22"
DPN	27° 47' 35.30"	$\bar{1}$.6686474		39.9	3.33"
		3.2917986			
NCD	45° 18 39.86	$\bar{1}$.8518301		20.8	6.39"
CED	33° 13' 58.72"	$\bar{1}$.7388160	+	32.1	4.14"
EPD	57° 08' 36.27"	$\bar{1}$.9242954		13.6	9.77"
PND	36° 43' 54.46"	$\bar{1}$.9767520		28.2	4.71"
		3.2916935			

.0001051

= .0000133 / ang

ZD ADJUSTMENT

ZD	C,DN*	58° 49' 55.07"
	NDP	115° 28' 30.24"
	PDE	74° 04' 12.05"
	EDC,	111° 37' 21.55"
		359° 59' 58.91"
		-1.09

+0.18/ANG , 0.55/C,DN*

Σ INTERIOR ANGLES

GEP	33° 14' 02.86"
DEP	48° 47' 04.47"
EPD	57° 08' 46.04"
DPN	27° 47' 31.97"
PND	36° 43' 59.17"
DNC,	75° 50. 59.98"
NC,D	45° 18' 46.25"
DC,E	35° 08' 35.29"
	359° 50' 46.03"
	13.97"

+1.75"/ANGLE

39.86
6.39
46.25

Σ INDIVIDUAL TRIANGLES

EDC1

EDC1	111° 37' 21.73"	
C1ED	33° 14' 04.61"	
DC1E	35° 08' 37.04"	
	180° 00' 03.38"	- 1.13"/ANG

PDE

PDE	74° 04' 12.23"	
DEP	48° 47' 06.22"	
EPD	57° 08' 47.79"	
	180° 00' 06.24"	- 2.08"/ANG

NDP

NDP	115° 28' 30.42"	
DPN	27° 47' 33.72"	
PND	36° 44' 00.92"	
	180° 00' 05.06"	- 1.69"/ANG

C1DN

C1DN*	58° 49' 55.62"	+ 8.79"
DNC1	75° 51' 01.73"	+ 2.93"
NC1D	45° 18' 48.00"	+ 2.93"/1
	179° 59' 45.35"	
	- 14.65"	

Σ Log Sines

				+
DNC,	75° 51' 04.66"	T. 9866216	5.3	2.26"
DC, E	35° 08' 35.91" ✓	T. 7601385	30.0	0.40"
DEP	48° 47' 04.14" ✓	T. 8763544	18.4	0.65"
DPN	27° 47' 32.03"	T. 6686345	39.9	0.30"
		.2917490		
NC, D	45° 18' 50.93"	T. 8518532	20.8	0.57"
C, ED	33° 14' 03.48" ✓	T. 7388313	32.2	0.37"
EPD	57° 08' 45.71" ✓	T. 9243083	13.6	0.88"
PND	36° 43' 59.23"	T. 7767655	28.2	0.42"
		.2917583		

.0000093

= .0000012/ANGLE

3D ADJUSTMENT

$\Sigma \angle D$	C_1DN^*	58° 50' 04.41"	-1.96"
	NDP	115° 28' 28.73"	-0.65"
	PDE	74° 04' 10.15"	-0.65"
	EDC_1	111° 37' 20.60"	-0.65"
		360° 00' 03.91"	

Σ INTERIOR ANGLES

C_1ED	33° 14' 03.41"
DEP	48° 47' 04.79"
EPD	57° 08' 44.85"
DPN	27° 47' 32.33"
PND	36° 43' 58.81"
DNC_1	75° 51' 06.92"
NC_1D	45° 18' 50.36"
DC_1E	35° 08' 36.31
	359° 59' 57.78"

$8\overline{)2.22} = +0.28''/ANG$

16

62

Σ INDIVIDUAL TRIANGLES

EDC1	111°	37'	19.95"	
C1ED	33°	14'	03.69"	
DC1E	35°	08'	36.59"	
	180°	00'	00.23"	− .08"/ANG

PDE	74°	04'	09.50"	
DEP	48°	47'	05.07"	
EPD	57°	08'	45.13"	
	179°	59'	59.70"	+ .10"/ANG

NDP	115°	28'	28.08"	
DPN	27°	47'	32.61"	
PND	36°	43'	59.09"	
	179°	59'	59.78	+ .09"/ANG

C1DN*	58°	50'	02.45"	
DNC1	75°	51'	07.20"	
NC1D	45°	18'	50.64"	
	180°	00'	00.29"	−.10"/ANG

Log Sines

DNC_1	75° 51' 07.10"	.9866229	5.3
DC_1E	35° 08' 36.51"	$\bar{1}$.7601403	30.0
DEP	48° 47' 05.17"	$\bar{1}$.8763563	18.4
DPN	27° 47' 32.70"	$\bar{1}$.6686371	39.9
		.2917566	
NC_1D	45° 18' 50.54"	$\bar{1}$.8518524	20.8
C_1ED	33° 14' 03.61"	$\bar{1}$.7388317	32.2
EPD	57° 08' 45.23"	$\bar{1}$.9243076	13.6
PND	36° 43' 59.18"	$\bar{1}$.7767653	28.2
		.2917570	

ADJUSTED VALUES TO NEAREST SECOND

		DIFF FROM STA. ADJ. ANGLES
C,DN*	58° 50' .02"	+5"
NDP	115° 28' 28"	-4"
PDE	74° 04' 10"	-3
EDC,	111° 37' 20"	+2
	360° 00' 00"	
C,ED	33° 14' 04"	+9"
DEP	48° 47' 05"	-8"
EPD	57° 08' 45"	+7"
DPN	27° 47' 33"	-4
PND	36° 43' 59"	+3"
DNC,	75° 51' 07"	-19"
NC,D	45° 18' 51"	+10"
DC,E	35° 08' 36"	—
	360° 00' 00"	

DO NOT USE

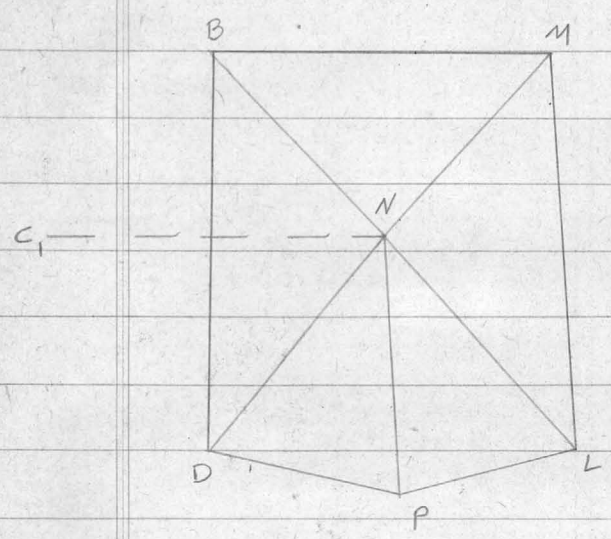
ANGLES - 5

ANGLE ADJUSTMENT

CENTRAL POINT B D P L M N

~~NOTE! SEE ANGLES-7~~

RECOMPUTED USING LOG. RESIDUALS



Σ N

BNM	76° 48' 22.08"
MNL	94° 16' 56.25"
LNP	16° 52' 09.58"
PND	36° 43' 56.25"
DNB*	135° 18' 35.83"
	359° 59' 59.99"

$= \Sigma\ DNC_1,\ C_1NB$

CORRECTIONS TO THIS ANGLE WILL BE DOUBLE.

Σ INTERIOR ANGLES

BDN	23° 08' 00.83"
NDP	115° 28' 31.66"
DPN	27° 47' 37.09"
NPL	116° 18' 11.25"
PLN	46° 49' 40.50"
NLM	33° 50' 34.67"
LMN	51° 52' 15.50"
NMB	35° 50' 18.84"
MBN	67° 21' 24.37"
NBD	21° 33' 38.54"
	540° 00' 13.25
	+ 13.25

$= -1.32''$ / ANGLE

Σ INDIVIDUAL TRIANGLES

DNB

DNB = *	135° 18' 35.83"		-6.28
NBD =	21° 33' 37.22" ✗		-3.14
BDN =	23° 07' 59.51" ✗		-3.14
	180° 00' 12.56"	+ 12.56"	

BNM

BNM =	76° 48' 22.08"		- 0.88
MBN =	67° 21' 23.05" ✗		- 0.88
NMB =	35° 50' 17.52" ✗		- 0.88
	180° 00' 02.65"	+ 2.65"	

MNL

MNL =	94° 16' 56.25"		+ 5.41
NLM =	33° 50' 33.35" ✗		+ 5.41
LMN =	51° 52' 14.18" ✗		+ 5.41
	179° 59' 43.78	- 16.22"	

LNP

LNP =	16° 52' 09.58"		+0.43
PLN =	46° 49' 39.18" ✗		+0.43
NPL =	116° 18' 09.93" ✗		+0.43
	179° 59' 58.69"	- 1.31"	

PND

PND =	36° 43' 56.25"		- 0.79
NDP =	115° 28' 30.34" ✗		- 0.79
DPN =	27° 47' 35.77" ✗		-0.79
	180° 00' 02.36"	+ 2.36"	
		35.10"	

Σ Log Sines

1795960 116 18 10.36 63°41'49.64"	NPL	116° 18' 10.36"	$\bar{1}.9525329$	10.4 − 11.83
	NLM	33° 50' 38.76"	$\bar{1}.7458045$	31.4 + 3.92
	NMB	35° 50' 16.64"	$\bar{1}.7675231$	29.2 + 4.21
	NBD	21° 33' 34.08"	$\bar{1}.5652179$	53.3 + 2.30
1795960 115 28 29.55 64 31 30 45	NDP	115° 28' 29.55"	$\bar{1}.9555189$	10.0 − 12.31
			.9865973	
	PLN	46° 49' 39.61"	$\bar{1}.8629057$	19.8 − 6.21
	LMN	51° 52' 19.59"	$\bar{1}.8957730$	16.5 − 7.46
	MBN	67° 21' 22.17"	$\bar{1}.9651621$	8.8 − 13.98
	BDN	23° 07' 56.37"	$\bar{1}.5942334$	49.3 − 2.49
	DPN	27° 47' 34.98"	$\bar{1}.6686462$	39.9 − 3.08
			.9867204	
			.0001231	
			.0000123 / Avg	

~~Δ DNB IS ADJUSTED FIRST, GIVING DOUBLE WEIGHT TO ∠ DNB~~

~~OTHER ANGLES ARE DISTRIBUTED EQUALLY IN TRIANGLES~~

2D ADJUSTMENT

BNM	76° 48' 21.20"
MNL	94° 17' 01.66"
LNP	16° 52' 10.01"
PND	36° 43' 55.46"
DNB*	135° 18' 29.55"
	359° 59' 57.88"

2.12 = 0.35/ANGLE + 0.71/DNB

BDN	23° 07' 53.88"
NDP	115° 28' 17.24"
DPN	27° 47' 31.90"
NPL	116° 17' 58.53"
PLN	46° 49' 33.40"
NLM	33° 50' 42.68"
LMN	51° 52' 12.13"
NMB	35° 50' 20.85"
MBN	67° 21' 08.19"
NBD	21° 33' 36.38"
	539° 59' 15.18"
	-44.82"

= +4.48"/ANGLE

Σ TRIANGLES

DNB

DNB*	135° 18' 30.26"	− 4.74"
NBD	21° 33' 40.86"	− 2.37"
BDN	23° 07' 58.36	− 2.37"
	180° 00' 09.48"	

BNM

BNM	76° 48' 21.55"	
MBN	67° 21' 12.67"	
NMB	35° 50' 25.33"	
	179° 59' 59.55	
	−0.45	+ 0.15/ANGLE

MNL

MNL	94° 17' 02.01"	
NLM	33° 50' 47.16"	
LMN	51° 52' 16.61"	
	180° 00' 05.78	− 1.93"/ANG

LNP

LNP	16° 52' 10.36"	
PLN	46° 49' 37.88	
NPL	116° 18' 03.01"	
	179° 59' 51.25"	
	−8.75"	+ 2.92"/ANG

PND

PND	36° 43' 55.81"	
NDP	115° 28' 21.77"	
DPN	27° 47' 36.38"	
	179° 59' 53.91"	
	6.09"	= + 2.03"/ANG

	Σ Log Sines			Diff 1"
179596000 116 18 05.93 634154 07	NPL	116° 18' 05.93"	.9525375	10.4 + 2.52"
	NLM	33° 50' 45.23 →	.7458369	31.4 − 0.84"
	NMB	35° 50' 25.48"	.7675488	29.1 − 0.90"
	NBD	21° 33' 38.49"	.5652415	53.3 − 0.49
179596000 115 28 23.75 643136 25	NDP	115° 28' 23.75"	.9555849	10.0 + 2.63
			.9867496	
	PLN	46° 49' 40.80"	.8629067	19.7 + 1.33"
	LMN	51° 52' 14.68"	.8957713	16.5 + 1.59"
	MBN	67° 21' 12.82"	.9651539	8.8 + 2.98"
	BDN	23° 07' 55.99"	.5942315	49.3 + 0.53"
	DPN	27° 47' 38.41"	.6686599	39.9 + 0.65
			.9867233	
			.0000263	
			= .0000026/ANG	

3D ADJUSTMENT

BNM	76° 48' 21.70"	+.26"
MNL	94° 17' 00.08"	+.26"
LNP	16° 52' 13.28"	+.26"
PND	36° 43' 57.84"	+.26"
DNB*	135° 18' 25.52"	+.53"
	359° 59' 58.42	
	−1.58	
BDN	23° 07' 56.52"	
NDP	115° 28' 26.38"	
DPN	27° 47' 39.06"	
NPL	116° 18' 08.45"	
PLN	46° 49' 42.13"	
NLM	33° 50' 44.39"	
LMN	51° 52' 16.27"	
NMB	35° 50' 24.58"	
MBN	67° 21' 15.80"	
NBD	21° 33' 38.00"	
	540° 00' 11.58"	−1.16"/ANG

Σ TRIANGLES

DNB*	135° 18' 26.05"	+.87
NBD	21° 33' 36.84"	+.43
BDN	23° 07' 55.38"	+.43
	58.27	
	-1.73"	
BNM	76° 48' 21.96"	-.01
MBN	67° 21' 14.64"	-.01
NMB	35° 50' 23.42"	-.01
	00.02"	
MNL	94° 17' 00.34"	
NLM	33° 50' 43.23"	
LMN	51° 52' 15.11"	
	58.68"	+0.44/ang
	-1.32"	
LNP	16° 52' 13.54"	
PLN	46° 49' 40.97"	
NPL	116° 18' 07.29"	
	01.80"	-0.60/ang
PND	36° 43' 58.10"	
NDP	115° 28' 25.22"	
DPN	27° 47' 37.90"	
	01.22"	-0.41/ang

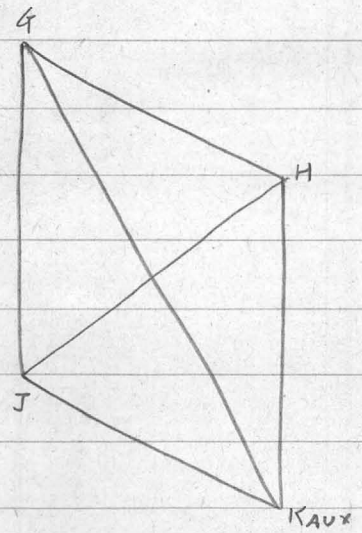
ADJUSTED VALUES TO NEAREST SECOND

BNM	76° 48' 22"	—
MNL	94° 17' 00"	+ 4
LNP	16° 52' 13"	+3
PND	36° 43' 58"	+2
DNB *	135° 18' 27"	-9
	360° 0000	
BDN	23° 07' 56"	-5"
NDP	115° 28' 25"	-7"
DPN	27° 47' 37"	+1
NPL	116° 18' 07"	-4"
PLN	46° 49' 40"	-1"
NLM	33° 50' 44"	+9"
LMN	51° 52' 16"	—
NMB	35° 50' 23	+4"
MBN	67° 21' 15"	-9"
NBD	21° 33' 37"	-2
	540° 00' 00"	

ANGLES - 3

ADJUSTMENT OF ANGLES

QUAD JK, HG



1ST ADJUSTMENT

Σ INTERIOR ANGLES	AFTER STA. CLOSURE
HGKAUX	17° 29' 55.56"
KAUX G J	16° 13' 55.56"
KAUX H J	37° 00' 18.75"
J H G	113° 59' 21.25"
G J H	32° 16' 37.34"
H J KAUX	100° 13' 12.34"
J KAUX G	31° 15' 58.33"
G KAUX H	11° 30' 37.50"
	359° 59' 56.63"
	− 3.37 = +.42"/ANGLE

Σ OPPOSITE INTERIOR

	+		−	
HJKAUX	100° 13' 12.76"	JHG	113° 59' 21.67"	DIFF = 6.14
JKAUX G	31° 15' 58.75"	HGKAUX	17° 29' 55.98"	1.52 /ANGLE
	131° 29' 11.51"		131° 29' 17.65"	

	+		−	
GJH	32° 16' 37.76"	GKAUX H	11° 30' 37.92"	
KAUX GJ	16° 13' 55.98"	KAUX HJ	37° 00' 19.17"	DIFF = 23.35
	48° 30' 33.74"		48° 30' 57.09"	= 5.84 /ANGLE

Σ Log Sines		Log Sin	Diff 1"
HJK Aux	100° 13' 14.28"	T.9930533	3.8" - 27.89"
GKAux H	11° 30' 32.08"	T.2999872	103.4 + 1.03"
JHG	113° 59' 20.15"	T.9607672	9.4 - 11.28"
KAux GJ	16° 14' 01.82"	T.4464723	72.3 + 1.47"
		Z.7002800	
JKAux G	31° 16' 00.27"	T.7151866	34.7 - 3.05"
KAux HJ	37° 00' 13.33"	T.7795003	27.9 - 3.80"
HGKAux	17° 29' 54.46"	T.4781048	66.8 - 1.59"
GJH	32° 16' 43.60"	T.7275732	33.3 - 3.18"
		Z.7003649	

48.29"

Diff = .0000849 = .0000106/Angle

2D Adjustment

Σ Interior Angles	After 1st Adj.
HGKAux	17° 29' 52.87"
KAux GJ	16° 14' 03.29"
KAux HJ	37° 00' 09.53"
JHG	113° 59' 08.87"
GJH	32° 16' 40.42"
HJKAux	100° 12' 46.39"
JKAux G	31° 15' 57.22"
GKAux H	11° 30' 33.11"
	359 59' 11.70"
	-48.30" + 6.04"/Angle

Σ OPPOSITE INTERIOR

HJ K_{AUX}	100° 12' 52.43"	JHG	113° 59' 14.91"
J K_{AUX} G	31° 16' 03.26"	HG K_{AUX}	17° 29' 58.91"
	131° 28' 55.69"		131° 29' 13.82"

DIFF = 18.13" = 4.53"/ANG

GJH	32° 16' 46.46"	G K_{AUX} H	11° 30' 39.15"
K_{AUX} GJ	16° 14' 09.33"	K_{AUX} HJ	37° 00' 15.57"
	48° 30' 55.79		48° 30' 55.72"

DIFF = 0.07" = .02"/ANG

Σ Log Sines

		Log Sin	Diff 1"	
HJ K_{AUX}	100° 12' 56.96"	$\bar{1}$.9930598	3.8	+ 5.79"
G K_{AUX} H	11° 30' 39.17"	$\bar{1}$.3000605	103.4	− 0.21"
JHG	113° 59' 10.33"	$\bar{1}$.9607767	9.3	+ 2.37"
K_{AUX} GJ	16° 14' 09.31"	$\bar{1}$.4465264	72.3	− 0.30"
		$\bar{2}$.7004234		
J K_{AUX} G	31° 16' 07.79"	$\bar{1}$.7152127	34.7	+ 0.63"
K_{AUX} HJ	37° 00' 15.59"	$\bar{1}$.7795066	27.9	+ 0.79"
HG K_{AUX}	17° 29' 54.38"	$\bar{1}$.4781043	66.8	+ 0.33"
GJH	32° 16' 46.44"	$\bar{1}$.7275826	33.3	+ 0.66"
		$\bar{2}$.7004062		10.06"

DIFF = .0000172 = .0000022/ANGLE

3D ADJUSTMENT

Σ INTERIOR ANGLES AFTER 2D ADJ.

HGK₁	17° 29' 54.71" ✓
K₁GJ	16° 14' 09.01" ✓
K₁HJ	37° 00' 16.38" ✓
JHG	113° 59' 12.70" ✓
GJH	32° 16' 47.10" ✓
HJK₁	100° 13' 02.75" ✓
JK₁G	31° 16' 08.42" ✓
GK₁H	11° 30' 38.96" ✓
	360° 00' 10.03"
	10.03" = -1.25"/ANGLE

Σ OPPOSITE INTERIOR

HJK₁	100° 13' 01.50"	JHG	113° 59' 11.45"
JK₁G	31° 16' 07.17"	HGK₁	17° 29' 53.46"
	131° 29 08.67"		131° 29' 04.91"

DIFF = 3.76 = 0.94"/ANG

GJH	32° 16' 45.85"	GK₁H	11° 30' 37.71"
K₁GJ	16° 14' 07.76"	K₁HJ	37° 00' 15.13"
	48° 30' 53.61		48° 30' 52.84"

DIFF = 0.77 = 0.19"/ANG

Σ Log Sines		Log Sin.	Diff 1"	
HJK,	100° 13' 00.56"	$\bar{1}$.9930585	3.8	.26"
GK,H	11° 30' 37.90"	$\bar{1}$.3000474	103.4	
JHG	113° 59' 12.39"	$\bar{1}$.9607748	9.3	
K,GJ	16° 14' 07.57"	$\bar{1}$.4465138	72.3	
		$\bar{2}$.7003945		
JK,G	31° 16' 06.23"	$\bar{1}$.7152073	34.7	
K,HJ	37° 00' 15.32"	$\bar{1}$.7795021	27.9	
HGK,	17° 29' 54.40"	$\bar{1}$.4781044	66.8	
GJH	32° 16' 45.66"	$\bar{1}$.7275800	33.3	
		$\bar{2}$.7003938		

DIFF = .0000007 = .0000001 / ANGLE

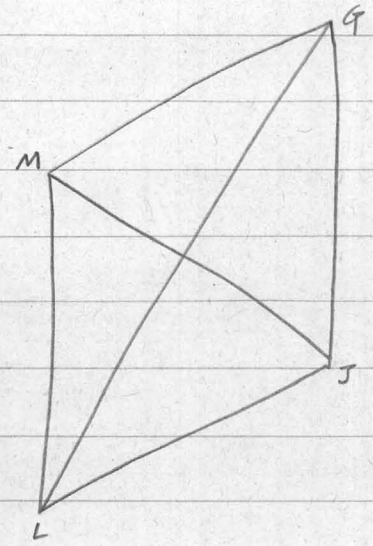
FINAL VALUES TO NEAREST SECOND

		DIFF FROM 514. ADJ. ANGLES
HGK,	17° 29' 54"	+3"
K,GJ	16° 14' 07"	+11"
K,HJ	37° 00' 15"	-4"
JHG	113° 59' 12"	-9"
GJH	32° 16' 46"	+9"
HJK,	100° 13' 01"	-11"
JK,G	31° 16' 06"	+8"
GK,H	11° 30' 38"	—
	360° 00' 00"	

ANGLES - 4

ADJUSTMENT OF ANGLES

QUAD M G J L



1ST ADJUSTMENT

Σ INTERIOR ANGLES	AFTER STA CLOSURE
GMJ	71° 33' 03.00"
JML	28° 48' 31.34"
MLG	21° 11' 46.34"
GLJ	24° 39' 13.00"
LJM	105° 20' 41.50"
MJG	33° 25' 48.17"
JGL	16° 34' 28.89"
LGM	58° 26' 35.56"
	360° 00' 07.80"
	+07.80"

- 0.98"/ANGLE

Σ OPPOSITE INTERIOR

MLG	21° 11' 45.36" (−)	JGL	16° 34' 27.91" (+)	DIFF = .62"
JML	28° 48' 30.36"	MJG	33° 25' 47.19"	.16"/ANGLE
	50° 00' 15.72"		50° 00' 15.10"	
GLJ	24° 39' 12.02" (−)	LGM	58° 26' 34.58" (+)	
LJM	105° 20' 40.52"	GMJ	71° 33' 02.02"	DIFF = 15.94
	129° 59' 52.54"		129° 59 36.60"	3.98"/ANGLE

Σ Log Sines		Log Sin.	Diff 1"
MLG	21°11' 45.20"	$\bar{1}.5581775$	54.3 + 1.05
LJM	105°20' 36.54"	$\bar{1}.9842378$	5.7 − 10.00"
JGL	16° 34' 28.07"	$\bar{1}.4552327$	70.8 + 0.81
GMJ	71° 33' 06.00"	$\bar{1}.9770874$	7.0 + 8.14
		$\bar{2}.9747354$	
GLJ	24° 39' 08.04"	$\bar{1}.6202501$	45.9 − 1.24"
MJG	33° 25' 47.35"	$\bar{1}.7410847$	31.9 − 1.79"
LGM	58° 26' 38.56"	$\bar{1}.9305056$	13.0 − 4.38"
JML	28° 48' 30.20"	$\bar{1}.6829407$	38.3 − 1.49"
		$\bar{2}.9747811$	− 8.90"

Diff = .0000457 = .0000057/angle

2D Adjustment

Σ Interior Angles	After 1st Adjustment
GMJ	71° 33' 14.14"
JML	28° 48' 28.71"
MLG	21° 11' 46.25"
GLJ	24° 39' 06.80"
LJM	105° 20' 26.54"
MJG	33° 25' 45.56"
JGL	16° 34' 28.88"
LGM	58° 26' 34.18"
	359° 59' 51.06
	− 8.94" + 1.12"/angle

Σ Opposite Interior

	−		+	
MLG	21° 11' 47.37"	JGL	16° 34' 30.00"	DIFF = 0.52
JML	28° 48' 29.83"	MJG	33° 25' 46.68"	.13/ANGLE
	50° 00' 17.20		50° 00' 1668"	
	+		−	
GLJ	24° 39' 07.92'	LGM	58° 26' 35.30"	
LJM	105° 20' 27.66"	GMJ	71° 33' 15.26"	DIFF = 14.98
	129° 59' 35.58"		129° 59' 50.56"	= 3.76"/ANGLE

Σ Log Sines

		Log Sin	Diff 1"
MLG	21° 11' 47.24" ✓	$\bar{1}.5581886$	54.3 + 0.17
LJM	105° 20' 31.42"	$\bar{1}.9842408$	5.8 − 1.55
JGL	16° 34' 30.13" ✓	$\bar{1}.4552573$	70.7 + 0.13"
GMJ	71° 33' 11.50"	$\bar{1}.9770913$	7.1 + 1.27
		$\bar{2}.9747780$	
GLJ	24° 39' 11.68" ✓	$\bar{1}.6202668$	45.9 − 0.20"
MJG	33° 25' 46.81" ✓	$\bar{1}.7410830$	31.9 − 0.28"
LGM	58° 26' 31.54"	$\bar{1}.9304965$	13.0 − 0.69"
JML	28° 48' 29.70" ✓	$\bar{1}.6829388$	38.3 − 0.23"
		$\bar{2}.9747851$	−1.38"

DIFF = .0000071 = .0000009/ANGLE

3D ADJUSTMENT

Σ INTERIOR ANGLES	AFTER 2° ADJ.
GMJ	71° 33' 12.77
JML	28° 48' 29.47
MLG	21° 11' 47.41
GLJ	24° 39' 11.48"
LJM	105° 20' 29.87"
MJG	33° 25' 46.53"
JGL	16° 34' 30.26
LGM	58° 26' 30.85"
	359° 59' 58.64"
	-1.36"

+ 0.17"/ ANGLE

Σ OPPOSITE INTERIOR

MLG	21° 11' 47.58" −	JGL	16° 34' 30.43" +
JML	28° 48' 29.64"	MJG	33° 25' 46.70"
	50° 00' 17.22		50° 00' 17.13

DIFF = .09" = .02/ANG

GLJ	24° 39' 11.65" +	LGM	58° 26' 31.03" −
LJM	105° 20' 30.04"	GMJ	71° 33' 12.94"
	129° 59' 41.65"		129° 59' 43.97"

DIFF = 2.32" = 0.58"/ANG

Σ Log Sines		Log Sin	Diff 1"
MLG	21° 11' 47.56"	$\bar{1}.5581904$	54.3
LJM	105° 20' 30.64"	$\bar{1}.9842412$	5.8
JGL	16° 34' 30.45"	$\bar{1}.4552596$	70.7
GMJ	71° 33' 12.36"	$\bar{1}.9770919$	7.1
		$\bar{2}.9747831$	
GLJ	24° 39' 12.23"	$\bar{1}.6202691$	45.9
MJG	33° 25' 46.72"	$\bar{1}.7410827$	31.9
LGM	58° 26' 30.45"	$\bar{1}.9304951$	13.0
JML	28° 48' 29.62"	$\bar{1}.6829384$	38.3
		$\bar{2}.9747853$	

DIFF = .0000022

.0000003

Final Values to Nearest Second

		Diff. from Sta. Adj. Angles
GMJ	71° 33' 12"	+ 9"
JML	28° 48' 30"	− 1"
MLG	21° 11' 47"	+1
GLJ	24° 39' 12"	−1"
LJM	105° 20' 31"	−10"
MJG	33° 25' 47"	−1"
JGL	16° 34' 30"	+1"
LGM	58° 26' 31"	−3"
	360° 00' 00"	

ANGLES - 2

TRIANGLE CLOSURES

TRIANGLE CLOSURES ~~AFTER STATION ADJUSTMENT~~ (MAIN NET)

TRIANGLE	ANGLE	ANGLE ADJ. FOR STATION CLOSURE	TRI. CLOSURE	BEFORE STA ADJ.	CLOSURE
ABD	BAD	21°12'23.89"		21°12'23.33"	
	ADB	14°38'45.83"		14°38'45.00"	
	DBA	144°08'43.54"		144°08'41.67"	
		179°59'53.26"	− 6.74"	179°59'50.00"	− 10.00
ACD AUX	D, AC AUX	15°01'17.23"		15°01'16.67"	
	ACD AUX	143°55'34.58"		143°55'35.84"	
	CDA AUX	21°03'10.83"		21°03'10.00"	
		180°00'02.64"	+ 2.64"	180°00'02.50	+ 2.51
BDN	NBD	21°33'38.54"		21°33'36.67"	
	BDN	23°08'00.83"		23°08'00.00"	
	DNB	135°18'35.83		135°18'36.67"	
		180°00'15.20	+ 15.20"	180°00'13.34	+ 13.34
BNM	MBN	67°21'24.37"		67°21'22.50"	
	BNM	76°48'22.08"		76°48'22.50"	
	NMB	35°50'18.84"		35°50'19.17"	
		180°00'05.29	+ 5.29"	180°00'04.17"	+ 04.17"
CDN AUX	N C AUX D	45°18'41.04"		45°18'41.67"	
	C AUX DN	58°49'57.49"		58°49'55.00"	
	DN C AUX	75°51'26.25"		75°51'26.67'	
		180°00'04.78	+ 4.78"	180°00'03.34"	+ 03.34"

TRIANGLE	ANGLE	ANGLES ADJ. FOR STATION CLOSURE	TRI. CLOSURE	BEFORE STA ADJ.	
CAUX DE	DCAUX E	35° 08' 36.04		35°08' 36.67"	
	CAUX ED	33° 13' 55.00"		33°13' 53.33	
	EDCAUX	111° 37' 17.50"		111° 37' 16.67"	
		179° 59' 48.54"	- 11.46"	179° 59' 46.67	-13.33
DNP	NDP	115° 28' 31.66"		115° 28' 30.83"	
	DPN	27° 47' 37.09"		27° 47' 36.67"	
	PND	36° 43' 56.25"		36° 43' 56.67"	
		180° 00' 05.00	+ 5.00"	180° 00' 04.17"	+ 4.17"
DEP	DEP	48° 47' 13.34"		48° 47' 11.67"	
	EPD	57° 08' 37.92"		57° 08' 37.50"	
	PDE	74° 04' 13.33"		74° 04' 12.50"	
		180° 00' 04.59"	+ 4.59"	1800 00' 01.67"	+ 1.67"
FGH	HFG	30° 43' 37.92"		30° 43' 40.00"	
	FGH	123° 17' 38.89"		123° 17' 40.00"	
	GHF	25° 58' 43.75"		25° 58' 42.50"	
		180° 00' 00.56"	+00.56"	180° 00' 02.50"	+ 02.50"
GHJ	HGJ	33° 43' 51.12"		33° 43' 53.34"	
	GJH	32° 16' 37.34"		32° 16' 36.67"	
	JHG	113° 59' 21.25"		113° 59' 20.00"	
		179° 59' 49.71	- 10.29"	179° 59' 50.01"	- 09.99"

TRIANGLE	ANGLE	ANGLES ADJ FOR STATION CLOSURE	TRI. CLOSURE	BEFORE STA CLOSURE	
GH KAUX	HGKAUX	17° 29' 55.56"		17° 29' 56.67"	
	GKAUX H	11° 30' 37.50"		11° 30' 35.00"	
	KAUX HG	150° 59' 40.00"		150° 59' 37.50"	
		180° 00' 13.06"	+13.06"	180° 00' 09.17"	+ 9.17"
GJL	JGL	16° 34' 28.89"		16° 34' 30.00"	
	GLJ	24° 39' 13.00"		24° 39' 10.83"	
	LJG	138° 46' 29.67		138° 46' 28.33"	
		180° 00' 11.56"	+11.56"	180° 00' 09.16"	+ 9.16"
GJM	JGM	75° 01' 04.45"		75° 01' 06.67"	
	GMJ	71° 33' 03.00"		71° 33' 03.33"	
	MJG	33° 25' 48.17"		33° 25' 47.50"	
		179° 59' 55.62"	- 4.38"	179° 59' 57.50"	- 2.50"
GLM	LGM	58° 26' 35.56"		58° 26' 36.67"	
	GML	100° 21' 34.34"		100° 21' 35.00"	
	MLG	21° 11' 46.34"		21° 11' 44.17"	
		179° 59' 56.24"	- 3.76"	179° 59' 55.84"	- 4.16"
HJ KAUX	KAUX HJ	37° 00' 18.75"		37° 00' 17.50"	
	HJ KAUX	100° 13' 12.34"		100° 13' 11.67"	
	JKAUX H	42° 46' 35.83		42° 46' 30.83"	
		180° 00' 06.69	+ 06.69"	180° 00' 00.00"	0.00"

Triangle	Angle	Angles Adj. for Station Closure	Tri. Closure	Before Sta Closure	
JLM	LJM	105° 20' 41.50"		105° 20' 40.83"	
	JML	28° 48' 31.34"		28° 48' 31.67"	
	MLJ	45° 50' 59.34		45° 50' 55.00"	
		180° 00' 12.18	+ 12.18"	180° 00' 07.50"	+ 07.50"
LMN	LMN	51° 52' 15.50"		51° 52' 15.83"	
	MNL	94° 16' 56.25"		94° 16' 56.67"	
	NLM	33° 50' 34.67"		33° 50' 32.50"	
		179° 59' 46.42"	− 13.58"	179° 59' 45.00"	−15.00"
LNP	PLN	46° 49' 40.50"		46° 49' 38.33"	
	LNP	16° 52' 09.58"		16° 52' 10.00"	
	NPL	116° 18' 11.25"		116° 18' 10.83"	
		180° 00' 01.34"	+ 01.34"	179° 59' 59.16"	− 0.84"
GJK$_{AUX}$	JK$_{AUX}$G	31° 15' 58.33"		31° 15' 55.83"	
	K$_{AUX}$GJ	16° 13' 55.56"		16° 13' 56.67"	
	GJK$_{AUX}$	132° 29' 49.68		132° 59' 48.34"	
		179° 59' 43.57"	− 16.43"	179° 59' 40.84"	− 19.16"
			149.53		132.51
			Ave = 7.86"		Ave = 6.97"

TRIANGLE CLOSURES - CLAIM COR.

TRIANGLE	ANGLE	ANGLE STA.	ADJ FOR. CLOSURE
CAUX N Q	CAUX N Q	31° 36' 57.50"	
	N Q CAUX	105° 42' 41.11"	
	Q CAUX N	42° 40' 18.75"	
		179° 59' 57.36"	- 2.64"
CAUX R Q	Q CAUX R	47° 02' 00.83"	
	CAUX R Q	107° 03' 51.25"	
	R Q CAUX	25° 53' 52.22"	
		179° 59' 44.30"	- 15.70"

ANGLES - 1

STATION CLOSURES

MAW NET

STA	ANGLE	OBSERVED	ADJ. FOR STATION CLOSURE
A	$C_{AUX}AB$	323° 46' 18.33"	323° 46' 18.89"
	BAD	21° 12' 23.33"	21° 12' 23.89"
	DAC_{AUX}	15° 01' 16.67"	15° 01' 17.23"
		359° 59' 58.33"	360° 00' 00.01"
		− 1.67"	
B	MBN	67° 21' 22.50"	67° 21' 24.37"
	NBD	21° 33' 36.67"	21° 33' 38.54"
	DBA	144° 08' 41.67"	144° 08' 43.54"
	ABM	126° 56' 11.67"	126° 56' 13.54"
		359° 59' 52.51"	359° 59' 59.99
		− 7.49	
C_{AUX}	$AC_{AUX}N$	98° 36' 54.17"	98° 36' 53.54"
	$NC_{AUX}D$	45° 18' 41.67"	45° 18' 41.04"
	$DC_{AUX}E$	35° 08' 36.67"	35° 08' 36.04"
	$EC_{AUX}A$	180° 55' 50.00"	180° 55' 49.37"
		360° 00' 02.51	359° 59' 59.99"
		+ 2.51	
D	ADB	14° 38' 45.00"	14° 38' 45.83"
	BDN	23° 08' 00.00"	23° 08' 00.83"
	NDP	115° 28' 30.83"	115° 28' 31.66"
	$C_{AUX}DA$	21° 03' 10.00"	21° 03' 10.83"
	PDE	74° 04' 12.50"	74° 04' 13.33"
	EDC_{AUX}	111° 37' 16.67"	111° 37' 17.50"
		359° 59' 55.00"	359° 59' 59.98"
		− 5.00	

STA	ANGLE	OBSERVED	ADJ. FOR STATION CLOSURE
E	$C_{AUX}ED$	33°13' 53.33"	33°13' 55.00"
	DEP	48°47' 11.67"	48°47' 13.34"
	PEC_{AUX}	277°58' 50.00"	277°58' 51.67"
		359°59' 55.00"	360°00' 00.01"
		-5.00	
F	HFG	30°43' 40.00"	30°43' 37.92"
	GFH	329°16' 24.17"	329°16' 22.09"
		360°00' 04.17"	360°00' 00.01"
		+4.17	
G	FGH	123°17' 40.00"	123°17' 38.89"
	HGK_{AUX}	17°29' 56.67"	17°29' 55.56"
	$K_{AUX}GJ$	16°13' 56.67"	16°13' 55.56"
	JGL	16°34' 30.00"	16°34' 28.89"
	LGM	58°26' 36.67"	58°26' 35.56"
	MGF	127°57' 26.67"	127°57' 25.56"
		360°00' 06.68"	360°00' 00.02"
		+6.68	
H	$K_{AUX}HJ$	37°00' 17.50"	37°00' 18.75"
	JHG	113°59' 20.00"	113°59' 21.25"
	GHF	25°58' 42.50"	25°58' 43.75"
	FHK_{AUX}	183°01' 35.00"	183°01' 36.25
		359°59' 55.00"	360°00' 00.00"
		-5.00	

STATION	ANGLE	OBSERVED	ADJ. FOR STATION CLOSURE
J	MJG	33°25'47.50"	33°25'48.17"
	GJH	32°16'36.67"	32°16'37.34"
	HJK_{AUX}	100°13'11.67"	100°13'12.34"
	$K_{AUX}JL$	88°43'40.00"	88°43'40.67"
	LJM	105°20'40.83"	105°20'41.50"
		359°59'56.67"	360°00'00.02"
		-3.33"	
K_{AUX}	$GK_{AUX}H$	11°30'35.00"	11°30'37.50"
	$JK_{AUX}G$	31°15'55.83"	31°15'58.33"
	$HK_{AUX}J$	317°13'21.67"	317°13'24.17"
		359°59'52.50	360°00'00.00"
		-7.50	
L	MLG	21°11'44.17"	21°11'46.34"
	GLJ	24°39'10.83"	24°39'13.00"
	JLP	233°28'43.33"	233°28'45.50"
	PLN	46°49'38.33"	46°49'40.50"
	NLM	33°50'32.50"	33°50'34.67"
		359°59'49.16"	360°00'00.01"
		-10.84	
M	GMJ	71°33'03.33"	71°33'03.00
	JML	28°48'31.67"	28°48'31.34"
	LMN	51°52'15.83"	51°52'15.50'
	NMB	35°50'19.17"	35°50'18.84
	BMG	171°55'51.67"	171°55'51.34"
		360°00'01.67"	00'00.02
		+1.67	

STATION	ANGLE	OBSERVED	ADJ. FOR STA. CLOSURE
N	BNM	76° 48' 22.50"	76° 48' 22.08"
	MNL	94° 16' 56.67"	94° 16' 56.25"
	LNP	16° 52' 10.00"	16° 52' 09.58"
	$C_{AUX}NB$	59° 27' 10.00"	59° 27' 09.58"
	PND	36° 43' 56.67"	36° 43' 56.25"
	DNC_{AUX}	75° 51' 26.67"	75° 51' 26.25"
		360° 00' 02.51"	359° 59' 59.99
		+2.51	
P	NPL	116° 18' 10.83"	116° 18' 11.25"
	LPE	158° 45' 33.33"	158° 45' 33.75"
	EPD	57° 08' 37.50"	57° 08' 37.92"
	DPN	27° 47' 36.67"	27° 47' 37.09"
		359° 59' 58.33	360° 00' 00.01"
		− 1.67	

WING TRIANGLES TO CLAIM CORS

N	$C_{AUX}NQ$	31° 36' 56.67"	31° 36' 57.50"
	QNC_{AUX}	328° 23' 01.67"	328° 23' 02.50"
		359° 59' 58.34"	360° 00' 00.00"
		−1.66"	
C_{AUX}	$QC_{AUX}N$	42° 40' 17.50"	42° 40' 18.75"
	$NC_{AUX}Q$	317° 19' 40.00"	317° 19' 41.25"
		359° 59' 57.50"	360° 00' 00.00"
		−2.50	
	$QC_{AUX}R$	47° 02' 00.00"	47° 02' 00.83"
	$RC_{AUX}Q$	312° 57' 58.33"	312° 57' 59.16"
		359° 59' 58.33"	359° 59' 59.99"
		−1.67	
R	$C_{AUX}RQ$	107° 03' 50.00"	107° 03' 51.25"
	QRC_{AUX}	252° 56' 07.50"	252° 56' 08.75"
		359° 59' 57.50"	360° 00' 00.00"
		−2.50	

STA	ANGLE	OBSERVED	ADJ. FOR STA CLOSURE
Q	NQR	79°48'50.00"	79° 48' 48.89"
	RQ C_{AUX}	25°53'53.33"	25° 53' 52.22"
	C_{AUX}QN	254° 17' 20.00"	254° 17' 18.89"
		360° 00' 03.33"	360° 00' 00.00"
		+ 3.33	

STA	No. ANGLES	CLOSURE	CORR. / ANGLE
A	3	-1.67	+0.56
B	4	-7.49	+1.87
C_{AUX}	4	+2.51	-0.63
D	6	-5.00	+0.83
E	3	-5.00	+1.67
F	2	+4.17	-2.08
G	6	+6.68	-1.11
H	4	-5.00	+1.25
J	5	-3.33	+0.67
K	3	-7.50	+2.50
L	5	-10.84	+2.17
M	5	+1.67	-0.33
N	6	+2.51	-0.42
P	4	-1.67	+0.42
TOTAL 14	60	65.04	16.51
AVE	4.3	4.65"	1.18"

WING TRIANGLES TO CLIM COR.

N	2	-1.66	+0.83
C_{AUX}	2	-2.50	+1.25
C_{AUX}	2	-1.67	+0.83
R	2	-2.50	+1.25
Q	3	+3.33	-1.11

27 Dec 60				Reeves Andres		

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1.925
4 4.5

STA	ANGLE	1ST HOR ANGLE	6TH HOR ANGLE
K_{AUX}	$GK_{AUX}H$	11° 30' 40"	69° 03' 30"
	$JK_{AUX}G$	31° 15' 55"	187° 35' 35"
	$HK_{AUX}J$	317° 13' 15"	103° 20' 10" +1800°

2
11/12 K_{AUX} H 117° 28' 40" DOUBLE =

H K_{AUX} K 99° 39' 30" DOUBLE =

H	$K_{AUX}HJ$	37° 00' 20"	222° 00' 25"
	$K_{AUX}HJ$	37° 00' 10"	222° 00' 40"
	JHG	113° 59' 10"	323° 55' 40"
	GHF	25° 58' 40"	155 52 20
	FHK_{AUX}	183° 01' 25"	18° 9' 40"

VOID

H	$K_{AUX}HJ$	37° 00' 25"	222° 01' 45
	JHG	113° 59' 20"	323° 56' 00"
	GHF	25° 58' 40"	155° 52' 15"
		~~183° 01' 20"~~ void	
	FHK_{AUX}	183 01' 20"	18° 9 30

STATION BALANCE

AVE OF 6 ∠'S	ANGLES BALANCED AROUND STATION	REMARKS
11° 30' 35.00"	11° 30' 37.50"	BOTH SIGNALS FULL LENGTH
31° 15' 55.83"	31° 15' 58.33"	MODERATE "BOILING"
317° 13' 21.67"	317° 13' 24.17"	J is visible
359° 59' 52.50"	360° 00' 00.00	only top 1½ ft thru trees

234° 57' 15" AVE = 117° 28' 37.5"

199° 18' 25" AVE = 99° 39' 12.5"

37° 00' 04.17	37° 00' 05 37"	J is visible
37° 00' 06.67"		only top 1½ ft
113° 59' 16.67"		thru trees
25° 58' 43.33"		
183° 01' 36.67"		
359° 59' 42.04"		
37° 00' 17.5	37° 00' 18.62"	
113° 59' 20"	113° 59' 21.12"	
25° 58' 42.5	25° 58' 43.62"	
183° 01' 35	183° 01' 36.12"	
359° 59' 55.5"	359° 59' 59.98"	

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4	F4H	123°	17'	30"	19°	45'	50"
	H4K$_{Aux}$	17°	29'	40"	104°	58'	50"
	K$_{Aux}$4J	16°	18'	50"	97°	23'	30"
	J4L	VOID					
	M4F	127°	57'	20"	47°	44'	15"
	L4M						

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123° 17′ 38.33″

17° 29′ 48.33″

16° 13′ 55″

127° 57′ 22.50″

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28 DEC 60

REEVES
ANDRES

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STA	ANGLE	1ST HOR ANGLE	6TH HOR ANGLE
G	FGH	123° 17' 15"	19° 46' 00"
	HG K_{AUX}	17° 29' 50"	104° 59' 40"
	K_{AUX} G J	16° 13' 45"	97° 23' 40"
	J G L	16° 34' 25"	99° 27' 00"
	~~L G M~~	~~89° 35' 40"~~	~~3 50° 39' 40"~~
	L G M	58° 26' 45"	THIS IS O.K.
	M G F	127° 57' 20"	47° 44' 40"
M	G M J	71° 32' 45"	69° 18' 20"
	J M L	28° 43' 25"	172° 51' 10"
	L M N	51° 52' 20"	311° 13' 35"
	N M B	35° 50' 15"	215° 01' 55'
	~~B M G~~	~~171° 55' 30"~~	~~311° 39' 45"~~
	B M G	171° 55' 30"	311° 35' 10"

6)1.67
12
47

5)1.67
5
17

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Ave of 6 ∡'s		Station	Closure	
123° 17'	40.00"	123° 17'	38.89"	
17° 29'	56.67"	17° 29'	55.56"	
16° 13'	56.67"	16° 13'	55.56"	
16° 34'	30.00"	16° 34'	28.89"	
~~58° 26'~~	~~36.67"~~	58° 26'	35.56"	
127° 57'	26.67"	127° 57'	25.56"	
360° 00'	06.68"	360° 00'	00.02"	
71° 33'	03.33"	71° 33'	03.00"	
28° 48'	31.67"	28° 48'	31.34"	Turned 1 angle to check minutes 28° 48' 20"
51° 52'	15.83"	51° 52'	15.50"	
35° 50'	19.17"	35° 50'	18.84"	
~~171° 56'~~	~~37.50"~~			Void
171° 55'	51.67"	171° 55'	51.34"	
360° 00'	01.67	360° 00'	00.02"	

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STA	ANGLE		
F	HFG	30° 43' 40"	184° 22' 00"
			30° 43' 40.00"
	GFM	329° 16' 20"	175° 38' 25"
			329° 16' 24.17"
			360° 00' 04.17"

HFG ADJUSTED = 30° 43' 37.92"

GFM " = 329° 16' 22.09"

360° 00' 00.01"

△ FGH

HFG = 30° 43' 37.92"

FGH = 123° 17' 38.89"

GHF = 25° 58' 43.62"

180° 00' 00.43"

BASE LINE MEASUREMENT

STA	FORWARD V4	FORWARD DIST	FORWARD TEMP	BACK V4	BACK DIST	BACK TEMP
¼ 2/1						
	265°23'40"	256.290 256.290		272°30'55"	255.720 255.725	70°
BL-1						
	94°43'20"	224.150 224.160	70°	87°21'30"	223.650 223.650	78°
BL-2						
	265°38'40"	279.490 279.495	78°	272°41'30"	278.955 278.950	74°
BL-3						
	94°13'00"	286.320 286.320	78°	87°20'00"	285.780 285.785	78°
BL-4						
	266°05'40"	253.000 253.000	79°	271°51'20"	252.485 252.496	80°
BL-5						
	93°20'00"	273.240 273.250	82°	88°33'40"	272.850 272.830	
BL-6						
	266°20'00"	296.255 296.255		271°55'20"	295.880 295.880	
BL-7						
	96°41'00"	99.145 99.150		88°30'20"	98.510 98.510	
BL-8						
	262°20'40"	166.115 166.115 ~~166.130~~		274°34'40"	165.190 165.190 ~~165.215~~	78°
BL-9						
	89°41'40"	182.560 182.560		93°09'00"	182.810 182.820	
BL-10						
	265°22'30"	121.595 121.590		89°49'40"	121.200 121.200	
~~BL-11~~	PROPERTY CORNER					

ALL MEASUREMENTS AT 20 LB

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ANGLES ON BASE LINE

STA	BS	FS			
PROP COR.	BL-7	BL-10	359°	24'	10" BL-7 IS IN LINE WITH BL-8
BL-10	PROP COR	BL-9	180°	58'	50"
BL-9	BL-10	BL-8	179°	36'	10"
BL-8	BL-9	PROP COR.	359°	59'	40"
			1079	58'	50"
			720		
			359°	58'	50"

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0 END AHEAD

BASE LINE MEASUREMENT

STA	FORWARD 20 LB	FORWARD 15 LB	FORWARD TEMP	BACKWARD 20 LB	BACKWARD 15 LB	BACKWARD TEMP
	82.418	82.410	62°			
	SUPP AT 63'					
	39.000	39.002	61°			
	UNSUPP.					
	82.756	82.750	64°			
	165.638	165.624	60°			
	45.718	45.718	57°			
	53.048	53.052	58°			
	295.790	296.002	57°			
	FULLY SUPPORTED		52°			
	272.970			272.950	272.946	
	SUPP		192'			

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3 JAN 61	REEVES ANDRES

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STA	ANGLE	1ST HOR ∡	6TH HOR ∡
J	MJG	33°25'40" VOID	200°39'45"
		AVE =	33°26'37.50"
	GJH	52°42'10"	316°14'00"
		AVE =	52°42'20.00"
	HJK AUX	79°47'50" VOID	118°44'20"
		AVE =	79°47'23.33"
	K AUX JL	88°44'05"	172°23'50"
		AVE =	88°43'58.33"
	LJM	105°20'15"	272°03'00"
		AVE =	105°20'30.00
	MJG	33°25'40"	200°35'15"
			33°25'52.50"
	HJK AUX	79°47'00"	118°42'50"
		AVE =	79°47'08.33"
			359°59'49.16
			10.84"

VOID

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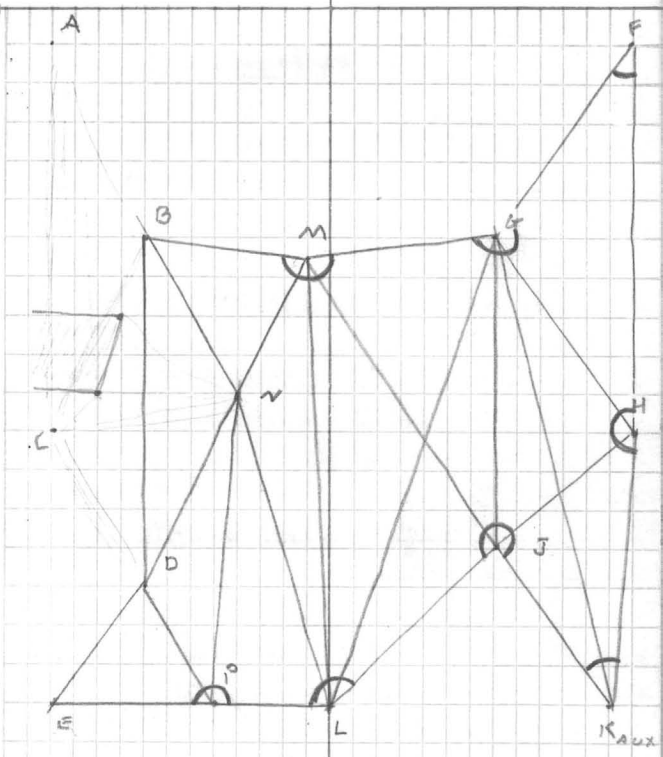

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L	MLG	21° 11' 40"	127° 10' 25"
		AVE =	21° 11' 44.17"
	GLJ	24° 39' 20"	147° 55' 05"
			24° 39' 10.83"
	JLP	233° 28' 20"	320° 52' 20"
			233° 28' 43.33"
	PLN	46° 49' 40"	280° 57' 50"
			46° 49' 38.33"
	NLM	33° 50' 30"	203° 03' 15"
			33° 50' 32.50"
			359° 59' 49.16

JL ¼ COR 1ST 215° 28' 30"

215° 28' 40"

138.41' TO ¼ COR

V ∡ 94° 20'

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70° 58'00"

70° 57'55" Ave 215° 28' 57.5"

Supp. at 56'

P	NPL	116° 18' 25"	337° 49' 05" 116° 18' 10.83"
	LPE	159° 45' 20"	232° 33' 20" 158° 45' 33.33"
	LPE	158° 45' 20"	TO CHECK DEGREES
	EPD	57° 08' 25"	342° 51' 45" 57° 08' 37.50"
	DPN	27° 47' 40"	166° 45' 40" 27° 47' 36.67" 359° 59' 58.33"
K	131.98	FROM RAUX TO K	

STA	ANGLE	1ST H 4		6TH H 4	
N	BNM	76° 48' 30"		100° 50' 15"	
			AVE =	76° 48' 22.50"	
	MNL	94° 16' 40"		205° 41' 40"	
			AVE =	94° 16' 56.67"	
	LNP	16° 52' 00"		101° 13' 00"	
			AVE =	16° 52' 10.00	
	CNB AUX	59° 27' 10"		356° 43' 00"	
			AVE =	59° 27' 10.00"	
	PND	36° 43' 45"		220° 23' 40"	
			AVE =	36° 43' 56.67"	
	DNC	75° 51' 20"		95° 08' 40"	
				75° 51' 26.67"	
				360° 00' 02.51"	
WIN & TRIANGLE					
	CNQ AUX	31° 36' 55"		189° 41' 40"	
				31° 36' 56.67"	
	QNC AUX	328° 22' 50"		170° 18' 10"	
				328° 23' 01.67"	
				359° 59' 58.34"	1.66"

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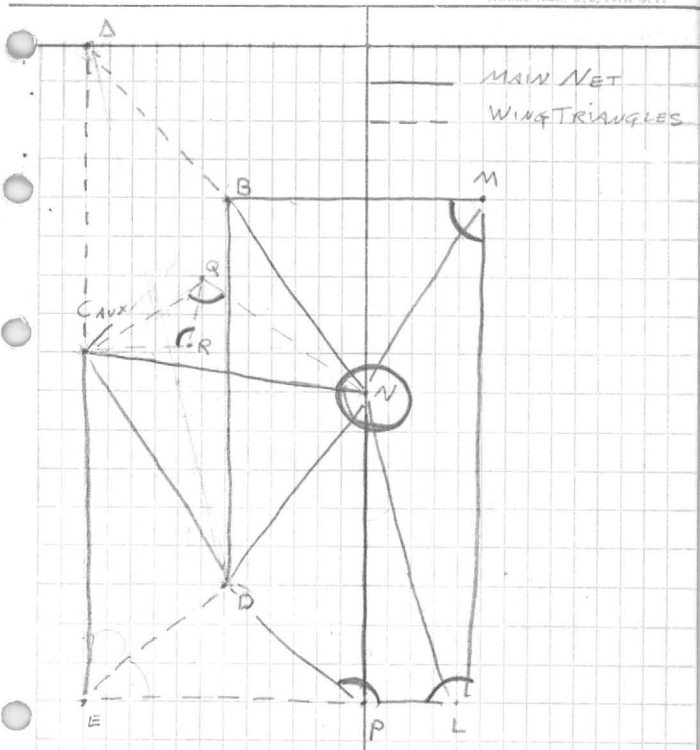

ANGLES TO TOP OF PIPE

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LEFAX, PHILADELPHIA, PA

STA	ANGLE	1ST H ∠	6TH H ∠
R	$C_{AUX}RQ$	107° 04' 20"	282° 23' 00"
		AVE =	107° 03' 50.00"
	QRC_{AUX}	252° 55' 55"	77° 36' 45"
		AVE =	252° 56' 07.50"
			359° 59' 57.50"
Q	NQR	79° 48' 40"	118° 53' 00"
		AVE =	79° 48' 50.00"
	RQC_{AUX}	25° 53' 45"	155° 23' 20"
			25° 53' 53.33"
	$C_{AUX}QN$	254° 17' 15"	85° 44' 00
			254° 17' 20.00
			360° 00' 03.33"

J	LJM				
	MJG	33°25'	45"	200°34' 45"	
			AVE	33°25' 47.50"	
	GJH	32°16'	20"	198°39' 40"	
			AVE =	32°16' 36.67"	
	HJK$_{aux}$	100°13'	20"	241°19' 10"	
			AVE =	100°13' 11.67"	
	K$_{aux}$JL	88°43'	40"	172°22' 00"	
				88°43' 40.00"	
	LJM			272°04' 05"	
				105°20' 40.83"	
				359°59' 56.67"	

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5 JAN 60	REEVES ANDRES

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STA	ANGLE	1ST H ANGLE	6TH H ANGLE
WING TRIANGLE			
C_{AUX}	$QC_{AUX}N$	42°40'10"	256° 01' 45"
		AVE =	42°40' 17.50"
	$NC_{AUX}Q$	317°19' 35"	103° 58' 00"
		AVE =	317°19' 40.00"
			359°59' 57.50"
	$EC_{AUX}A$	180° 55' 50"	5° 36' 40"
		AVE =	180° 56' 06.33"
	$NC_{AUX}D$	[illegible]	[illegible]
		AVE =	45° 18' 36.67"
	$DC_{AUX}E$	35°02' 10"	[illegible]
		AVE =	35° 02' 26.67"
	$AC_{AUX}N$	98° [illegible]	[illegible]
			98° 38' 56.67"
			360°00' 06.34"
WING TRIANGLE			
	$QC_{AUX}R$	47°02' 15"	282° 12' 00"
		AVE =	47°02' 00.00"
	$RC_{AUX}Q$		77° 47' 50
		AVE =	312° 57' 58.33"
			359° 59' 58.33"
	$NC_{AUX}C$	79° 54' 40"	DOUBLE 159° 49' 40"
268.32'	SLOPE DIST	C_{AUX} TO C	VA = 97°16' 30"

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MADE IN U.S.A.

LEFAX, PHILADELPHIA, PA.

Ave = 79° 54' 50"

D	ADB	14°38'40"		87°52'30"	
			Ave =	14°38'45.00"	
	BDN	23°07'50"		138°48'00"	
			Ave =	23°08'00.00"	
	NDP	115°28'30"		332°51'05"	
			Ave =	115°28'30.83"	
	C_{AUX}DA	21°03'20"		126°19'00"	
			Ave =	21°03'10.00"	
	PDE	74°04'00"		84°25'15"	
			Ave =	74°04'12.50"	
	EDC_{AUX}	111°37'10"		309°43'40"	
			Ave =	111°37'16.67"	
				359°59'55.00"	

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REEVES
ANDRES

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MADE IN U.S.A.
LEFAX, PHILADELPHIA, PA.

STA		1ST H		2ND H	
E	CALC ED	33° 14' 00"		199° 33' [illegible]	
				33° 13' 53.33"	
	DEP	48° 47' [illegible]		[illegible]	
				48° 47' [illegible]	
	PE CALC	[illegible]		[illegible]	
				217° 58' 59.00'	
				359° 59' 55.00"	
	[illegible]	[illegible]		[illegible]	
			AVE =	323° 46' [illegible].33"	
	PAD	21° 12' [illegible]		[illegible] 14' 20"	
			AVE =	21° 12' 23.33"	
	DAC CALC	15° 01' 29"		90° [illegible]	
				15° 01' [illegible]	
				359° 59' 59.33"	

B	ABM				
	MBN	67° 21' [illegible]		[illegible]	
		VOID		67° 21' 18.33	
	MBN	[illegible]		[illegible]	
			Ave	67° 21' 22.50"	
	NBD	21° 33' [illegible]5"		129° 21' 40"	
			Ave	[illegible]	
	DBA	144° 03' [illegible]		144° [illegible]	
			Ave	144° 03' [illegible]	
	ABM	126° 55' 55"		[illegible]	
				[illegible]	
				359° 59' 57.51	

S_{AUX}	$AC_{AUX}N$	98°37'20"		231°45'45"
		VOID		98°37'37.50"
	$AC_{AUX}N$	98°36'40"		231°41'25"
				98°36'54.17"
	$NC_{AUX}D$	45°18'25"		271°52'10"
				45°18'41.67"
	$DC_{AUX}E$	35°08'20"		210°51'40"
			AVE=	35°08'36.67"
	$EC_{AUX}A$	180°56'00"		5°35'00"
			AVE	180°55'50.00"
				360°00'02.51"

BASE LINE

1205

1ST MEAS. 20#	2429.497 ~~2430.449~~	AVE 2429.628 ~~2430.602~~	PRECISION = $\frac{1}{7,935}$
2D MEAS 20#	2429.760 ~~2430.756~~		

1ST MEAS. 30#	2429.761 ~~2430.713~~	AVE 2429.842 ~~2430.797~~
2D MEAS. 30#	2429.922 ~~2430.881~~	

TOTAL AVE = 2429.735 ± .059 ~~.085~~
~~2430.700 ± .102~~

PRECISION = ~~$\frac{1}{23,830}$~~ $\frac{1}{41,182}$

REQUIRED PRECISION = $\frac{1}{50,000.}$

BENDERS C.C.
BASE LINE. MEAS 31 DEC 60
CALL 2 JAN 61

CALCULATIONS SHOULD BE
CHECKED FOR ERRORS

JEP

	+	HI	−	EL	
1/4 COR.	6.48	211.90	1.43		
TP		211.90	10.27	201.63	
TP	0.77	202.40	10.03	192.37	
105 TP	0.57	192.94	10.73	182.21	
TP	-1.18	181.03	11.75	169.28	
TP	0.50	169.78	11.95	157.83	
TP	1.29	159.12	11.25	147.87	
TP	0.86	148.73	11.27	137.46	
114 TP	1.13	138.59	8.97	129.62	
118 TP	-0.16	129.46	10.88	127.48	
TP	-0.51	126.97	9.87	117.10	
122	2.67	119.77	9.69	110.08	

STA	HI	TOP	MID	BOTT	V ∠
	4.23	ABOVE	- 122		
123		2.00	2.36	3.72	101°02'
124		2.00	2.84	3.67	96°36'
125		2.00	3.74	5.47	92°04'
126		2.00	3.94	5.87	91°48'
COR		3.00	5.34	7.67	92°00'

BASE-LINE LEVELS

STA	+	HI	−	ELEV.
℄ 2/1				100.00
101		4.65	9.71	
122				100.00
121	10.98	110.98	6.43	
120		110.98	3.96	
TP		110.98	0.57	110.41
119	10.10	120.51	8.00	
118 TP		120.51	3.11	117.40
117	6.46	123.86	2.42	
116 TP		123.86	1.02	122.84
115	8.64	131.48	6.95	
114 TP		131.48	3.05	128.43
113 TP	9.60	138.03	3.11	134.92
112	9.10	144.02	3.73	
111 TP		144.02	-.99	145.01
110	9.78	154.79	2.97	
TP		154.79	0.61	155.40
109	10.83	166.23	8.71	
108 TP		166.23	1.21	165.02
107	9.72	174.74	4.43	
106 TP	-	174.74	-0.55	175.29
105 TP	8.65	183.94	1.74	182.20
104	8.15	190.35	3.00	
TP		190.35	2.01	188.34
103	9.77	198.11	3.57	
TP		198.11	1.45	196.66
102	10.46	207.12	6.91	
101 TP		207.12	1.70	205.42

BASE LINE LEVELS

STA	+	HI	−	EL	DIFF. IN EL.
122				100.00	4.55
121	10.98	110.98	6.43	104.55	2.47
120			3.96	107.02	
TP			0.57	110.41	5.49
119	10.10	120.51	8.00	112.51	4.89
118 TP			3.11	117.40	4.04
117	6.46	123.86	2.42	121.44	1.40
116 TP			1.02	122.84	1.69
115	8.64	131.48	6.95	124.53	3.90
114 TP			3.05	128.43	6.49
113 TP	9.60	138.03	3.11	134.92	5.37
112	9.10	144.02	3.73	140.29	4.72
111 TP			−.99	145.01	6.81
110	9.78	154.79	2.97	151.82	
TP			0.61	154.18	4.48
109	10.83	165.01	8.71	156.30	7.50
108 TP			1.21	163.80	5.29
107	9.72	173.52	4.43	169.09	4.98
106 TP			−0.55	174.07	6.91
105 TP	8.65	182.72	1.74	180.98	5.15
104	8.15	189.13	3.00	186.13	
TP			2.01	187.12	7.19
103	9.77	196.89	3.57	193.32	
TP			1.45	195.44	4.86

STA	+	HI	−	El	
102	10.46	205.90	6.91	198.18	6.02
101 TP			1.70	204.20	5.05
1/4 COR	6.48	210.68	1.43	209.25	
TP			10.27	200.41	
TP	0.77	201.18	10.03	191.15	
105 TP	0.57	191.72	10.73	180.99	
TP	-1.18	179.81	11.75	168.06	
TP	0.50	168.56	11.95	156.61	
TP	1.29	157.90	11.25	146.65	
TP	0.86	147.51	11.27	136.24	
114 TP	1.13	137.37	8.97	128.40	
118 TP	-0.16	128.24	10.88	117.36	
TP	-0.51	116.85	9.87	106.98	
122	2.67	109.65	9.69	99.96	ERROR = 0.04'

STA HI = 104.23

	TOP	MID	BOTT.		DIFF EL FROM STADIA H.J.	EL	DIFF EL.
						122	
							11.65
123	2.00	2.36	2.72	11°02'	13.52	88.35	
							6.03
124	2.00	2.84	3.67	6°36'	19.07	82.32	
							-5.68
125	2.00	3.74	5.47	2°04'	12.49	88.00	
							0.14
126	2.00	3.94	5.87	1°48'	12.15	88.14	
							5.55
PROP. COR.	3.00	5.34	7.67	2°00'	16.30	82.59	

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30 DECEMBER 1960

REEVES
ANDRES

ORIGINAL COPR. 1910 BY J. G. PARKER
MADE IN U.S.A.
LEFAX, PHILADELPHIA, PA.

BASE-LINE MEASUREMENT

STATIONS	DISTANCE	TENSION	TEMP	REMARKS
122-121	46-.275	20	46°	
" "	46-.285	30	"	
121-120	54-.952	20	46°	
" "	54-.960	30	"	
120-119	97-.222	20	46°	
	97-.235	30		
119-118	100-.415	20	44°	
" "	100-.425	30		5-27 37-29
118-117	100-.320	20	44	
	100-.332	30	44	
117-116	47-.726	20	41	
	47-.732	30	41	
116-115	90-.492	20	42°	
	90-.505	30	42°	
115-114	67-.910	20	43°	
	67-.915	30	"	
114-113	100-.388	20	46°	
	100-.390	30	"	
113-112	100-.340	20	45°	
"	100-.360	30	"	
112-111	100-.416	20	44°	
" "	100-.430	30	"	
111-110	100-.600	20	46°	
	100-.630	30	"	
110-109	100-.600	20	45	
	100-.610	30	"	
109-108	99-.285	20	48°	
	99-.300	30	"	

Station	Distance	Tens	Temp	Rem.
108-107	98 - .540	20	54°	
" "	98 - .565	30	"	
107-106	100 - .420	20	45°	5 35'
" "	100 - .440	30	"	
106-105	100 - .585	20	44°	
" "	100 - .600	30	44°	
105-104	99 - .730	20	46°	
" "	99 - .758	30	"	
104-103	100 - .135	20	47°	
	100 - .145	30	47°	
103-102	100 - .330	20	45°	
	100 - .350	30	45°	
102-101	100 - .232	20	48°	
"	100 - .255	30	"	
101-⊕	79 - .646	20	50°	
	79 - .655	30		
⊕-101	79 - .640	20		
	79 - .649	30		
101-102	100 - .238	20	50	
	100 - .259	30		
102-103	100 - .318	20		
	100 - .349	30	51	
103-104	100 - .118	20		
	100 - .148	30	50	
104-105	99 - .723	20		
	99 - .762	30	52	
105-106	100 - .581	20		
	100 - .598	30	52	

STA	DIST		TBN	TEMP
106-107	100	.421	20	
	100	.432	30	52
107-108	98	.538	20	
	98	.562	30	53
108-109	99	.281	20	
	99	.293	30	53
109-110	100	.600	20	
	100	.612	30	54
110-111	100	.592	20	
	100	.631	30	52
111-112	100	.421	20	
	100	.436	30	54
112-113	100	.341	20	
	100	.364	30	50
113-114	100	.385	20	
	100	.400	30	51
114-115	67	.905	20	
	67	.923	30	53
115-116	90	.490	20	
	90	.510	30	50
116-117	47	.732	20	
	47	.739	30	52
117-118	100	.321	20	
	100	.333	30	50
118-119	100	.403	20	
	100	.416	30	53
119-120	97	.232	20	
		.243	30	53

120-121	54	-.950	20		
	54	-.955	30	54	
121-122	46	-.275	20		
	46	-.280	30	53	
122-123	72	-.850	20		
	72	-.860	30	58	
123-124	95	-.360	20		S-27
	95	-.385	30	50	
124-125					
125-126	40	-.986	20		
	40	-.990	30	56	
126-P.C.	83	-.612	20		
	83	-.623	30	55	
P.C.-126	83	-.618	20	57°	Sup
	83	-.628	30	"	Sup.
126-125	40	-.990	20	55°	
	40	-.998	30	"	
125-124	182	+.700	15		
	182	+.645	20	57°	
	182	+.625	30	57°.	
124-123	95	-.1375	20	56	
	95	-.385	30	56	
123-122	72	-.860	20	56	
	72	.870	30	56	

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		.675	
125-124	182.~~735~~	15	
	182.650	20	
	182.610	30	
	SUPP- 37' S OF 124		58°

ORIGINAL COPR. 1910 BY A. G. PARKER
MADE IN U.S.A.
LEFAX, PHILADELPHIA, PA.

WEIGHT OF CHAIN = .022 LB/FT

1ST MEASUREMENT - TENSION 20LB

TEMP 46° 122-1/4 COR (CHAIN LENGTH = 99.9935')

56° 122-P.C. (CHAIN LENGTH = 100.000')

	MEAS. DIST	SUPPORT	SAG COR	DIST COR. FOR SAG	DIST COR FOR TEMP = SLOPE DIST
1/4 COR - 101	78.354 ✓		-.024	78.330	78.325
101 - 102	99.768 ✓		-.050	99.718	99.712
102 - 103	99.670 ✓		-.050	99.620	99.614
103 - 104	99.865 ✓		-.050	99.815	99.809
104 - 105	98.270 ✓		-.043	98.227	98.221
105 - 106	99.415 ✓		-.049	99.366	99.360
106 - 107	99.580 ✓	35'	-.016	99.564	99.558
107 - 108	97.460 ✓		-.047	97.413	97.407
108 - 109	98.715 ✓		-.048	98.667	98.661
109 - 110	99.400 ✓		-.049	99.351	99.345
110 - 111	99.400 ✓		-.049	99.351	99.345
111 - 112	99.584 ✓		-.050	99.534	99.528
112 - 113	99.660 ✓		-.050	99.610	99.604
113 - 114	99.612 ✓		-.050	99.562	99.556
114 - 115	66.090 ✓		-.015	66.075	66.071
115 - 116	89.508 ✓		-.036	89.472	89.466
116 - 117	46.274 ✓		-.005	46.269	46.266
117 - 118	99.680 ✓		-.050	99.630	99.624
118 - 119	99.585 ✓	27, 37, 79	-.008	99.577	99.571
119 - 120	96.778 ✓		-.046	96.732	96.726
120 - 121	53.048 ✓		-.008	53.040	53.037
121 - 122	45.725 ✓		-.005	45.720	45.717
122 - 123	71.140 ✓		-.018	71.122	71.122
123 - 124	94.625 ✓	27'	-.016	94.609	94.609
124 - 125	182.645 ✓	37'	-.105	182.540	182.540

	MEASURED DIST	SUPPORT	SAG CORR.	DIST COR FOR SAG	CORR. FOR TEMP
125 - 126	39.010 ✓		-.003	39.007	39.007
126 - P.C.	82.382 ✓	FULLY	-.000	82.382	82.382
RAW TOTAL =	2435.243		TOTAL C_S = -.940 ✓	2434.303 ✓	

STA	SLOPE DIST	DIFF EL	SIN α = DIFF EL / SLOPE DIST	COS α	H DIST
¼ COR -101	78.325	5.05	.06447	.99792	78.162
101-102	99.712	6.02	.06037	.99817	99.530
102-103	99.614	4.86	.04879	.99881	99.495
103-104	99.809	7.19	.07204	.99740	99.549
104-105	98.221	5.15	.05243	.99863	98.086
105-106	99.360	6.91	.06955	.99758	99.120
106-107	99.558	4.98	.05002	.99875	99.434
107-108	97.407	5.29	.05431	.99852	97.263
108-109	98.661	7.50	.07602	.99710	98.375
109-110	99.345	4.48	.04510	.99898	99.244
110-111	99.345	6.81	.06855	.99764	99.111
111-112	99.528	4.72	.04742	.99888	99.417
112-113	99.604	5.37	.05391	.99855	99.460
113-114	99.556	6.49	.06519	.99788	99.345
114-115	66.071	3.90	.05903	.99826	65.956
115-116	89.466	1.69	.01889	.99982	89.450
116-117	46.266	1.40	.03026	.99954	46.245
117-118	99.624	4.04	.04055	.99918	99.542
118-119	99.571	4.89	.04911	.99879	99.451
119-120	96.726	5.49	.05676	.99839	96.570
120-121	53.037	2.47	.04657	.99892	52.980
121-122	45.717	4.55	.09953	.99505	45.491
122-123	71.122	11.65	~~.01638~~ .16380	.98649 ~~.99987~~	70.161 ~~71.113~~
123-124	94.609	6.03	.06374	.99797	94.417
124-125	182.540	5.68	.03112	.99952	182.452 } x.99998 =182.448

	SLOPE DIST	DIFF EL	SIN α = DIFF EL / SLOPE DIST	α	COS α	H DIST
125-126	39.007	0.14	.00359		.99999	39.007
126-PC	82.382	5.55	.06737		.99772	82.194

.99995
x
121.201
121.195

~~2430.449~~ ✓
2429.497

2D MEASUREMENT – TENSION 20 LB
TEMP 53° (CHAIN LENGTH = 100.002)

	MEAS DIST	SAG COR	DIST COR FOR SAG	DIST CORR FOR TEMP = SLOPE DIST	COS α	H DIST	DIFFERENCE OVER 1ST MEAS.
1/4 COR -101	78.360 ✓	-.024	78.336	78.338	.99792	78.175	+.013
101 -102	99.762 ✓	-.050	99.712	99.714	.99817	99.532	+.002
102-103	99.682 ✓	-.050	99.632	99.634	.99881	99.515	+.020
103-104	99.882 ✓	-.050	99.832	99.834	.99740	99.574	+.025
104-105	98.277 ✓	-.043	98.234	98.236	.99863	98.101	+.015
105-106	99.419 ✓	-.049	99.370	99.372	.99758	99.132	+.012
106-107	99.579 ✓	-.016	99.563	99.565	.99875	99.441	+.007
107-108	97.462 ✓	-.047	97.415	97.417	.99852	97.273	+.010
108-109	98.719 ✓	-.048	98.671	98.673	.99710	98.387	+.012
109-110	99.400 ✓	-.049	99.351	99.353	.99898	99.252	+.008
110-111	99.408 ✓	-.049	99.359	99.361	.99764	99.127	+.016
111-112	99.579 ✓	-.050	99.529	99.531	.99888	99.420	+.003
112-113	99.659 ✓	-.050	99.609	99.611	.99855	99.467	+.007
113-114	99.615 ✓	-.050	99.565	99.567	.99788	99.356	+.011
114-115	66.095 ✓	-.015	66.080	66.081	.99826	65.966	+.010
115-116	89.510 ✓	-.036	89.474	89.476	.99982	89.460	+.010
116-117	46.268 ✓	-.005	46.263	46.264	.99954	46.243	-.002
117-118	99.679 ✓	-.050	99.629	99.631	.99918	99.549	+.007
118-119	99.597 ✓	-.008	99.589	99.591	.99879	99.470	+.019
119-120	96.768 ✓	-.046	96.722	96.724	.99839	~~96.612~~ 96.568	+.042
120-121	53.050 ✓	-.008	53.042	53.043	.99892	52.986	+.006
121-122	45.725 ✓	-.005	45.720	45.721	.99505	45.495	+.004
122-123	71.150 ✓	-.018	71.132	71.133	~~.99987~~ .98649	~~71.124~~ 70.172	+.011
123-124	94.640 ✓	-.016	94.624	94.626	.99797	94.434	+.017
124-125	182.650 ✓	-.105	182.545	182.549	.99952	182.461 }	× .99998 = 182.457
125-126	39.014 ✓	-.003	39.011	39.012	.99999	39.012 }	+.009 121-214 × .99995
126-P.C.	82.388 ✓	-.000	82.388	82.390	.99772	82.202 }	= 121.208
	2435.337	-.940	2434.397				+.013
						2429.760	~~2430.956~~ ✓ .307

1ST MEASUREMENT - 30# TEMP 46° 122-1/4 COR (CHAIN LENGTH 99.9935)
56° 122-P.C. C " " 100.0001

	MEAS. DIST	SAG COR	PULL COR (.00457/100')	DIST COR FOR SAG & PULL	DIST COR FOR TEMP	COS α	H DIST	DIFF FROM 1ST AT 20#
1/4 -101	78.345 ✓	-.011	+.004	78.338	78.333	.99792	78.170	+.008
101-102	99.745 ✓	-.022	+.005	99.728	99.722	.99817	99.540	+.010
102-103	99.650 ✓	-.022	+.005	99.633	99.627	.99881	99.508	+.013
103-104	99.855 ✓	-.022	+.005	99.838	99.832	.99740	99.572	+.023
104-105	98.242 ✓	-.019	+.004	98.227	98.221	.99863	98.086	.000
105-106	99.400 ✓	-.022	+.005	99.383	99.377	.99758	99.137	+.017
106-107	99.560 ✓	-.007	+.005	99.558	99.552	.99875	99.428	-.006
107-108	97.435 ✓	-.021	+.004	97.418	97.412	.99852	97.268	+.005
108-109	98.700 ✓	-.021	+.005	98.683	98.677	.99710	98.391	+.016
109-110	99.390 ✓	-.022	+.005	99.373	99.367	.99898	99.266	+.022
110-111	99.370 ✓	-.022	+.005	99.353	99.347	.99764	99.113	+.002
111-112	99.570 ✓	-.022	+.005	99.553	99.547	.99888	99.436	+.019
112-113	99.640 ✓	-.022	+.005	99.623	99.617	.99855	99.473	+.013
113-114	99.610 ✓	-.022	+.005	99.593	99.587	.99788	99.376	+.031
114-115	66.085 ✓	-.007	+.003	66.081	66.077	.99826	65.962	+.006
115-116	89.495 ✓	-.016	+.004	89.483	89.477	.99982	89.461	+.011
116-117	46.268 ✓	-.002	+.002	46.268	46.265	.99954	46.244	-.001
117-118	99.668 ✓	-.022	+.005	99.651	99.645	.99918	99.563	+.021
118-119	99.575 ✓	-.004	+.005	99.576	99.570	.99879	99.450	+.001
119-120	96.765 ✓	-.020	+.004	96.749	96.743	.99839	96.587	+.017
120-121	53.040 ✓	-.004	+.002	53.038	53.035	.99892	52.978	-.002
121-122	45.715 ✓	-.002	+.002	45.715	45.712	.99505	45.486	-.005
122-123	71.130 ✓	-.008	+.003	71.125	71.125	.98649 ~~.99987~~	70.164 ~~71.116~~	+.003
123-124	94.615 ✓	-.007	+.004	94.612	94.612	.99797	94.420	+.003
124-125	182.625 ✓	-.047	+.011	182.589	182.589	.99952	182.501	×.99998 = +.049 182.497
125-126	39.002 ✓	-.001	+.002	39.003	39.003	.99999	39.003	= 121.191 × .99995
126 - P.C.	82.372 ✓	-.000	+.004	82.376	82.376	.99772	82.188	-.010 = 121.185

~~2430.713~~
2429.761

2P MEASUREMENT - 30# TEMP 53° (CHAIN = 100.002)

	MEAS DIST.	SAG & PULL	DIST COR FOR SAG & PULL	DIST CORR. FOR TEMP.	COS α	H DIST	DIFF FROM L&T AT 30
1/4 -101	78.351 ✓	-.007	78.344	78.346	.99792	78.183	+0.013
101-102	99.741 ✓	-.017	99.724	99.726	.99817	99.544	+0.004
102-103	99.651 ✓	-.017	99.634	99.636	.99881	99.517	+.009
103-104	99.852 ✓	-.017	99.835	99.837	.99740	99.577	+.005
104-105	98.238 ✓	-.015	98.223	98.225	.99863	98.090	+.004
105-106	99.402 ✓	-.017	99.385	99.387	.99758	99.146	+.009
106-107	99.568 ✓	-.002	99.566	99.568	.99875	99.444	+.016
107-108	97.438 ✓	-.017	97.421	97.423	.99852	97.279	+.011
108-109	98.707 ✓	-.016	98.691	~~98.701~~ 98.693	.99710	~~98.415~~ 98.407	~~+.024~~
109-110	99.388 ✓	-.017	99.371	99.373	.99898	99.272	+.006
110-111	99.369 ✓	-.017	99.352	99.354	.99764	99.120	+.007
111-112	99.564 ✓	-.017	99.547	99.549	.99888	99.438	+.002
112-113	99.636 ✓	-.017	99.619	99.621	.99855	99.477	+.004
113-114	99.600 ✓	-.017	99.583	99.585	.99788	99.374	-.002
114-115	66.077 ✓	-.004	66.073	66.074	.99826	65.959	-.003
115-116	89.490 ✓	-.012	89.478	89.480	.99982	89.464	+.003
116-117	46.261 ✓	—	46.261	46.262	.99954	46.241	-.003
117-118	99.667 ✓	-.017	99.656	~~99.651~~ 99.652	.99918	~~99.564~~ 99.570	-.006
118-119	99.584 ✓	+.001	99.585	99.587	.99879	99.466	-.016
119-120	96.757 ✓	-.016	96.741	96.743	.99839	96.587	—
120-121	53.045 ✓	-.002	53.043	53.044	.99892	52.987	+.009
121-122	45.720 ✓	—	45.720	45.721	.99505	45.495	+.009
122+123	71.140 ✓	-.005	71.135	71.136	~~.99987~~ .98649	~~71.127~~ 70.175	+.014
123-124	94.615 ✓	-.003	94.612	94.614	.99797	94.422	+.002
124-125	182.610 ✓	-.036	182.574	182.578	.99952	182.490 }	-.011 × .99998 = 182.486
125-126	39.010 ✓	+.001	39.011	39.013	.99999	39.013 }	121.208 × .99995
126-P.C.	82.377 ✓	+.004	82.381	82.383	.99772	82.195 }	+.017 = 121.202

2430.881

	1ST 20	2D 20	1ST 30	2D 30
1/4 - 101	78.162 ✓	78.175 ✓	78.170 ✓	78.183 ✓
101 - 102	99.530 ✓	99.532 ✓	99.540 ✓	99.544 ✓
102-103	99.495 ✗	99.515 ✓	99.508 ✓	99.517 ✓
103-104	99.549 ✗	99.574 ✓	99.572 ✓	99.577 ✓
104-105	98.086 ✓	98.101 ✗	98.086 ✓	98.090 ✓
105-106	99.120 ✗	99.132 ✓	99.137 ✓	99.146 ✓
106-107	99.434 ✓	99.441 ✓	99.428 ✓	99.444 ✓
107-108	97.263 ✓	97.273 ✓	97.268 ✓	97.279 ✓
108-109	98.375 ✗	98.387 ✓	98.391 ✓	98.407 ~~98.415~~ ✓
109-110	99.244 ✓	99.252 ✓ ✓	99.266 ✓	99.272 ✗ ✓
110-111	99.111 ✓	99.127 ✓	99.113 ✓	99.120 ✓
111-112	99.417 ✓	99.420 ✓ ✓	99.436 ✓	99.438 + ✓
112-113	99.460 ✓	99.467 ✓	99.473 ✓	99.477 ✓
113-114	99.345 ✗	99.356 ✗	99.376* ✓	99.374 ✓
114-115	65.956 ✓	65.966 ✓	65.962 ✓	65.959 ✓
115-116	89.450 ✗	89.460 ✓	89.461 ✓	89.464 ✓
116-117	46.245 ✓	46.243 ✓	46.244 ✓	46.241 ✓
117-118	99.542 ✓	99.549 ✓ ✓	99.563 ✓	99.570 ~~99.569~~ ✓ ✓
118-119	99.451 ✓	99.470 ✓ ✓	99.450 ✓	99.466 ✓
119-120	96.570 +	96.568* ~~96.612~~	96.587 ✓	96.587 ✓
120-121	52.980 ✓	52.986 ✓	52.978 ✓	52.987 ✓
121-122	45.491 ✓	45.495 ✓	45.486 ✓	45.495 ✓
122-123	70.161 ✓	70.272 ✓	70.164 ✓	70.175 ✓
123-124	94.417 ✓	94.434 ✗	94.420 ✓	94.422 ✓
124-125	182.448 ✓	182.457 ✓	182.497* ✗	182.486 ✗
125-126	121.195 ✓	121.208 ✓	121.185 ✗	121.202 ✓
126 - P.2.				
	2429.497	2429.760	2429.761	2429.922

PROBABLE ERROR OF BASE LINE

MEAN 2429.735

4 MEASUREMENTS

2429.497	$v = 0.238$	$v^2 =$	.056644
2429.760	$v = 0.025$	$v^2 =$	.000625
2429.761	$v = .026$	$v^2 =$	.000627
2429.922	$v = .187$	$v^2 =$	.034969
		$\Sigma v^2 =$	.092865

$$E_m = 0.6745\sqrt{\frac{.092865}{n(n-1)}}$$

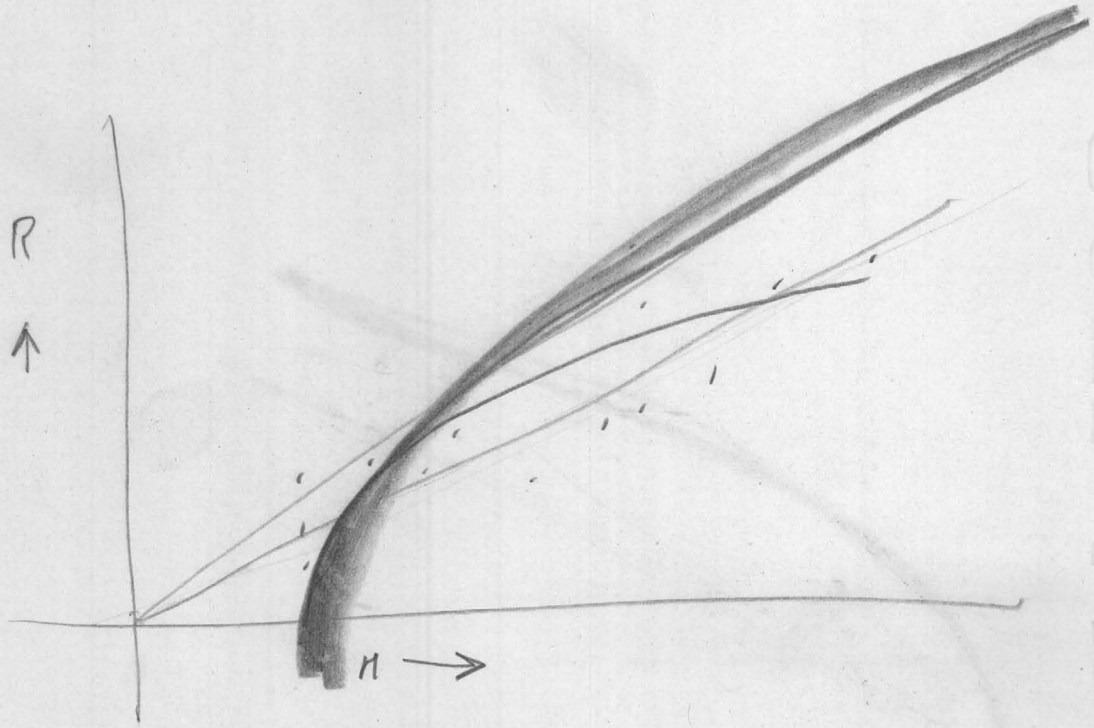
$$n = 4$$

$$= 0.6745\sqrt{.007738}$$

$$= (0.6745)(.87966) = .059$$

$$\frac{1}{41,176}$$

.735	.735	.73 ± .06
−.059	+.059	
~~.674~~	.794	
~~.68~~	.79	
.676		
.68	.79	



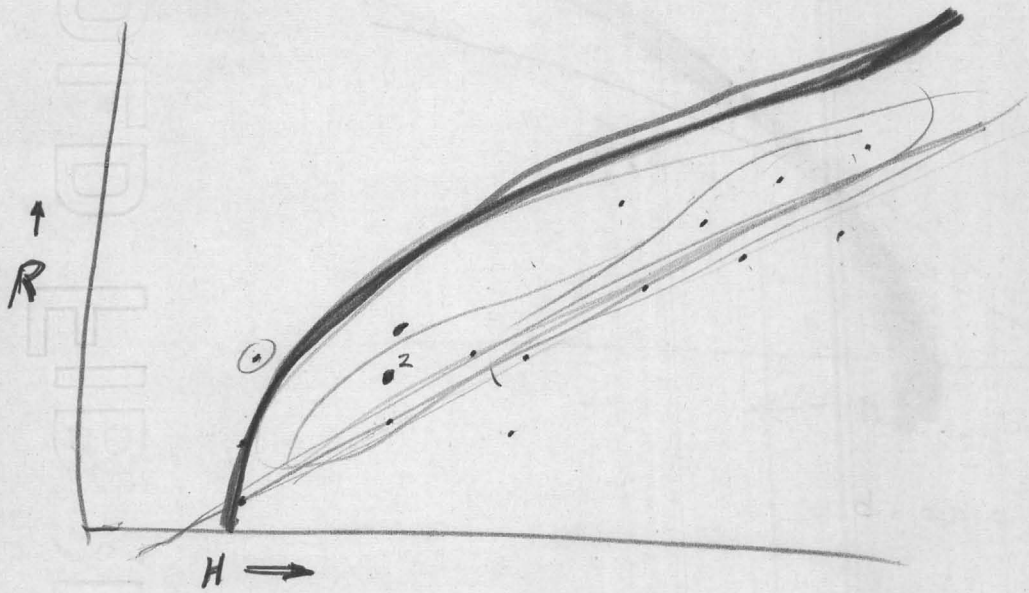
$y = ax + b$

$e_1 = ax_1 + b - y_1$

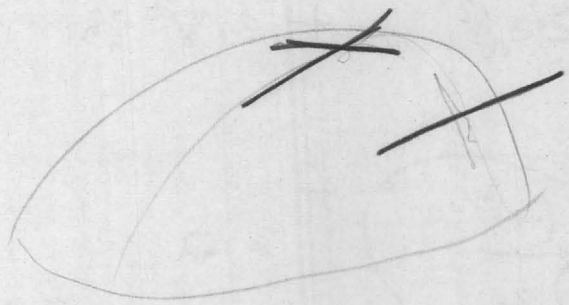
$\Sigma(e_n)^2 = f\ a, x_n, b, y_n$

$\frac{\partial (e_n)^2}{\partial a} = f = 0$

$\frac{\partial}{\partial b} = 0$



$R_1 = aH_1 + b$ e



$R_1 - e_1 = aH_1 + b$

$R_2 - e_2 = aH_1 + b$

$$(e_n)^2 = (R_n - aH_n + b)^2$$

$$\frac{\partial (e_n)^2}{\partial H} = 0 \qquad \frac{\partial (e_n)^2}{\partial R} = 0$$

20#		30#	
SAG	− 0.940		−.413
TEMP	+ 0.050	PULL	+ .118
		TEMP	− .120

(10)(1000)(.000065)

.065 / 100 FT / 10°F.

$$\frac{(.022)^2(100)^3}{24(20)^2}$$

1,000,000

.022
.022
44
44
.000484.

24
400
9600

484

.050 / 100.

9600) 48400
48 000
4000

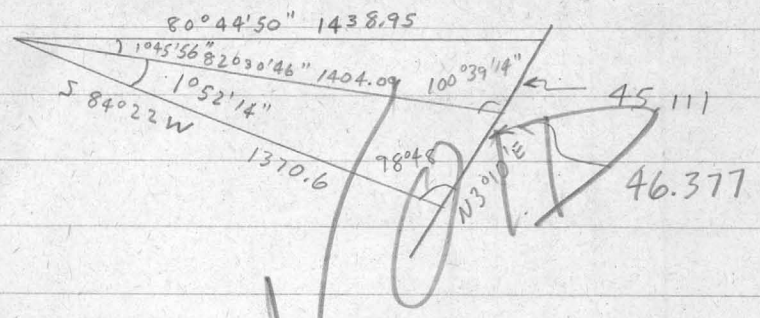
$$\frac{(P-P_0)L}{}$$

.00457 / 100'

MISC

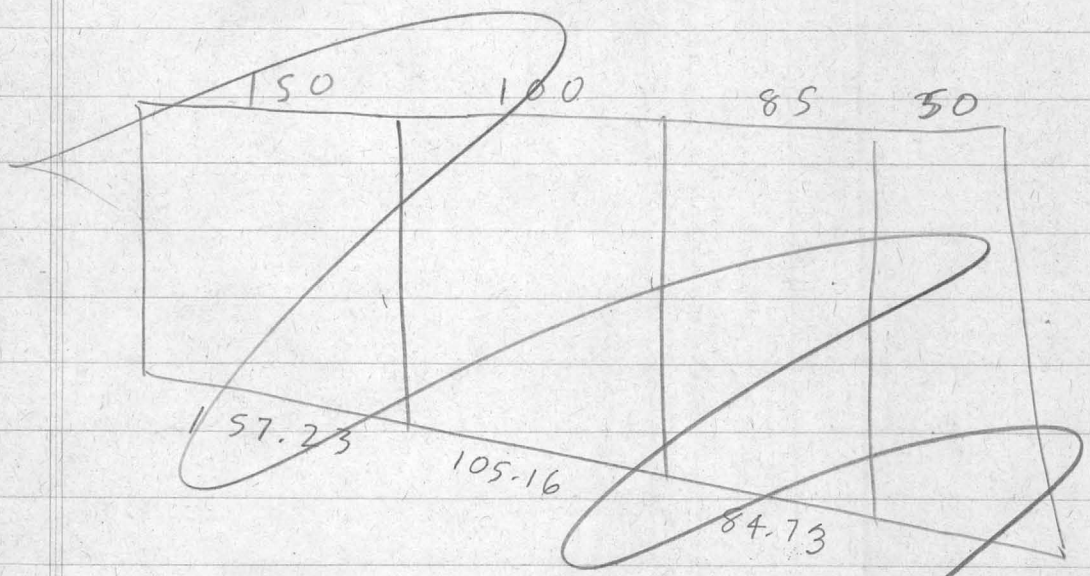
PROOF ON INACCURACY OF CLAIM SURVEY

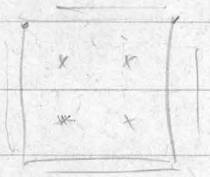
84 22 00	82 30 46
82 30 46	80 44 50
1° 51 14	1 45 56

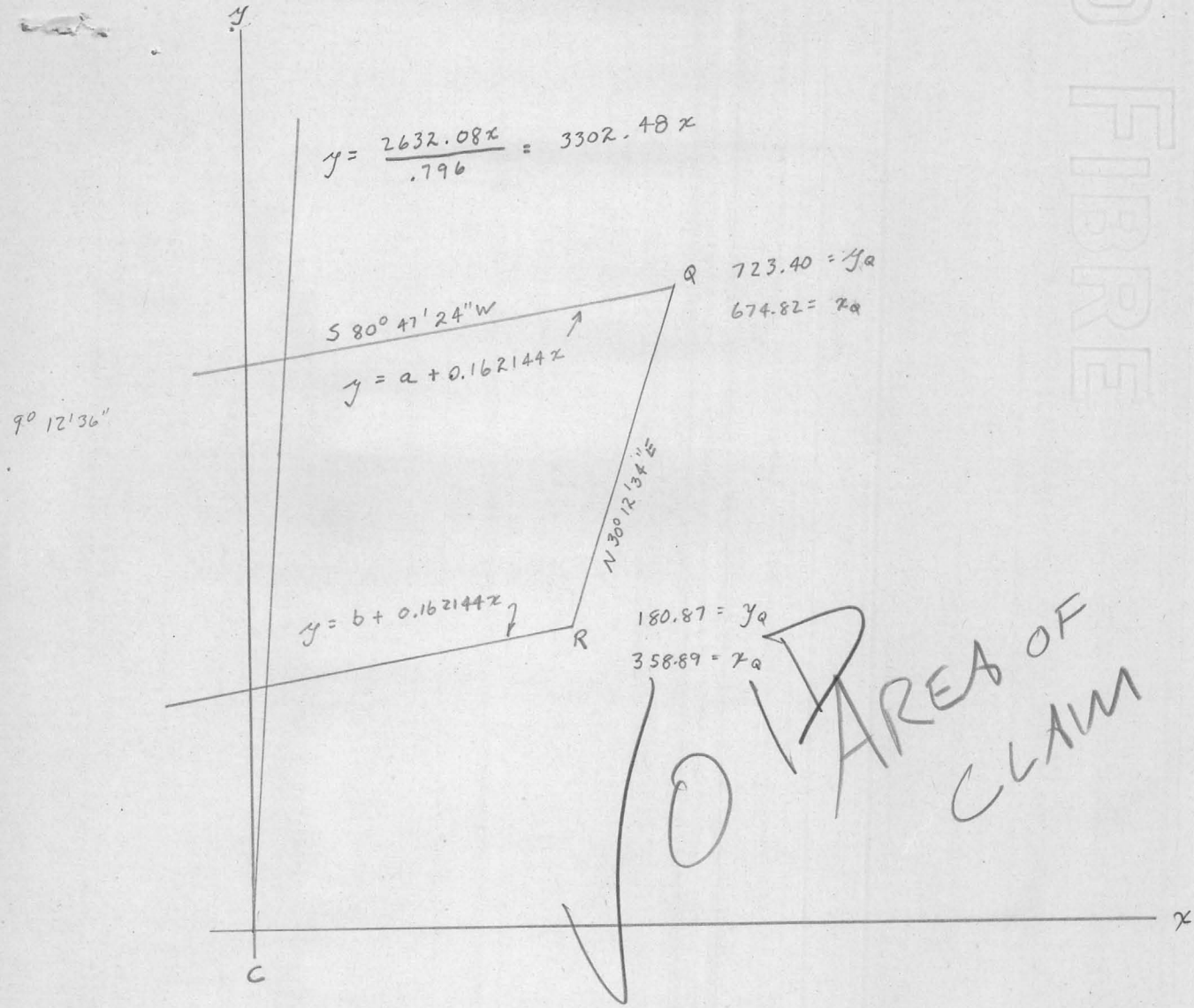


20.51'

3°10'	3°10	3°10
95°38'	97°29 14	99° 15' 10"
98° 48'	100°39' 14"	102° 25' 10"







$y = a + 0.162144x$

$x = 674.82$

$y = 723.40$

$a = 723.40 - (0.162144)\,674.82$

$= 723.40 - 109.42 = 613.98$

$y = 613.98 + 0.162144x$

$y = b + 0.162144x$

$x = 358.89$

$y = 180.87$

$b = 180.87 - (0.162144)(358.89)$

$= 180.87 - 58.19$

$= 122.68$

$y = 122.68 + 0.162144x$

$y = 613.98 + 0.162144x$

$y = 3302.48x$

$x = \frac{613.98}{3302.36} = 0.18$

$y = (3302.48)\left(\frac{613.98}{3302.36}\right) = 614.00$

CHECK $614.00 = 613.98 + (0.162144)(.18)$

$= 613.98 + .03$ CHECK .01 ✓

$y = 122.68 + .162144x$

$y = 3302.48x$

$x = \frac{122.68}{3302.36} = .03$

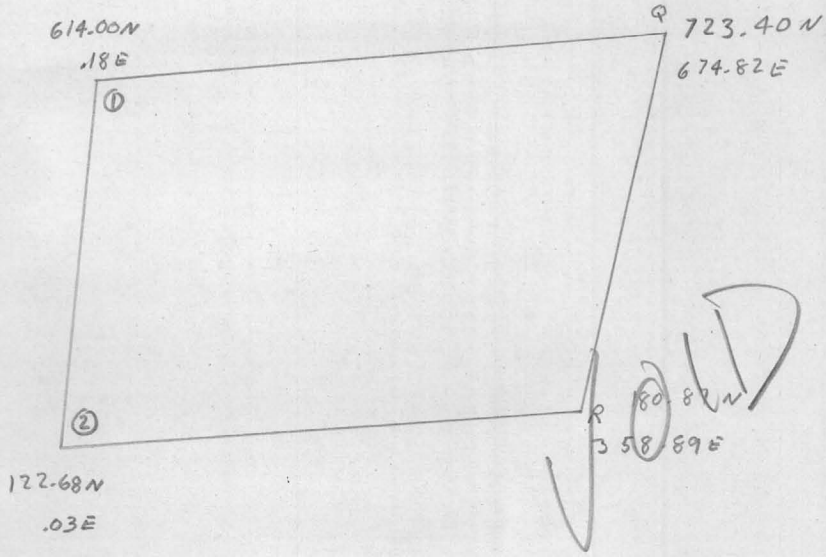
$y = \frac{(3302.48)\ 122.68}{3302.36} = 122.68$

CHECK $122.68 = 122.68 + (.162144)(.03)$

$= 122.68 + .00$ ✓

VOID

COPY FILE

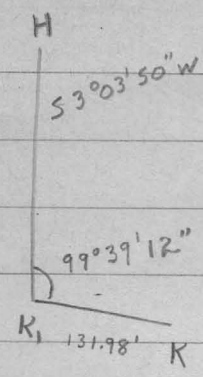


	DMD	LAT	PRODUCT
②	.21	491.32	103.18
①	675.00	109.40	738.45
Q	315.93	- 542.53	- 171,401.50
R	358.92	- 58.19	- 20,885.55
Z			

2A = 191445.42

A = 95,722.71 SQ FT

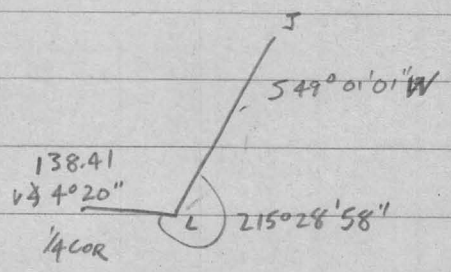
= 2.19 ACRES



99°39'12
3°03'50
102°43'02'

K1		LAT	DEP
S 77° 16' 58" E	131.98'	- 29.05	+ 128.74

K

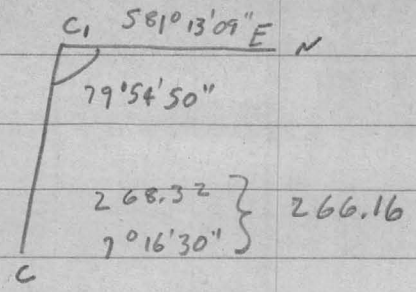


130°58'59"
215°28'58"
346 27 57"
180
166 27' 57"
~~S 86°27'57" W~~
S 84°29'59" W

229 01 01
215 28 58
180
624 29 59
360
264 29 59

L		LAT	DEP
S 84°29'59" W		-13.22	-137.37
~~S 86°27'57" W~~	138.01	~~-85.07~~	~~-137.75~~

1/4 COR



98°46'51"
79°54'50"
178°41'41"

			LAT	DEP
C_1				
	S 01° 18' 19" E	266.16	-266.09 ✓	+ 6.06 ✓
C				

	G.L.O.	TRIANGULATION
FA	WEST	S 89° 59' 22" W
AC	SOUTH	S 0° 01' 02" W
CE	S 0° 45' E	S 0° 42' 42" E
EK	N 88° 12' E	E-1/4 N 88° 10' 30" E 1/4-K N 88° 17' 48" E AVE. N 88° 14' 09" E
KH	N 0° 02' E	N 0° 01' 34" E
HF	N 0° 02' E	N 0° 02' 00" E (ASSUMED)

				LAT		DEP
A						
	N 89° 59' 22" E	5506.45	+	1.01	+	5506.45
F						
	S 0° 02' 00' W	2637.91	−	2637.91	−	1.53
H						
	S 0° 01' 34" W	2455.31	−	2455.31	−	1.12
K						
	S 88° 17' 48" W	2641.01	−	78.50	−	2639.84
1/4 COR						
	S 88° 10' 30" W	2833.51	−	90.24	−	2832.07
E						
	N 0° 42' 42" W	2629.03	+	2628.83	−	32.65
C						
	N 0° 01' 02" E	2632.08	+	2632.08	+	0.79
A						
				− .04		+ .03

	N	E
E ✓	0.00	0.00
C ✓	2628.83	− 32.65
A ✓	5260.91	− 31.86 ✓
F ✓	5261.92	5474.59
H ✓	2624.01	5473.06
K ✓	168.70	5471.94
1/4 COR ✓	90.20	2832.21
E	− 0.04	+ .03

$$\begin{array}{r} 793 \\ 696 \\ \hline 97 \end{array}$$

$\left(\dfrac{2429.735}{\sin 100°13'12''}\right) \sin 42°46'31'' = JH =$ 1676.696 +.097

$\left(\dfrac{JH}{\sin 33°43'53''}\right) \sin 113°59'20'' = GJ$ 2758.634 −.027

$\left(\dfrac{GJ}{\sin 71°33'03''}\right) \sin 75°01'07'' = MJ$ 2809.249 +.035

$\left(\dfrac{MJ}{\sin 45°50'55''}\right) \sin 105°20'41'' = ML$ 3775.742 +.167

$\left(\dfrac{ML}{\sin 94°16'57''}\right) \sin 33°50'33'' = MN$ 2108.642 +.133

$\left(\dfrac{MN}{\sin 67°21'23''}\right) \sin 35°50'19'' = NB$ 1337.734 +.142

$\left(\dfrac{NB}{\sin 23°08'00''}\right) \sin 135°18'37'' = BD$ 2394.632 ✓ −.480 $\dfrac{1}{4989}$

$\dfrac{ML}{\sin 94°16'57''}$ $51°52'16'' = NL =$ 2978.404 +.050

$\left(\dfrac{NL}{\sin 116°18'11''}\right) 46°49'38'' = NP$ 2423.002 +.038

$\left(\dfrac{NP}{\sin 115°28'31''}\right) 27°47'37'' = ND$ 1251.498 +.036

$\left(\dfrac{ND}{\sin 21°33'37''}\right) \sin 135°18'37''$ 2395.063 −.0491

712
156
.556

$\frac{1}{7000}$ ±

$$\left(\frac{2395.347}{\sin 21°12'23''}\right) \sin 144°08'42'' = AD = 3878.712 \quad -.556$$

$$\left(\frac{AD}{\sin 143°55'36'}\right) \sin 21°03'10'' = AC_1 = 2366.326 \quad +.327 \quad \left(\frac{1}{7200}\right)$$

$$\left(\frac{1251.498}{\sin 45°18'42''}\right) \sin 75°51'27'' = C_1D = 1706.982 \quad +.045$$

$$\left(\frac{C_1D}{\sin 33°13'53''}\right) \sin 111°37'17'' = AC_1 = 2895.647 \quad +0.463 \left(\frac{1}{6250}\right)$$

E

C

A

F

K

E

		LAT	DEP
N0°45'W	2628.12	+2627.88	−34.40
NORTH	2630.76	+2630.76	—
EAST	5497.80	—	+5497.80
S0°02'W	5096.52	−5096.52	−2.96
S88°12'W	5478.00	−172.06	−5475.32
	21,331.20	−9.94	−14.88

$9.94^2 = 98.8036$

$14.88^2 = 221.4144$

320.2280

$r = 17.38$ FT = ERROR OF CLOSURE

$\frac{1}{1193.02}$

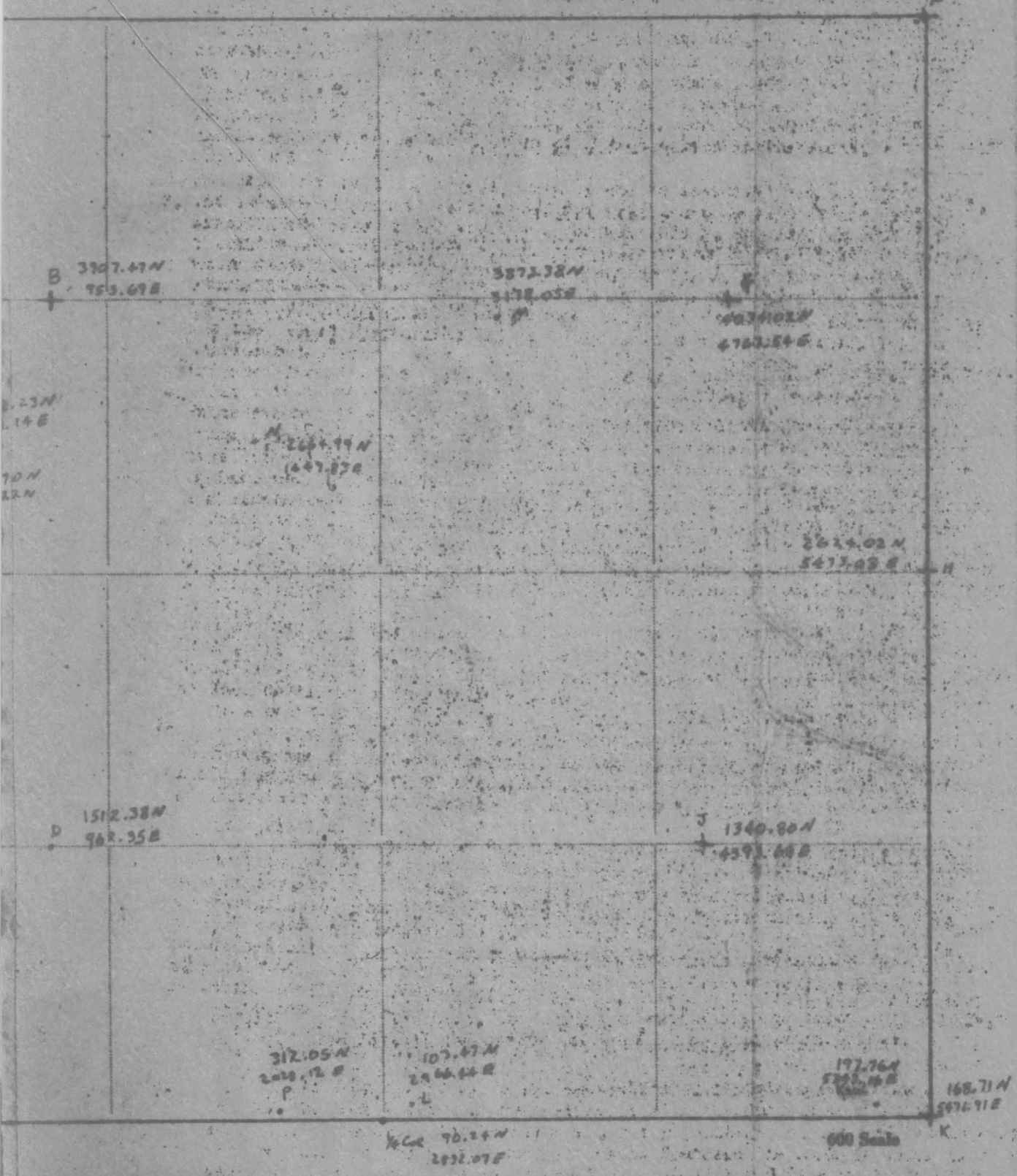
~~39.82~~
~~.01309~~
~~35838~~
~~19460~~
~~3982~~
~~52124~~

	FAS	GER	LE	HA		
12 DEC 60	8	8 1/2	8 1/2	8 1/2	PICTURE POINT	
13	4	6	6	6	"	
14	X	10^{-1}	X	10^{-1}	OBSERVATION	
15	X	8	5	8	"	
16	X	8 1/2	X	8 1/2	"	
17		4	X		COMPUTING	
19	X	8	X	5	3 COMPUTING	
20	3 COMP.	3 COMP	X			
21	8	8	X	X	COMPUTING	
22	8	8	4		4 SIGNALS - 4 OFFICE	
23	8	8	8	8	BASE LINE	
27	X	9	X	9	OBSERVATION	
28 NOV		8 1/2	X	8 1/2		
29		8	X	2 NE 2	2-BASELINE	6 OFFICE
30		8	X	8	STAKES	
3	X	8	X	8	OBSERVATION	
4	X	8	X	8	"	
5	X	8 1/2	X	8 1/2	"	
6	X	8	X	8	"	
7	X	8	X		COMP	DRAFT
9	X	8 3/4	X	X		
10	X	10	X			
11	X	9 1/4	X	X		
12	X	9	X	X		1
13	X	8 1/2	X	X		8 1/2
14	X	6 1/2				5

	FAS	GER	HA	LE	NE
PICTURE POINTS	12	14½	14½	14½	—
OBSERVATION	—	30½	30½		
[redacted] 1ST		~~28½~~	[redacted]	5	—
COMPUTING 1ST	15	26 ~~22~~	—	—	—
SIGNALS - 2D	4	4	4	4	—
BASELINE	8	18	18	8	2
OBSERVATION 2D	[redacted]	32½	32½	—	—
COMP	—	47½	—	—	—
DRAFT	—	12½	—	—	—
	39 ✓	185½	99½	~~29½~~ 31½ ✓	2 2 ✓
FLAT TIRE	—	1	1	—	—

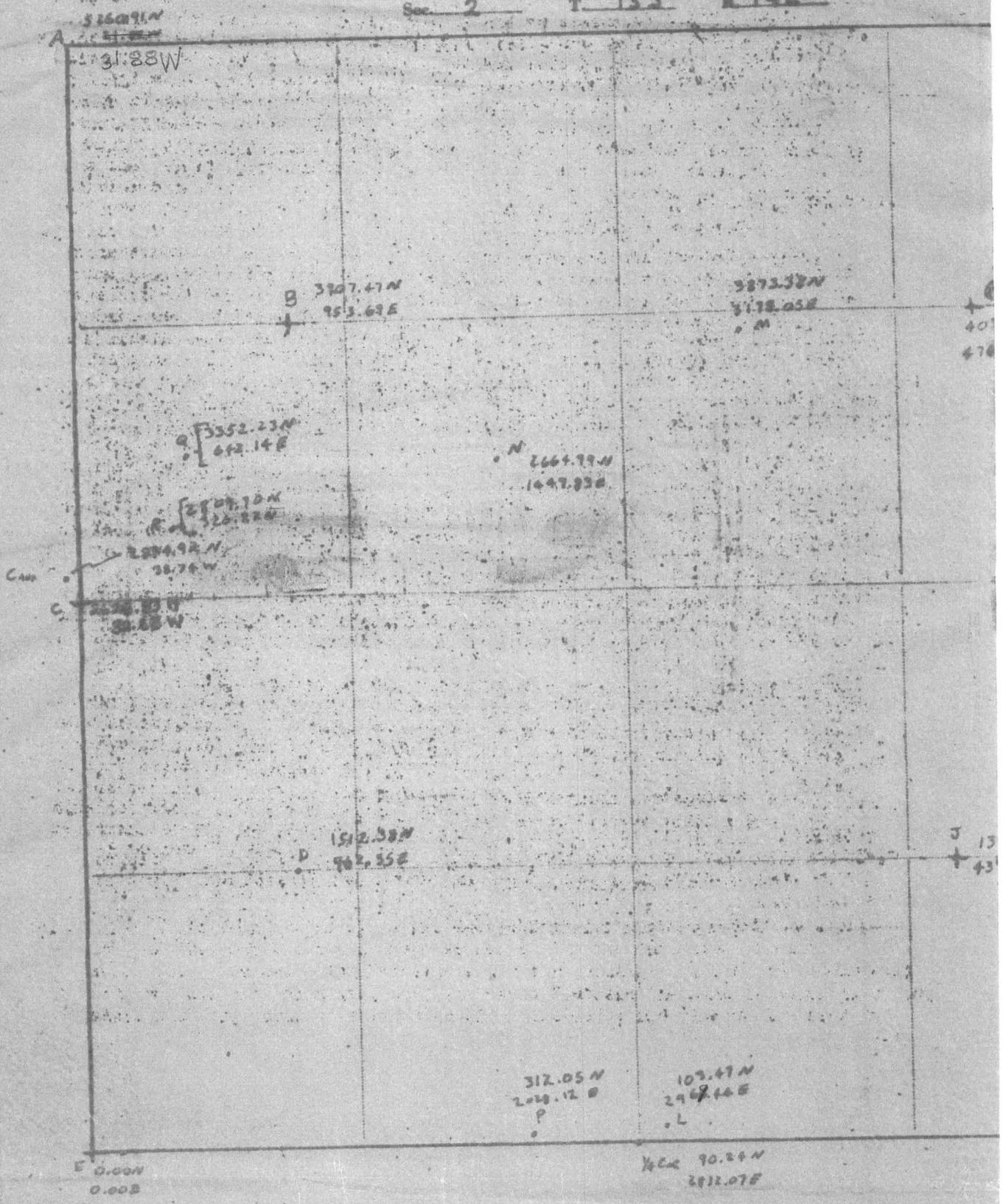
Pima County Ariz.

Sec. 2 T. 13 S R. 14 E.



Pima County Ariz.

Sec. 2 T. 13 S R. 14 E



$$\frac{(.204)(2.2)\sqrt{\frac{(.022)(1.44)}{7.86 \times 62.4}\ 30 \times 10^6}}{\sqrt{P_n - 20}} = P_n$$

3168

95040

~~479.232~~

490.464

193.77568

193.77568

$$.4488\sqrt{193.77568} = P_n\left(\sqrt{P_n - 20}\right)$$

$$.4488(13.9) = P_n\sqrt{P_n - 20}$$

$$6.23832 = P_n\sqrt{P_n - 20}$$

$$(.4488)(440) = P_n\left(\sqrt{P_n - 20}\right)$$

197.47

225

P_n	45	225
P_n	40	179
P_n	42	196

7.86 #/FTCU

$$\frac{.022 \text{ LB} \quad FT^3}{FT \quad 7.86 \text{ LB}}$$

$$C_p = \frac{(\cancel{10})(\cancel{100})\ 7.86}{.022 \quad 30{,}000{,}\cancel{000}}$$

$$\frac{7.86}{660}$$

$$\begin{array}{r} .012 \\ 660\overline{)\ 7.86} \\ 660 \\ \hline 1260 \end{array}$$

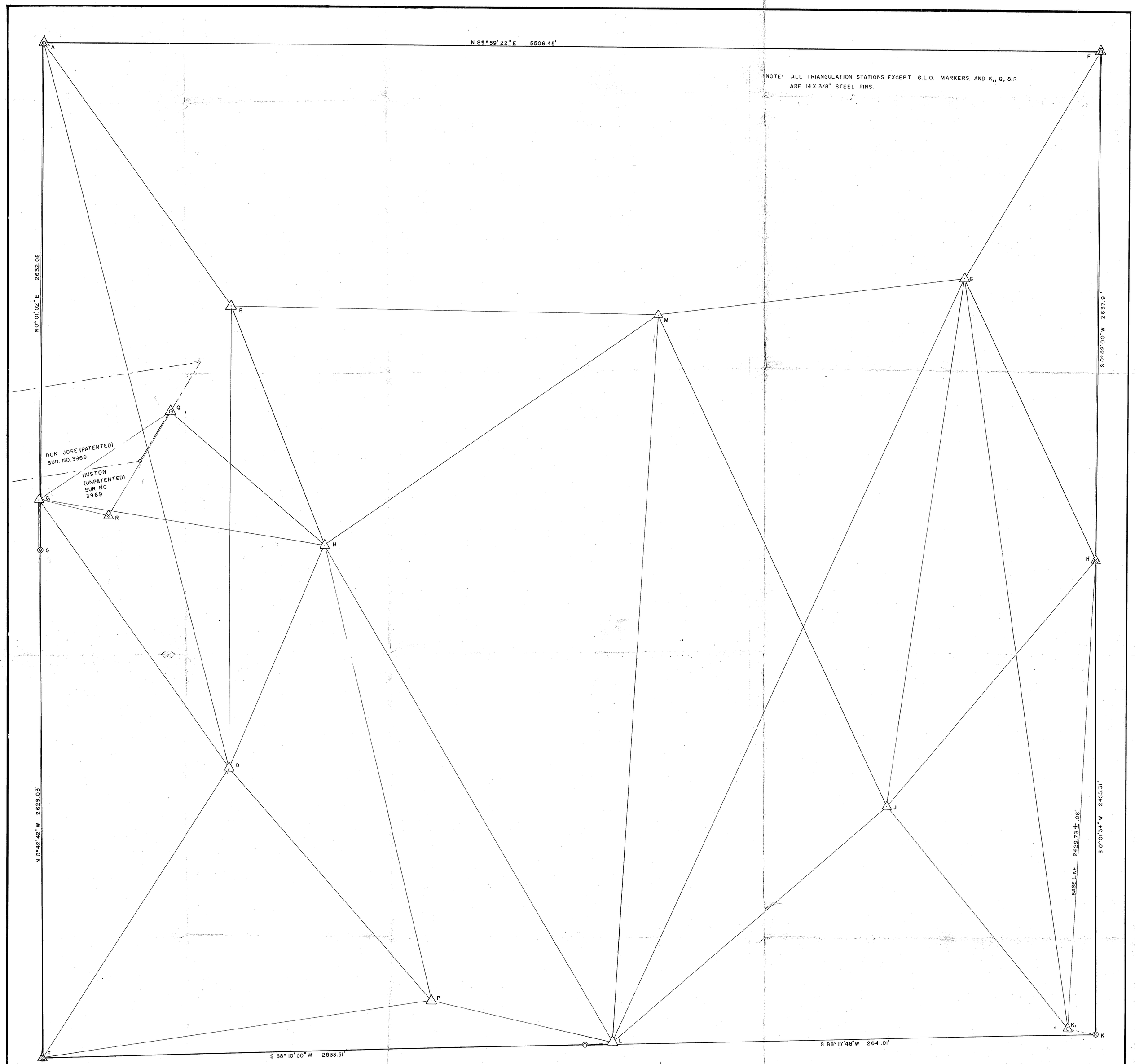
$$\begin{array}{r} .002 \\ 7.86\overline{)\ .02200} \end{array}$$

$$\frac{7.86}{660}$$

$$\frac{FT \quad (\cancel{10})(\cancel{100})\ \cancel{FT}\ (7.86)(62.4)\ \cancel{LB}\ \cancel{FT^2}\ \cancel{IN^2}}{(.022)\ \cancel{LB}\ (144\ \cancel{IN^2}) \quad \cancel{FT^3} \quad 30{,}000{,}\cancel{000}\ \cancel{LB}}$$

$$\frac{(7.86)(62.4)}{(\cancel{0}2.2)(144)(30{,}0\cancel{00})} = \frac{490.464}{95040} = 0.00516$$

600



LEGEND

- G.L.O. Pipe & Brass Cap
- Private Survey Marker
- Triangulation Station
- Section Boundary
- Triangulation Net
- Traverse Line
- Unsurveyed Boundary

COÖRDINATES (IN FEET NORTH AND EAST OF STATION E)

	N	E		N	E
A	5260.91	31.88	J	1340.80	4393.69
B	3907.47	953.69	K	168.71	5471.91
C	2628.83	32.68	K_1	197.76	5343.17
C_1	2894.92	38.74	L	103.47	2969.44
D	1512.38	962.35	M	3873.38	3178.05
E	0.00	0.00	N	2664.99	1449.83
F	5261.93	5474.57	P	312.05	2028.12
G	4074.02	4767.54	Q	3352.23	642.14
H	2624.02	5473.03	R	2809.70	326.22
S ¼ Cor.	90.24	2832.07			

Note: Stations A, B, C, D, E, F, G, H, J, and K are picture-points.

N

SCALE: 1" = 200'

BENDER'S COUNTRY CLUB PROJECT

SECTION 2 T13S R14E PIMA COUNTY, ARIZONA

FOR

TAYLOR, McFARLAND, & JOHNSON

BY

HEINRICHS GEOEXPLORATION COMPANY

P.O. BOX 5671 TUCSON, ARIZONA

JANUARY 1961

December 16, 1960

Mr. Al Marshick
Taylor, McFarland & Johnson
15 East Alameda
Tucson, Arizona

Re: Benders Country Club
Don Jose Mining Claim

Dear Al:

The assessors plat of the patent group including the Don Jose Mining Claim is in Book 102 of Patented Mines in the assessors office. Taxes have been paid by patentee Dora Carpenter through 1960. This deed was recorded 2/12/43 in Book 34, Page 294 by Dora Carpenter, patent # 1022599-058119 Santa Catalina Mining District. These claims were tied to U. S. Mineral Monument # 3969 and not known to be tied to legal subdivision. We have ordered the survey plat (patent survey # 3969) from the Bureau of Land Management, Phoenix, and will proceed to accurately tie this claim to the ground when we receive it.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

Frank Seward

FS/ce

ıy small, and were, at times, of different signs. It should be noticed, however, that a difference of 10°F from standard temperature will produce a correction of 0.065 ft per hundred ft for a steel chain. The slope correction was determined by spirit leveling, and no explanation of the method of correction is deemed necessary.

I trust that this information will be of some assistance.

Yours very truly,

George E. Reeves
HEINRICHS GEOEXPLORATION CO.

HEINRICHS GEOEXPLORATION COMPANY
MINERAL ENGINEERING CONSULTANTS AND CONTRACTORS
GEOPHYSICAL, GEOLOGICAL AND ECONOMIC APPRAISALS
TUCSON, ARIZONA

WALTER E. HEINRICHS, JR.
E. GROVER HEINRICHS

PHONE: MAIN 2-4202
806-808 WEST GRANT ROAD
MAIL: P. O. BOX 5671

10 May 1961

Mr. Al Marshick
Taylor, McFarland & Johnson
15 East Alemeda
Tucson, Arizona

Dear Al;

In regard to your recent telephone inquiries, we are submitting the following information concerning base line measurement on the Bender's Country Club Project.

The chain was standardized on the brass plugs at the University of Arizona campus. Standardization was made with a tension of 20 lb, and the temperature at the time was noted.

The base line was slope chained on brads driven in 1 x 2 x 24-in. stakes. Four measurements were made, two at 20 lb tension, and two at 30 lb tension. The mode of support of the chain and the temperature at the time of each reading were recorded. Spirit levels were run on the stakes to determine the difference of elevation.

In computing the length of the base line, corrections were made for sag, tension (on the two measurements made at 30 lb tension), temperature, and slope, in that order. The following table indicates the magnitude of the corrections applied.

Tension	20 lb	30 lb
Sag correction	-0.940	-0.413
Tension correction	-----	+0.118
Temperature correction	+0.050	-0.120

The sag correction, at 20 lb tension, is of the magnitude of 0.050 ft per hundred ft, and varies as the cube of the length. The tension correction, applied to the measurements made at 30 lb tension, is of the magnitude of .005 ft per hundred ft, and varies directly as the length. By applying sufficient tension to counteract sag, both corrections may be disregarded. For the chain used, the requisite tension for a length of a hundred ft is 42 lb. Accurate measurements with a tension of this magnitude cannot be made without the use of a tape stretcher and spring balance. The temperature corrections varied with the ambient temperature, and as the measurements were made at a temperature near that of standardization, the corrections were fair-

January 19, 1961

STATEMENT

To: Taylor, McFarland & Johnson
15 E. Alameda Street
Tucson, Arizona

Re: Bender Country Club Project, Pima County, Arizona
Horizontal Control Survey

Services:

December	12	--- 4 man,	Foto signal	----------	$125.00
	13	--- 2 "	" "	----------	125.00
	14	--- 2 "	Observation	----------	NC
	15	--- 4 "	"	----------	NC
	16	--- 2 "	"	----------	NC
	19	--- 2 "	"	----------	125.00
	20	--- 1 "	Computing	----------	NC
	21	--- 2 "	"	----------	NC
	22	--- 1 "	"	----------	NC
	23	--- 2 "	Observation	----------	125.00
	27	--- 2 "	"	------	125.00
	28	--- 2 "	"	(rain)-------	NC
	29	--- 2 "	"	----------	125.00
	30	--- 2 "	Stake setting	----------	125.00
January	3	--- 2 "	Observation	----------	125.00
	4	--- 2 "	"	----------	125.00
	5	--- 2 "	"	----------	125.00
	6	--- 2 "	"	----------	125.00
	7 through 14 and 16 through 18, 1 man computing and drafting				NC
					1,375.00

Expenses:

Vehicles --- 694 Miles @ 10¢ per mile----	69.40	
19 days @ $7.50 per day-----	142.50	
Misc. expenses ----------	17.96	
		229.86
TOTAL		$1,604.86

RESUBMITTED FOR PAYMENT MARCH 4, 1961

RECEIVED MAR 8 1961

Check # 727 - On Account 1,200.00

Balance 404.86

TO Heinrichs GeoExploration Co.

TAYLOR, McFARLAND - JOHNSON, ENGINEERS
Tucson, Arizona

REMITTANCE VOUCHER

DATE	INVOICE NUMBER	ACCOUNTS PAYABLE DEBIT		ACCOUNTS PAYABLE CREDIT		OTHER DEDUCTIONS	REMARKS	CUMULATIVE BALANCE	
1/19	Stmt	1604	86				Eng. Services	1604	86
							Payment on Account	1200	00

RECEIVED MAR 8 1961

DATE	CH. NO.	GROSS		OTHER DEDUCTIONS	% DISC.	DISCOUNT	NET CHECK		REMARKS
8/7/61	727	1200	00				1200	00	

DETACH THIS STUB BEFORE CASHING

COORDINATES

	N	E
A	5260.91	-31.88
B	3907.47	953.69
C	2628.83	-3268
C,	2894.92	-38.74
D	1512.38	962.35
E	0.00	0.00
F	5261.93	5474.57
G	4074.02	4767.54
H	2624.02	5473.03
J	1340.80	4393.69
K	168.71	5471.91
K,	197.76	5343.17
L	103.47	2969.44
M	3873.38	3178.05
N	2664.99	1449.83
P	312.05	2028.12
Q	3352.23	642.14
R	2809.70	326.22
S¼ Cor.	90.24	2832.07

Respectfully submitted,

Registered Professional Engineer
CERTIFICATE EXPIRES
WALTER E. HEINRICHS, JR.
DEC. 31, 19
ARIZONA, U. S. A.

Franklin A. Seward, Jr.

Approved:
Walter E. Heinrichs, Jr.
President & General Manager

January 18, 1961

STATION R is a 1½ in. iron pipe projecting 3 ft. above the surface and is the east end center of the Huston Mining Claim (unpatented).

DESCRIPTION OF CORNERS LOCATED

Corners tied into triangulation net:

NW Cor. Section 2	G.L.O. Pipe & Brass Cap
W ½cor. "	"
SW Cor. "	"
S ¼Cor. "	"
SE Cor. "	"
E ¼ Cor. "	"
NE Cor. "	"
E End Center Don Jose Mining Claim	1½ in. Iron pipe, Survey No.3969
E.End Center, Huston Mining Claim	" "
Private survey marker (See station description of K_1)	1 in. iron pipe & cap.

Corners not tied to Triangulation Net.

NE Cor. Section 11	G.L.O. Pipe
N ¼ cor. "	" "
N 1/16 Cor. Sections 1 & 2 (?)*	1 in. iron pipe & cap Private Survey Marker
S 1/16 Cor. Sections 1 & 2 (?)*	"
Cor. No. 2, Don Jose Mining Claim	1½ in iron pipe, Survey No.3969

*This marker was found at the approximate location of the S 1/16 Cor. of Sections 1 & 2, but since it is not marked, identification is tentative.

marked with a guard stake and flagged with blue & yellow.

STATION K is the SE corner of Section 2.

STATION K_1 (K auxiliary) is a private survey marker located approximately 132' W of the SE corner of Section 2.

STATION L is a 14 x 3/8 in. steel pin projecting ½ in. above the surface. The station is located approximately 138' E of the S ½ corner of Section 2.

STATION M is a 14 x 3/8 in. steel pin projecting ½ in. above the surface. The station is located on a ridge which runs SSE through the section. The station is marked with a guard stake and flagged with blue & yellow.

STATION N is a 14 x 3/8 in. steel pin projecting ½ in. above the surface, and located on the western portion of a small hill to the west of the wash which runs SSE through the section. The station is marked with a guard stake, and flagged with blue & yellow.

STATION P is a 14 x 3/8 in. steel pin projecting ½ in. above the surface, and located on a small hill to the west of the road running NE to the stone house. The station is marked with a guard stake, and is flagged with blue & yellow.

STATION Q is a 1½ in. iron pipe projecting 3 ft. above the surface and is the east end center of the Don Jose mining claim (Patented)

STATION DESCRIPTIONS

STATION A is the NW corner of Section 2,T13S, R14E, GS&R B&M

STATION B is a 14 x 3/8 in. steel pin projecting ½ in. above the surface. The station is located at a prospect pit on the nose of a small ridge overlooking the large wash which runs generally SSW through the section.

STATION C is the W ¼ cor. of Section 2.

STATION C_1 (C auxiliary) is a 14 x 3/8 in. steel pin projecting ½ in. above the surface, and is located on a ridge approximately 266' northerly from the W ¼ cor. of Sec. 2. The station is marked with a guard stake and flagged with blue & yellow.

STATION D is a 14 x 3/8 in. steel pin projecting ½ in. above the surface. The station is marked with a guard stake and flagged with blue & yellow.

STATION E is the SW corner of Section 2.

STATION F is the NE corner of Section 2.

STATION G is a 14 x 3/8 in. steel pin projecting 6 in. above the surface. The station is located on a rock outcrop NW of an old windmill. The station is marked with a guard stake and flagged with blue & yellow.

STATION H is the E¼ cor of Section 2.

STATION J is a 14 x 3/8 in. steel pin projecting ½ in. above the surface. The station is located N of the road between the old stone house and the W ¼ cor. The station is

of the stations, may be presumed to differ from their true values by not greater than one part in five thousand (1/5000).

Although third order triangulation, as defined, requires an average triangle closure of 5" to obtain a check on a base line of one part in five thousand, this limit presupposes a chain of some twenty figures. In shorter nets, such as the one observed during the course of this project, it is felt that a triangle closure of 7" is not compatable with third order accuracy.

The east end centers of the Don Jose (Patented) and the Huston (Unpatented) mining claims were tied into the triangulation net. However, the determination of the true location of the boundaries of one or both claims will involve resurvey of the sidelines, which was not done at this time.

BENDER COUNTRY CLUB PROJECT
Pima County Arizona

HORIZONTAL CONTROL

METHODS AND PROCEDURES

At the request or Mr. Russell Taylor of Taylor, McFarland and Johnson, Heinrichs Geoexploration Company provided horizontal control in Section 2 T13S, R14E, G&SRB&M, Pima County Arizona. Ten horizontal picture points were established and connected with a triangulation net. Field operations were begun on 12 December 1960 and were completed on 6 January 1961. The field personnel consisted of George E. Reeves, instrument man and Harvey Andres, assistant, augmented by additional personnel as required. Computations and other related office work was started on 7 January 1961 and completed on 17 January 1961. Computations were made by George E. Reeves. Field and office operations were under the over-all supervision of Franklin A. Seward, Jr.

A base line was measured between stations H and K, (K auxiliary). The mean of four measurements was 2439.73 ft. with a probable error of $\pm$ 0.06 ft. With this amount of error, the ratio of precision is 1:41,000.

Since eccentricity of signal and the exaggerated phase effect of square signals produce distortion of a triangulation net, it was determined that signals should be round and without "doglegs".

With two exceptions, 1 3/8 inch wooden dowels, 5 ft. long, and standard range poles, up to 12 ft. long were used as signals. In the exceptions mentioned, 2 x 2 inch wooden signals were used, and were plumbed with the theodolite.

All angles about a station were observed by the method of repetition with a Wild T-1A Theodolite, No. 64328. The mean of each set of six angles so observed was determined and, after station adjustment, was used in the adjustment of the net. The average triangle closure before station adjustment was 7 seconds.

After station adjustment, all figures, with the exception of simple triangles, were adjusted by the method of logarithmic residuals. The bearing of the line between the NE cor. and the E¼ cor. of Section 2 was assumed to be S 0° 02' 00" W in agreement with the G.L.O. Plat, and all other bearings were referred to this value.

As a check on the effect of the adjustment of the angles, sides AC₁ and C₁E were computed using the original, unadjusted angles, as observed. The discrepency in the length of line AC₁ was found to be 0.33 ft. in 2366 ft. or 1/7200. The discrepency of the length of line C₁E was found to be 0.46 ft. in 2895, or 1/6250. Discrepencies in the lengths of all other lines computed in this manner were of a lesser magnitude.

From the above considerations, it is seen that the adjustments made have not been excessive. Therefore, the most probable values of the angles and the lengths of the lines, i.e., the coordinates

Al Marshick
Ea 66392

2

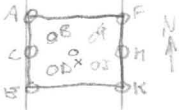
TR. MK. REG. U.S. PAT. OFF

T13S R14E

3/10 2/11	PIPE	GEN. LAND OFF			
3/2	"	"			
34/3 2	"	"			
CHAIN S. FROM 34/3 2					
300'	@	26°	45%	265	35
300'		11°	21		+6
300'		12°	22%		+6
300'		—	—	300'	
2/12 1	PIPE	GLO			
2/11 12	PIPE	GLO			
N 1/16 2 1	PIPE	- NOT FOUND	IN FENCE LINE		
2/35 1/36	PIPE	GLO	S. SIDE MON		

ORIGINAL COPR. 1910 BY L. C. PARKER

LEFAX PHILADELPHIA 7, PA. MADE IN U.S.A.



⊼ Reeves
⊡ Andres
Dec 14/60

3

STA	ANGLE	HOR ANGLE	VERT ANGLE TO	
A	JAK	① 1° 14' 40" ~~JAK~~	① 93° 24' 5"	J
			② 93° 24' 5"	~~K~~J
			③ 93° 24' 5"	J
			④ 266 34' 40"	J
			⑤ 266 34' 55"	J
		⑥ 7° 28' 30"	⑥ 266 34' 55	
	AVE	1° 14' 45"		
			93 24 10	J
			93 24 10	J
			93 24 10	J
			266 34' 55	J
			266 35' 00	J
			266 34 55	J
	~~AH~~			
A	KAB	① 11° 09' 55"	1	
			2	
			3	
			4	
			5	
		⑥ 66° 58' 15"	6	
		11° 09' 43"		
A	BAD			
		① 21° 12' 20"	① 96° 51' 50"	D
			② 96° 51 45	D
			③ 96° 51 50	D
			④ 263° 07' 35"	D
			⑤ 263 07 40	D
		⑥ 127° 14' 30	⑥ 263 07 45	
		21° 12' 25"		

All VL. are Zenith Distances

Pentatoc
12-14-60
4

TR. MK. REG. U.S. PAT. OFF

VERT ANGLE TO ___		HI	REMARKS
92°54' 5"	K	4.41	
92°54' 5"	K		All Vert Xs
92°53' 50"	K		measured to
267°05' 00"	K		bottom of
267°05' 00"	K		target
267 04' 55"	K		
			Height of pole
267 05 00	K		at A - 10.04 ft
267 05 00	K		measured bottom
267 05 00	K		of pole to bottom
92 54 05	K		of ~~signal~~ target
92 54 05	K		
92 54 10	K		- bottom of pole
			to top of
			target 11.95 ft
98°05' 10"	B		
98°05' 00"	B		- base of pole 0.44'
98 05 00"			below top of pipe
261°54' 10"			
261 54 05			
261 54 00			

VERT. ANGLE TO BOTTOM OF LARGE VEHICLE.

ORIGINAL COPR. 1918 J. C. PARKER
MADE IN U.S.A.
LEFAX, PHILADELPHIA 7, PA.

Sta	Angle	Hor Angle	Vert Angle	to
A	DAE	ⓓ 14° 30' 00"	95° 45' 50"	E
			95 45 50	E
			95 45 45	E
			264 13 20	E
			264 13 35	E
		ⓖ 87 02 05	264 13 35	E
	Average	14° 30' 21"		
A	EAC	0° 23' 20"	ⓓ 99° 56' 55"	C
			99° 56' 50"	C
			99° 56' 45"	C
			260° 2' 45"	C
			260° 2' 40"	C
		2° 12' 20"	260 2' 40"	C
	Ave.	0° 22' 3"		
A	JAC	ⓓ 48° 29' 5"		
		ⓖ 290 54 25		
	Ave	48° 29' 6"		
	Repeats			
A	KAB	ⓓ 11° 9' 35"		
		ⓖ 66 57 40		
	Ave	11° 9' 37"		
	DAE	ⓓ 14° 30' 10"		
		ⓖ 87° 02' 15"		
	Ave	14° 30' 22"		

Pontiac
12-14-60

6

TR. MK. REG. U.S. PAT. OF

H.I
4.41

Remarks

GINAL COPR. 1919 J. C. PARKER
MADE IN U.S.A.
LEFAX, PHILADELPHIA 7, PA.

HI 4.41 at A

Sta	Angle	Hor Angle	Vert Angle	to
A	DAE			
		① 14° 30' 10"		
		⑥ 87° 02' 10"		
	Ave	~~14° 30' 21"~~	14° 30' 22"	9/8R
A	EAC			
		① 0° 21' 40"		
		⑥ 2° 10' 45		
	Ave	0° 21' 47"		
A	EAC	① 0° 21' 40"		
		⑥ 2° 10' 50"		
	Ave	0' 21' 48"		
B				
	DBE	① 13° 55' 15"	95 08 00"	D
			95 08 00	D
			95 07 50	D
			264 51 25	D
		⑥ 83° 33' 20"	264 51 15	D
	Ave	13° 55' 33"	264 51 20	D
	Rpt			
	DBE	① 13° 55' 25"		
		⑥ 83 32 25		
	Ave	13 55' 26"		

Pontatoc
12-14-60
3

TR. MK. REG. U.S. PAT. OFF.

H.I

All vert angles are zenith distances

18.46' base of pole at B to base of target

20.32 base of pole at B to top of target

Base of pole on pin

5.04 — HI at B

No vert angles on E from B due to orientation of target

J. C. PARKER
ORIGINAL COPR. 1916
MADE IN U.S.A.
LEFAX, PHILADELPHIA 7, PA.

Sta.	Angle	Hor Angle	Vert Angle	Lo
B	EBC			
		① 23° 54' 55"	97° 25' 20"	C
			97° 25' 15"	C
			97° 25' 10"	C
			262° 34' 20	C
			262° 34' 15	C
		⑥ 143 30 40	262° 34' 26	C
		Ave ~~23° 55' 37"~~	23° 55' 07"	
B	EBA	① 130° 13' 25"	278' 42' 25"	
			278° 42' 20"	
			278° 42' 20'	
			81 16 55	
	EBA	① 130° 13' 35"	81' 16 50	A
			81 16 50	A
			81 16 50	A
			278 42' 20'	A
			278 42 20	A
		⑥ 61 21 26	278 42 20	
		Ave 130° 13' 33'		
B	DBA	① 144° 8' 50		
		⑥ 144° 5' 55"		
		Ave 144° 8' 59"		

Pontatoc
12-14-60

4

TR. MK. REG. U.S. PAT. OFF.

H.I

5.04

GINAL COPR. 1910 J. C. PARKER,
MADE IN U.S.A.
LEFAX, PHILADELPHIA 7, PA.

STA	ANGLE	HOR ANGLE
B	EBC	① 23° 54' 50"
		⑥ 143° 29' 15"
		AVE = 23°54'52"

Oct 15/60

Sta	Angle	Hor Angle	Vert Angle	to
E	~~EFA~~ ①		88° 11' 45"	C
			88° 11' 45"	C
			88° 11' 45"	C
			271° 47' 45"	C
			271° 47' 45"	C
			271° 47' 50"	C
	⑥			
E	AEB	① 14° 3' 50"	84° 02' 05"	A
			84° 02' 05"	A
			84° 02' 10"	A
			275° 57' 20"	A
			275° 57' 20"	A
		⑥ 84 23 30	275° 57' 20"	A
	Ave	14° 3' 55"		
E	BED	① 18° 46' 00"	87° 30' 40"	D
			87° 30' 30"	
			87° 30' 35"	
			272° 28' 40"	
			272° 28' 35"	
		⑥ 112° 37' 40"	272° 28' 40"	
	Ave	18° 46' 17"		

TR. MK. REG. U.S. PAT. OFF.

H.I.

TARGET C IS VISIBLE ONLY AT TOP AND IS NOT CONSIDERED AN ACCURATE POINTING.

Vert Angle	to	
	A	bottom of pole .95' below top of pipe at E
	A	
	A	
	A	
	A	pole at E 21.85 ft bottom of pole to top of targe 18.76 ft bottom of pole to bottom of target
85° 38' 25"	B	
85° 38' 30"	B	
85 38 35	B	3.88
274° 20' 45"	B	unable to see pole at C from E.
274° 20' 40"	B	
274° 20' 45"	B	

Vert ∠ on D to Bottom of Large Target

ORIGINAL COPR. 1910 J. C. PARKER.
MADE IN U.S.A.
LEFAX, PHILADELPHIA 7, PA.

~~Solar Observation~~

~~A~~	~~Bs~~	~~VL~~	Hor L	Time
~~E~~	~~A~~			

Sta	Angle	Hor Angle	Vert Angle	Tc
E	Rpt BED	① 18° 46' 25"		
		⑥ 112 38 05		
	Ave	18° 46' 21"		
E	DEF	① 15° 38' 40"	85° 00' 05"	F
			85° 00' 10"	F
			85° 00' 10"	F
			274° 59' 10"	F
			274° 59' 05"	F
		⑥ 81° 53' 25"	274° 59' 20"	F
	Ave	13° 38' 54"		
E	Repeat DEF	① 13° 38' 45"	~~274° 05' 15"~~	
		⑥ 81° 53' 45"		
	Ave	13° 38' 58"		
E	Repeat DEF	① 13° 38' 40"		
		⑥ 81° 53' 40"		
	Ave	13° 38' 58"		
E	FEG	① 3° 20' 55"	274° 05' 15" G 274° 05' 15" G 274° 05' 05"	
		⑥ 20° 04' 55"	85° 54' 40" 85° 54' 35"	
	Ave	3° 20' 49"	85° 54' 35"	

STA	ANGLE	HOR ANGLE	VERT. ANGLE	TO.
E	GEH	① 14° 54' 15"	272° 41' 40"	H
		⑥ 89° 25' 45"	272° 41' 35"	
	AVE	14° 54' 18"	272° 41' 35"	
			~~87° 17' 30"~~	
			87° 18' 00"	
			87° 17' 55"	
			87° 17' 55"	
E	HEJ	① 8° 38' 25"	272° 23' 45"	J
		⑥ 43° 41' 05"	272° 23' 40"	
		~~52° 19' 30"~~	272° 23' 40"	
	REPEAT		87° 36' 10"	
	HEJ	① 8° 38' 45"	87° 36' 10"	
		⑥ 60° 31' 30"	87° 36' 15"	
	AVE	10° 05' 15"		
	REPEAT			
	HEJ	① 8° 38' 35"		
		⑥ 51° 52' 40"		
	AVE	8° 38' 47"		
E	AEJ	① 73° 22' 40"		
		⑥ 80° 17' 20"		
		73° 22' 53"		
E	FEX	① 6° 38' 40"	86° 23' 45"	X
			86° 23' 35"	
			86° 23' 40"	
		⑥ 39° 53' 20"	273 36 00	
		6° 38' 53"	273 36 00	
			273 35 55	

Sta	Angle	Hor Angle	Vert Angle	to
D	ADB ①	14° 38' 55"	82° 51' 25"	A
			82° 51' 20"	
			82° 51' 20"	
			277° 07' 55"	
			277° 08' 00"	
	⑥	87° 53' 05"	277° 08' 10"	
	Ave	14° 38' 51"		
D	BDX ①	69° 20' 20"	85° 26' 55"	X
			85° 26' 55"	X
			85° 27' 0"	
			274° 32' 55"	
			274° 32' 55"	
	⑥	56° 02' 15"	274° 32' 55"	
	Ave	69° 20' 22"		
D	XDE ①	143° 20' 40"	91° 35' 45"	E
			91° 35' 50"	E
			91° 35' 50"	
			268° 24' 00"	
			268° 24' 00"	
	⑥	140° 2' 45"	268° 24' 00"	
	Ave	143° 20' 28"		
D	EDC ①	105° 47' 25"	89° 16' 10"	C
			89° 16' 10"	
			89° 16' 10"	
			270° 43' 25"	
	⑥	274° 45' 10"	270° 43' 20"	
	Ave ⑥	105° 47' 32"	270° 43' 25"	

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Vert Angle		to	H.I	D
84°	12' 25"	B	4.94	19.08 ft bottom of pole to base of Large target at point D
84°	12' 30"	B		
84°	12' 20"			
275°	46' 50"			19.63 ft bottom of pole to base of small target
275°	46' 55"			
275°	46' 55"			21.53 ft bottom of pole to top of small target
				21.67 ft bottom of pole to top of large target
				- bottom of pole on pin

Sta	Angle	Hor Angle	Vert Angle	Ht
D	CDA ①	26° 52 55		
	⑥	161 18 15		
	Ave	26° 53' 2"		

Sta	Angle	Hor Angle	Vert Angle	to
H.	KHJ	① 40° 01' 50"	92° 30' 20"	K
			92° 30' 25"	
			92° 30' 25"	
			267° 29' 10"	
			267° 29' 10"	
		⑥ 240° 09' 20"	267 29 20	
	Ave	40° 01' 33		
	Rpt			
	KHJ	① 40° 01' 50"		
		⑥ 240° 09' 10"		
	Ave	40° 01' 32"		
H.	JHF	① 139° 58' 45"	81° 32' 40"	F
			81° 32' 45"	
			81° 32 45	
			278 26' 55"	
			278 27 00	
		⑥ 119° 54' 35"	278 26 55	
		139° 59' 6"		
	Rpt			
H	JHF	① 139 58 45		
		⑥ 119° 54 35'		
	Ave	139° 59' 6"		

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Vert Angle to	H.I	
		H
92° 42' 45" J		
92° 42' 45"	4.83	Bottom of signal 0.36' below top of pipe at H
92° 42' 45"		
267 16 40		
267 16 35		Bottom of pole to bottom of target 19.62 ft
267 16 35		
		Bottom of pole to top of target 22.33 ft

Sta	Angle	Hor Angle	Vert Angle	to
	BS on K			
	Deflection Art to F			
H	KHF	@ 0° 0' 25"		
		@ 0° 3' 55"		
		Ave 0° 0' 39"		
Haux	$GH_{aux}F$	@ 25° 47' 55"	83° 40' 25"	G
		51 36' 00"	83° 40' 25"	
		77° 23 45"	83 40 25	
		103° 12' 00"	276° 18' 45	
		129 00 00"	276° 18' 50"	
		@ 154° 47' 55	276° 18' 50'	
		Ave 25° 47' 59"		
Haux			81° 44' 40"	F
			81° 44 45"	
			81° 44' 35'	
			278° 14' 50'	
			278 14' 55'	
			278 14 50"	

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H.I

Set eccentric point 11.72 ft south of H on line FH extended — Haux

4.83

3.64 — above H

Vert. Δs to G are to top of pole

Vert Δ to top of pipe at F from Haux

Sta	Angle	Hor Angle	Vert Angle	To
G	FGH ①	123° 17' 20"	81° 17' 05"	F
			81° 17' 10"	
			81° 17' 10"	
			278° 42' 40"	
			278° 42' 25"	
	⑥	19° 44' 20"	278° 42' 25"	F
	Ave	123° 17' 23"		
G	HGK ①	15° 43' 25"	94° 01' 40"	K
			94° 01' 40"	
			94° 01' 40"	
			265° 57' 50"	
			265° 57' 50"	
	⑥	94° 20' 25"	265° 57' 50"	
	Ave	15° 43' 24"		
G	KGJ ①	18° 00' 35"	95° 12' 15"	J
			95° 12' 10"	
			95° 12' 15"	
			264° 47' 15"	
			264° 47' 10"	
	⑥	108° 3' 10"	264° 47' 15"	
	Ave	18° 00' 32"		
G	JGE ①	41° 41' 50"	93° 56' 00"	E
			93° 56' 10"	
			93° 56 10	
			266° 03' 55"	
			266° 03' 50"	
	⑥	250° 11' 20"	266 03 50	
	Ave	41° 41' 53"		

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Vert Angle	to	H.I.	G
95°34'00"	H	4.60	Bottom pole .47 below top of pin at G
95°34'00"			
95°34'00"			
264°25'15"			Bottom of pole to bottom of target - 10.21 ft
264°25'20"			
264°25'10"	H		
			Bottom of pole to top of target 12.05 ft
			Bottom of pole to top of pole 12.08 ft
			Vert Ang from G are to top of pipe

Sta	Angle		Hor Angle	Vert Angle	to
G	EGF	①	161 16 30		
		⑥	247° 40' 55		
		Ave	161 16 49		
J	XJA	①	6° 25 50	87° 52' 30"	X
				87° 52' 20"	
				87° 52' 30"	
				272 07' 10"	
				272° 07' 15"	
		⑥	38° 35' 25'	272° 07' 20"	
		Ave	6° 25' 54"		
J	AJG	①	56° 14' 50"	84° 22' 40"	G
				84° 22 45"	
				84° 22' 40"	
				275° 36' 40"	
				275 36' 30"	
		⑥	337° 29' 50"	275° 36' 35"	
		Ave	56 14' 58"		
J	GJF	①	7° 37' 30"	83° 17' 40"	F
				83° 17' 30"	F
				83° 17' 30"	
				276° 41' 40"	
				276° 41' 40"	
		⑥	45° 45' 50"	276° 41' 40"	
		Ave	7° 37' 38"		

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Vert	Angle	to	HI	
			4.60	
				J
				Bottom of pole to bottom of Largat 20.08 ft at J
		A	4.94	
				Bottom of pole to top of Largat 22.04 ft at J
				pole on pin at J
				no vert As on A from J due to orientation of Largat
				vert angle to F from J to top of pipe

Sta	Angle	Hor Angle	Vert. Angle	To
J	FJH ①	24° 40' 20"	86° 16' 40"	H
			86° 16' 40"	
			86° 16' 40"	
			273° 42' 55"	
			273° 42' 50"	
	⑥	148° 02' 40"	273° 42' 50"	
	Avg	24° 40' 26"		
J	HJK ①	97° 19' 00"	90° 27' 40"	K
			90° 27' 40"	
			90° 27' 45"	
			269° 31' 50"	
			269° 31' 45"	
	⑥	223° 54' 10"	269° 31' 50"	
	Avg	97° 19' 2"		
J	KJX ①	167° 41' 50"		
	⑥	286 12 25		
	Avg	167 42 4		

H. I

4.94

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Sta	Angle	Hor Angle	Vert Angle	to
X	JxE ①	107° 39' 45"	91° 26' 00"	J
			91° 26' 00"	J
			91° 26' 00"	
			268° 33' 35"	
			268° 33' 30"	
	⑥	285° 59' 20"	268 33 30	
	Ave	107° 39' 53"		
X	EXD ①	16° 19' 30"	94° 03' 05"	D
			94° 02 55	
			94° 03' 00"	
			265° 56' 45"	
			265° 56' 50"	
	⑥	98 02 30	265° 56' 45"	
	Ave	16 20 25		
	Rpt			
	EXD ①			
	⑥			
	Ave			

not used

Not used

Vert Angle		to	H.I	x
93°	19' 35"	E		bottom of pole
93°	19' 40"	E		to bottom of
93°	19' 40"		5.22	target 10.19
266°	40' 00"		(above ground)	
266°	40' 00"			bottom of pole
266°	39' 55"			to top of
				target 11.98

Vert ∠ to D from x shot to bottom of small target

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Dec 19 T Reeves
Andros

			Hor Angle	Vert Angle	Ev.
X	JXE	①	107° 40' 20"	91° 26' 00"	J
				91° 25' 55"	
				91° 26' 00"	
				268° 33' 15"	
				268 33 00	
		⑥	286° 01' 05"	268° 33' 05"	
		Ave	107° 40' 11"		
X	EXD	①	16° 20' 15"	94° 02' 30"	D
				94 02 30	
				94 02 30	
				265° 57' 10"	
				265° 57' 10"	
		⑥	98° 2' 00"	265 57 05	
		Ave	16° 20' 20		
X	DXA	①	64° 55' 25"	85° 53' 55"	A
				85° 54' 00"	
				85° 53' 50	
				274° 05' 20"	
				274° 05' 20"	
		⑥	29 32 05	274 05 20	
			64° 55' 21"		
X	AXJ	①	171° 03' 55"		
		⑥	306° 24' 25"		
		Ave	171° 4' 4"		

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Vert Angle to		HI
93° 19' 10"	E	
93° 19' 10"		
93° 19' 20"		5.20
266° 40' 10"		
266° 40' 15		
266° 40 10		

vert ∡ to D from
x to bottom of
small target

VERT ∡ TO A TO
TOP OF PIPE

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Sta	Angle	Hor Angle	Vert Angle	to
F	KFH	0° 0' 10"	95° 33' 20"	K
			95° 33' 20"	
			95° 33' 15"	
			264° 27' 05"	
			264° 27' 10"	
		0° 0' 0"	264° 27' 10"	
	Ave	0° 0' 10"		
F	HFJ	15° 22' 20	96° 33' 15"	J
			96° 33' 20"	
			96° 33' 20"	
			263° 27' 20"	
			263° 27' 15"	
		92° 14 20	263° 27' 25"	
	Ave	15 22 23		
F	JFG	15° 21' 30"	98° 39' 20"	G
			98° 39' 25"	
			98° 39' 20"	
			261° 21' 20"	
			261° 21' 20"	
		92° 8' 50"	261° 21' ~~25"~~ 20"	
	Ave	15° 21' 28"		
F	GFE	15° 21' 55"	94° 52' 40"	E
			94° 52' 40"	
			94° 52 45"	
			265° 08' 00"	
		92° 11 40	265° 08' 15"	
	Ave	15° 21' 57"	265° 08' 00"	

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Vert Angle to	H.I	
98° 02' 50" H		Bottom of pole
98° 02' 45"	3.56	1.32 ft below top
98° 02' 50"		of pipe
261 57' 35"		
261 57 50"		Bottom of pole
261 57 40"		to bottom of target
		10.03' at F
		~~Bottom of~~ pole
		~~to top~~ of tar

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Sta	Am	Hor Angle
F	EFK ①	313° 58' 30"
	⑥	83° 22' 10"
	Ave	313 53 42

Hor to check minutes of EFK

313° 53' 40"

F	EFK ①	313° 53' 45"
	⑥	83 22' 40"
	Ave	313° 53' 47"

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K

Bottom of pole
to Bottom of
target 19.20 ft at K

pole on pipe

C

Large target is oriented
EW direction (visible from
N or South)

Bottom of pole 0.43'
bdow top of pipe

Bottom of pole to bottom of
19.84' ← Large target

Bottom of pole to bottom
of small target
20.01 ft

- Bottom of pole
to top of small
target 21.49.

- top of large target
21.84

Standardization of Chains
12-22-60

Chain	Distance	Temp	Tension
1	299.962	57.5	20
	299.955	"	20
	299.962	"	20
	299.962	"	20
	299.949	"	15
2	299.991	57.5	20
	299.990	"	20
	299.990	"	20
	299.990	"	20
	299.983	"	15
	299.980	"	15
	299.980	"	15
	299.980	"	15
3	299.962	57.5	20
	299.962	"	20
	299.962	"	20
	299.954	"	15
	299.952	"	15
	299.952	"	15
5.	100.00	56	20
	100.00	"	20
	100.00	"	20
	99.991	"	15
	99.991	"	15
	99.991	"	15

Andres
Estrada

Dist at 70°F

All measurements
taken with chain
flat on the ground
throughout

300.016

WEIGHT OF CHAIN 2.661 LB/100'

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ORIGINAL COPR. 191 J. C. PARKE
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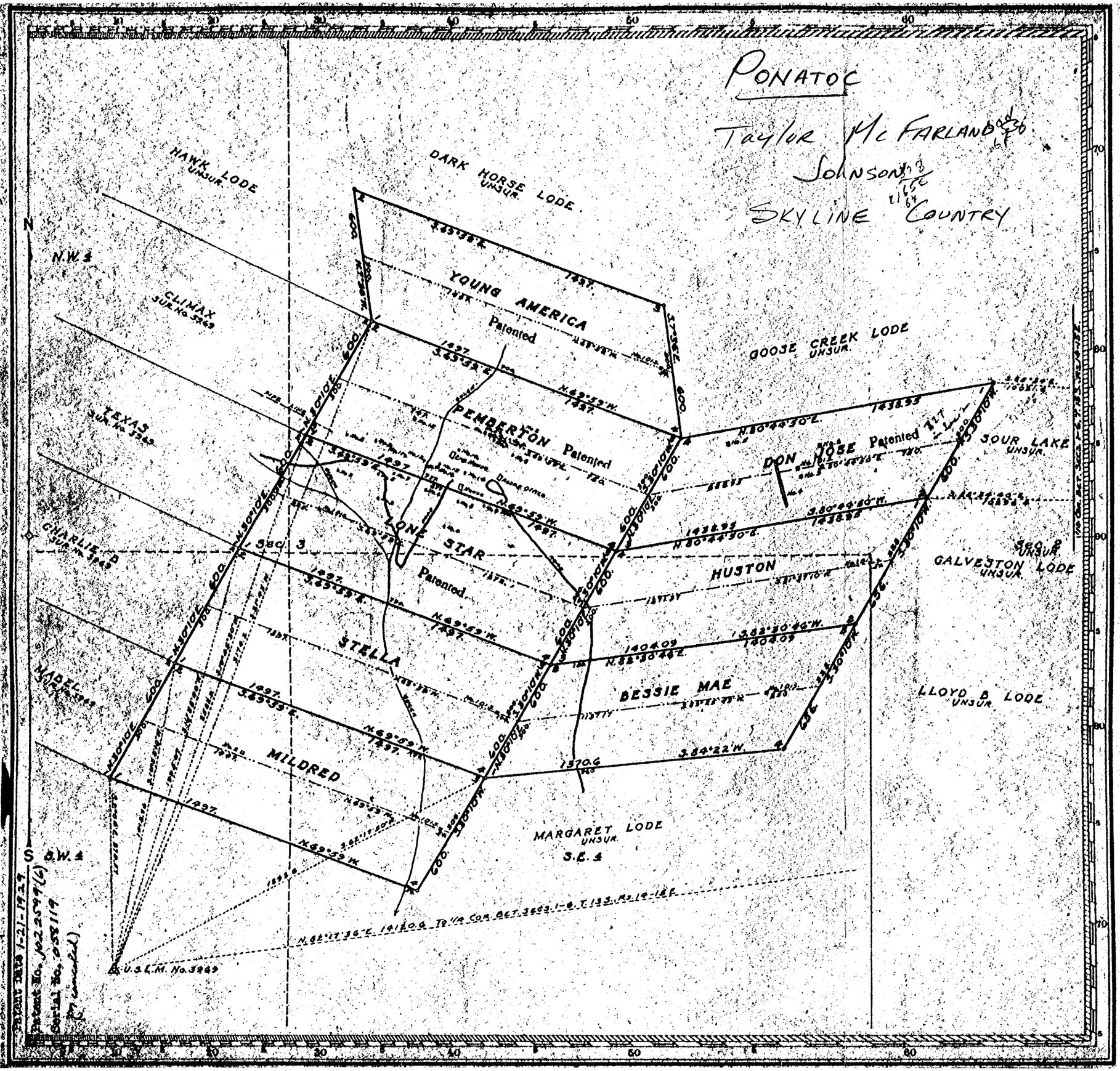
LEFAX, PHILADELPHIA 7, PA.

Chain	Distance	Temp	Tension
6	99.998	56	20
	99.998	"	20
	99.992	"	15
	99.992	"	15



Claim Located _____ 19

Mineral Survey No. 3969 Sheet No. 2

Lot No. Land District

PLAT

OF THE CLAIM OF

KNOWN AS THE

IN MINING DISTRICT,

COUNTY,

Containing an Area of Acres,

Scale of Feet to the Inch,

Variation

SURVEYED 19 BY

U.S. Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim of

known as the

from which this plat has been made under my direction, have been examined and approved, and are on file in this Office, and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or grantors and that said improvements consist of

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

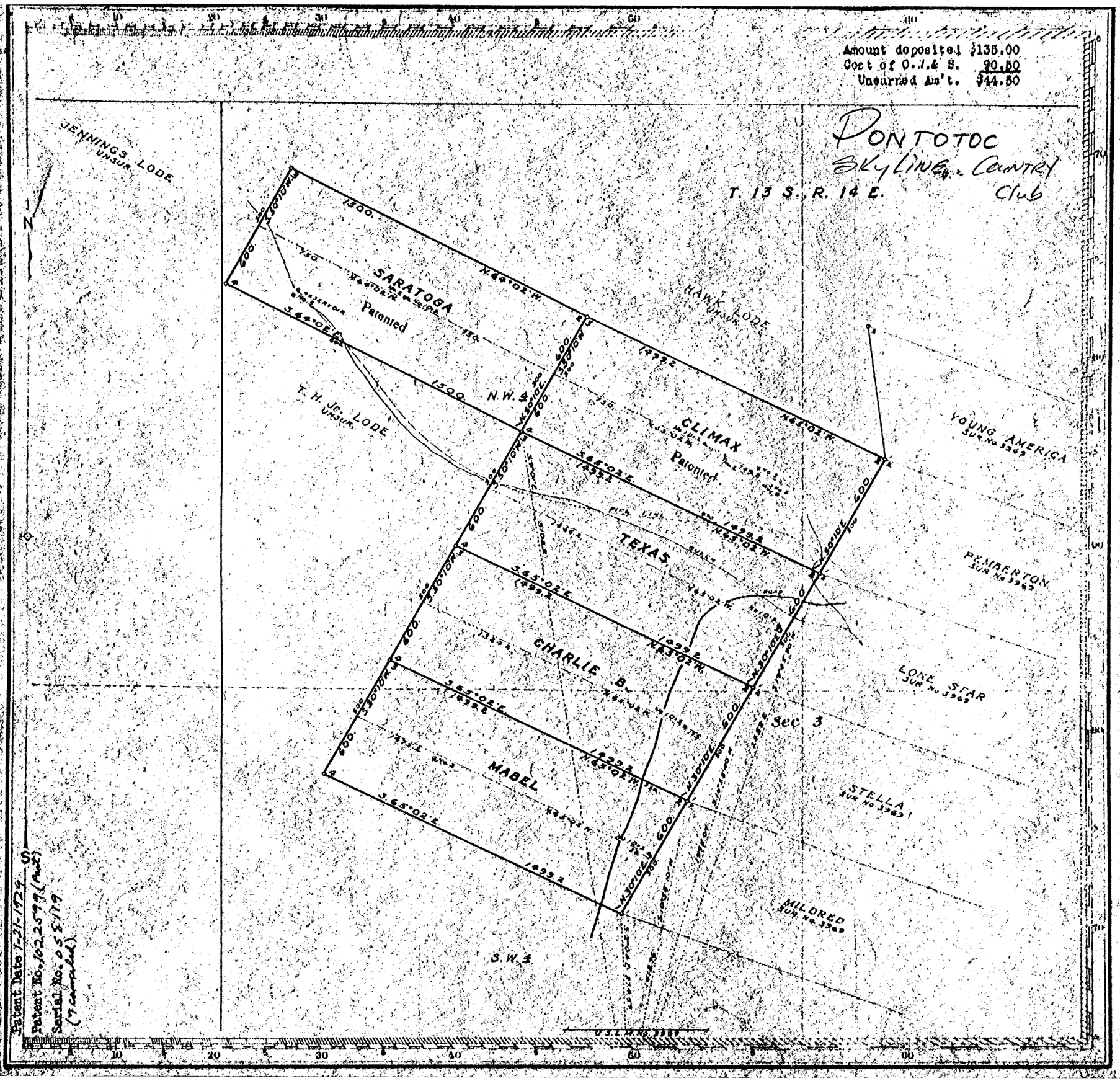
And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office.

_____, 19

U.S. Surveyor General for

Amount deposited $135.00
Cost of O.W.& S. 90.50
Unearned Am't. $44.50



Patent Date 1-21-1929
Patent No. 1022599 (Part)
Serial No. 058119
(7 cancelled)

Claim Located _____ 19

Mineral Survey No. 3969 2 Sheets.

LOT No.
ARIZONA Land District.

PLAT

OF THE CLAIM OF
Texas-Arizona Copper Company

KNOWN AS THE
YOUNG AMERICA, DON JOSE, PEMBERTON, CLIMAX, SARATOGA, HUSTON, LONE STAR, TEXAS, CHARLIE B., STELLA, BESSIE MAE, MABEL, and MILDRED lodes

IN Santa Catalina MINING DISTRICT,
Pima COUNTY, Arizona
Containing an Area of _____ Acres
Scale of 400 Feet to the Inch.
Variation 13° 30' E.
SURVEYED December 1 - 11 19 24 BY
T. N. Stevens
U.S. Deputy Mineral Surveyor

The Original Field Notes of the Survey of the Mining Claim of
Texas-Arizona Copper Company
known as the
YOUNG AMERICA et al lodes

from which this plat has been made under my direction, have been examined and approved, and are on file in this Office, and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.
I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claims by claimant or its grantors and that said improvements consist of 22 shafts, 1 trench, 1 cut, 1 tunnel, 1 drift, and 20 drill holes, total value $29,675.

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.
And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office.
Phoenix, Arizona,
March 26, 1925

Charles M. Donohoe
U.S. Surveyor General for
ARIZONA.