

5752

5752

Form 504
U. S. COAST AND GEODETIC SURVEY
DEPARTMENT OF COMMERCE
DESCRIPTIVE REPORT
Type of Survey <u>Air Photographic</u>
Field No. _____ Office No. <u>T-5752</u>
LOCALITY
State <u>Massachusetts</u>
General locality <u>Scituate Harbor, Mass.</u>
Locality _____
<u>194 5</u>
CHIEF OF PARTY
<u>R. W. Knox, Chief, Surveys Br.</u>
LIBRARY & ARCHIVES
DATE _____

Examined for cat.

C:

C

Q

T5752

Form T-1

DATA RECORD

T-5752

~~Quadrangle (II):~~

~~Project No. (II):~~

Field Office: *No field work*

Chief of Party: ~~Washington Office~~

Compilation Office: *Washington office*

Chief of Party: *R.W. Knox*

Instructions dated (II III):
None

~~Copy filed in Descriptive~~
Report No. T- (VI)

Completed survey received in office: 1-10-45

Reported to Nautical Chart Section: 1-10-45

Reviewed: 1-10-45 Applied to chart No. Date:

Redrafting Completed: *Not redrafted*

Registered: *1/25/45* Published: *Not published*

Compilation Scale: 1:5,000 Published Scale:

Scale Factor (III): 1.0

Geographic Datum (III): N.A. '27 Datum Plane (III):

Reference Station (III): Scituate L. H. (Old Tower)

Lat.: 42°12'16.746" Long.: 70°42'58.796"

Adjusted
~~Unadjusted~~

State Plane Coordinates (VI): *None*

X =

Y =

Military Grid Zone (VI)

PHOTOGRAPHS (III)

<u>Number</u>	<u>Date</u>	<u>Time</u>	<u>Scale</u>	<u>Stage of Tide</u>
44C-2309 & 44C-2310	7-19-44	8:15 am	1:10,000	6.0 Ft.

Tide from (III): **Predicted Tables**

Mean Range: **9.0 ft.**

Spring Range: **10.5 ft.**

Camera: (Kind or source)

Field Inspection by: **None**

date:

Field Edit by: **None**

date:

Date of Mean High-Water Line Location (III):

Projection and Grids ruled by (III) **Wash. Office** date: **Dec., 1944**

" " " checked by: **Wash. Office** date: **Dec., 1944**

Control plotted by: **Joe N. Henningsen** date: **Dec., 1944**

Control checked by: **K. N. Maki** date: **Dec., 1944**

Radial Plot by: **Joe N. Henningsen** date: **Dec., 1944**

Detailed by: **Joe N. Henningsen** date: **Dec., 1944**

Reviewed in compilation office by: **L. C. Lande** date: **Dec., 1944**

Elevations on Field Edit Sheet
checked by: **None**

date:

REPORT ON SHEET NO. T-5752

Scituate Harbor, Mass.

1:5,000

The ^{sheet} chart was plotted at 1:5,000 utilizing the multiplex aero-projector. Photographs were taken by the "six inch" focal length "Metrogon" camera, the scale of the negatives was approximately 1:10,000. Ratio photographs at a scale of 1:5,000 were used for additional study and interpretation. Only two pictures were taken (numbers 2309 and 2310) and although this gave photographic coverage, only the portion of the chart north of latitude $43^{\circ}11'50''$ had stereoscopic coverage. Due to this all objects north of this latitude are believed to be shown in their proper position to within less than 0.3 millimeter, while objects may be in error by as much as 2.0 millimeters in the southern portion of the chart. Due to this lack of stereoscopic coverage, all objects on Second Cliff were assumed to be at the same elevation, or at a slightly higher elevation, than similar objects on First Cliff. By use of this procedure it is believed that the small additional errors that would be introduced by relief displacement in the plotting of Second Cliff were eliminated.

Horizontal Control

Triangulation stations Old Tower and Cliff Tower; sextant positions for C. G. Cupola, Dyers wharf, Beacon and flashing light. See chart letter No. 687 (1940) for a list of the angles used.

Accuracy

Horizontal control points Old Tower Δ , Cupola, Dyers wharf, BN, and Fl. Lt. were used for multiplex triangulation to control model (2309 - 2310). The maximum error occurred at BN and was approximately 1.5 meters. The remainder of the chart, south of latitude $43^{\circ}11'50''$, was oriented between Old Tower Δ and Cliff Tower Δ . An azimuth swing of 0.3 millimeter was necessary, no apparent additional error was introduced at the other control points by this adjustment. To remove the relief displacement of Cliff Tower Δ , it was necessary to estimate the elevation of the top of the tower. It is believed that it was accomplished with sufficient accuracy to remove any error in azimuth. (Principal points of the picture were shifted in position during this orientation.) Cliff Tower Δ was not used for scale.

No vertical control was furnished for multiplex plotting. The coast line was used for horizontalizing the model.

- Comparison with Previous Topographic Survey

T 4062, 1924 1:5000 which covers the same area as this air photo survey is in error from 0.0 to 7.0 mm for shoreline details and 0.0 to 10.0 for other common points.

T 5752 is being filed as a topographic survey to supersede T 4062

L. C. Handy

The portion of the chart west of longitude $70^{\circ}43'30''$ and south of latitude $42^{\circ}11'50''$ may be displaced by 0.0 millimeter to 1.0 millimeter as relief displacement in this area could not be estimated, and picture definition was poor. Due to the lack of stereoscopic coverage north of latitude $42^{\circ}12'30''$ and south of latitude $42^{\circ}11'50''$, a probable error of from 0.0 millimeter to 2.0 millimeters may exist in the offshore objects as plotted by the multiplex in these areas.

Photographs

C 2309 and C 2310 - taken July 18, 1944

Suggestion

Had one additional photograph been taken on the south end of the strip, the chart could have been compiled in much shorter time and the accuracy of the southern portion would have probably been increased to the point where all objects would have been within 0.3 millimeter of their proper locations.

Where piers have been deleted we have no information regarding underwater remains.

This compilation was completed due to the many corrections that would be necessary to be applied to T-4062, 1924, of the same area and shall supersede T-4062. *

~~THIS CHART WAS COMPILED FROM THE PHOTOGRAPHS TAKEN ON JULY 18, 1944, AND THE CHART T-4062, 1924, OF THE SAME AREA. IT SUPERSEDES T-4062.~~

Compiled and submitted by:

James A. Henning
Cartographic Engr.
James A. Webb

Approved by:

L. C. Lande
L. C. Lande

January 18, 1945

* This sheet originally was intended for chart corrections only but large errors were noted in T-4062, the last survey covering this area and the sheet is being filed as a topographic survey to supersede T-4062.

see last sheet for signatures
B. J. Jones

COMPUTATION OF TRIANGLES

State: *Massachusetts*

for *T5752*

11-9121

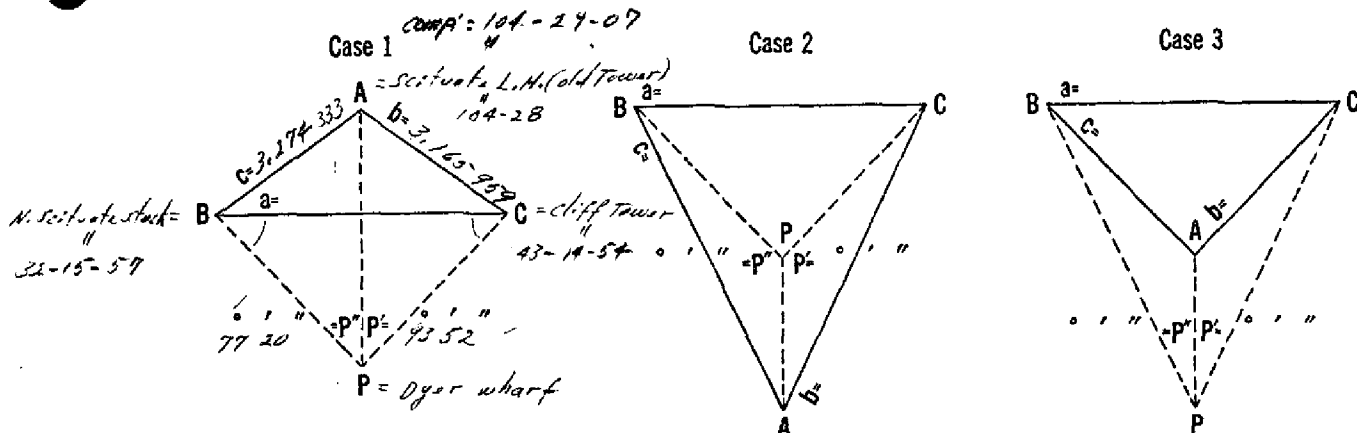
NO.	STATION	OBSERVED ANGLE	CORR'N	SPHER' L ANGLE	SPHER' L EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3	<i>Sci. Lt. H. (St. Thomas)</i>						<i>2.435 948</i>
1	<i>C. G. Cupola</i>	<i>24-38</i>					<i>0.380 062</i>
2	<i>Sci. Lt. H. (St. Thomas)</i>	<i>54-54</i>					<i>9.912 833</i>
3	<i>Breakwater Lt.</i>	<i>100-28</i>					<i>9.992 713</i>
1-3						<i>(535.07)</i>	<i>2.728 343</i>
1-2						<i>643.0</i>	<i>2.808 223</i>
2-3	<i>Sci. Lt. H. (St. Thomas)</i>						<i>3.045 732</i>
1	<i>C. G. Cupola</i>	<i>109-47</i>					<i>0.026 420</i>
2	<i>Breakwater Lt.</i>	<i>33-10</i>					<i>1.733 078</i>
3	<i>Sci. Lt. H. (St. Thomas)</i>	<i>37-03</i>					<i>9.777 966</i>
1-3						<i>645.9</i>	<i>2.810 200</i>
1-2						<i>(711.44)</i>	<i>2.852 118</i>
2-3	<i>Sci. Lt. H. (St. Thomas)</i>						
2-3							
1							
2							
3							
1-3							
1-2							
2-3							
1							
2							
3							
1-3							
1-2							

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GP's Scituate Harbor

Station		Sec.	Sec-M.	B.D. Meters				
Dyers Wharf.	42 11	49.94	1540.8	310.5				
	70 43	31.13	714.6	662.3				
Day Beacon.	42 12	12.33	380.4	1470.9				
	70 43	02.29	52.5	1324.0				
Breakwater L. H.	42 12	11.08	341.9	1509.4				
	70 42	49.69	1140.0	236.5				
Scituate C.G. Cupola.	42 11	55.94	1726.0	125.3				
	70 43	01.16	26.6	1350.3				

COMPUTATION OF THREE-POINT PROBLEM



Cases 1 and 2

P' 93-52
P'' 77-20
A 104-28

Sum 275-40
1/2 Sum 137-50

S = 180° - 1/2 sum = 42-10

Case 3

P'
P''

Sum
A

A - sum

S = 1/2 (A - sum) =

Log c = 2.274 333
Log sin P' = 9.899 010
Colog b = 6.834 041
Colog sin P'' = 0.010 700

Sum = log tan Z = 0.118 084

Z = 52-42

Z + 45° = 97-42

Log cot (Z + 45°) = 9.130 794

Log tan S = 9.756 977

Sum = log tan ε = 9.087 971 (sign -)

ε 6-59

S 42-10

(Tan ε +)

S + ε = angle ABP

S - ε = angle ACP

(Tan ε -)

S - ε = angle ABP

S + ε = angle ACP

BPA 77-20

ABP 35-11

PAB 62-29

APC 93-52

PCA 49-09

CAP 36-59

PCB 05-54

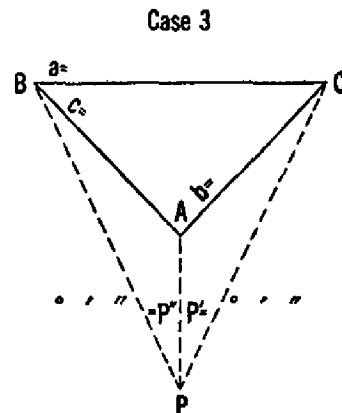
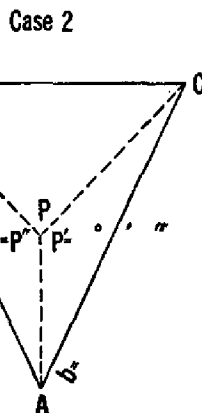
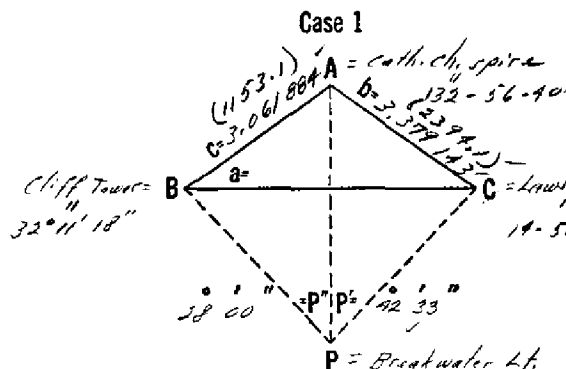
CBP 02-55

BPC 171-12

180-01

(For explanation of this form see Special Publication No. 138, pages 191 and 192, or Special Publication No. 145, pages 98-100)

COMPUTATION OF THREE-POINT PROBLEM



Cases 1 and 2

P' 42° 33'
P'' 28° 00'
A 132° 57'

Sum 203 30
1/2 Sum 101 45

$$S = 180^\circ - \frac{1}{2} \text{ sum} = 78^\circ 15'$$

Case 3

P'
P''

Sum
A

A - sum

$$S = \frac{1}{2} (A - \text{sum}) =$$

Log c = 3.061 884
Log sin P' = 9.830 097
Colog b = 6.620 857
Colog sin P'' = 0.328 391

Sum = log tan Z = 9.841 229

Z = 34° 45'
Z + 45° = 79° 45'

Log cot (Z + 45°) = 9.257 269
Log tan S = 10.681 936

Sum = log tan ε = 9.939 205 (sign +)

ε 41° 00'
S 78° 15'

(Tan ε +)

S + ε = angle ABP
S - ε = angle ACP

119° 15'
37° 15'

(Tan ε -)

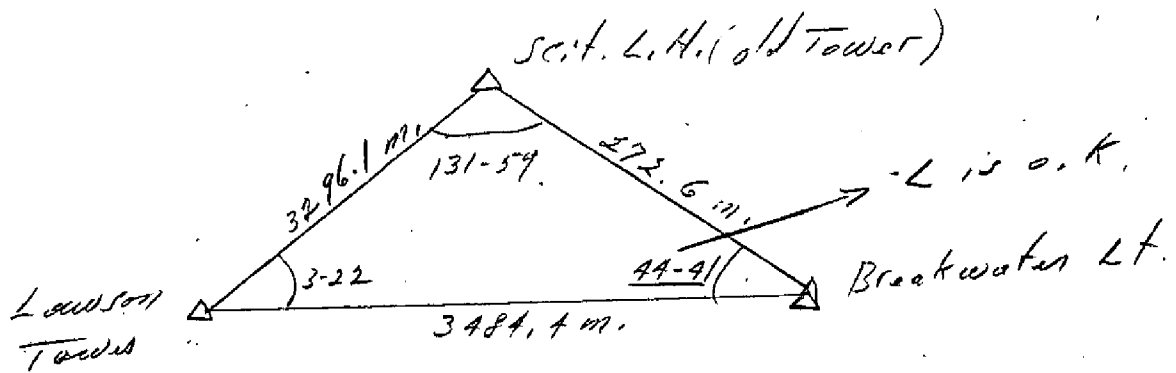
S - ε = angle ABP
S + ε = angle ACP

BPA 18° 00'
ABP 119° 15'
PAB 32° 45'

APC 42° 33'
PCA 54° 15'
CAP 100° 12'

PCB 12° 23'
CBP 87° 09'
BPC 70° 33'

(For explanation of this form see Special Publication No. 138, pages 191 and 192, or Special Publication No. 145, pages 98-100)



Ch. by Law of sines

$$\begin{array}{r} 2450.19 \\ 2450.12 \\ \hline .07 \text{ error in m.} \end{array}$$

COMPUTATION OF TRIANGLES

State: _____

11-9121

U. S. GOVERNMENT PRINTING OFFICE

NO.	STATION	OBSERVED ANGLE	CORR'N	SPHER'L ANGLE	SPHER'L EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3	Cliff Tower to Spire						3.261 884
1	Lawson Tower	14 - 52					0.590 793
2	Cliff Tower	32 - 11					9.726 926
3	Spire	132 - 57					9.864 481
1-3							3.379 103
1-2							3.517 158
2-3	Cliff Tower to Lawson Tower						3.517 158
1	Breakwater Lt.	70 - 33					0.025 519
2	Cliff Tower	87 - 04					9.999 431
3	Lawson Tower	22 - 23					9.580 699
1-3						3484.2	3.542 108
1-2						1328.5	3.123 376
2-3							
1							
2							
3							
1-3							
1-2							
2-3							
1							
2							
3							
1-3							
1-2							

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COMPUTATION OF TRIANGLES

State: Massachusetts

11-9121

NO.	STATION	OBSERVED ANGLE	CORR'N	SPHER' L ANGLE	SPHER' L EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3	Cliff Tower to Lawson Tower						3.517 177
1	Breastwater Lt.	70 - 33					0.025 519
2	Cliff Tower	87 - 04					9.989 431
3	Lawson Tower	22 - 23					9.580 699
1-3							3.542 127
1-2							3.123 395
2-3	N. Scituate Stack to Cliff Tower						3.424 510
1	Dyer wharf	171 - 12	- 20"			171-11-40	0.815 077
2	N. Scit. Stack	02 - 55	- 20"			02-54-40	8.705 749
3	Cliff Tower	05 - 54	- 20"			05-53-40	9.011 554
1-3		+ 01				(281.7m) =	2.945 336
1-2						(1983.0m) =	3.257 141
2-3	Scit. L.H. (old tower) to Breastwater Lt.						2.435 448
1	Day Beacon	67 - 03					0.035 813
2	Scit. L.H. (old tower)	80 - 27					9.993 939
3	Breastwater Lt.	32 - 30					9.730 216
1-3						(291.9m)	2.465 200
1-2						(159.0m)	2.201 479
2-3	Scit. L.H. (old tower) to Breastwater Lt.						2.435 448
1	Day Beacon	67 - 13					0.035 280
2	Scit. L.H. (old tower)	80 - 27					9.993 939
3	Breastwater light	32 - 20					9.728 227
1-3						(291.5m)	2.464 667
1-2						(158.1m)	2.198 955

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(Check Camp.)

M-2064.1

POSITION COMPUTATION, TRAVERSE (Calculating machine)

M-2064-1

POSITION COMPUTATION, TRAVERSE (Calculating machine)

$$\angle \text{at Center (Law of Cosines)} = \frac{12-21}{45-15} =$$
$$\times \left(\frac{1}{2} \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} e^{-\frac{1}{2} \lambda^2} d\lambda \right) =$$

a	Scit. L.H. Coll. Tans to Breakwater Lt.	309	56
L	&	+ 80	27"
a	2 Scit. L.H. to Day Riv.	30	2.3
Δα			
		180	00
a	1 Day Riv. to Scit. L.H.	210	2.3
		67	2.3
		277°	2.3
φ	42	16.95	2
Δφ	-	4.75	S = 15.20
φ'	42	12.33	1
Corr.			D. M. Meters
Adj.			D. P. Meters
Cos α	180.2	661	Sin α
S Cos α	135.2	135.2	S Sin α
B	30.80	4.4	H
(S Sin α) ² (10,000)			Δλ (= H S Sin α)
C	230		Sin ½ (φ + φ')
			- Δφ

POSITION COMPUTATION, TRAVERSE
(Calculating machine)

α	N. Se. Ledge Stack	Cliff Tower	321	44	46	α	Cliff Tower to N. Se. Ledge Stack	141	45	34
L			+ 02	54	40	L		705	53	40
α	2 N. Se. Ledge Stack	1 Dyer Wharf	324	39	26	α	2 Cliff Tower to 1 Dyer Wharf	135	51	54
$\Delta\alpha$				+ 30		$\Delta\alpha$			-	18
α	1 Dyer Wharf	2 N. Se. Ledge Stack	144	39	56	α	1 Dyer Wharf to 2 Cliff Tower	315	51	36
315 52										
ϕ	42	12	37.08	2	N. Se. Ledge Stack	λ	70	44	16.09	
$\Delta\phi$						$\Delta\lambda$			44.95	
ϕ'	42	11	49.94	1	Dyer Wharf	λ'	70	43	31.14	
Corr.						Corr.				
Adj.						Adj.				
$\cos\alpha$	.815706					$\sin\alpha$			.696351	
$S\cos\alpha$	1454.40					$S\sin\alpha$			613.97	
B	30.854					H			.043585	
$S\sin\alpha$ (10,000)	.011					$\Delta\lambda$				
C	.230					$\sin\frac{1}{2}(\phi+\phi')$			.672	
						$-\Delta\phi$			+ 18	

INVERSE POSITION COMPUTATION

$$\begin{aligned} s_1 \sin \left(\alpha + \frac{\Delta \alpha}{2} \right) &= \frac{\Delta \lambda_1 \cos \phi_m}{A_m} \\ s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) &= \frac{-\Delta \phi_1 \cos \frac{\Delta \lambda}{2}}{B_m} \\ -\Delta \alpha &= \Delta \lambda \sin \phi_m \sec \frac{\Delta \phi}{2} + F(\Delta \lambda)^2 \end{aligned}$$

in which $\log \Delta \lambda_1 = \log (\lambda' - \lambda)$ - correction for arc to $\sin^*$; $\log \Delta \phi_1 = \log (\phi' - \phi)$ - correction for arc to $\sin^*$; and $\log s = \log s_1 +$ correction for arc to $\sin^*$.

NAME OF STATION												
1.	ϕ	-	42	11	29.433	Cliff Tower	λ	-	70	43	04.372	
2.	ϕ'	+	42	12	37.081	N. Scituate Stack	λ'	+	70	44	16.086	
$\Delta\phi (= \phi' - \phi)$			+ 01			07.648	$\Delta\lambda (= \lambda' - \lambda)$			+ 01		11.714
$\frac{\Delta\phi}{2}$			+			33.824	$\frac{\Delta\lambda}{2}$			+		35.857
$\phi_m (= \phi + \frac{\Delta\phi}{2})$			42			12	03.257					
$\Delta\phi$ (secs.)			+			67.648	$\Delta\lambda$ (secs.)			+		71.714
$\log \Delta\phi$			1.830			255	$\log \Delta\lambda$			1.855		604
cor. arc-sin			-			-	cor. arc-sin			-		-
$\log \Delta\phi_1$			10.			-	$\log \Delta\lambda_1$			9.869		698
$\log \cos \frac{\Delta\lambda}{2}$			1.489			317	$\log \cos \phi_m$			1.490		938
$\text{colog } B_m$			1.489			317	$\text{colog } A_m$			1.490		938
$\log \{s_1 \cos(\alpha + \frac{\Delta\alpha}{2})\}$			3.319			572	$\log \{s_1 \sin(\alpha + \frac{\Delta\alpha}{2})\}$			3.216		240
			(opposite in sign to $\Delta\phi$)				$\log \{s_1 \cos(\alpha + \frac{\Delta\alpha}{2})\}$			3.319		572
$\log \Delta\lambda$			1.855			604	$\log \tan(\alpha + \frac{\Delta\alpha}{2})$			9.896		668
$\log \sin \phi_m$			9.827			196	$\alpha + \frac{\Delta\alpha}{2}$			141		45 10
$\log \sec \frac{\Delta\phi}{2}$			1.682			800	$\log \sin(\alpha + \frac{\Delta\alpha}{2})$			9.791		730
$\log a$			+			48	$\log \cos(\alpha + \frac{\Delta\alpha}{2})$			9.895		062
a			-			48	$\log s_1$			+		
b			-			48	cor. arc-sin			+		
$-\Delta\alpha$ (secs.)			+			24	$\log s$			3.424		510
$-\frac{\Delta\alpha}{2}$			+			24				26		57.7
$\alpha + \frac{\Delta\alpha}{2}$			141			45 10						
α (1 to 2)			141			45 34						
$\Delta\alpha$			-			48						
α' (2 to 1)			321			44 46						

* Use the table on the back of this form for correction of arc to sin.

* Use the table on the back of this form for correction of
are to sin.

NOTE.—For log s up to 4.0 and for $\Delta\phi$ or $\Delta\lambda$ (or both) up to 3', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 7 decimal places.

Table of arc-sin corrections for inverse position computations

$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034	
4.327	2	2.836	5.234	130	3.743	5.530	508	4.039	
4.415	3	2.924	5.243	136	3.752	5.534	519	4.043	
4.478	4	2.987	5.253	142	3.762	5.539	530	4.048	
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052	
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057	
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062	
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066	
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070	
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075	
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079	
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084	
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088	
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092	
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096	
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100	
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104	
4.804	18	3.313	5.363	236	3.872	5.600	702	4.109	
4.827	20	3.336	5.369	243	3.878	5.604	716	4.113	
4.857	23	3.366	5.376	251	3.885	5.608	729	4.117	
4.876	25	3.385	5.383	259	3.892	5.612	743	4.121	
4.892	27	3.401	5.390	267	3.899	5.616	757	4.125	
4.915	30	3.424	5.396	275	3.905	5.620	771	4.129	
4.936	33	3.445	5.403	284	3.912	5.624	785	4.133	
4.955	36	3.464	5.409	292	3.918	5.628	800	4.137	
4.972	39	3.481	5.415	300	3.924	5.632	814	4.141	
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145	
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149	
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153	
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157	
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161	
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165	
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169	
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172	
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176	
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180	
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183	
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187	
5.151	89	3.660	5.489	422	3.998				
5.163	94	3.672	5.495	433	4.004				
5.172	98	3.681	5.500	443	4.009				
5.183	103	3.692	5.505	453	4.014				
5.193	108	3.702	5.510	464	4.019				
5.205	114	3.714	5.515	474	4.024				
5.214	119	3.723	5.520	486	4.029				

INVERSE POSITION COMPUTATION

$$s_1 \sin \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{\Delta \lambda_1 \cos \phi_m}{A_m}$$

$$s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{-\Delta \phi_1 \cos \frac{\Delta \lambda}{2}}{B_m}$$

$$-\Delta \alpha = \Delta \lambda \sin \phi_m \sec \frac{\Delta \phi}{2} + F(\Delta \lambda)^3$$

in which $\log \Delta \lambda_1 = \log (\lambda' - \lambda)$ - correction for arc to sin*; $\log \Delta \phi_1 = \log (\phi' - \phi)$ - correction for arc to sin*; and $\log s = \log s_1 +$ correction for arc to sin*.

		NAME OF STATION							
1.	ϕ	42	12	01.894	Lawson Tower	λ	70	45	21.038
2.	ϕ'	42	11	20.032	Cath. Ch. Spire	λ'	70	43	53.011
$\Delta \phi (= \phi' - \phi)$		- 41.662			$\Delta \lambda (= \lambda' - \lambda)$		- 01 28.027		
$\frac{\Delta \phi}{2}$		- 20.831			$\frac{\Delta \lambda}{2}$		- 44.014		
$\phi_m (= \phi + \frac{\Delta \phi}{2})$		42	11	40.263					
$\Delta \phi$ (secs.)		- 41.662			$\Delta \lambda$ (secs.)		- 88.027		
$\log \Delta \phi$		1.619 740 X			$\log \Delta \lambda$		1.944 615 X		
cor. arc - sin		-			cor. arc - sin		-		
$\log \Delta \phi_1$					$\log \Delta \lambda_1$				
$\log \cos \frac{\Delta \lambda}{2}$		10. -			$\log \cos \phi_m$		9.869 740 X		
$\text{colog } B_m$		1.989 316 X			$\text{colog } A_m$		1.190 937 X		
$\log \{s_1 \cos (\alpha + \frac{\Delta \alpha}{2})\}$		3.109 056 X			$\log \{s_1 \sin (\alpha + \frac{\Delta \alpha}{2})\}$		3.305 293 X		
		(opposite in sign to $\Delta \phi$)			$\log \{s_1 \cos (\alpha + \frac{\Delta \alpha}{2})\}$		3.109 056 X		
$\log \Delta \lambda$		1.944 615 X			$\log \tan (\alpha + \frac{\Delta \alpha}{2})$		0.196 137 X		
$\log \sin \phi_m$		9.827 144 X			$\alpha + \frac{\Delta \alpha}{2}$		302 28 28		
$\log \sec \frac{\Delta \phi}{2}$					$\log \sin (\alpha + \frac{\Delta \alpha}{2})$		9.926 152		
$\log a$		1.771 760 X			$\log \cos (\alpha + \frac{\Delta \alpha}{2})$		9.729 912		
a		- 59			$\log s$				
b					cor. arc - sin		+		
$-\Delta \alpha$ (secs.)		+ 5.7			$\log s$		3.374 143		
$\frac{\Delta \alpha}{2}$		- 30					2394.1		
$\alpha + \frac{\Delta \alpha}{2}$		302 28 28							
α (1 to 2)		302 27 58							
$\Delta \alpha$		+ 59							
		180							
α' (2 to 1)		122 28 57							

* Use the table on the back of this form for correction of arc to sin.

NOTE.—For $\log s$ up to 4.0 and for $\Delta \phi$ or $\Delta \lambda$ (or both) up to 3', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 7 decimal places.

Table of arc-sin corrections for inverse position computations

$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034	
4.327	2	2.836	5.234	130	3.743	5.530	508	4.039	
4.415	3	2.924	5.243	136	3.752	5.534	519	4.043	
4.478	4	2.987	5.253	142	3.762	5.539	530	4.048	
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052	
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057	
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062	
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066	
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070	
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075	
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079	
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084	
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088	
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092	
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096	
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100	
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104	
4.804	18	3.313	5.363	236	3.872	5.600	702	4.109	
4.827	20	3.336	5.369	243	3.878	5.604	716	4.113	
4.857	23	3.366	5.376	251	3.885	5.608	729	4.117	
4.876	25	3.385	5.383	259	3.892	5.612	743	4.121	
4.892	27	3.401	5.390	267	3.899	5.616	757	4.125	
4.915	30	3.424	5.396	275	3.905	5.620	771	4.129	
4.936	33	3.445	5.403	284	3.912	5.624	785	4.133	
4.955	36	3.464	5.409	292	3.918	5.628	800	4.137	
4.972	39	3.481	5.415	300	3.924	5.632	814	4.141	
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145	
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149	
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153	
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157	
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161	
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165	
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169	
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172	
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176	
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180	
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183	
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187	
5.151	89	3.660	5.489	422	3.998				
5.163	94	3.672	5.495	433	4.004				
5.172	98	3.681	5.500	443	4.009				
5.183	103	3.692	5.505	453	4.014				
5.193	108	3.702	5.510	464	4.019				
5.205	114	3.714	5.515	474	4.024				
5.214	119	3.723	5.520	486	4.029				

INVERSE POSITION COMPUTATION

$$s_1 \sin \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{\Delta \lambda_1 \cos \phi_m}{A_m}$$

$$s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{-\Delta \phi_1 \cos \frac{\Delta \lambda}{2}}{B_m}$$

$$-\Delta \alpha = \Delta \lambda \sin \phi_m \sec \frac{\Delta \phi}{2} + F(\Delta \lambda)^2$$

in which $\log \Delta \lambda_1 = \log (\lambda' - \lambda)$ - correction for arc to sin*; $\log \Delta \phi_1 = \log (\phi' - \phi)$ - correction for arc to sin*; and $\log s = \log s_1 +$ correction for arc to sin*.

		NAME OF STATION			
1. ϕ	42 12 01.694	Lawson Tower	λ	70 45 21.038	
2. ϕ'	42 11 29.933	Cliff Tower	λ'	70 43 09.372	
$\Delta \phi (= \phi' - \phi)$	-32.261		$\Delta \lambda (= \lambda' - \lambda)$	-02 16.666	
$\frac{\Delta \phi}{2}$	-16.130		$\frac{\Delta \lambda}{2}$	-01 08.333	
$\phi_m (= \phi + \frac{\Delta \phi}{2})$	42 11 45.564		$\Delta \lambda$ (secs.)	-136.666	
$\Delta \phi$ (secs.)	-32.261				
$\log \Delta \phi$	1.508 698		$\log \Delta \lambda$	2.135 660	
cor. arc - sin			cor. arc - sin		
$\log \Delta \phi_1$			$\log \Delta \lambda_1$		
$\log \cos \frac{\Delta \lambda}{2}$	10. —		$\log \cos \phi_m$	9.869 731	
$\text{colog } B_m$	1.484 316		$\text{colog } A_m$	1.490 938	
$\log \{s_1 \cos (\alpha + \frac{\Delta \alpha}{2})\}$	2.997 994	(opposite in sign to $\Delta \phi$)	$\log \{s_1 \sin (\alpha + \frac{\Delta \alpha}{2})\}$	3.996 329	
$\log \Delta \lambda$	2.135 660		$\log \{s_1 \cos (\alpha + \frac{\Delta \alpha}{2})\}$	2.997 994	
$\log \sin \phi_m$	9.827 155	$3 \log \Delta \lambda$	$\log \tan (\alpha + \frac{\Delta \alpha}{2})$	0.498 335	
$\log \sec \frac{\Delta \phi}{2}$		$\log F$	$\alpha + \frac{\Delta \alpha}{2}$	287 36 42	
$\log a$	1.962 815	$\log b$	$\log \sin (\alpha + \frac{\Delta \alpha}{2})$	4.979 152	
a	-92		$\log \cos (\alpha + \frac{\Delta \alpha}{2})$	9.480 817	
b			$\log s_1$		
$-\Delta \alpha$ (secs.)	+92		cor. arc - sin	+	
$-\frac{\Delta \alpha}{2}$	-46		$\log s$	3.517 177	
$\alpha + \frac{\Delta \alpha}{2}$	587 36 42			3289.8	
α (1 to 2)	287 35 56				
$\Delta \alpha$	+01 32				
	180				
α' (2 to 1)	107 37 28				

* Use the table on the back of this form for correction of arc to sin.

NOTE.—For $\log s$ up to 4.0 and for $\Delta \phi$ or $\Delta \lambda$ (or both) up to 3', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 7 decimal places.

Table of arc-sin corrections for inverse position computations

$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034	
4.327	2	2.836	5.234	130	3.743	5.530	508	4.039	
4.415	3	2.924	5.243	136	3.752	5.534	519	4.043	
4.478	4	2.987	5.253	142	3.762	5.539	530	4.048	
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052	
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057	
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062	
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066	
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070	
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075	
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079	
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084	
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088	
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092	
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096	
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100	
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104	
4.804	18	3.313	5.363	236	3.872	5.600	702	4.109	
4.827	20	3.336	5.369	243	3.878	5.604	716	4.113	
4.857	23	3.366	5.376	251	3.885	5.608	729	4.117	
4.876	25	3.385	5.383	259	3.892	5.612	743	4.121	
4.892	27	3.401	5.390	267	3.899	5.616	757	4.125	
4.915	30	3.424	5.396	275	3.905	5.620	771	4.129	
4.936	33	3.445	5.403	284	3.912	5.624	785	4.133	
4.955	36	3.464	5.409	292	3.918	5.628	800	4.137	
4.972	39	3.481	5.415	300	3.924	5.632	814	4.141	
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145	
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149	
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153	
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157	
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161	
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165	
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169	
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172	
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176	
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180	
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183	
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187	
5.151	89	3.660	5.489	422	3.998				
5.163	94	3.672	5.495	433	4.004				
5.172	98	3.681	5.500	443	4.009				
5.183	103	3.692	5.505	453	4.014				
5.193	108	3.702	5.510	464	4.019				
5.205	114	3.714	5.515	474	4.024				
5.214	119	3.723	5.520	486	4.029				

INVERSE POSITION COMPUTATION

$$s_1 \sin \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{\Delta \lambda_1 \cos \phi_m}{A_m}$$

$$s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{-\Delta \phi_1 \cos \frac{\Delta \lambda}{2}}{B_m}$$

$$-\Delta \alpha = \Delta \lambda \sin \phi_m \sec \frac{\Delta \phi}{2} + F(\Delta \lambda)^3$$

in which $\log \Delta \lambda_1 = \log (\lambda' - \lambda)$ - correction for arc to sin*; $\log \Delta \phi_1 = \log (\phi' - \phi)$ - correction for arc to sin*; and $\log s = \log s_1 +$ correction for arc to sin*.

		NAME OF STATION			
1.	ϕ	42	11	20.032	Cell. Ch. Spire
2.	ϕ'	42	11	29.933	Cliff Tower
$\Delta \phi (= \phi' - \phi)$		+		09.901	
$\frac{\Delta \phi}{2}$		+		04.950	
$\phi_m (= \phi + \frac{\Delta \phi}{2})$		42	11	24.732	
$\Delta \phi$ (secs.)		+		09.901	
$\log \Delta \phi$		0.993 174		$\log \Delta \lambda$	
cor. arc - sin		—		1.686 985	
$\log \Delta \phi_1$		—		cor. arc - sin	
$\log \cos \frac{\Delta \lambda}{2}$		10. —		$\log \Delta \lambda_1$	
colog B_m		1.489 315		$\log \cos \phi_m$	
$\log \{s_1 \cos (\alpha + \frac{\Delta \alpha}{2})\}$		2.462 489		9.869 770	
(opposite in sign to $\Delta \phi$)				colog A_m	
$\log \Delta \lambda$		1.686 985		1.490 437	
$\log \sin \phi_m$		9.827 107		$\log \{s_1 \sin (\alpha + \frac{\Delta \alpha}{2})\}$	
$\log \sec \frac{\Delta \phi}{2}$		—		3.047 692	
$\log a$		1.514 092		$\log \{s_1 \cos (\alpha + \frac{\Delta \alpha}{2})\}$	
a		- 33		2.462 489	
b		—		$\log \tan (\alpha + \frac{\Delta \alpha}{2})$	
$-\Delta \alpha$ (secs.)		+ 33		0.585 203	
$-\frac{\Delta \alpha}{2}$		- 16		$\alpha + \frac{\Delta \alpha}{2}$	
$\alpha + \frac{\Delta \alpha}{2}$		25 3 25 53		25 3 25 53	
α (1 to 2)		25 3 25 37		$\log \sin (\alpha + \frac{\Delta \alpha}{2})$	
$\Delta \alpha$		+ 33		9.985 807	
		180		$\log \cos (\alpha + \frac{\Delta \alpha}{2})$	
α' (2 to 1)		75 26 10		9.400 606	
				$\log s_1$	
				cor. arc - sin	
				+	
				$\log s$	
				3.061 884	
				1153.1	

* Use the table on the back of this form for correction of arc to sin.

NOTE.—For $\log s$ up to 4.0 and for $\Delta \phi$ or $\Delta \lambda$ (or both) up to 3', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 7 decimal places.

Table of arc-sin corrections for inverse position computations

$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034	
4.327	2	2.836	5.234	130	3.743	5.530	508	4.039	
4.415	3	2.924	5.243	136	3.752	5.534	519	4.043	
4.478	4	2.987	5.253	142	3.762	5.539	530	4.048	
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052	
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057	
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062	
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066	
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070	
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075	
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079	
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084	
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088	
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092	
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096	
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100	
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104	
4.804	18	3.313	5.363	236	3.872	5.600	702	4.109	
4.827	20	3.336	5.369	243	3.878	5.604	716	4.113	
4.857	23	3.366	5.376	251	3.885	5.608	729	4.117	
4.876	25	3.385	5.383	259	3.892	5.612	743	4.121	
4.892	27	3.401	5.390	267	3.899	5.616	757	4.125	
4.915	30	3.424	5.396	275	3.905	5.620	771	4.129	
4.936	33	3.445	5.403	284	3.912	5.624	785	4.133	
4.955	36	3.464	5.409	292	3.918	5.628	800	4.137	
4.972	39	3.481	5.415	300	3.924	5.632	814	4.141	
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145	
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149	
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153	
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157	
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161	
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165	
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169	
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172	
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176	
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180	
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183	
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187	
5.151	89	3.660	5.489	422	3.998				
5.163	94	3.672	5.495	433	4.004				
5.172	98	3.681	5.500	443	4.009				
5.183	103	3.692	5.505	453	4.014				
5.193	108	3.702	5.510	464	4.019				
5.205	114	3.714	5.515	474	4.024				
5.214	119	3.723	5.520	486	4.029				

INVERSE POSITION COMPUTATION

$$s_1 \sin \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{\Delta \lambda_1 \cos \phi_m}{A_m}$$

$$s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{-\Delta \phi_1 \cos \frac{\Delta \lambda}{2}}{B_m}$$

$$-\Delta \alpha = \Delta \lambda \sin \phi_m \sec \frac{\Delta \phi}{2} + F(\Delta \lambda)^3$$

in which $\log \Delta \lambda_1 = \log (\lambda' - \lambda)$ - correction for arc to sin*; $\log \Delta \phi_1 = \log (\phi' - \phi)$ - correction for arc to sin*; and $\log s = \log s_1 +$ correction for arc to sin*.

		NAME OF STATION			
1. ϕ	-	42° 12' 16.746"	Scituate L.H. (old tower)	70° 42' 58.796"	
2. ϕ'	+	42° 11' 29.433"	Cliff Tower	70° 43' 04.372"	
$\Delta \phi (= \phi' - \phi)$		- 47.313"		+ 05.576"	
$\frac{\Delta \phi}{2}$		- 23.656"		+ 02.788"	
$\phi_m (= \phi + \frac{\Delta \phi}{2})$		42° 11' 53.090"			
$\Delta \phi$ (secs.)		- 47.313"		+ 05.576"	
$\log \Delta \phi$		1.674 980"		$\log \Delta \lambda$	0.746 323
cor. arc-sin		-		cor. arc-sin	-
$\log \Delta \phi_1$				$\log \Delta \lambda_1$	
$\log \cos \frac{\Delta \lambda}{2}$		10. —		$\log \cos \phi_m$	9.869 717
$\text{colog } B_m$		1.989 316		$\text{colog } A_m$	1.490 938
$\log \left\{ s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) \right\}$		3.164 296	(opposite in sign to $\Delta \phi$)	$\log \left\{ s_1 \sin \left(\alpha + \frac{\Delta \alpha}{2} \right) \right\}$	2.106 978
$\log \Delta \lambda$		0.746 323		$\log \left\{ s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) \right\}$	3.164 296
$\log \sin \phi_m$		9.827 172		$\log \tan \left(\alpha + \frac{\Delta \alpha}{2} \right)$	8.942 682
$\log \sec \frac{\Delta \phi}{2}$				$\alpha + \frac{\Delta \alpha}{2}$	5° 00' 30"
$\log a$		0.573 495		$\log \sin \left(\alpha + \frac{\Delta \alpha}{2} \right)$	8.941 017
a		+ 4		$\log \cos \left(\alpha + \frac{\Delta \alpha}{2} \right)$	9.998 339
b				$\log s_1$	
$-\Delta \alpha$ (secs.)		- 4"		cor. arc-sin	+
$-\frac{\Delta \alpha}{2}$		+ 2"		$\log s$	3.165 959
$\alpha + \frac{\Delta \alpha}{2}$		5° 00' 30"			1465.4
α (1 to 2)		5° 00' 32"			
$\Delta \alpha$		- 04"			
α' (2 to 1)		185° 00' 28"			

* Use the table on the back of this form for correction of arc to sin.

NOTE.—For $\log s$ up to 4.0 and for $\Delta \phi$ or $\Delta \lambda$ (or both) up to 3', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 7 decimal places.

Table of arc-sin corrections for inverse position computations

$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034	
4.327	2	2.836	5.234	130	3.743	5.530	508	4.039	
4.415	3	2.924	5.243	136	3.752	5.534	519	4.043	
4.478	4	2.987	5.253	142	3.762	5.539	530	4.048	
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052	
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057	
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062	
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066	
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070	
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075	
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079	
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084	
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088	
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092	
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096	
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100	
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104	
4.804	18	3.313	5.363	236	3.872	5.600	702	4.109	
4.827	20	3.336	5.369	243	3.878	5.604	716	4.113	
4.857	23	3.366	5.376	251	3.885	5.608	729	4.117	
4.876	25	3.385	5.383	259	3.892	5.612	743	4.121	
4.892	27	3.401	5.390	267	3.899	5.616	757	4.125	
4.915	30	3.424	5.396	275	3.905	5.620	771	4.129	
4.936	33	3.445	5.403	284	3.912	5.624	785	4.133	
4.955	36	3.464	5.409	292	3.918	5.628	800	4.137	
4.972	39	3.481	5.415	300	3.924	5.632	814	4.141	
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145	
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149	
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153	
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157	
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161	
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165	
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169	
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172	
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176	
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180	
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183	
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187	
5.151	89	3.660	5.489	422	3.998				
5.163	94	3.672	5.495	433	4.004				
5.172	98	3.681	5.500	443	4.009				
5.183	103	3.692	5.505	453	4.014				
5.193	108	3.702	5.510	464	4.019				
5.205	114	3.714	5.515	474	4.024				
5.214	119	3.723	5.520	486	4.029				

INVERSE POSITION COMPUTATION

$$s_1 \sin \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{\Delta \lambda_1 \cos \phi_m}{A_m}$$

$$s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{-\Delta \phi_1 \cos \frac{\Delta \lambda}{2}}{B_m}$$

$$-\Delta \alpha = \Delta \lambda \sin \phi_m \sec \frac{\Delta \phi}{2} + F(\Delta \lambda)^3$$

in which $\log \Delta \lambda_1 = \log (\lambda' - \lambda)$ - correction for arc to sin*; $\log \Delta \phi_1 = \log (\phi' - \phi)$ - correction for arc to sin*; and $\log s = \log s_1 +$ correction for arc to sin*.

		NAME OF STATION			
1. ϕ	42 12 37.081	N. Scituate Stack	λ	70 44 16.086	
2. ϕ'	42 12 16.746	Scituate L. H. (old tower)		70 42 58.786	
$\Delta \phi (= \phi' - \phi)$	- 20.335		$\Delta \lambda (= \lambda' - \lambda)$	- 01 17.290	
$\frac{\Delta \phi}{2}$	- 10.168		$\frac{\Delta \lambda}{2}$	- 38.645	
$\phi_m (= \phi + \frac{\Delta \phi}{2})$	42 12 26.713				
$\Delta \phi$ (secs.)	- 20.335		$\Delta \lambda$ (secs.)	- 77.540	
log $\Delta \phi$	1.308 2442 ⁿ		log $\Delta \lambda$	1.888 1233 ⁿ	
cor. arc-sin	-		cor. arc-sin	-	
log $\Delta \phi_1$			log $\Delta \lambda_1$		
log cos $\frac{\Delta \lambda}{2}$	10. -		log cos ϕ_m	9.869 6523	
colog B_m	1.489 3170		colog A_m	1.490 9378	
log $\left\{ s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) \right\}$	2.797 5612	(opposite in sign to $\Delta \phi$)	log $\left\{ s_1 \sin \left(\alpha + \frac{\Delta \alpha}{2} \right) \right\}$	3.248 7134 ⁿ	
			log $\left\{ s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) \right\}$	2.797 5612	
log $\Delta \lambda$	1.888 1233 ⁿ	3 log $\Delta \lambda$	log tan $\left(\alpha + \frac{\Delta \alpha}{2} \right)$	0.451 1522	
log sin ϕ_m	9.827 2511	log F	$\alpha + \frac{\Delta \alpha}{2}$	289 29 15.04	
log sec $\frac{\Delta \phi}{2}$		log b	log sin $\left(\alpha + \frac{\Delta \alpha}{2} \right)$	9.974 3801	
log a	1.715 3744 ⁿ		log cos $\left(\alpha + \frac{\Delta \alpha}{2} \right)$	9.523 2278	
a	- 51.92		log s_1	3.274 3334	
b			cor. arc-sin	+	
$-\Delta \alpha$ (secs.)	+ 51.92		log s	3.274 3334	
$\frac{\Delta \alpha}{2}$	- 25.96			1.880.8	
$\alpha + \frac{\Delta \alpha}{2}$	289 29 15.04				
α (1 to 2)	289 28 47.08				
$\Delta \alpha$	+ 51.92				
	180				
α' (2 to 1)	108 29 41.00				

* Use the table on the back of this form for correction of arc to sin.

NOTE.—For log s up to 4.52 and for $\Delta \phi$ or $\Delta \lambda$ (or both) up to 10', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 6 decimal places.

Table of arc-sin corrections for inverse position computations

$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034	
4.327	2	2.836	5.234	130	3.743	5.530	508	4.039	
4.415	3	2.924	5.243	136	3.752	5.534	519	4.043	
4.478	4	2.987	5.253	142	3.762	5.539	530	4.048	
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052	
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057	
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062	
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066	
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070	
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075	
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079	
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084	
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088	
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092	
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096	
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100	
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104	
4.804	18	3.313	5.363	236	3.872	5.600	702	4.109	
4.827	20	3.336	5.369	243	3.878	5.604	716	4.113	
4.857	23	3.366	5.376	251	3.885	5.608	729	4.117	
4.876	25	3.385	5.383	259	3.892	5.612	743	4.121	
4.892	27	3.401	5.390	267	3.899	5.616	757	4.125	
4.915	30	3.424	5.396	275	3.905	5.620	771	4.129	
4.936	33	3.445	5.403	284	3.912	5.624	785	4.133	
4.955	36	3.464	5.409	292	3.918	5.628	800	4.137	
4.972	39	3.481	5.415	300	3.924	5.632	814	4.141	
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145	
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149	
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153	
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157	
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161	
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165	
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169	
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172	
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176	
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180	
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183	
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187	
5.151	89	3.660	5.489	422	3.998				
5.163	94	3.672	5.495	433	4.004				
5.172	98	3.681	5.500	443	4.009				
5.183	103	3.692	5.505	453	4.014				
5.193	108	3.702	5.510	464	4.019				
5.205	114	3.714	5.515	474	4.024				
5.214	119	3.723	5.520	486	4.029				

INVERSE POSITION COMPUTATION

$$s_1 \sin \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{\Delta \lambda_1 \cos \phi_m}{A_m}$$

$$s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) = \frac{-\Delta \phi_1 \cos \frac{\Delta \lambda}{2}}{B_m}$$

$$-\Delta \alpha = \Delta \lambda \sin \phi_m \sec \frac{\Delta \phi}{2} + F(\Delta \lambda)^2$$

in which $\log \Delta \lambda_1 = \log (\lambda' - \lambda)$ - correction for arc to sin*; $\log \Delta \phi_1 = \log (\phi' - \phi)$ - correction for arc to sin*; and $\log s = \log s_1 +$ correction for arc to sin*.

		NAME OF STATION			
1. ϕ	42 12 16.746	scituate L.H.	λ	70 42 58.786	
2. ϕ'	42 12 01.694	Lawson Tower	λ'	70 45 21.038	
$\Delta \phi (= \phi' - \phi)$	- 15.052		$\Delta \lambda (= \lambda' - \lambda)$	+ 02 22.252	
$\frac{\Delta \phi}{2}$	- 07.526		$\frac{\Delta \lambda}{2}$	+ 01 11.121	
$\phi_m (= \phi + \frac{\Delta \phi}{2})$	42 12 09.220				
$\Delta \phi$ (secs.)	- 15.052		$\Delta \lambda$ (secs.)	+ 142.252	
$\log \Delta \phi$	1.177 5942		$\log \Delta \lambda$	2.153 0278	
cor. arc-sin			cor. arc-sin		
$\log \Delta \phi_1$			$\log \Delta \lambda_1$		
$\log \cos \frac{\Delta \lambda}{2}$	10. —		$\log \cos \phi_m$	9.869 6861	
$\text{colog } B_m$	1.489 3166		$\text{colog } A_m$	1.490 9377	
$\log \left\{ s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) \right\}$	2.666 9108	(opposite in sign to $\Delta \phi$)	$\log \left\{ s_1 \sin \left(\alpha + \frac{\Delta \alpha}{2} \right) \right\}$	3.513 6516	
			$\log \left\{ s_1 \cos \left(\alpha + \frac{\Delta \alpha}{2} \right) \right\}$	2.666 9108	
$\log \Delta \lambda$	2.153 0278	$3 \log \Delta \lambda$	$\log \tan \left(\alpha + \frac{\Delta \alpha}{2} \right)$	0.846 7408	
$\log \sin \phi_m$	9.827 2102	$\log F$	$\alpha + \frac{\Delta \alpha}{2}$	81 54 00.66	
$\log \sec \frac{\Delta \phi}{2}$		$\log b$	$\log \sin \left(\alpha + \frac{\Delta \alpha}{2} \right)$	9.995 6458	
$\log a$	1.480 2380		$\log \cos \left(\alpha + \frac{\Delta \alpha}{2} \right)$	9.148 9050	
a	+ 75.55		$\log s_1$		
b			cor. arc-sin	+	
$-\Delta \alpha$ (secs.)	- 95.55		$\log s$	3.578 0058	
$\frac{\Delta \alpha}{2}$	+ 7.78			3296.1	
$\alpha + \frac{\Delta \alpha}{2}$	81 54 00.66				
α (1 to 2)	81 54 48.44				
$\Delta \alpha$	- 01 35.55				
	180				
α' (2 to 1)	261 53 12.89				

*Use the table on the back of this form for correction of arc to sin.

NOTE.—For $\log s$ up to 4.52 and for $\Delta \phi$ or $\Delta \lambda$ (or both) up to 10', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 6 decimal places.

Table of arc-sin corrections for inverse position computations

$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034	
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4.415	3	2.924	5.243	136	3.752	5.534	519	4.043	
4.478	4	2.987	5.253	142	3.762	5.539	530	4.048	
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052	
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057	
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062	
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066	
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070	
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075	
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079	
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084	
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088	
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092	
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096	
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100	
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104	
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4.972	39	3.481	5.415	300	3.924	5.632	814	4.141	
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145	
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149	
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153	
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157	
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161	
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165	
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169	
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172	
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176	
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180	
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183	
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187	
5.151	89	3.660	5.489	422	3.998				
5.163	94	3.672	5.495	433	4.004				
5.172	98	3.681	5.500	443	4.009				
5.183	103	3.692	5.505	453	4.014				
5.193	108	3.702	5.510	464	4.019				
5.205	114	3.714	5.515	474	4.024				
5.214	119	3.723	5.520	486	4.029				

INVERSE POSITION COMPUTATION

$$s_1 \sin \left(\alpha + \frac{\Delta\alpha}{2} \right) = \frac{\Delta\lambda_1 \cos \phi_m}{A_m}$$

$$s_1 \cos \left(\alpha + \frac{\Delta\alpha}{2} \right) = \frac{-\Delta\phi_1 \cos \frac{\Delta\lambda}{2}}{B_m}$$

$$-\Delta\alpha = \Delta\lambda \sin \phi_m \sec \frac{\Delta\phi}{2} + F(\Delta\lambda)^3$$

in which $\log \Delta\lambda_1 = \log (\lambda' - \lambda)$ - correction for arc to sin*; $\log \Delta\phi_1 = \log (\phi' - \phi)$ - correction for arc to sin*; and $\log s = \log s_1 +$ correction for arc to sin*.

		NAME OF STATION				
1.	ϕ	42	12	16.75	South L.H. (old Town)	λ - 70 42 58.80
2.	ϕ'	42	11	49.94	Dyer Wharf	λ' - 70 43 31.13
$\Delta\phi (= \phi' - \phi)$						32.33
$\frac{\Delta\phi}{2}$						16.16
$\phi_m (= \phi + \frac{\Delta\phi}{2})$		42	12	03.35		
$\Delta\phi$ (secs.)		- 26.81				432.33
$\log \Delta\phi$		1.428 297				$\log \Delta\lambda$ 1.509 606
cor. arc - sin						
$\log \Delta\phi_1$						$\log \Delta\lambda_1$
$\log \cos \frac{\Delta\lambda}{2}$		10. —				$\log \cos \phi_m$ 9.869 698
$\text{colog } B_m$		1.489 317				$\text{colog } A_m$ 1.490 938
$\log \{s_1 \cos (\alpha + \frac{\Delta\alpha}{2})\}$		2.917 614				$\log \{s_1 \sin (\alpha + \frac{\Delta\alpha}{2})\}$ 2.870 242
		(opposite in sign to $\Delta\phi$)				$\log \{s_1 \cos (\alpha + \frac{\Delta\alpha}{2})\}$ 2.917 614
$\log \Delta\lambda$		1.509 606				$\log \tan (\alpha + \frac{\Delta\alpha}{2})$ 9.952 628
$\log \sin \phi_m$		9.827 196				$\alpha + \frac{\Delta\alpha}{2}$ 41 52 53
$\log \sec \frac{\Delta\phi}{2}$						$\log \sin (\alpha + \frac{\Delta\alpha}{2})$ 9.824 510
$\log a$		1.336 802				$\log \cos (\alpha + \frac{\Delta\alpha}{2})$ 9.871 881
a		+ 22				$\log s_1$
b						cor. arc - sin
$-\Delta\alpha$ (secs.)		- 52				$\log s$ 3.045 732
$\frac{\Delta\alpha}{2}$		+ 11				
$\alpha + \frac{\Delta\alpha}{2}$		41 52 53				
α (1 to 2)		41 53 04				
$\Delta\alpha$		- 22				
		180				
α' (2 to 1)		52 42				

* Use the table on the back of this form for correction of arc to sin.

NOTE.—For $\log s$ up to 4.0 and for $\Delta\phi$ or $\Delta\lambda$ (or both) up to 3', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 7 decimal places.

Table of arc-sin corrections for inverse position computations

$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034	
4.327	2	2.836	5.234	130	3.743	5.530	508	4.039	
4.415	3	2.924	5.243	136	3.752	5.534	519	4.043	
4.478	4	2.987	5.253	142	3.762	5.539	530	4.048	
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052	
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057	
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062	
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066	
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070	
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075	
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079	
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084	
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088	
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092	
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096	
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100	
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104	
4.804	18	3.313	5.363	236	3.872	5.600	702	4.109	
4.827	20	3.336	5.369	243	3.878	5.604	716	4.113	
4.857	23	3.366	5.376	251	3.885	5.608	729	4.117	
4.876	25	3.385	5.383	259	3.892	5.612	743	4.121	
4.892	27	3.401	5.390	267	3.899	5.616	757	4.125	
4.915	30	3.424	5.396	275	3.905	5.620	771	4.129	
4.936	33	3.445	5.403	284	3.912	5.624	785	4.133	
4.955	36	3.464	5.409	292	3.918	5.628	800	4.137	
4.972	39	3.481	5.415	306	3.924	5.632	814	4.141	
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145	
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149	
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153	
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157	
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161	
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165	
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169	
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172	
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176	
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180	
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183	
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187	
5.151	89	3.660	5.489	422	3.998				
5.163	94	3.672	5.495	433	4.004				
5.172	98	3.681	5.500	443	4.009				
5.183	103	3.692	5.505	453	4.014				
5.193	108	3.702	5.510	464	4.019				
5.205	114	3.714	5.515	474	4.024				
5.214	119	3.723	5.520	486	4.029				

Table of arc-sin corrections for inverse position computations

$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034	
4.327	2	2.836	5.234	130	3.743	5.530	508	4.039	
4.415	3	2.924	5.243	136	3.752	5.534	519	4.043	
4.478	4	2.987	5.253	142	3.762	5.539	530	4.048	
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052	
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057	
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062	
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066	
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070	
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075	
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079	
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084	
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088	
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092	
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096	
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100	
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104	
4.804	18	3.313	5.363	236	3.872	5.600	702	4.109	
4.827	20	3.336	5.369	243	3.878	5.604	716	4.113	
4.857	23	3.366	5.376	251	3.885	5.608	729	4.117	
4.876	25	3.385	5.383	259	3.892	5.612	743	4.121	
4.892	27	3.401	5.390	267	3.899	5.616	757	4.125	
4.915	30	3.424	5.396	275	3.905	5.620	771	4.129	
4.936	33	3.445	5.403	284	3.912	5.624	785	4.133	
4.955	36	3.464	5.409	292	3.918	5.628	800	4.137	
4.972	39	3.481	5.415	300	3.924	5.632	814	4.141	
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145	
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149	
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153	
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157	
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161	
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165	
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169	
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172	
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176	
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180	
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183	
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187	
5.151	89	3.660	5.489	422	3.998				
5.163	94	3.672	5.495	433	4.004				
5.172	98	3.681	5.500	443	4.009				
5.183	103	3.692	5.505	453	4.014				
5.193	108	3.702	5.510	464	4.019				
5.205	114	3.714	5.515	474	4.024				
5.214	119	3.723	5.520	486	4.029				

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A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.