5452

Form 504

U. S. DEPARTMENT OF COMMERCE

COAST AND GEODETIC SURVEY

DESCRIPTIVE REPORT

Type of Survey

Field No. Office No. 5452

LOCALITY

State New York.

General locality New York City

Locality Manhattan & Bronx

1936

CHIEF OF PARTY

J.C. Partington Jr. USC&GS

LIBRARY & ARCHIVES

DATE

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5452

SUPPLEMENTAL T 5452

5452

Form 504
Rev. Dec. 1933

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
R. S. PATTON, DIRECTOR

DESCRIPTIVE REPORT

Air Photo
Topographic
~~*Hydrographic*~~ } *Sheet No.* T-5452

State New York

LOCALITY

New York City

Manhattan & Bronx

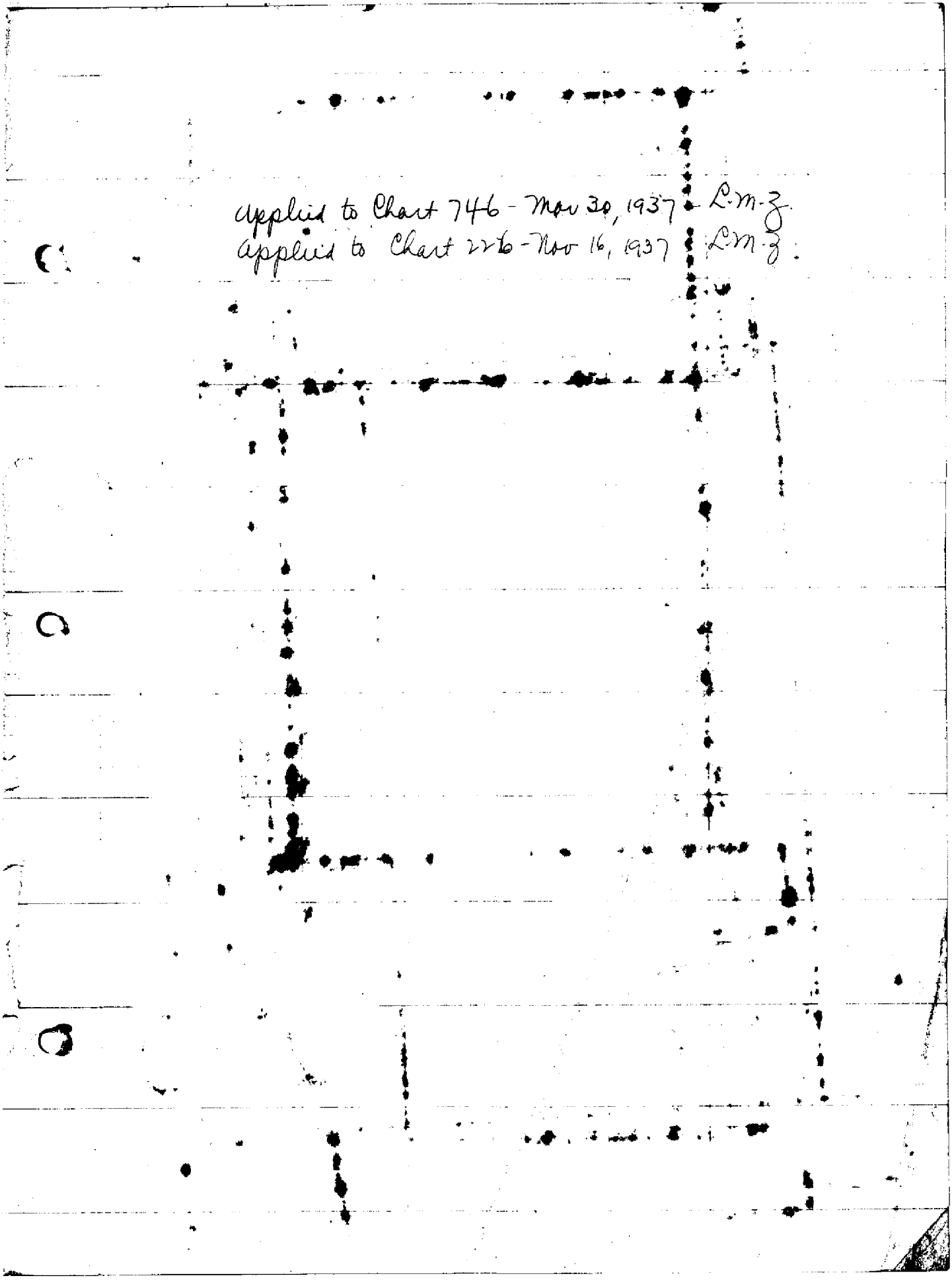
1936

CHIEF OF PARTY

J.C.Partington - Jr. H.& G.E.

5452

SUPPLEMENTAL T 5452


applied to Chart 746 - Nov 30, 1937 L.M.Z.
applied to Chart 226 - Nov 16, 1937 L.M.Z.

Form 537a
Ed. Nov. 1929

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY

REG. NO.

TOPOGRAPHIC TITLE SHEET

The Topographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

Field No. 84 & 85 T5452

REGISTER NO. T-5452 & ~~T-5453~~

State New York

General locality New York City

Locality Bronx and Manhattan

Scale 1: 5000 Date of survey photographs Nov. 25, 1934 and Mar. 26, 1935, 19

Vessel Air Photo Compilation Party

Chief of party J.C. Partington J.C. Partington

Surveyed by See STATISTICS SHEET, page 2 of this report.

Inked by See STATISTICS SHEET, page 2 of this report.

Heights in feet above - - - to ground to tops of trees

Contour, Approximate contour, Form line interval - - - feet

Instructions dated March 14, 19 34

Remarks:

* STATISTICS *

on

COMPILATION, FIELD NOS. 84 & 85, REGISTER NOS. T-5452 ~~T-5453~~

PHOTOGRAPH NO.	DATE	TIME	TIDE			
			High		Low	
			Time	Ht.	Time	Ht.
351-356 (876 A-8)	Nov.25, 1934	1:15 PM	11:19 AM	3.9	5:07 AM	0.3
			- -	- -	5:54 PM	0.0
333-337 (876 A-8)	Nov.25, 1934	11:04 AM	12:32 AM	4.1	6:17 AM	0.3
			12:29 PM	4.8	7:04 PM	0.0
338-340 (876 A-8)	Nov. 25,1934	11:10 AM	11:50 AM	5.8	8:09 AM	0.8
			11:43 PM	6.2	8:46 PM	0.2
467-469 (876 A-8)	Mar.26, 1935	10:35 AM	1:33 AM	5.2	8:01 AM	0.4
			1:56 PM	4.1	7:33 PM	0.5

	By	Date From	Date To
SCALE FACTOR (1.000)	R.C.Bolstad	(Previously determined)	
PROJECTION	W.E.Hackett	12-21-34	
PROJECTION CHECKED	J.P.O'Donnell	12-21-34	
CONTROL PLOTTED	W.E.Brown	3-8 -35	
CONTROL CHECKED	J.G.Albert	3-11-35	
SMOOTH RADIAL LINE PLOT	W.Barasch	6-29-35	7-12-35
RADIAL LINE PLOT CHECKED	J.C.Partington	May 1936	
DETAIL INKED	R.H.Young	7-20-36	8-31-36
	J.C.Partington	9- 1-36	9-10-36
PRELIMINARY REVIEW OF SHEET	J.C.Partington	9-11-36	9-19-36

AREA OF DETAIL INKED (land area) 6.3 Square Statute Miles
AREA OF DETAIL INKED (shoals) 0.0 " " "

LENGTH OF SHORELINE (more than 200 M. from opposite shore) 8.2 Stat. Miles
LENGTH OF SHORELINE (rivers & sloughs less than 200 M.wide 4.4 Stat. Miles
LENGTH OF STREETS, ROADS, RAILROADS, TRAILS 251 Stat. Miles

GENERAL LOCATION New York City

Location Manhattan

DATUM North American 1927

STATION Saint Johns, 1932 (N.Y.) Latitude 40° 48' 18.214" 561.8 m.

Longitude 73 57 47.186 1106.0 m.

(Adjusted computations)

COMPILERS REPORT

for

AIR PHOTO TOPOGRAPHIC SHEET, FIELD NOS. 84 & 85; REGISTER NOS. T-5452 ~~& T-5453~~

GENERAL INFORMATION

The Air-photo Field Inspection Report for Metropolitan New York attached to the descriptive report of AIR-PHOTO TOPOGRAPHIC SHEET, Field No. 90, Register No. T-5458, furnished the necessary information for the compilation of this sheet.

This sheet has been compiled from single lens photographs listed on the previous page of this report. Photographs numbers 351 to 356 (876 A-8) were taken on Nov. 25, 1934 at approximately two hours after high water. Photographs numbers 333 to 337 (876 A-8) were taken on Nov. 25, 1934 at approximately one and one-half hours before high water. Photographs numbers 338 to 340 (876 A-8) were taken on Nov. 25, 1934 at approximately two and one-half hours before high water at Lawrence Point. Photographs numbers 467 to 469 (876 A-8) were taken on Mar. 26, 1935 at approximately two and one-half hours after low water at Horns Hook.

The photographs were taken by the U.S.Army Air Corps at Mitchell Field, L.I., N.Y. with a special camera recently developed by the Fairchild Camera Corporation, 62-10 Woodside Ave., Woodside New York City. Due to the fact that these photographs were among the first to be taken by this camera, mechanical troubles were encountered which caused considerable difficulty at first. This probably accounts for the irregular time interval between exposures which in turn affects the overlap. This is also probably the cause of excessive tilt in some pictures. The camera is known as the "K-7C" by the Army and as the "K-7A" by the Fairchild Corporation. See opposite page.

The Army plane was piloted by Lieut. Cullen at an altitude very close to 15,000 feet; the photographer was Sergeant Cates. A 24 inch cone (focal length 24") was used with this camera, producing the negatives on a scale of 1: 7,500. Contact prints were furnished the field party for use in field inspection. The original negatives were used by the Washington office of the U.S.Coast and Geodetic Survey for enlarging a set of office prints on a scale of 1: 5,000. The 1: 5,000 prints were furnished the field party and were used in compiling this sheet.

CONTROL

(a) Sources

Control for the compilation of this sheet was obtained from the following sources:

1. Triangulation, 1930-33 by R.W.Woodworth.
2. Triangulation, 1903-08, Greater New York.
3. U.S.Engineers stations as described on Form 524 submitted with this report.
4. 3 point theodolite fix. (Station"Mount Morris Park Flag Pole"). Attached to this report.
5. Triangulation, 1885 by G.Bradford (House of Refuge). Destroyed by erection of Tri-borough Bridge.

(b) Errors.

No error was found in the position of any of the triangulation stations located by the U.S.Coast and Geodetic Survey.

All of the U.S.Engineers stations were found to be correct except two. The two stations found to be in error are: Station 43 (U.S.E.) and West 139th St.(U.S.E.). The coordinate position of Station 43 (U.S.E.) was found to disagree from the position as found by the radial plot by 7.0 meters inazimuth 297° (from north). The spotting of this station has been verified and the radial line plotted position verified. It has been located by four "cuts" which give a strong angle of intersection. The black 2½ m m circle shown on the celluloid sheet is the radial line plot position of this station. The coordinate position of West 139th St.(U.S.E.) was found to differ from the radial line plot position by 2.0 meters inazimuth 75° (from north). The spotting of this station on the photographs is somewhat open to question due to indefinite detail in the vicinity. It has been located by three "cuts" which give a strong angle of intersection. The black 2½ m m circle shown on the celluloid sheet is the radial line plot position of this station.

with in probable error of the photo plot.

The geographic positions of all of the U.S.Engineers stations were computed from their coordinates and plotted on the sheet with a 2½ m m circle. They were all found to agree with the radial line plot within 1.0 meter, except the two mentioned above. All of the U.S.Engineers stations shown on this sheet are described on Form 524 and form a part of this report. Other recoverable objects are shown by the same 2½ mm. circle but are not described on Form 524.

Some of the U.S.Engineers stations which were found by the field inspection party are not shown on this sheet because they are not permanently marked. An effort has been made to show the most permanently marked stations at intervals of about one-half mile along the waterfront.

COMPILATION.

(a) Method.

The following streets were tied in to existing triangulation stations by field measurements:

Amsterdam Ave.
Fifth Ave.
Second Ave.
First Ave.
116th Street

These streets were held fixed on the compilation which materially aided the radial line plot.

The usual radial line method of plotting was used in the compilation of this sheet together with the field measurements given in the preceeding paragraph.

The U.S.Engineers stations were used as supplementary control and their positions accepted only after it was found that they agreed with the radial line plot.

(b) Adjustment of Plot.

No great difficulty was encountered in running the radial line plot, and no unusual adjustment of the plot was necessary. There is sufficient overlap between successive photographs and between adjacent flights to give a strong radial line plot. The pictures have very little scale fluctuation or tilt.

The only part of the sheet where the plot is not strong is along the meridian 73° 55' between latitude 40° 48' 30" and 40° 49' 30". The radial points in this area are near the outer edge of the photographs but are located by 3 "cuts" and are believed to be correct within 2 meters in position. The junction between this sheet and compilation T-5089 is in agreement.

(c) Interpretation.

No attempt has been made to show the street railway systems. Only railroad tracks and elevated tracks have been shown. No information on the railroad track layouts on this sheet were available and they have been detailed entirely from the photographs. It is quite possible that some of the tracks have been omitted particularly in the railroad yards and sidings.

The double full line is used to show first class roads and streets (curb to curb), and the double dashed line is used to show second class roads, poor motor roads and walks in park areas.

An attempt has been made to show all of the buildings along the waterfront. Some of the more important buildings farther inland have also been shown. The stereoscope has been used freely in interpreting the shape of the buildings.

The usual graphic symbols were used and no difficulty was experienced in interpreting the photographic detail.

(d) Information from Other Sources.

At the time the photographs were taken there were numerous buildings on Randalls Island. Since that time the buildings have been razed and the Tri-borough Bridge and other changes have been built. The location of the Tri-borough Bridge and it's approaches in the Bronx and Manhattan have been taken from a celluloid contact of control survey T-6489a, executed in August 1936.

There is a discrepancy in the high water line between sheet T-6489a and this compilation in the vicinity of Bronx Kill at the abutments of the Triborough Bridge. Unless there have been changes in the high water line since Nov. 25, 1934 (when the photographs were taken) the shoreline is believed to be correctly shown on this compilation, T-5453. The descriptive report of T-6489a makes no mention of having surveyed the high water line. Compilation corrected to T6489a 1936.

T-6489a also shows changes in the highwater line near Latitude 40° 47.8' Longitude 73° 55.8'. The descriptive report also mentions this. The high water line on this compilation (T-5453) probably is incorrect at the present time due to the construction of the East River Drive. The shoreline on this compilation is taken from the photographs in the absence of more recent information.

Compilation corrected to T6489a.

B.G.D.

Bridge Data - Clearance values of bridges on this compilation in Harlem River above and including Willis Ave. are from the Coast Pilot as stated on the opposite page. These values agree with the U.S.E. Bridge List for 1935, except:

Vertical clearances are listed in Bridge Book as above H.W. instead of M.H.W. as shown on this compilation. These actually are equal to the low water clearances listed in the Bridge Book - mean range of tide.

A number of the bridges have slightly different horizontal clearances on opposite sides of the center pier. Only the lower value is shown on the compilation as in the Coast Pilot.

The Triborough Bridge and Railroad Bridge clearances below Willis Ave. are from the U.S.E. Bridge List for 1935. M.H.W. values are shown are equal to Engineers Bridge List M.L.W. values-mean range of tide. The following data from the Engineers Bridge List is not shown on the compilation because of apparent errors in the list:

(1) Triborough Bridge over Bronx Kills: Horizontal clearances given in Bridge Book disagree with blueprint 29320 of Triborough Bridge authority. Bridge not on photos of this area.

(2) Railroad Bridge over Bronx Kills listed in Bridge Book as Bascule -- appears to be fixed as seen on photographs. ?

(3) Triborough Bridge over Little Hell Gate - Horizontal clearances given in Bridge List do not agree with the blueprint 29318 of Triborough Bridge authority. Bridge does not appear on the photos.

The recent planetable survey of Triborough Bridge does not give clearance data.

(e) Names.

A list of the geographic names shown on this sheet are given on Form M 234 included with this report.

Street names may be taken from Map of the City of New York, Board of Estimate and Approtionment.

LIST OF RECOVERABLE OBJECTS.

Nine cards Form 524 are included with this report which describe the U.S.Engineers stations shown on this sheet.

The following stations were located by the radial line plot for use as recoverable objects. They are not described.

NAME	LATITUDE	LONGITUDE	METHOD OF DETERMINATION
North Twin Chy.	40° 48' 1690.5 m	73° 56' 183.0 m.	Radial plot.
Black Stack	40 48 313.5 m	73 55 449.0 m.	" "

Mount Morris Park Flag Pole was located by a 3 Pt. theodolite fix. This station is described on form 524 included with this report together with computations.

Six other stations located by the survey of sheet T-6489a are shown on this compilation. These are the two towers at the toll bridge on Randalls Island and the lights on top of the four supports to the lift span across the Harlem River.

All recoverable objects are shown with a 2½ m m. black circle.

BRIDGES:

The bridge data shown on the overlay sheet was taken from the Coast Pilot, Atlantic Coast, Section B, 1933; page 264. This data was compared with the publication "List of Bridges over the Navigable Waters of the United States", 1927; and no errors were found.

No data is on hand in this office pertaining to the clearances of the Tri-borough Bridge. This data probably can be obtained from the blue-prints of the Tri-borough Bridge Authority.

See opposite page.

Junctions.

This sheet joins compilation T-5451 to the northward along parallel 40° 49' 30" and the junction is satisfactory.

This sheet joins compilation T-5089 (1: 10,000 scale) to the northeastward along meridian 73° 55' 00". This sheet has been compared with a photostat enlargement of T-5089 and the junction appears to be satisfactory. No direct comparison of the two sheets has been made because sheet T-5089 was transmitted to the Washington office before this sheet was compiled.

This sheet joins compilation T-5458 (1: 5000 scale) at the south end of Randalls Island and the junction is satisfactory.

This sheet joins compilations T-5454 and T-5455 to the southward along 95 th Street and the junction is satisfactory.

COMPARISON WITH OTHER SURVEYS

No comparison between this sheet and other surveys has been made due to the fact that no other surveys of this area are on hand at this office. The discrepancies between this sheet and T-6489 a are discussed on page 5 paragraph (d) of this report.

COMPARISON WITH CHARTS.

Due to the fact that the charts of this area are on a 1: 10,000 scale and the compilation is on a 1: 5000 scale no direct comparison between the two has been made.

However a comparison between this compilation and the 1: 5000 scale insert of chart 226 shows discrepancies of as much as 5 meters in the shoreline of the south side of Randalls Island. There are also discrepancies of as much as 17 meters in the shoreline of Sunken Meadow which appears to be shown too large on chart 226.

A comparison between this compilation and charts 226 and 274 show discrepancies in the shoreline of the north side of Bronx Kill in the vicinity of the railroad bridge and the Tri-borough Bridge.

The shoreline is believed to be correctly shown on this compilation and it is recommended that it be used in preference to that shown on the present charts.

RECOMMENDATIONS FOR FURTHER SURVEYS.

This sheet is believed to have a probable error of not greater than 2 meters in position for well defined detail of importance for charting, and not more than 4 meters for other detail. It is understood the width of roads, railroads, and similar detail may be slightly exaggerated in order to keep the detail clear when the sheet is reproduced.

On page 5 paragraph (d) of this report reference is made to the probable change in shoreline near Latitude 40° 47.8' Longitude 73° 55.8'. Except for this area this sheet is believed to be complete in all details offimportance for charting and no additional surveys are required.

A better estimate of the accuracy would be 0.2 to 0.6 mm for intersected points and 0.2 to 1.0 mm for other detail.
B.C.J.

Submitted by

J.C. Partington

J.C.Partington
Chief of Party

	Remarks	Decisions
1		
2		
3	* Called "Bronx Kills" on local map	
4		
5		
6		
7		
8	* Called "N.Y.C.R.R." on field print	
9	* Called "Thomas Jefferson Park" on local map	
10		
11		
12		
13		
14		
15	Railroad yards nearby called "Manhattanville Terminal" on local map. *	
16		
17		
18		
19		
20	* Called "Borough of Manhattan" on local map	
21		
22		
23		
24		
25		
26		
27		

GEOGRAPHIC NAMES

Survey No. T-5452 & ~~T-5453~~

Name on Survey	On Chart No. A	On previous survey No. B	On U. S. quadrangle Maps C	From local information D	Field Inspection Party On local Maps E	P. O. Guide or Map F	Rand McNally Atlas G	U. S. Light List H	K	
Hudson River	746		✓	x	x					1
Harlem River	274		✓	x	x					2
Bronx Kill	226 274				*					3
Little Hell Gate	226 274				x					4
Sunken Meadow	226 274				x					5
Randalls Island	226 274		Randall I.		x					6
N.Y.N.H. & H. R.R.	226 274				x					7
N.Y.C. & H.R. R.R.	746			*						8
Jefferson Park	226 274			x	*					9
Mount Morris Park				x	x					10
St. Nicholas Park				x	x					11
Morningside Park					x					12
Riverside Park	746				x					13
Central Park	369		✓		x					14
Manhattanville	746		✓		*					15
Columbia University					x					16
College of the City of N.Y.					x					17
Mott Haven	274		✓		x					18
Mott Haven Canal	274									19
New York City	369 746				*					20
~~Borough of the Bronx~~					x					21
Hebrew Orphan Asylum				x	x					22
The Pool					x					23
The Loch					x					24
Harlem Meer					x					25

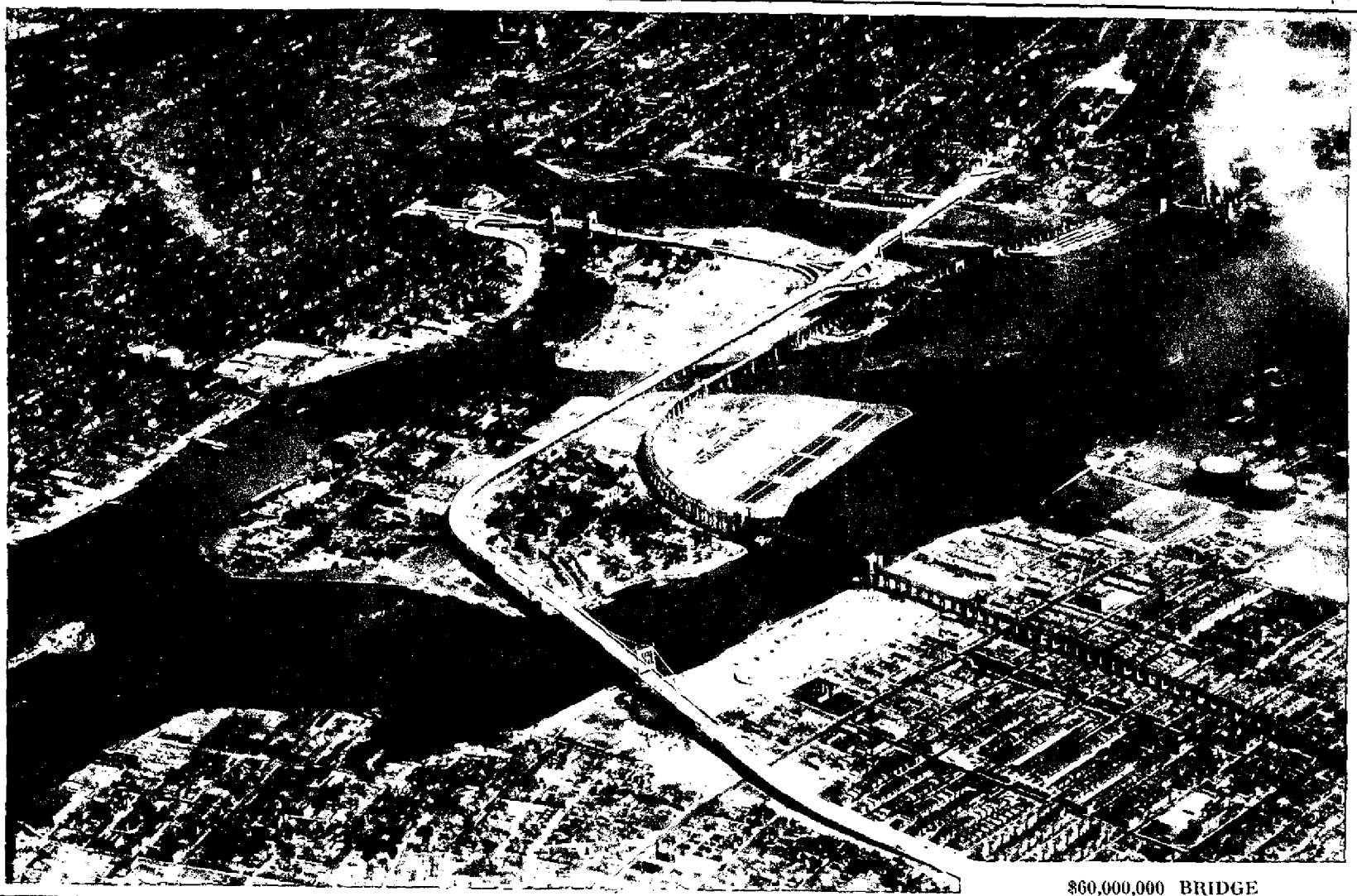
Names underlined in red approved by K.T.A. on 11/17/36

Note: The local map under column "E" is called Map of the City of New York - Board of Estimate and Apportionment.

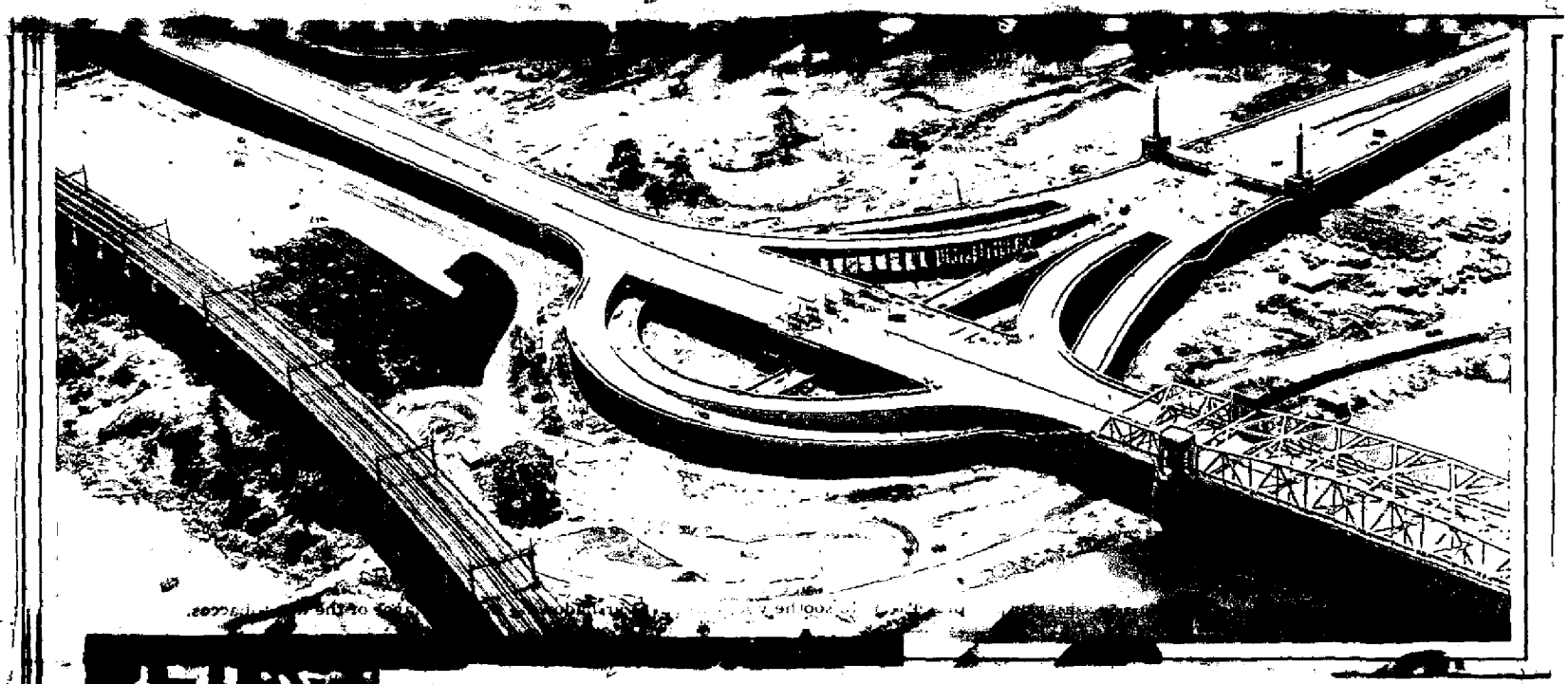
26

27

M 234



$60,000,000 BRIDGE
An airplane view of the Triborough Bridge, joining Manhattan, the Bronx and Queens, which was dedicated July 11 by President Roosevelt
(Wide World)



A ne[illegible] which solved a problem similar to that confronting Baltimore engineers who plan to empty traffic from the Howard street extension into North avenue at grade

(Associated Press)

Note The two small islands
and the pile shown on this
compilation lat 40° 48.05' long 73° 55.6'
at west entrance to Bronx
Kill have been added to
the compilation in this office.
They require field inspection
for absolute identification but
have been added in this
office as they are ~~too clear~~
~~or~~ clearly fixed objects.

B.J. Jones

REVIEW OF AIR PHOTO COMPILATION T-5452
Scale 1:5,000

Comparison with Graphic Control Surveys

1. T-6489a and b (August 1936), 1:5,000 - T-6489a and b is a location of the Triborough Bridge and adjacent detail which was constructed since the photos for this compilation and for compilation T-5458 were taken. All detail on T-6489a and b is shown on this compilation and on compilation T-5458.

There are no new hydrographic surveys in this area.

Comparison with Previous Topographic Surveys

Changes in this area have been so numerous that differences between this compilation and the old surveys are not listed in detail. The compilation is complete and adequate to supersede the sections of the following older topographic surveys which it covers, except for location of offlying rocks and contours, as listed below:

T- 258 (1848), 1:5,000 - Except for rocks awash northeast of Sunken Meadow and on the south side of Randalls Island
T- 475 (1854), 1:10,000
T- 485 (1854), "
T- 488 (1855), "
T- 604 (1859), " - Except for contours and rocks at lat. 40° 48', long. 73° 55.7'
T- 608 (1857), "
T- 675 (1857), 1:5,000 - Except for the rocks in Bronx Kills
T-1668 (1885), " , (combined hydro. and topo. survey) - Except for rocks in Bronx Kills, northeast of Sunken Meadow, and in Little Hell Gate.
T-1703 (1886), 1:5,000 - Except for rocks in Bronx Kills
T-1743 (1886), 1:10,000 - Except for contours along Hudson River

The contours listed on the above sheets are generally incomplete and conditions have no doubt been considerably changes by cuts and fills of construction work in this area. The rocks mentioned above are also discussed under the comparison with the charts.

Comparison with the Charts

1. Chart 226 - The rocks awash on chart 746 at lat. 40° 48', long. 73° 55.7', the numerous rocks and small islands in Bronx Kills, and the rocks awash in Little Hell Gate and around Sunken Meadow do not show on the photographs and are not shown on this compilation. None of these rocks are disproved by the photographs and their positions as shown on the chart are not affected by this compilation. In Bronx Kills the fact that the rocks above high water cannot be seen on the photos, while not disproving the existence of the rocks, indicates that they are not so large or prominent as shown on the chart.

See note on opposite page also

This compilation does not show all of the new construction on Randalls Island. Since the photos were taken all old buildings have been razed and new construction is now in progress (reported by graphic control survey T-6489, August 1936).

The dock on Randalls Island, lat. 40° 47.8', long. 73° 55.6', is gone except for piling remains.

2. Chart 274 - The wreck at lat. 40° 48.5', long. 73° 56.1' on chart 274 is not shown on this compilation. The photographs show a number of barges moored over this position indicating that the wreck has been removed.

3. Chart 746 - The piling shown on chart 746 at lat. 40° 49.5', long. 73° 57.5' is not visible on the photos and was not indicated by the field inspection. However, the photographs do not disprove the existence of broken-off remains slightly above water or under water.

The vessel at the Naval reservation is apparently permanently moored and in use and is shown on the compilation by solid lines.

This compilation shows numerous minor changes in water line detail and additions and changes to inshore detail on all of the above mentioned charts.

All landmarks including lights shown on the charts are on the compilation. No additional landmarks have been recommended by the compilation.

General

The control for this compilation is adequate and well distributed.

The compilation to be complete should have been supplemented by a planetable survey of the rocks mentioned above and definite statements should have been furnished by field inspection regarding existence or non-existence of the piling on chart 746 discussed above.

The projection on this compilation was hand drawn and a number of the lines were found out of position some 0.3 mm. These lines have been corrected as far as practicable before applying the grid system.

With the above exceptions the compilation is complete and carefully made as regards both the photo plotting and drafting.

H. H. Schleiter

Nov. 10, 1936.

B. G. JONES

B G Jones

REVIEW OF AIR PHOTO COMPILATION NO. T-5452 ~~and T-5453~~

Chief of Party: J.C.Partington — Compiled by: See STATISTICS

Project: HT-175 — Instructions dated: Mar. 14, 1934.

1. The charts of this area have been examined and topographic information necessary to bring the charts up to date is shown on this compilation. (Par. 16a, b,c,d,e,g and i; 26; and 64)

2. Change in position, or non-existence of wharfs, lights, and other topographic detail of particular importance to navigation which affect the chart, is discussed in the descriptive report. (Par. 26; and 66 g,n) *See review report preceeding page.*

3. Ground surveys by plane table, sextant, or theodolite have been used to supplement the photographic plot where necessary to obtain complete information, and all such surveys are discussed in the descriptive report. (Par. 65; and 66 d,e)

Five streets tied to existing triangulation - Page 4, Descriptive Report Tri-borough Bridge taken from Topographic Sheet T-6489a.
3 pt. theodolite fix included with this report.

4. Blue-prints and maps from other sources which were transmitted by the field party contain sufficient control for their application to the charts. (Par. 28)

No blue-prints transmitted.

5. Differences between this compilation and contemporary plane table and hydrographic surveys have been examined and rectified in the field before forwarding the compilations to the office and are discussed in the descriptive report.

No contemporary surveys for comparison except Sheet T-6489a.

6. The control and adjustment of the photo plot are discussed in the descriptive report. Unusual or large adjustments are discussed in detail and limits of the area affected are stated. (Par. 12b; 44; and 66 c,h,i)

Discussed in descriptive report.

7. High water line on marshy and mangrove coast is clear and adequate for chart compilation. (Par. 16a, 43, and 44)

NOTE: Strike out paragraphs, words or phrases not applicable and modify those requiring it. Paragraph numbers refer to those in the Topographic Manual. Refer also to the pamphlet "Notes on the Compilation of Planimetric Line Maps from Five Lens Air Photographs." M-67

8. The representation of low water lines, reefs, coral reefs and rocks, and legends pertaining to them is satisfactory. (Par. 36, 37, 38, 39, 40, 41)

9. Recoverable objects have been located and described on Form 524 in accordance with circular 30, 1933, circular letter of March 3, 1933, and circular 31, 1934. (Par. 29, 30, and 57)

10. A list of landmarks was furnished on Form 567 and instructions in the Director's letter of July 16, 1934, Landmarks for Charts, complied with. (Par. 16d, e; and 60)

No additional landmarks submitted.

11. All bridges shown on the compilation are accompanied by a note stating whether fixed or draw, clearance, and width of draw if a draw bridge. Additional information of importance to navigation is given in the descriptive report. (Par. 16c)

No data on Tri-borough Bridge

12. Geographic names are shown on the overlay tracing. The accepted local usage of new names has been determined and they are listed in the report, together with a general statement as to source of information and a specific statement when advisable. Complete discussion of place names differing from the charts and from the U. S. G. S. Quadrangles is given in the descriptive report, together with reasons for recommendations made. (Par. 64, and 66k)

13. The geographic datum of the compilation is N.A. 1927 and the reference station is correctly noted.

14. Junctions with adjoining compilations have been examined and are in agreement. (Par. 66j)

15. The drafting is satisfactory and particular attention has been given the following:

1. Standard symbols authorized by the Board of Surveys and Maps have been used throughout except as noted in the report.

2. The degrees and minutes of Latitude and Longitude are correctly marked.

3. All station points are exactly marked by fine black dots. ✓

4. Closely spaced lines are drawn sharp and clear for printing. ✓

5. Topographic symbols for similar features are of uniform weight. ✓

6. All drawing has been retouched where partially rubbed off. ✓

7. Buildings are drawn with clear straight lines and square corners where such is the case on the ground. ✓

(Par. 34 ✓, 35 ✓, 36 ✓, 37 ✓, ~~38~~, 39 ✓, 40 ✓, ~~41~~, 42 ✓, 43 ✓, 44 ✓, 45 ✓, 46 ✓, 48 ✓)

16. No additional surveying is recommended at this time. ✓

17. Remarks:

18. Examined and approved;

J.C. Partington
Chief of Party

19. Remarks after review in office:

Reviewed in office by: B.G. Jonas.

Examined and approved:

E.F. Green.
Chief, Section of Field Records

Fred. L. Peacock
Chief, Section of Field Work

L.O. Colbert.
Chief, Division of Charts

H. Rude
Chief, Division of Hydrography and Topography.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 24A
Rev. Oct., 1932

LIST OF DIRECTIONS

Station Mount Morris Park (Ecc.) Flag Pole *State* New York

Chief of party R.C.Bolstad *Date* March 26, 1935 *Computed by* R.C.B.

Observer R.C.Bolstad *Instrument* Berger # 232 *Checked by* G.C.M.

OBSERVED STATION	Observed direction	Eccentric reduction	Sea level reduction*	Corrected direction with zero initial	Adjusted direction*
	° ′ ″	′ ″	″	° ′ ″	′ ″
N. Tower Eldorado (1932)	0 00 00.00			0 00 00.00	
Dome(Grants Tomb)	73 09 19.2 ✓				
Highbridge 1898	143 35 44.8 ✓				
E. Tower, Tri. Br.(Mast)	283 33 05 ✓				
W. Tower, Tri. Br.(Mast)	283 53 40 ✓				
Mt. Morris Park F.P.(Center)	313 47 40 ✓				
		✓			
(Eccentric distance to F.P. = 4.56 meters)					

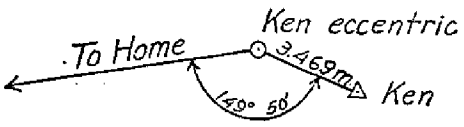
* These columns are for office use and should be left blank in the field.

Station: Ken | *State:* Maryland

Chief of party: C. V. H. | *Date:* 1917 | *Computed by:* O. P. S.

Observer: C. V. H. | *Instrument:* No. 168 | *Checked by:* W. F. R.

OBSERVED STATION	Observed direction	Eccentric reduction	Sea level reduction	Corrected direction with zero initial	Adjusted direction
	° ′ ″	′ ″	″	° ′ ″	′ ″
Chevy	0 00 00.00	− 7.31		0 00 00.00	
Tank west of △ Dulce	29 03 37.0	−1 09.8		29 02 34.5	
Ken (center), 3.469 meters	176 42				
Forest Glen standpipe	313 24 53.0	+3 01.2		313 28 01.5	
Home	326 31 30.21	+ 31.93		326 32 09.45	
Bureau of Standards, wireless pole	352 17 20.8	+ 5.7		352 17 33.8	
Reno	357 23 48.63	− 1.16		357 28 54.78	
Reference mark, 16.32 m	358 31 20				



This form, with the first three and fifth columns properly filled out and checked, must be furnished by field parties. *To be acceptable it must contain every direction observed at the station.*

It should be used for observations with both repeating and direction theodolites.

The directions at only one station should be placed on a page.

If a repeating theodolite is used, do not abstract the angles in tertiary triangulation. The local adjustment corrections (to close horizon only) are to be written in the Horizontal Angle Record, and the List of Directions is to be made from that record directly.

Choose as an initial for Form 24A some station involved in the local adjustment, and preferably one which has been used as an initial for a round of directions on objects not in the main scheme. Use but one initial at a station. Call the direction of the initial 0° 00′ 00.″ 00, and by applying the corrected angles to this, fill in opposite each station its direction reckoned *clockwise* around the whole circumference regardless of the direction of graduation of the instrument. The clockwise reckoning is necessary for uniformity and to make the directions comparable with azimuths.

If a station has been occupied eccentrically, reduce to the center and enter in this form, in ink, the resulting corrections to the observed directions in the column provided for them. If an eccentric reduction is necessary, but not made in the field, leave the column blank. If the station was occupied centrally, and no eccentric reduction is required, put dashes in the column to show that no corrections are necessary.

Directions in the main scheme should be entered to hundredths of seconds in first-order triangulation; otherwise to tenths only. Points observed upon but once, direct and reverse, should be carried to tenths in first-order and second-order triangulation, and to even seconds only in third-order triangulation. In general, but two uncertain figures should be given.

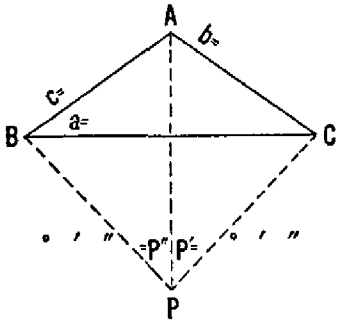
It is recommended that the following simple plan of observing be used with a repeating instrument: Measure each single angle in the scheme at each station and the outside angle necessary to close the horizon. *Measure no sum angles.* Follow each measurement of every angle immediately by a measurement of its explement. Six repetitions are to constitute a measurement. The local adjustment will consist simply of the distribution of the error of closure of the horizon.

N.A. Datum

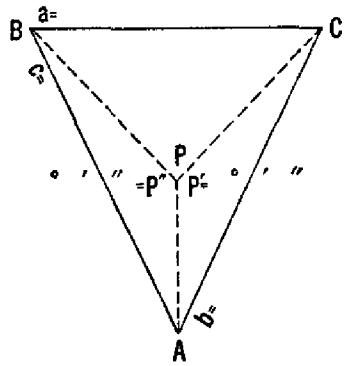
DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 655
Ed. Sept., 1929

COMPUTATION OF THREE-POINT PROBLEM

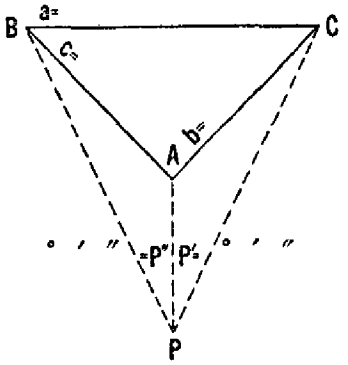
Case 1



Case 2



Case 3



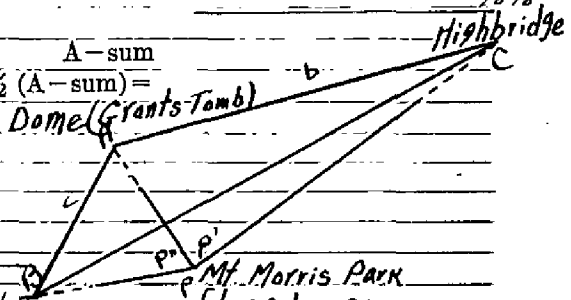
Cases 1 and 2

P'	70 26 25.6 ✓
P"	73 09 19.2 ✓
A	149 03 03.6 ✓
Sum	292 38 48.4 ✓
½ Sum	146 19 24.2 ✓
S = 180° − ½ sum =	33 40 35.8 ✓

Log c =	3.448 3160 ✓
Log sin P' =	9.979 1864 ✓
Colog b =	6.384 5620 ✓
Colog sin P" =	0.019 0455 ✓
Sum = log tan Z =	9.826 1099 ✓
Z =	33 49 27.2 ✓
Z + 45° =	78 49 27.2 ✓
Log cot (Z+45°) =	9.295 7123 ✓
Log tan S =	9.823 6838
Sum = log tan ε =	9.119 3961 ✓ (sign +)
ε	7° 29' 56.2" ✓
S	33 40 35.8 ✓

Case 3

P'	
P"	
Sum A	
A − sum	
S = ½ (A − sum) =	



(Tan ε +)				(Tan ε −)
S + ε = angle ABP	41	10	33.9 ✓	S − ε = angle ABP
S − ε = angle ACP	26	10	37.6 ✓	S + ε = angle ACP

BPA	APC	PCB
ABP	PCA	CBP
PAB	CAP	BPC

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

U. S. GOVERNMENT PRINTING OFFICE: 1929
11—9012

N.A. Datum

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 662
Rev. April, 1931

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		NAME OF STATION	
1. ϕ	40° 48′ 48.480″	Dome (Grants tomb)	73° 57′ 48.370″	λ
2. ϕ'	40 47 18.249	N. Tower (El dorado)	73 58 04.044	λ'
$\Delta\phi$ (=$\phi'-\phi$)	− 1 30.231		$\Delta\lambda$ (=$\lambda'-\lambda$)	+ 0 15.674
$\frac{\Delta\phi}{2}$	− 45.116		$\frac{\Delta\lambda}{2}$	
$\phi_m\left(=\phi+\frac{\Delta\phi}{2}\right)$	40 − 48 − 03.364			
$\Delta\phi$ (secs.)	− 90.231		$\Delta\lambda$ (secs.)	+ 15.674
log $\Delta\phi$	1.9553558		**log** $\Delta\lambda$	1.1951798
cor. arc−sin	−		cor. arc−sin	−
log $\Delta\phi_1$	1.9553558		log $\Delta\lambda_1$	1.1951798
log cos $\frac{\Delta\lambda}{2}$			**log cos** ϕ_m	9.8790869
colog B_m	1.4892093		**colog** A_m	1.4909019
log $\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\}$	3.4445651 + (opposite in sign to $\Delta\phi$)		**log** $\{s_1 \sin\left(\alpha+\frac{\Delta\alpha}{2}\right)\}$	2.5651686 +
			log $\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\}$	3.4445651 +
log $\Delta\lambda$	1.1951798 (3 log $\Delta\lambda$)		**log tan** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.1.2060,35 +
log sin ϕ_m	9.8152011 (log F)		$\alpha+\frac{\Delta\alpha}{2}$	7 31 12.28
log sec $\frac{\Delta\phi}{2}$	(log b)		**log sin** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.1168521
log a	1.0103809		**log cos** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.9962485
a			**log** s_1	3.4483165
b			cor. arc−sin	+
−$\Delta\alpha$ (secs.)	+ 10.24		log s	3.4483316
$\frac{\Delta\alpha}{2}$	5.12	5.12		
	+	10.24		
$\alpha+\frac{\Delta\alpha}{2}$	7 31 12.28			
α (1 to 2)	7 31 17.4			
$\Delta\alpha$	− 10.2			
	180			
α' (2 to 1)	187 31 07.2			

*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. 11—9810

U. S. GOVERNMENT PRINTING OFFICE: 1931

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			

N.A. Datum

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 662
Rev. April, 1931

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	40° 48′ 48.480	Dome (Grants tomb)	λ	73° 57′ 48.370 ✓
2. ϕ'	40 50 33.166	Highbridge	λ'	73 55 58.826 ✓
$\Delta\phi\ (=\phi'-\phi)$	+ 1 44.686		$\Delta\lambda\ (=\lambda'-\lambda)$	− 1 49.544
$\frac{\Delta\phi}{2}$	+ 52.343		$\frac{\Delta\lambda}{2}$	
$\phi_m\left(=\phi+\frac{\Delta\phi}{2}\right)$	40 − 49 − 40.823			
$\Delta\phi$ (secs.)	+ 104.686		$\Delta\lambda$ (secs.)	− 109.544
log $\Delta\phi$	2.0198886		**log** $\Delta\lambda$	2.0395886
cor. arc−sin	−		cor. arc−sin	−
log $\Delta\phi_1$	2.0198886		log $\Delta\lambda_1$	2.0395886
log cos $\frac{\Delta\lambda}{2}$			**log cos** ϕ_m	9.8789098
colog B_m	1.4892113		**colog** A_m	1.4969026
log $\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\}$	3.5090999 − (opposite in sign to $\Delta\phi$)		**log** $\{s_1 \sin\left(\alpha+\frac{\Delta\alpha}{2}\right)\}$	3.4094010 −
			log $\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\}$	3.5090999 −
log $\Delta\lambda$	2.0395886 | 3 log $\Delta\lambda$		**log tan** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.9003011
log sin ϕ_m	9.8154386 | log F		$\alpha+\frac{\Delta\alpha}{2}$	218° 28′ 49.65
log sec $\frac{\Delta\phi}{2}$	| log b		**log sin** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.7939633
log a	1.8550272		**log cos** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.8936621
a			**log** s_1	3.6154377
b	− 71.62″		cor. arc−sin	+
$-\Delta\alpha$ (secs.)			log s	3.615438
$-\frac{\Delta\alpha}{2}$	− 35.81″			
	− 35.81			
$\alpha+\frac{\Delta\alpha}{2}$	218° 28′ 49.65			
α (1 to 2)	218 28 13.8			
$\Delta\alpha$	+ 01 11.6			
	180			
α' (2 to 1)	38 29 25.4			

*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.

11—9810
U. S. GOVERNMENT PRINTING OFFICE: 1931

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			

Check on Inverse's

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 27
Ed. April, 1929

POSITION COMPUTATION, THIRD-ORDER TRIANGULATION

			°	′	″
α	2	to 3			
2d ∠		&	+		
α	2	to 1	187	31	07.2
Δα			+		20.7
			180	00	00.0
α′	1	to 2	7	31	17.4

			°	′	″
α	3	to 2			
3d ∠		&	−		
α	3	to 1	38	29	25.4
Δα			−	01	11.6
			180	00	.00.0
α′	1	to 3	218	28	13.8

First Angle of Triangle

	°	′	″			°	′	″
φ	40	47	18.249	2 N. Tower Eld.	λ	73	58	04.044
Δφ	+	01	30.231		Δλ	−		15.674
φ′	40	48	48.480	1 Dome Grants Tomb	λ′	73	57	48.370

	Logarithms	Values in seconds
s	3.448316	
Cos α	9.996250	
B	8.510792	
h	1.955358	1st term − 90.2315
s²	6.8966	
Sin² α	8.2335	
C	1.3403	
	6.4704	2d term + .0003
h²	3.911	
D	2.388	
	6.299	3d term + .0002
		−Δφ 90.231

	°	′	″	Logarithms	Values in seconds
½(φ+φ′)	40	48	03.4		
s				3.448316	
Sin α				9.116771	
: A′				8.509098	
Sec φ′				0.120995	
Δλ				1.195180	15.674
Sin ½(φ+φ′)				9.915201	
−Δα				1.010381	10.24

	Logarithms	Values in seconds
s	3.615438	
Cos α	9.893602	
B	8.510788	
h	2.019828	1st term + 104.6715
s²	7.2309	
Sin² α	9.5881	
C	1.3410	
	8.1600	2d term + .0145
h²	4.040	
D	2.388	
	6.428	3d term + .0003
		−Δφ 104.6863

	°	′	″	Logarithms	Values in seconds
½(φ+φ′)	40	49	40.8		
s				3.615438	
Sin α				9.794058	
A′				8.509098	
Sec φ′				0.120995	
Δλ				2.039589	109.544
Sin ½(φ+φ′)				9.815439	
−Δα				1.855028	71.67

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N.A. Datum

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 25
Ed. Jan., 1929

COMPUTATION OF TRIANGLES

State: _____

11—9121

NO.	STATION	OBSERVED ANGLE	CORR'N	SPHER'L ANGLE	SPHER'L EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
	2-3 Mt. Morris Park		✓				3.448316 ✓
	1 Flagpole ecc.	73 09 19.2					0.019045
	2 Eldorado W. Tower Dome	41 10 35.9	✓				9.818473 6
	3 (Grants Tomb)	(65 40 06.8)					9.959603 0 ✓
	1-3				0.0		3.285835 ✓
	1-2						3.426964 ✓
	2-3 Mt. Morris Park		✓				3.615438 ✓
	1 Flagpole ecc.	70 26 25.6					0.025813 6
	2 (Grants Tomb) Dome	(83 22 56.8)					9.997096 8 ✓
	3 Highbridge 1898	26 10 37.5	✓				9.644584 1
	1-3				0.0		3.638348 ✓
	1-2						3.285836 ✓
	2-3						
	1						
	2						
	3						
	1-3						
	1-2						
	2-3						
	1						
	2						
	3						
	1-3						
	1-2						

Do not write in this margin

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 27
Ed. April, 1929

POSITION COMPUTATION, THIRD-ORDER TRIANGULATION

			°	′	″
α	2	to 3	187	31	07.2
2d ∠		&	+41	10	33.9
α	2	to 1	228	41	41.2
Δα					56.0
			180	00	00.0
α′	1	to 2	48	42	37.2
			73	09	19.2

			°	′	″
α	3	to 2	7	31	17.4
3d ∠		&	-65	90	06.8
α	3	to 1	301	51	10.6
Δα					45.7
			180	00	00.0
α′	1	to 3	121	51	56.3

First Angle of Triangle

	°	′	″			°	′	″
φ	40	47	18.249	2 S. Tower Eldorado	λ	73	58	04044
Δφ			57.185	Mt. Morris Pt.	Δλ		01	25.655
φ′	40	48	15434	1 Flagpole ecc.	λ′	73	56	38.389

	°	′	″			°	′	″
φ	40	48	48.480	3 Dome Grants Tomb	λ	73	57	48.370
Δφ			33.046	Mt. Morris Pt.	Δλ		01	09.981
φ′	40	48	15434	1 Flagpole ecc.	λ′	73	56	38.389

	Logarithms	Values in seconds
s	3.426964	
Cos α	9.819 5904	
B	8.510 7917	
h	1.757 3461	1st term 57.1934
s²	6.8539	
Sin² α	9.7515	
C	1.3404	
	7.9458	2d term +0.0088
h²	3.5147	
D	2.3877	
	5.9024	3d term +0.0001
		−Δφ 57.1845

½(φ+φ′)	°	′	″	Logarithms	Values in seconds
s				3.426964	
Sin α				9.875 7577	
A′				8.5090980	
Sec φ′				0.1209349	
Δλ				1.932 7546	85.6554
Sin ½(φ+φ′)				9.815 1607	
−Δα				1.747 9153	55.96

	Logarithms	Values in seconds
s	3.285835	
Cos α	9.722 4204	
B	8.510 7898	
h	1.519 0452	1st term 33.0404
s²	6.5716	
Sin² α	9.8582	
C	1.3408	
	7.7706	2d term +0.0059
h²	3.0381	
D	2.3877	
	5.4258	3d term + 2
		−Δφ 33.0463

½(φ+φ′)	°	′	″	Logarithms	Values in seconds
s				3.285835	
Sin α				9.929 1151	
A′				8.5090980	
Sec φ′				0.1209349	
Δλ				1.844 9830	69.9815
Sin ½(φ+φ′)				9.815 2709	
−Δα				1.660 2539	45.73

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On N.A. Datum

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 27
Ed. April, 1929

POSITION COMPUTATION, THIRD-ORDER TRIANGULATION

Mt Morris Pk N. Tower

			°	′	″
α	2 Flagpole ecc	to 3 Eldorado	48	42	37.0
2d ∠		&	+313	47	40.0
α	2	to 1	2	30	17.2
Δα					
			180	00	00.0
α′	1	to 2	182	30	17.2

			°	′	″
α	3	to 2			
3d ∠		&	−		
α	3	to 1			
Δα					
			180	00	00.0
α′	1	to 3			

First Angle of Triangle

	°	′	″			°	′	″
φ	40	48	15.434	Mt Morris Pk	λ	73	56	38.389
Δφ	−		11.148	2 Flagpole ecc 4.56 M	Δλ			00.008
φ′	40	48	15.286	Mt Morris Pk 1 Flagpole	λ′	73	56	38.397

	°	′	″			°	′	″
φ				3	λ			
Δφ					Δλ			
φ′				1	λ′			

	Logarithms	Values in seconds
s	0.658965	471.5 m. (1379.3) m.
Cos α	9.999585	
B	8.510790	
h	9.169340	1st term + 0.1477
s²	1.3179	
Sin²α	7.2808	
C	1.3406	
		2d term +
h²		
D	2.3877	
		3d term +
		−Δφ

	°	′	″	Logarithms	Values in seconds
½(φ+φ′)					
s				0.658965	900.0 m (506.4) m
Sin α				8.640499	
A′				8.509098	
Sec φ′				0.120935	
Δλ				7.929497	0.0085
Sin ½(φ+φ′)				9.815	
−Δα				7.744	

	Logarithms	Values in seconds
s		
Cos α		
B		
h		1st term ″
s²		
Sin²α		
C		
		2d term +
h²		
D		
		3d term +
		−Δφ

	°	′	″	Logarithms	Values in seconds
½(φ+φ′)					
s					
Sin α					
A′					
Sec φ′					″
Δλ					
Sin ½(φ+φ′)					
−Δα					

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Above position on N.A. Datum

For N.A. 1927 Datum
Apply Lat. − 12.0 m
Long + 3.6 m

N.A. 1927 Datum Position
40° 48′ 459.5 m
73° 56′ 903.6 m

Plane coordinates on Lambert projection

State L. Island Station St Johns 1932 (NY)

ϕ = 40° 48′ 18.″214 λ = 73° 57′ 47.″186

Tabular difference of R for 1″ of ϕ = 101.20267

R (for min. of ϕ)		24 253 248.71	y′ (for min. of ϕ)		209,296.59
Cor. for sec. of ϕ		− 1 843.31	Cor. for sec. of ϕ		+ 1 843.31
R		24,251,405.40	y′		211,139.90
			y″ (=2R sin² $\frac{\theta}{2}$)		+ 2.15
θ (for min. of λ)		+ 0° 01′ 57.″73478	y		211,142.05 ✓
Cor. for sec. of λ		− 30.86352			
θ		+ 1 26.87126	$\frac{\theta}{2}$		° ′ 43.″4
θ″	For machine computation	86.″87126		For machine computation	
			log θ″		1.93888
log θ″		1.93887612	colog 2		9.69897000
S for θ		4.68557485	S for $\frac{\theta}{2}$		4.68557
log sin θ	sin θ		log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$	6.32342
log R		7.38473691		R sin $\frac{\theta}{2}$	
log x′		4.00918788	log sin² $\frac{\theta}{2}$	R sin² $\frac{\theta}{2}$	2.64684
x′	R sin θ	+ 10,213.81	log R		7.38474
		2,000,000.00	log 2		0.30103000
x		2,010,213.81 ✓	log y″		0.33261

x = 2,000,000.00 + R sin θ

y = y′ + 2R sin² $\frac{\theta}{2}$

y′ = the value of y on the central meridian for the latitude of the station

S = log of ratio for reducing arc expressed in seconds to sine

(see log tables)

R, y′, and θ are given in special tables

(R 340)

Geodetic positions from Lambert coordinates

State _____ Station _____

x	2,014,000.00	$R_b + A$	24,462,545.30
C	2,000,000.00	y	210,000.00
x' (= x − C)	+ 14,000.00	$R_b + A - y$	24,252,545.30
	4.146128044		
	7.384757337		
tan θ	6.761370711	R (by)	7.384757241
θ	° 01 59.06847		
	+ 119.06847	y	210,000.00
$\frac{\theta}{\ell}$ (= Δλ)	+ 182.0390	y''	− 4.04
		y'	209,995.96
λ (central mer.)	74° 00 00.0000		
− Δλ	− 3 02.0390	φ (by interpolation)	40° 48 06.9106
λ	73 56 57.9610		426.3
	1310.86		(1424.5)
	(95.6)		1850.8
	1406.5		

Station _____

x	2,022,000.00	$R_b + A$	24,462,545.30
C	2,000,000.00	y	204,000.00
x' (= x − C)	22,000.00	$R_b + A - y$	24,258,545.30
	4.342422265		
	7.364864733		
tan θ	6.957557793	R (by)	7.364864493
θ	° 03 07.06102		
	+ 187.06102	y	204,000.00
$\frac{\theta}{\ell}$ (= Δλ)	+ 285.9901	y''	− 9.94
		y'	203,990.02
λ (central mer.)	74° 00 00.0000		
− Δλ	− 04 45.9901	φ (by interpolation)	40° 47 07.5647
λ	73 55 14.0099		466.7
	657.0		(1384.1)
	(749.8)		1850.8
	1406.8		

$\tan\theta = \frac{x - C}{R_b + A - y}$

$\Delta\lambda = \frac{\theta}{\ell}$

$\lambda = \lambda$ (central mer.) $- \Delta\lambda$

$R = (R_b + A - y) \sec\theta$

$y'' = 2R \sin^2 \frac{\theta}{2}$

$y' = y - y''$

C is constant added to x' in computation of coordinates

R_b is map radius of lowest parallel

A is value of y' for R_b; in most cases it is zero

φ is interpolated from table of y'

(M-28)

Geodetic positions from Lambert coordinates

State _____ Station _____

x	2,022,000.00	$R_b + A$	24,462,545.30
C	2,000,000.00	y	216,000.00
x' (= x − C)	+ 22,000.00	$R_b + A - y$	24,246,545.30
	4.3424 2268		
	7.3846 4987		
tan θ	6.9577 7281	R	7.3846 5005
θ	° 03 07.15379		
	+ 187.15379	y	216,000.00
$\frac{\theta}{\ell}$ (= Δλ)	+ 246.1320	y''	− 9.98
		y'	215,990.02
λ (central mer.)	74 00 00.0000		
− Δλ	− 0 04 46.1320	φ (by interpolation)	4° 49 06.1384
λ	73 55 13.8680		378.7
	650.0		(1472.1)
	(756.1)		1850.8
	1406.1		

Station _____

x		$R_b + A$	
C		y	
x' (= x − C)		$R_b + A - y$	
tan θ		R	
θ	° ' "		
	"		
		y	
$\frac{\theta}{\ell}$ (= Δλ)		y''	−
		y'	
λ (central mer.)	° ' "		
− Δλ		φ (by interpolation)	° ' "
λ			

$$\tan\theta = \frac{x - C}{R_b + A - y}$$

$$\Delta\lambda = \frac{\theta}{\ell}$$

$$\lambda = \lambda\,(\text{central mer.}) - \Delta\lambda$$

$$R = (R_b + A - y)\sec\theta$$

$$y'' = 2R\sin^2\frac{\theta}{2}$$

$$y' = y - y''$$

C is constant added to x' in computation of coordinates

R_b is map radius of lowest parallel

A is value of y' for R_b; in most cases it is zero

φ is interpolated from table of y'

(M-28)

Geodetic positions from Lambert coordinates

State _____ Station _____

x	2,006,000.00	$R_b + A$	24,462,545.30
C	2,000,000.00	y	204,000.00
x' (= x − C)	+ 6,000.00	$R_b + A - y$	24,258,545.30
	3.778151125		
	7.384486475		
tan θ	6393286500	R log	7.384486475
θ	° ′ ″ 0 0 51.01677		
	+ 51.01677	y	204,000.00
$\frac{\theta}{\ell}$ (= Δλ)	+ 77.9975	y″	− .74
		y′	203,999.26
λ (central mer.)	74 00 00.0000		
− Δλ	− 01 17.9922	φ (by interpolation)	40 47 07.6500
λ	73 58 42.0078		472.0
	562.8		(1378.8)
	(844.0)		1850.8
	1406.8		

Station _____

x	2,006,000.00	$R_b + A$	24,462,545.30
C	2,000,000.00	y	204,000.00
x' (= x − C)	+ 6,000.00	$R_b + A - y$	24,258,545.30
	3.778151125		
	7.384649588		
tan θ	6393587138	R log	7.384649588
θ	° ′ ″ 0 0 51.04225		
	+ 51.04225	y	216,000.00
$\frac{\theta}{\ell}$ (= Δλ)	+ 78.0365	y″	− .74
		y′	215,999.26
λ (central mer.)	74 00 00.0000		
− Δλ	− 01 18.0365	φ (by interpolation)	40 49 06.2302
λ	73 58 41.9635		384.4
	560.8		(1466.4)
	(845.3)		1850.8
	1406.1		

$$\tan\theta = \frac{x - C}{R_b + A - y}$$

$$\Delta\lambda = \frac{\theta}{\ell}$$

$$\lambda = \lambda\,(\text{central mer.}) - \Delta\lambda$$

$$R = (R_b + A - y)\sec\theta$$

$$y'' = 2R\sin^2\frac{\theta}{2}$$

$$y' = y - y''$$

C is constant added to x′ in computation of coordinates

R_b is map radius of lowest parallel

A is value of y′ for R_b; in most cases it is zero

φ is interpolated from table of y′

Report for Supplemental T 5452
3/8/39

The corrections shown in red on T 5452 Supplemental have been plotted in this office from single lens air photographs without field inspection.

Field inspection is now in progress and any additional corrections resulting from the field inspection will be added in another color as soon as the field inspection data is available.

Photographs Single lens - 7"X 9" - scale 1:10 000 negatives on file in this office. Photographs taken by Naval Air Station Unit Washington, D.C. early in Feb. 1939, exact date not furnished

Plot Details in red plotted by J.A. McGann. Radial plot on a separate projection from ratio prints scale 1:5000. Corrections transferred to the supplemental by J.A. McGann.

Hydrographic Survey Shoreline on the hydrographic survey of this area is from T 5453 prior to the above corrections. The corrections on T 5453 Supplemental have not been applied to the Hydrographic Sheet.

B.G. Jones 3/9/39

Additional details in blue added 4/2/39 after checking with the field inspection. Field inspection notes are shown on the photographs and on C 158 (Air Photo Unit files).