

Applied to Chart # 688. April 1940. L.Am.

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. 36

REGISTER NO. T-5684

T5684

State FLORIDA

General locality ST. JOHNS RIVER

Locality CROWS BLUFF and VICINITY

Scale 1:10,526 Date of survey March 14 & 20, 1935

Vessel Air Photographic Party No. 2-A

Chief of party Hubert A. Paton

Surveyed by See Page 2

Inked by " " "

Heights in feet above to ground to tops of trees

Contour, Approximate contour, Form line interval feet

Instructions dated March 4, 1935, 19

Remarks: U. S. Army Air Corps Camera No. 32-2 used.

NOTES ON COMPILATION

SHEET NO. 36

REGISTER NO. T-5684

Photographs: Five Lens Flight No. 27, Photos Nos. 1044-1060
" " " " 28 " " 1099-1100

Date of Flights: March 14 and 20, 1935.

Scale Plot by: Hubert A. Paton.

Scale Factor used: 0.95

Projection By: Washington Office.

Control Plotted by: Henry O. Fortin.

Control Checked by: William C. Russell.

Smooth Radial Plot: HAP

Shoreline Inked by: HAP

Details Inked by: Henry Mach.

Overlay Sheet by: HM

Area of Detail of Area Inked: 17.15 sq. Stat. Miles

Length of Shoreline (over 200 meters) NONE

Length of Shoreline (under 200 meters) 56.7 Statute Miles.

Length of Shoreline of Small Lakes 11.2 " "

Ref. Sta. - St. Francis 1935' Lat. $29^{\circ} 02' 13.764''$ (423.8 m) ✓
Long. $81^{\circ} 25' 05.888''$ (159.3 m) ✓ *adjusted*

$$x = 366,329.3$$

$$y = 1,709,966.2$$

DESCRIPTIVE REPORT

to accompany

TOPOGRAPHIC MAP NO. 36

REGISTER NO. T-5684

July 15, 1938.

General Information:

✓ This sheet was compiled from air photographs taken by the U. S. Army Air Corps, using a five lens camera, No. 32-2. The major portion of the sheet was covered by Flight No. 27, but the extreme southeast corner was traced from the wing pictures of Flight No. 28. The scale of the pictures was 1:10,526. The flights were made at an elevation of approximately 5000 feet. The river in this region has no tide and it is not known what the stage of the water was at the time of the flight. In Lake Monroe, the stage was 2.1 feet below mean lake level. At Palatka, the river was at normal stage. From the appearance of the photographs, the river was probably near or a little below normal stage.

CONTROL:

✓ Only three triangulation stations appear on this sheet. However there were several stations on the adjoining sheet which gave sufficient control to permit the radial plot to be made. The stations were plotted from field values, adjusted for closure of arc, and no corrections were found necessary when the adjusted values were finally received.

✓ There were no Florida Geodetic Survey traverse stations on this sheet. The character of the terrain prevented the location of three-point stations without the expenditure of excessive amount of funds. There are no graphic control sheets in this area.

RADIAL PLOT:

✓ Although the control was rather scanty, a satisfactory plot was put through without a great amount of trouble. No unusual nor large adjustments were necessary. The plot was first begun on Sheet No. 5685 where more control was available and the radial points then transferred to this sheet.

JUNCTIONS:

✓ On the northwest, this sheet joins No. 5683, and a satisfactory junction was made with it. On the south, it joins Sheet No. 5685, which has not been compiled as yet. The detail has been transferred however, and the junction will be discussed in the report of the latter sheet.

Note The details on T 5684 are
essentially of the date of the photographs,
March 1935. The field inspection
showed no important changes since
the photographs were taken. B.J.F.

GENERAL DESCRIPTION OF TOPOGRAPHY:

The part of the St. Johns River and its tributaries shown on this sheet are almost entirely surrounded by dense deciduous swamps and marshes. Only at St. Francis and in the vicinity of Crows Bluff bridge the shore rises about 6 to 10 feet forming low bluffs.

West from St. Francis Dead River about 100 to 150 meters the terrain rises and is covered by scattered pines and palmettos, with occasional ponds, mostly filled with grass.

Towards the southeast part of the sheet, the swamp area changes in a similar way. The extreme southeast corner covers part of DeLand Junction and the orange groves that extend to the east toward the city of DeLand.

In the south part of the sheet the state highway No. 21 from Cassia joins highway No. 100 before crossing the bridge and continues on through DeLand Junction.

A high tension transmission line follows Highway No. 100, crosses the river about 300 meters north of the bridge and turns toward DeLand as shown on the sheet.

Some parts of the river and nearly all of its tributaries are completely clogged with water hyacinth, a plant that floats on the surface of the water. This prevented field inspection of most of the streams by the usual methods.

ROADS:

The manner of showing the roads follows the first set of instructions, - paved roads are shown by double solid lines, improved dirt roads or trails down to the waters edge are shown by double broken lines and all other trails are shown by a single broken line. Under the revised instructions most of the second class roads would be included with the first class.

FIELD INSPECTION:

The field inspection was begun in July, 1935. Additional inspection was made in June 1938, by truck and in January 1938 by airplane. *See note on opposite page*

PILING:

Piling on this sheet consist of a few piles at the east end of the bridge. The ruined dock is shown by a broken line.

GROVES:

All orchards on this sheet are of a citrous nature.

COMPARISON WITH OTHER SURVEYS: H 6311

Discrepancies in the shore line on this sheet with the work on Boat Sheet No. 44, Lieut. Comdr. L. D. Graham, Chief of Party, were investigated carefully and adjusted if an error was found. However in one place it was not possible to agree exactly, Lat. 29°01.2' Long. 81°23.7'. The photographs at this point are quite clear and it is believed that the location is correct on this sheet.

A comparison was made with the surveys of the U. S. Engineers

in 1926. So many differences were noted that the accuracy of their surveys are very much in doubt. It is believed that they were making only a reconnaissance survey and a close comparison is not justified.

BUILDINGS:

✓ All buildings that could be seen on the photographs ✓ are shown on this drawing. There may be some buildings obscured by trees or erected since the date of the photographs that were not shown, but it was deemed inexpedient to try to locate all of these in the field.

BRIDGES:

✓ There is only one bridge on this sheet, the steel swing bridge at Crows Bluff. The horizontal clearance is 89.7 feet on the left side and 92.3 feet on the right side. The vertical clearance is 7 feet at high water, 9 feet at mean low water. This information is taken from the LIST OF BRIDGES OVER NAVIGABLE WATER OF THE U. S., War Department publication, 1927. ✓ 1935 These measurements agree quite closely with the values obtained by the field inspection parties.

TRANSMISSION LINE:

✓ The aerial transmission line, crossing the river at Crows Bluff, consists of 6 cables. They have a clearance of 88 feet at mean high water according to the U. S. Coast Pilot, Section D, Page 240. This figure was not checked in the field but is probably correct. Since these waters are used only by small boats without masts, the clearance is not sufficiently important to warrant additional field inspection.

MISCELLANEOUS:

✓ The shoreline around marshes was put in quite heavy in accordance with the old instructions. An effort was made to erage this line and replace it with a light line to agree with more recent instructions. However it was found to be impossible to get all of the old line out and so the line is still too heavy in most places. The paragraph in the title block, therefore, does not apply to this sheet and should be blanked off when the sheet is photographed. *Shoreline carried in office 1399*

GEOGRAPHIC NAMES:

The names shown on the overlay were obtained from the following sources:-

1. U. S. C. & G. S. Chart No. 509.
2. U. S. Engineers Surveys of 1925 and 1926.
3. Lake County Road Map, State Highway Dept.
4. Lake County Soil Map, U. S. Dept. of Agriculture.
5. Orlando, Sectional Aeronautical Chart, C&GS.
6. Sectional Map of Florida, Dept. of Agriculture.
7. Names well established by local usage.
8. Graphic Control Sheet JJJ, L. D. Graham.

CROWS BLUFF. Sources 1, 2, 3, 4, and 7. The area on the

west side of the St. Johns River near the highway bridge. On source No. 2, this name appears as Crow's Bluff and on No. 6 it is shown as Crowsbluff. The first method is recommended,

DELAND LANDING. Sources 1, 2, and 7. Located on the east side of the river about 600 meters above the bridge. On some maps the name appears near the east end of the bridge but the name applies to the St. Johns River Line Dock shown on this sheet. The name should be spelled "DeLand", leaving no space between the syllables, and with a capital L.

HERMITAGE POINT. Sources 1, 2, and 7. The sharp point on the east shore of the river about one mile north from DeLand Landing.

HIGHLAND PARK CANAL. Sources 1, 2, and 7. The canal at Hermitage Point, about 300 meters long connecting Norris Dead River with the St. Johns River. The construction of this canal was promoted by a man named Norris, many years ago, who also promoted the Highland Park townsite, now abandoned.

REVOLVING BEND. Sources 1, 2, and 7. About three miles north from the bridge, the ox-bow loop on the north side of the St. Johns River.

ST. FRANCIS. A landing place located one mile north from Revolving Bend. Sources 1, 2, 4, and 7. On source No. 2, this place is shown as St. Francis Landing and as St. Francis also. There are no docks at the place now, so the name Landing is not recommended.

ST. FRANCIS DEAD RIVER. Sources 1, 2, and 7. A tributary of the St. Johns River near St. Francis. Sometimes called just Dead River but in order to distinguish this from the other two dead river the name St. Francis has been added and has been in common use by all the local inhabitants.

DEAD MANS BEND. Sources 1, 2, and 7. An "S" bend in the St. Johns River about one mile north of St. Francis. The possessive form is always used.

HONEY CREEK. Source 7. A long creek joining the river at Revolving Bend. It is known as Harrys Creek on Sheet No. 5683. Both names should be used on our charts. The dividing point for the two names is not certain. Mr. Driggers, DeLeon Springs, Florida said that the names change at Harrys Island but could not point out that spot on our maps. The island is probably somewhere near the junction of the two sheet, and is a small spot of high ground in the swamp.

NORRIS DEAD RIVER. Source 7. The long creek or river connecting Lake Woodruff with the St. Johns River at Highland Park Canal. See Descriptive Report Sheet 5683 for a discussion of this name.

ZEIGLER DEAD RIVER. The slough near Station Zeigler. This is one of the three Dead Rivers on this sheet. The local inhabitants usually refer to each one of these as Dead River without any distinguishing name. However if one is asked about the Dead River near old man Zeigler's place, they know immediately which one you mean. Several of these people were asked if they thought the name Zeigler Dead River would be suitable and they all agreed that it would be. This name is therefore recommended.

TWIN LAKES. Source- 7. The connecting lakes near the junction of this sheet with Sheet No. 5681. Only the south end of one of these lakes is shown on this sheet.

GATOR LAKE. Source 7. The long lake out in the marsh between Norris Dead River and the St. Johns River. It has no connection with either stream except at times of high water.

BLUE PETER LAKE. Source 7. An enlarged portion of Norris Dead River.

DELAND JUNCTION. Source 7. The community near the railroad passenger station. On sources Nos. 5 and 6 the name DeLand Station appears but the former name is the only one used by the local inhabitants. The agent at the station said that tickets to the place read DeLand merely, but they were all agreed that this community was outside of the city limits of DeLand. The freight depot is in the city but all passengers must travel by taxi out to the Junction.

SCOGGIN CREEK. Source 7 and 8. The creek at the northern end of this sheet, flowing into Lake Woodruff.

HIGHLAND PARK LANDING. A landing site on Norris Dead River. The photographs do not show a road leading to this place, which has been built in the last few years. There are no docks at the landing, but the high ground is indicated on the sheet. There are no houses at the landing, and only fishermen in small boat make use of it.

The following names were taken from a DeLand City Map and were verified in the field. These names are not posted on sign boards but some of the local inhabitants make use of the terms.

WEST EUCLID AVENUE

WEST NEW YORK AVENUE

WEST BERESFORD AVENUE. The paved road leading south to Beresford is also called Beresford Avenue by some of the people but the map shows it should apply to the street running east and west.

GRAND AVENUE

RIDGEWOOD AVENUE

BELLE STREET.

Remarks:

The local custom is to spell DELAND as "DeLand". Leave no space between syllables and capitalize the L.

The normal tracing limits of the photographs was exceeded on this sheet in order to show all of Norris Dead River.

✓ LANDMARKS.

Eight landmarks were selected from this sheet and are submitted on Form No. 567.

Respectfully submitted,

Henry Mach

Henry Mach, Draftsman, C&GS.

T 5684

Remarks.

Decisions

	Remarks.	Decisions
1		
2		DeLand one word, capital L
3		
4		
5		
6		USG.B. decision
7		
8	Not Dead Mans Bend	
9		
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27		

GEOGRAPHIC NAMES

Survey No. T 5684

Name on Survey	Source										
	A	B	C	D	E	F	G	H	K		
<u>Crows Bluff</u> ✓				✓							1
<u>De Land Landing</u> ✓				✓							2
<u>Hermitage Pt.</u> ✓				✓							3
<u>Highland Park Canal</u> ✓				✓							4
<u>Revolving Bend</u> ✓				✓							5
<u>St. Francis</u> ✓				✓							6
<u>St. Francis Dead River</u> ✓				✓							7
<u>Deadmans Bend</u> ✓ <small>Dead Mans Bend</small>				✓							8
<u>Honey Creek</u> ✓				✓							9
<u>Norris Dead River</u> ✓				✓							10
<u>Ziegler Dead River</u> ✓				✓							11
<u>Twin Lakes</u> ✓				✓							12
<u>Gator Lake</u> ✓				✓							13
<u>Blue Peter Lake</u> ✓				✓							14
<u>De Land Junction</u> ✓				✓							15
<u>Scoggin Cr.</u> ✓				✓							16
<u>Highland Park Landing</u> ✓				✓							17
											18
											19
											20
											21
											22
											23
											24
											25
											26
											27

Names underlined in ed approved
by L. Heck on 11/3/38

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

LANDMARKS FOR CHARTS

STRIKE OUT ONE

TO BE CHARTED
~~TO BE DELETED~~

Palatka, Florida.

July 16, 1938, 193

I recommend that the following objects which have ~~(insert)~~ been inspected from seaward to determine their value as landmarks, be charted on ~~(deleted from)~~ the charts indicated.
The positions given have been checked after listing.

Hubert A. Paton
Hubert A. Paton
Chief of Party.

GENERAL LOCALITY	NAME AND DESCRIPTION	POSITION				METHOD OF LOCATION	DATE OF LOCATION	HARBOR CHART	INSHORE CHART	OFFSHORE CHART	CHARTS AFFECTED				
		LATITUDE		LONGITUDE								DATUM			
		°	'	°	'								D. P. METERS		
	Crows Bluff, St. Johns R.														
	TIDE GAGE HOUSE	29	02	449	81 25	133		N. A. 1927	Photo.	1938	X				509
	PLATFORM	29	01	1782	81 24	445		"	"	"	X				"
	POINT OF TREES	29	01	1648	81 24	874		"	"	"	X				"
	CYPRESS ISLAND	29	01	1119	81 23	1253		"	"	"	X				"
	END OF TRAIL	29	01	179	81 23	1275		"	"	"	X				"
	N. E. CORNER OF DOCK	29	00	1269	81 23	564		"	"	"	X				"
	S. POLE TRANSMISSION TOWER east side of river (d)	29	00	1224	81 23	418		"	"	"	X				"
	TRANSMISSION TOWER, S. pole, W side of river	29	00	1223	81 23	580		"	"	"	X				"
	<i>Dock is shown on 75684 without arib to avoid confusion of label</i>														

This form shall be prepared in accordance with 1934 Field Memorandum, "LANDMARKS FOR CHARTS." The data should be considered for the charts of the area and not by individual field survey sheets. Information under each column heading should be given.

REVIEW OF AIR PHOTO COMPILATION NO. 5684

Chief of Party: Hubert A. Paton

Compiled by: H. Mach.
& HAP.

Project: H T 168

Instructions dated: 3/4/35

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)
Yes
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) Charts should be completely revised.
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) No supplemental surveys made except L. D. Grahams Hydrographic Survey.
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) City map of DeLand furnished for source of names only.
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. Yes, except for differences mentioned in report.
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) No unusual nor large adjustments necessary.
7. ✓ High water line on marshy and mangrove coast is clear and adequate for chart compilation. (Par. 16a, 43, and 44) Yes.

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."

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) Non-tidal waters. No. low water line shown.
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) Yes
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) Yes
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) Yes
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) Yes
13. ✓ The geographic datum of the compilation is N. A. 1927 *adjusted* and the reference station is correctly noted.
14. ✓ Junctions with adjoining compilations have been examined and are in agreement. (Par. 66j) Yes. Junction with 5685 has been transferred but the latter sheet has not been compiled as yet.
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. Yes
 2. The degrees and minutes of Latitude and Longitude are correctly marked. Yes

- ✓ 3. All station points are exactly marked by fine black dots. Yes
- ✓ 4. Closely spaced lines are drawn sharp and clear for printing. Yes
- ✓ 5. Topographic symbols for similar features are of uniform weight. Yes
- ✓ 6. All drawing has been retouched where partially rubbed off. Yes
- ✓ 7. Buildings are drawn with clear straight lines and square corners where such is the case on the ground. Yes

(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;

Hubert A. Paton

Hubert A. Paton
Chief of Party

19. Remarks after review in office:

Reviewed in office by: *L. C. Lande 11/14/38*

Section of Field Records

REVIEW OF AIR PHOTOGRAPHIC SURVEY T-5684

Scale 1:10,000

Photographs taken March 1935. Compiled May to September 1938.
Refer to pages 1 to 5 of Descriptive Report for additional data.

Chief of Party, H. A. Paton
Radial plot by H. A. Paton
Inked in field by H. A. Paton, Henry Mach.

Field inspection in 1935 and 1938. Refer to page 4 of the Descriptive Report.

There are no Contemporary Graphic Control Surveys within the area of T-5684

Contemporary Hydrographic Surveys

H-6310 (1938), 1:5,000
H-6311 (1938), 1:5,000

The shoreline and part of the hydrographic signals shown on the above hydrographic surveys were taken from the air photographic surveys. T-5684 is in agreement with the above Hydrographic Surveys except for a small discrepancy mentioned on page 4 of the Descriptive Report.

Former Topographic Surveys

T-2027 (1875), 1:80,000

T-2027 shows only the main channel which is quite different from T-5684. T-5684 is complete and adequate to supersede the area of T-2027 which it covers.

Comparison with Chart 509

Chart 509 shows only the main channel and adjacent vegetation. T-5684 does not show the fixed aids. These are located on H-6310 and H-6311.

Remarks.

The cypress shoreline was redrafted in this office from an open tree symbol to a light line in accordance with Field Memorandum No. 1, 1938. The shoreline as shown by the field party was in accordance with previous instructions.

The details of T-5684 are of the date of the photographs.

Additional Work

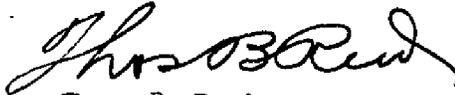
The drafting on T-5684 is very good and the Descriptive Report and compilation of map details is complete.

No additional topographic surveys are required for charting in the area covered by this survey.

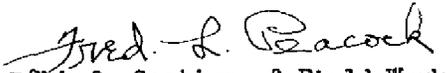
Reviewed in office by L. C. Lande, November 14, 1938.

Inspected by B. G. Jones.

Examined and approved:


Thos. B. Reed
Chief, Section of Field Records


K.T. Adams
Chief, Division of Charts


Fred. L. Bacoek
Chief, Section of Field Work


Chief, Division of Hydrography
and Topography

PLANE COORDINATE GRID SYSTEM

Positions of grid intersections used for fitting the grid to this compilation were computed by Division of Geodesy and the computation forms are included in this report.

Positions plotted by S. KASS

Positions checked by H. REED

Grid inked on machine by S. KASS

Intersections inked by S. KASS

Points used for plotting grid:

x 375,000
y 1,695,000

x 375,000
y 1,715,000

x 390,000
y 1,695,000

x
y

x 365,000
y 1,705,000

x
y

x 375,000
y 1,205,000

x
y

Triangulation stations used for checking grid:

- | | |
|----------------------------|----------|
| 1. <u>DELAND 1935</u> | 5. _____ |
| 2. <u>ST. FRANCIS 1935</u> | 6. _____ |
| 3. _____ | 7. _____ |
| 4. _____ | 8. _____ |

PLANE COORDINATES ON TRANSVERSE MERCATOR PROJECTION
(CALCULATING MACHINE COMPUTATION)

State Fla. Zone East Station χ 375,000
4 1,695,000
λ (Central meridian) 81°
28° 59' 45".88 λ 81 23 27.65
Δφ (Excess of φ over even 10' expressed as minutes and decimal) 9'.764667 Δλ (Central meridian - λ) _____
Δλ (in sec.) 1407".65

		$\left(\frac{\Delta\lambda''}{100}\right)^2$	
Tabular H (even 10')		Tabular V (even 10')	
Interpolated H (fraction of 10')	-	Interpolated V (fraction of 10')	+
Cor. for second dif.	+ 7	Cor. for second dif.	+ 1
H	88.804366	V	1.043695
a	- .77	Tabular difference of y for 1" of ϕ	
b	+ 7.12	y (for minutes of ϕ)	
$H (\Delta\lambda'')$	125,005.5	y (for seconds of ϕ)	
ab	- 5.5	Tabular y	1,694,793.2
x'	125,000	$V \left(\frac{\Delta\lambda''}{100}\right)^2$	206.8
	500,000.00	c	-
x	375	y	1,695,000
$\frac{(\text{Tabular } y) + y}{2}$		$\Delta\lambda'' \sin \frac{\phi + \phi'}{2}$	
$\frac{\phi + \phi'}{2}$ (Interpolated from projection table)		$F (\Delta\lambda'')$	
$\sin \frac{\phi + \phi'}{2}$		$\Delta a''$	"
		Δa	"

$x' = H\Delta\lambda + ab$

$x = x' + 500,000$

$y = \text{Tabular } y + V \left(\frac{\Delta\lambda''}{100}\right)^2 + c$

$\Delta a'' = \Delta\lambda'' \sin \frac{\phi + \phi'}{2} + F (\Delta\lambda'')$

PLANE COORDINATES ON TRANSVERSE MERCATOR PROJECTION
(CALCULATING MACHINE COMPUTATION)

State Fla. Zone East Station 390,000
4 1,695,000
 λ (Central meridian) 81 20 38.73
 ϕ 28° 59' 46.34
 $\Delta\phi$ (Excess of ϕ over even 10' expressed as minutes and decimal) 9.772333 $\Delta\lambda$ (Central meridian - λ) 1238.73
 $\Delta\lambda$ (in sec.) 1238.73

		$\left(\frac{\Delta\lambda''}{100}\right)^2$	
Tabular H (even 10')		Tabular V (even 10')	
Interpolated H (fraction of 10')	-	Interpolated V (fraction of 10')	+
Cor. for second dif.	+ 7	Cor. for second dif.	+ 1
H	88.804257	V	1.043698
a	- .77	Tabular difference of y for 1" of ϕ	
b	+ 6.39	y (for minutes of ϕ)	
		y (for seconds of ϕ)	
$H (\Delta\lambda'')$	110,004.9	Tabular y	1,694,839.8
ab	- 4.9	$V \left(\frac{\Delta\lambda''}{100}\right)^2$	160.2
x'	110,000		
	500,000.000	c	- 0
x	390	y	1,695,000
$\frac{(\text{Tabular } y) + y}{2}$		$\Delta\lambda'' \sin \frac{\phi + \phi'}{2}$	
$\frac{\phi + \phi'}{2}$ (Interpolated from projection table)		$F (\Delta\lambda'')$	"
$\sin \frac{\phi + \phi'}{2}$		$\Delta a''$	"
		Δa	"

$x' = H\Delta\lambda + ab$
 $x = x' + 500,000$

$y = \text{Tabular } y + V \left(\frac{\Delta\lambda''}{100}\right)^2 + c$
 $\Delta a'' = \Delta\lambda'' \sin \frac{\phi + \phi'}{2} + F (\Delta\lambda'')$

PLANE COORDINATES ON TRANSVERSE MERCATOR PROJECTION
(CALCULATING MACHINE COMPUTATION)

State Fla. Zone East Station x 365,000
y 1,705,000

λ (Central meridian) _____
 ϕ 29° 01' 24.55 λ 81 25 20.66

$\Delta\phi$ (Excess of ϕ over even 10' expressed as minutes and decimal) 1.4091666 $\Delta\lambda$ (Central meridian - λ) _____
 $\Delta\lambda$ (in sec.) 1520.66

		$\left(\frac{\Delta\lambda''}{100}\right)^2$	
Tabular H (even 10')		Tabular V (even 10')	
Interpolated H (fraction of 10')	-	Interpolated V (fraction of 10')	+
Cor. for second dif.	+ 44	Cor. for second dif.	+ 2
H	88.780928	V	1.044320
a	- .77	Tabular difference } of y for 1" of ϕ }	
b	+ 7.56	y (for minutes of ϕ)	
		y (for seconds of ϕ)	
$H (\Delta\lambda'')$	135,005.8	Tabular y	1,704,758.5
ab	-	$V \left(\frac{\Delta\lambda''}{100}\right)^2$	241.5
x'	135,000		
	500,000.000	c	-
x	365	y	1,705,000
$\frac{(\text{Tabular } y) + y}{2}$		$\Delta\lambda'' \sin \frac{\phi + \phi'}{2}$	
$\frac{\phi + \phi'}{2}$ (Interpolated from projection table)		$F (\Delta\lambda)''^3$	"
$\sin \frac{\phi + \phi'}{2}$		$\Delta\alpha''$	"
		$\Delta\alpha$	"

$x' = H\Delta\lambda + ab$

$y = \text{Tabular } y + V \left(\frac{\Delta\lambda''}{100}\right)^2 + c$

$x = x' + 500,000$

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

PLANE COORDINATES ON TRANSVERSE MERCATOR PROJECTION
(CALCULATING MACHINE COMPUTATION)

State Fla. Zone East Station X 375,000
y 1,705,000
 λ (Central meridian) 81 23 28.02
 ϕ 29° 01' 24.89

$\Delta\phi$ (Excess of ϕ over even 10' expressed as minutes and decimal) 1.4148333 $\Delta\lambda$ (Central meridian - λ) 1408.02
 $\Delta\lambda$ (in sec.) 1408.02

		$\left(\frac{\Delta\lambda''}{100}\right)^2$	
Tabular H (even 10')		Tabular V (even 10')	
Interpolated H (fraction of 10')	-	Interpolated V (fraction of 10')	+
Cor. for second dif.	+ 44	Cor. for second dif.	+ 2
H	88.780847	V	1.044322
a	- .77	Tabular difference of y for 1" of ϕ	
b	+ 7.12	y (for minutes of ϕ)	
H ($\Delta\lambda''$)	125,005.5	y (for seconds of ϕ)	
ab	-	Tabular y	1,704,793.0
x'	125,000	$V \left(\frac{\Delta\lambda''}{100}\right)^2$	207.0
	500,000.000	c	- 0
x	375	y	1,705,000
$\frac{(\text{Tabular } y) + y}{2}$		$\Delta\lambda'' \sin \frac{\phi + \phi'}{2}$	
$\frac{\phi + \phi'}{2}$ (Interpolated from projection table)		$F (\Delta\lambda'')$	
$\sin \frac{\phi + \phi'}{2}$		$\Delta a''$	"
		Δa	"

$x' = H\Delta\lambda + ab$

$x = x' + 500,000$

$y = \text{Tabular } y + V \left(\frac{\Delta\lambda''}{100}\right)^2 + c$

$\Delta a'' = \Delta\lambda'' \sin \frac{\phi + \phi'}{2} + F (\Delta\lambda'')$

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PLANE COORDINATES ON TRANSVERSE MERCATOR PROJECTION
(CALCULATING MACHINE COMPUTATION)

State Fla. Zone East Station X 375,000
Y 1,715,000

λ (Central meridian) _____
 ϕ 29° 03' 03.90 λ 81 23 28.40

$\Delta\phi$ (Excess of ϕ over even 10' expressed as minutes and decimal) 3.065 $\Delta\lambda$ (Central meridian - λ) _____
 $\Delta\lambda$ (in sec.) 1408.40

		$\left(\frac{\Delta\lambda''}{100}\right)^2$	
Tabular H (even 10')		Tabular V (even 10')	
Interpolated H (fraction of 10')	-	Interpolated V (fraction of 10')	+
Cor. for second dif.	+ 79	Cor. for second dif.	+ 4
H	88.757308	V	1.044948
		Tabular difference of y for 1" of ϕ	
a	- .77	y (for minutes of ϕ)	
b	+ 7.12	y (for seconds of ϕ)	
H ($\Delta\lambda''$)	125,005.5	Tabular y	1,714,792.7
ab	-	$V \left(\frac{\Delta\lambda''}{100}\right)^2$	207.3
x'	125,000		
	500,000.00	c	-
x	375	y	1,715,000
$\frac{(\text{Tabular } y) + y}{2}$		$\Delta\lambda'' \sin \frac{\phi + \phi'}{2}$	
$\frac{\phi + \phi'}{2}$ (Interpolated from projection table)		$F (\Delta\lambda)''^2$	
$\sin \frac{\phi + \phi'}{2}$		$\Delta a''$	"
		Δa	"

$$x' = H\Delta\lambda + ab$$

$$x = x' + 500,000$$

$$y = \text{Tabular } y + V \left(\frac{\Delta\lambda''}{100}\right)^2 + c$$

$$\Delta a'' = \Delta\lambda'' \sin \frac{\phi + \phi'}{2} + F (\Delta\lambda'')^2$$

PLANE COORDINATES ON TRANSVERSE MERCATOR PROJECTION
(CALCULATING MACHINE COMPUTATION)

State Fla. Zone East Station St Francis 1935
 λ (Central meridian) 81° ' "
 ϕ 29° 02' 13".764 λ 81 25 05.888
 $\Delta\phi$ (Excess of ϕ over even 10' expressed as minutes and decimal) 2.2294 $\Delta\lambda$ (Central meridian - λ) 0
 $\Delta\lambda$ (in sec.) 1505.888

		$\left(\frac{\Delta\lambda''}{100}\right)^2$	
Tabular H (even 10')		Tabular V (even 10')	
Interpolated H (fraction of 10')	-	Interpolated V (fraction of 10')	+
Cor. for second dif.	+ 64	Cor. for second dif.	+ 3
H	88.769230	V	1.044631
		Tabular difference of y for 1" of ϕ	
a	- .77	y (for minutes of ϕ)	
b	+ 7.51	y (for seconds of ϕ)	
$H (\Delta\lambda'')$	133,676.5	Tabular y	1,709,729.3
ab	- 5.8	$V \left(\frac{\Delta\lambda''}{100}\right)^2$	236.9
x'	- 133,670.7		
	500,000.00	c	- 0
x	366,329.3	y	1,709,966.2
$\frac{(\text{Tabular } y) + y}{2}$		$\Delta\lambda'' \sin \frac{\phi + \phi'}{2}$	
$\frac{\phi + \phi'}{2}$ (Interpolated from projection table)		$F (\Delta\lambda'')$	"
$\sin \frac{\phi + \phi'}{2}$		$\Delta\alpha''$	"
		$\Delta\alpha$	"

$$x' = H\Delta\lambda + ab$$

$$x = x' + 500,000$$

$$y = \text{Tabular } y + V \left(\frac{\Delta\lambda''}{100}\right)^2 + c$$

$$\Delta\alpha'' = \Delta\lambda'' \sin \frac{\phi + \phi'}{2} + F (\Delta\lambda'')$$

PLANE COORDINATES ON TRANSVERSE MERCATOR PROJECTION
(CALCULATING MACHINE COMPUTATION)

State Fla. Zone East Station De Land 1935

λ (Central meridian) 81°
81 20 58.695

ϕ 29° 01' 10".642

$\Delta\phi$ (Excess of ϕ over even 10' expressed as minutes and decimal) 1.1773666 $\Delta\lambda$ (Central meridian - λ)
 $\Delta\lambda$ (in sec.) 1258.695

		$\left(\frac{\Delta\lambda''}{100}\right)^2$	
Tabular H (even 10')		Tabular V (even 10')	
Interpolated H (fraction of 10')	-	Interpolated V (fraction of 10')	+
Cor. for second dif.	+ 39	Cor. for second dif.	+ 2
H	88.784234	V	1.044232
		Tabular difference of y for 1" of ϕ	
a	- .77	y (for minutes of ϕ)	
b	+ 6.48	y (for seconds of ϕ)	
H ($\Delta\lambda''$)	111,752.3	Tabular y	1,703,354.0
ab	- 5.0	$V \left(\frac{\Delta\lambda''}{100}\right)^2$	165.4
x'	111,747.3		
	500,000.000	c	- 0
x	388,252.7	y	1,703,519.4
$\frac{(\text{Tabular } y) + y}{2}$		$\Delta\lambda'' \sin \frac{\phi + \phi'}{2}$	
$\frac{\phi + \phi'}{2}$ (Interpolated from projection table)		$F(\Delta\lambda)''$	
$\sin \frac{\phi + \phi'}{2}$		$\Delta a''$	
		Δa	

$$x' = H\Delta\lambda + ab$$

$$x = x' + 500,000$$

$$y = \text{Tabular } y + V \left(\frac{\Delta\lambda''}{100}\right)^2 + c$$

$$\Delta a'' = \Delta\lambda'' \sin \frac{\phi + \phi'}{2} + F(\Delta\lambda)''$$