5613

Form 504
Rev. Dec. 1933

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

DESCRIPTIVE REPORT

~~Topographic~~
Hydrographic } *Sheet No.* 4

State Texas

LOCALITY

Texas Coast

Vicinity of Aransas Pass

193 4

CHIEF OF PARTY

Earl O. Heaton

U.S. GOVERNMENT PRINTING OFFICE: 1934

5613

Form 537
Ed. Dec., 1930

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

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

Field No. 4 5613

REGISTER NO.

State Texas

General locality Texas Coast

Locality Vicinity of Aransas Pass

Scale 1 : 10,000 Date of survey July to November, 19 34

~~Project No.~~ Project HT-118

Chief of Party Earl O. Heaton

Surveyed by Walter R. Helm

Protracted by C. W. O'Melveny

Soundings penciled by C. W. O'Melveny

Soundings in ~~fathoms~~ feet

Plane of reference M.L.W.

Subdivision of wire dragged areas by

Inked by C.R. Draper M A Hagel

Verified by C.R. Draper and J.A. McCormick

Instructions dated Nov.5,1932; Nov.16,1933; Mar.5,1934, 19

Remarks:

U. S. GOVERNMENT PRINTING OFFICE: 1931

Hydrographic Sheet Number 4 and the accompanying records have been inspected and are approved.

Earl O. Heaton

Earl O. Heaton,
Chief of Party, C.& G.S.

DESCRIPTIVE REPORT
TO ACCOMPANY HYDRO. SHEET NO. 4
ARANSAS PASS AND LYDIA ANN CHANNEL

Date of Instructions:

Instructions for this work were dated Nov. 5, 1932, with supplemental instructions dated Nov. 16, 1933 and March 5, 1934 (All Proj. HT-118).

Survey Methods:

With the exception of some work in the Aransas Pass small boat channel and on shoal work north of Lydia Ann island, the survey of the entire area covered by this sheet was accomplished by means of a launch and using a lead line graduated in feet. For the shoal work mentioned a skiff powered by an outboard motor was used; soundings were taken from the skiff by means of a sounding pole graduated in feet. To further accuracy and to prevent sinking in soft mud the sounding lead used on launch work was so moulded that its base was about 4 inches in diameter and the sounding pole had a thin lead plate about 6 inches in diameter attached to the bottom. Some skiff work was also done on development work in locating sunken wrecks.

A wire drag was made up of ordinary cable and used in an attempt to locate a sunken wreck about 1½ miles offshore in the Gulf of Mexico. The cable broke at a place where the wreck was later found by using a leadline. Soundings obtained by the leadline have been plotted on the smooth sheet and the drag positions have been omitted for this reason.

The shoreline shown on this smooth sheet was transferred from topographic plane-table sheets U and T, except that portion north of Lat. 27° 53' which was obtained from the photo-topographic work of Ensign T. M. Price.

Discrepancies:

The following discrepancies were noted and corrected as shown:

Blue "C" launch day soundings from position 43 to 47 inc. were rejected because they were too deep. Soundings made at a later date on "K" day proved this to be the case.

Blue "F" launch day soundings from position 111 to 113 inc. were rejected as being too deep as shown by later soundings on positions 2 to 4 "N" day.

No other discrepancies of import were found.

Dangers:

Of some danger to small boats are two unmarked wrecks. The first lying submerged in 18 ft., with a least sounding of 8 ft. on it at M.L.W. at Lat. 27° 51.27', Long. 97° 02.00', position number 13e (red, skiff) day. The second and more dangerous one, lies in 14 ft. of water with the least depth only 1 ft. below the surface at M.L.W. This wreck is located at Lat. 27° 49.75', Long. 97° 01.40', position 17b (red, skiff) day.

Of no danger to navigation but a source of irritation to fishermen, who catch their nets on it, is a submerged wreck in the Gulf at Lat. 27° 48.00', Long. 97° 01.40'. The Coast Guard has attempted to dynamite it but the hulk still rises about 5 ft. from the bottom. This wreck had a least depth of 38 ft. on it in 43 ft. of water at M.L.W. and the shoal sounding is at position 4R (blue, launch) day.

At. Lat. 27° 50.04', Long. 97° 02.49' between the jetties just south of the dredged channel is the exposed stem of an old wreck. It presents no danger except to small boats at night.

Location of Beacons and Buoys:

The following beacons have been discontinued since this survey was made:

Aransas Pass Spur Dike Bn. #4 (Hydro. sta. Spur) -- (structure still standing, Jan. 3, 1935).

Channel Entrance R. Rg. Bn. (Hydro. sta. Bean)

Aransas Pass R. Rg. Bn. (Hydro. sta. Lam)

The following beacons have been constructed since this survey was made and are now in operation:

Turtle Cove -- Front and Rear Rg. Bns.

Harbor Island - " " " " "

The positions of all buoys on this sheet were taken from topographic sheet U with the exception of one buoy in Lydia Ann Channel near Aransas Lighthouse. The topographic locations were made on Jan,.3, 1935.

Hydrographic fixes had previously been taken on all buoys except the Humble turning basin buoy and they were found to check the topographic locations within the scope of the anchor cable, with the exception of the following which have been moved to the location nowshown:

Aransas Pass lighted buoy #3

" " " " #7

Channels:

There are five channels on this sheet, of which two are of major importance. In order; these are:

Aransas Pass Entrance Channel

Corpus Christi Channel

Lydia Ann Channel

Aransas Channel (small boat channel to Aransas Pass)

Ferry Channel to Port Aransas

The Aransas Pass Entrance Channel is a well maintained, dredged, channel running NW. by $\frac{1}{4}$W from about Lat. 27° 49.7', Long. 94° 01.7' to Port Aransas and lies between St. Joseph Island on the north and Mustang Island on the south. It is protected by two rock jetties extending about a mile into the Gulf of Mexico. The U. S. Engineer department maintains and periodically surveys this channel. The following information is taken from the results of their surveys as shown on their blue prints dated Dec. 1, 1934 and July 1934, which accompany this report.

The least depth along the entire center line of the channel is 36 ft. A 34 ft. least depth is given for a 700 ft. width outside the jetties. The 34 ft. least depth exists also for the project width of 400 ft. extending from about Lat. 27° 50.1', Long. 97° 02.5' to the Harbor Island basin.

According to verbal information from the U. S. Engineers there is a rapid shoaling in the channel at about Lat. 27 ° 50.0', Long. 97° 02.4' and at present (Jan. 10th., 1935) there is a least depth of 33 ft. in this place. The Engineer Dept. is making a study of this part of the channel in order to learn how to prevent this shoaling.

Next to the Houston Entrance Channel this is one of the most important channels on the Texas Coast. It is used by shipping interests serving Corpus Christi and by oil refineries which have their loading racks on Harbor Island and at Harbor City. Oil tankers drawing 32 ft. and commercial ships drawing 28 ft. comprise the major portion of traffic. *The channel is well marked by lighted beacons and buoys. (*See paragraph location of buoys and beacons).

The Corpus Christi Channel, of which a small portion is shown on this sheet, runs in a westerly direction for 18 miles to Corpus Christi and before extensive widening and dredging was done the east end was known as

Turtle Cove Channel. It is maintained by the U. S. Engineers to a minimum depth of 30 ft. for a bottom width of 200 ft. It is well lighted as follows: white lights on the south side at approximately 2300 yard intervals from Port Aransas entrance to the Corpus Christi breakwater, while seven red lights to pair with some of the white ones mark the north side. This channel is surveyed periodically by the U. S. Engineers.

The inside route channel (or Lydia Ann Channel) runs in a northerly direction from the inner basin of Aransas Entrance Channel, between St. Joseph and Harbor Island along the west side of Lydia Ann Island to Aransas Bay and Rockport. It is a natural channel and is not maintained. From the inner basin to Bn. #2 at southerly tip of Lydia Ann Island it has a controlling depth of 15 ft. and from Bn. #2 to the northern limit of this sheet the controlling depth is 10 ft. This channel is used mainly by shrimp fishermen with boats drawing about 6 ft. of water or less.

The small boat channel to Aransas Pass is used by boats of about 4 ft. draft. The controlling depth is 4 ft.

The Ferry Channel to Port Aransas is dredged and maintained by the Army Engineers to a 100 ft. width. The project depth is 12 ft. but a depth of 13 ft. can be carried to the ferry landing. At the south end of the Ferry Channel there are docks which are used by boats drawing about 6 ft. of water or less. At these docks small boats are well protected in ordinary weather but in case of hurricanes this protection is useless. Protection at the town of Aransas Pass is somewhat better, but best protection will be found at Corpus Christi.

Comparison with Previous Surveys:

On previous Coast Survey charts, particularly #1285 and #1286, the following differences have been found:

Aransas Pass Channel alinement has been changed and should be changed on the charts to correspond to the new center line shown on the smooth sheet.

The area shown on charts at about Lat. 28° 54', Long. 97° 02' as having depths of $\frac{1}{4}$, 4, & 2 no longer exists as water but has shoaled extensively to form a peninsula on St. Joseph Island.

At Lat. 28° 53', Long. 97°02' there is shown an inlet to St. Joseph Island - this no longer exists. It is apparent that a general shoaling has occurred on the west side of St. Joseph Island. The shoreline along the east side of Harbor Island remains about the same, however Lydia Ann Island, shown on the charts as two islands is now filled into one island of somewhat smaller extent.

The soundings around Lydia Ann Island and in Lydia Ann Channel are so different that no attempt to compare them will be made.

Outside of and northeast of the jetties the depth curves agree reasonably well with the chart except that the thirty foot curve appears slightly closer inshore now than formerly. Just southwest of the jetties the six, and twelve foot depth curves agree with the chart. The eighteen foot curve however shows a deepening which would lead to the conclusion that the currents from Aransas Entrance Channel and wave action from hurricanes, which are common in this locality, were the causes. The thirty foot curve is now further seaward also due to the same causes. The shape of the thirty foot curve remains the same but is displaced to the south.

Further southwest near Lat. 27° 48', Long. 97° 03', the 30 ft. depth curve on the recent work shows a shoaling which might be due to lack of detail in the earlier survey. The 18 ft. curve near the southwest edge of the sheet agrees reasonably well with the chart. The 6 and 12 ft. curves are not shown on the chart at this place.

The following beacons have been discontinued and should be removed from the chart: (Dated Oct. 12, 1939)

Spur Dike #4 Bn., Lat. 27° 50.38', Long. 97° 02.40' not officially discontinued RJS
Fixed Green Light, " 27 50.85, " 97 03.88 (Ch. Ent. R.R.)
" " " " 27 50.74, " 97 03.67 (Ch. Ent. R.R.?)
" Red " " 27 50.66 " 97 03.29
" " " " 27 50.53 " 97 03.06 (St. Joseph)
" White " " 27 50.49 " 97 03.45 (A.P.R.R.)
" " " " 27 50.42 " 97 03.29 (A.P.R.)
Cline Pt. " " 27 50.51 " 97 03.39

The U. S. Engineer Dept. contemplates removal of the old jetty and wreck shown at about Lat. 27° 50', crossing the south jetty. Portions of the jetty have already been removed.

The following beacons have been recently established and should be charted:

Flashing Red Light at Lat. 27° 50.52', Long. 97° 03.07' (St. Joseph Id.)
Fixed " " " " 27 50.54 " 97 03.63 (Pt Aransas Channel "2")

The Cline Point Light has been moved to the new position shown below:
Fixed White Light now at Lat. 27° 50.50', Long. 97° 03.34'. (Cline Point)

Geographic Names:

The channel extending from the inner basin northerly along the west side of Lydia Ann Island is well known locally as Lydia Ann Channel. It is recommended that this name be adopted.

The small boat channel running from Port Aransas to Aransas Pass is known locally as Aransas Channel. As this is a fairly important channel for the fishing industry it is reccommended that the local name be used.

Statistics:

Number of Positions ---------- 996
Number of Soundings ----------6647
Statute miles of Sounding Lines ----------208.8

Men in Charge of Hydrography:

The hydrography on this sheet was accomplished by Walter R. Helm, Surveyor.

Inspected and approved:

Earl O. Heaton,
Chief of Party, C.& G.S.

Respectfully submitted,

C. W. O'Melveny, Surveyor

Form 567
Rev. Jan. 1933

DIVISION OF CHARTS, FILE NO._____

DEPARTMENT OF COMMERCE

U.S. COAST AND GEODETIC SURVEY

~~AIDS TO NAVIGATION~~
~~LANDMARKS FOR CHARTS~~

Corpus Christi, Texas

December 14, 193**4**

DIRECTOR, U.S. COAST AND GEODETIC SURVEY:

The following determined objects are prominent, can be readily distinguished from seaward from the description given below, and should be charted:

Earl O. Heaton

Earl O. Heaton

Chief of Party.

DESCRIPTION	POSITION						DATUM	METHOD OF DETERMINATION	CHARTS AFFECTED	
	LATITUDE			LONGITUDE						
	°	′	D.M. METERS	°	′	D.P. METERS				
BEACON, Harbor Island Front Rg.	27	50	1346.2	97	03	1073.8	N.A. 1927	Triangulation	1285,	1286 ✓
BEACON, Harbor Island Rear Rg.	27	50	1617.5	97	03	1522.7	"	"	"	" ✓
BEACON, Turtle Cove Ch. Front Rg.	27	50	1253.0	97	03	463.4	"	"	"	" ✓
BEACON, Turtle Cove Ch. Rear Rg.	27	50	1378.4	97	02	1504.2	"	"	"	" ✓

Note: These beacons were established as described in Dept. of Commerce publication, "Notice to Mariners", dated October 31st and November 7th, 1934.

Checked and verified by: W. T. W.

A list of objects carefully selected because of their value as landmarks as determined from seaward, together with individual descriptions, must be furnished in a special report on this form, and a copy of such report must be attached by the Chief of Party to his descriptive report.

The selection, determination, and description of these points are an important factor in the value of the chart. Landmarks selected at appropriate intervals can be clearly charted. However, when none is outstanding, a group of two or three objects may by their interrelationship provide positive indentification. A group so selected should be indicated.

The description of each object should be short, but such as will clearly identify it; for example, a standpipe, elevated tank, gas tank, church spire, tall stack, red chimney, radio mast, etc. Assign numerals to landmarks to indicate: (1) Offshore, (2) inshore, (3) harbor, 1, 2, 3 would be a mark useful on all charts. Generally, flagstaffs and like objects are not sufficiently permanent to chart.

U.S. GOVERNMENT PRINTING OFFICE: 1934 25379

Form 567
Rev. Jan. 1933

DIVISION OF CHARTS, FILE NO._____

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY

LANDMARKS FOR CHARTS

Corpus Christi, Texas

January 16, 1935, 193

DIRECTOR, U.S. COAST AND GEODETIC SURVEY:

The following determined objects are prominent, can be readily distinguished from seaward from the description given below, and should be charted:

Earl O. Heaton

Chief of Party.

	DESCRIPTION	POSITION					METHOD OF DETERMINATION	CHARTS AFFECTED
		LATITUDE		LONGITUDE		DATUM		
		° '	D.M. METERS	° '	D.P. METERS			
1,2,3	*TANK (ELEVATED) (Verified) (Aransas Pass Warehouse & Terminal Co., Tank, 1931)	27 50	1649.9	97 03	1254.3	N.A. 1927	Traingulation	1117, 1285 & 1286 ✓
2,3	CUPOLA (U.S.Coast Guard cupola, 1934)	27 50	478.3	97 03	886.3	"	"	" " ✓
	These objects are visible from the water.							
	Checked and verified by: J. H. Burney							

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U.S. GOVERNMENT PRINTING OFFICE: 1934 25379

Form 567
Rev. Jan. 1933

DIVISION OF CHARTS, FILE NO._____

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
~~AIDS TO NAVIGATION~~

LANDMARKS FOR CHARTS

Corpus Christi, Texas

January 16, 1935, 193

DIRECTOR, U.S. COAST AND GEODETIC SURVEY:

The following determined objects are prominent, can be readily distinguished from seaward from the description given below, and should be charted:

Earl O. Heaton

Earl O. Heaton
Chief of Party.

	DESCRIPTION	POSITION					DATUM	METHOD OF DETERMINATION	CHARTS AFFECTED
		LATITUDE			LONGITUDE				
		° '	D.M. METERS		° '	D.P. METERS			
	BEACONS								
	Lydia Ann Channel								
(3)	#2	27 52	1385		97 02	1250	N.A. 1927	Topo-graphy	1285 & 1286 ✓
(3)	#4	27 54	85		97 03	13	"	Sextant Angles	" " ✓
(3)	#6	27 54	1019		97 03	188	"	"	" " ✓
(3)	BEACON (old wrecked barge)	27 51	1284		97 03	110	"	Topo-graphy	" " ✓
			Checked and verified by:					W. T. W.	

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U.S. GOVERNMENT PRINTING OFFICE: 1934 25379

Form 567
Rev. Jan. 1933

AIDS TO NAVIGATION

DIVISION OF CHARTS, FILE NO._____

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY

LANDMARKS FOR CHARTS

Corpus Christi, Texas

January 8, 1935

DIRECTOR, U.S. COAST AND GEODETIC SURVEY:

The following determined objects are prominent, can be readily distinguished from seaward from the description given below, and should be charted:

Earl O. Heaton

Earl O. Heaton
Chief of Party.

	DESCRIPTION	POSITION					METHOD OF DETERMINATION	CHARTS AFFECTED
		LATITUDE		LONGITUDE		DATUM		
		° ′	D.M. METERS	° ′	D.P. METERS			
(3)	BEACON Corpus Christi Ch.1,1934	27 50	620.2	97 04	1446.9	N.A. 1927	Triangulation	1285 & 1286 ✓
1,2,3	*BEACON Aransas Pass L.H., 1931	27 51	1535.9	97 03	602.3	"	"	" " ✓
(3)	BEACON U.S.Engr.Govt.dock,1934	27 50	570.0	97 03	68.9	"	"	" " ✓
(3)	BEACON Pt.Aransas Ch.Bn.2,1935	27 50	967.7	97 03	1051.2	"	"	" " ✓
(3)	BEACON Cline Pt., 1935 ✓	27 50	922.8	97 03	580.7	"	"	" " ✓
(3)	BEACON St. Joseph Island, 1935	27 50	943.9	97 03	107.2	"	"	" " ✓
			Checked & verified by: W.F.W.					

A list of objects carefully selected because of their value as landmarks as determined from seaward, together with individual descriptions, must be furnished in a special report on this form, and a copy of such report must be attached by the Chief of Party to his descriptive report.

The selection, determination, and description of these points are an important factor in the value of the chart. Landmarks selected at appropriate intervals can be clearly charted. However, when none is outstanding, a group of two or three objects may by their interrelationship provide positive indentification. A group so selected should be indicated.

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U.S. GOVERNMENT PRINTING OFFICE: 1934 25479

5613

Lists of directions for obtaining azimuths of Turtle Cove range and Harbor Island Range.

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

LIST OF DIRECTIONS

Station HARBOR ISLAND REAR RANGE BEACON *State* Texas

Chief of party E. O. Heaton *Date* 1/2/35 *Computed by* C.W.O'M.

Observer W.T.W. *Instrument* 279 *Checked by* W.T.W.

11—2503

OBSERVED STATION	Observed direction	Eccentric reduction	Sea level reduction*	Corrected direction with zero initial	Adjusted direction*
	° ′ ″	′ ″	″	° ′ ″	′ ″
II POGY	0 00 00.00			0 00 00.00	
III Harbor Island Fr.Rg.Bn.	75-20-12.5				

Taken from Vol. 10 of Horizonital Angles submitted with triangulation records.
No eccentricity of instrument or signal.

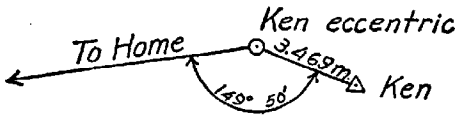
* These columns are for office use and should be left blank in the field.

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 28 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.

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

LIST OF DIRECTIONS

Station TURTLE COVE FRONT RANGE BEACON *State* Texas

Chief of party E. O. Heaton *Date* 1/2/35 *Computed by* C.W.O'M.

Observer W.T.W. *Instrument* 279 *Checked by* W.T.W.

U. S. GOVERNMENT PRINTING OFFICE: 1932 11—9503

OBSERVED STATION	Observed direction	Eccentric reduction	Sea level reduction*	Corrected direction with zero initial	Adjusted direction*
	° ′ ″	′ ″	″	° ′ ″	′ ″
III PORT ARANSAS WEATHER BUREAU MAST	0 00 00.00			0 00 00.00	
III Turtle Cove R. Rg. Bn.	227-48-36.3				

Taken from Vol.10 of Horizonital Angles submitted with triangulation records.

No eccentricity of instrument or signal.

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

5613

Computations for positions of

Aransas Pass Lighted Whistle and marker buoys.

Observations are in Volume 4, pg.14.
Sheet No. 4.

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

POSITION COMPUTATION, THIRD-ORDER TRIANGULATION

			°	′	″
α	2	to 3	201	04	59.6
2d ∠		&	+ 68	56	32
α	2	to 1	270	01	32
Δα			+	03	28
			180	00	00.0
α′	1	to 2	90	05	00
			40	59	00

			°	′	″
α	3	to 2	21	05	51.8
3d ∠		&	− 70	04	28
α	3	to 1	311	01	24
Δα			+	02	36
			180	00	00.0
α′	1	to 3	131	04	00

First Angle of Triangle

	°	′	″			°	′	″
φ	27	47	31.965	2 KNOLL	λ	97	05	13.904
Δφ		−	00.377		Δλ	−	07	25.586
φ′	27	47	31.59	ARANSAS PASS 1 ENTRANCE BUOY	λ′	96	57	48.32

	°	′	″			°	′	″
φ	27	51	49.898	3 PASS	λ	97	03	22.015
Δφ		− 04	18.305		Δλ		− 05	33.694
φ′	27	47	31.59	ARANSAS PASS 1 ENTRANCE BUOY	λ′	96	57	48.32

	Logarithms	Values in seconds
s	4.086 293	+ 972.3
Cos α	6.649 363	− 874.5
B	8.511 717	1846.8
h	9.247 373	
s²	8.1726	
Sin²α	0.0000	
C	1.1275	
	9.3003	
h²	8.495	
D	2.308	
	0.803	
1st term		+ 0.177
2d term		+ 0.200
3d term		+ —
−Δφ		+ 0.377

Lighted Whistle

	°	′	″	Logarithms	Values in seconds
½(φ+φ′)	27	47	31.8		
s				4.086 293	+ 1322.8
Sin α				0.000 000	− 319.8
A′				8.509 407	1642.6
Sec φ′				0.053 231	
Δλ				2.648 931	− 445.586
Sin ½(φ+φ′)				9.668 634	
−Δα				2.317 565	− 207.76

	Logarithms	Values in seconds
s	4.083 085	
Cos α	9.817 146	
B	8.511 712	
h	2.411 943	
s²	8.166 2	
Sin²α	9.755 3	
C	1.1289	
	9.0502	
h²	4.824	
D	2.309	
	7.133	
1st term		+ 258.192
2d term		+ 0.112
3d term		+ 0.001
−Δφ		+ 258.305

	°	′	″	Logarithms	Values in seconds
½(φ+φ′)	27	49	40.8		
s				4.083 085	
Sin α				9.877 626	
A′				8.509 407	
Sec φ′				0.053 231	
Δλ				2.523 349	− 333.694
Sin ½(φ+φ′)				9.669 148	
−Δα				2.192 497	− 155.77

11—9362 U. S. GOVERNMENT PRINTING OFFICE: 1929

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

POSITION COMPUTATION, THIRD-ORDER TRIANGULATION

			°	′	″
α	2	to 3	201	04	59.6
2d ∠		&	+ 69	05	51
α	2	to 1	270	10	51
Δα			+	03	29
			180	00	00.0
α′	1	to 2	90	14	20
			40	38	00

FIRST ANGLE OF TRIANGLE

	°	′	″			°	′	″
φ	27	47	31.965	2 KNOLL	λ	97	05	13.904
Δφ		−	01.464	Entrance	Δλ	−	07	29.296
φ′	27	47	30.50	1 ARANSAS PASS MARKER BUOY	λ′	96	57	44.61

	Logarithms	Values in seconds
s	4.089 898	+938.8 / −908.0 / 1846.8
Cos α	7.499 155	
B	8.511 716	
h	0.100 769	1st term + 1.261
s²	8.1798	
Sin²α	9.9999	
C	1.1277	
	9.3074	2d term + 0.203
h²	0.201	
D	2.308	
	2.509	3d term + —
		−Δφ + 1.464

	°	′	″	Logarithms	Values in seconds
½(φ+φ′)	27	47	31.2		
s				4.089 898	
Sin α				9.999 998 n	+1221.2
A′				8.509 407	−421.3 / 1642.5
Sec φ′				0.053 230	
Δλ				2.652 533	−449.296
Sin½(φ+φ′)				9.668 631	
−Δα				2.321 164	−209.49

	Logarithms	Values in seconds
s	4.086 610	
Cos α	9.815 444	
B	8.511 712	
h	2.413 766	1st term + 259.278
s²	8.1732	
Sin²α	9.7578	
C	1.1289	
	9.0599	2d term + 0.115
h²	4.828	
D	2.309	
	7.137	3d term + 0.001
		−Δφ + 259.394

	°	′	″	Logarithms	Values in seconds
½(φ+φ′)	27	49	40.2		
s				4.086 610	
Sin α				9.878 906 n	
A′				8.509 407	
Sec φ′				0.053 230	
Δλ				2.528 153	−337.406
Sin½(φ+φ′)				9.669 146	
−Δα				2.197 299	−157.50

	°	′	″			°	′	″
φ	27	51	49.898	3 PASS	λ	97	03	22.015
Δφ	−	04	19.394	ARANSAS PASS ENTRANCE	Δλ	−	05	37.406
φ′	27	47	30.50	1 MARKER BUOY	λ′	96	57	44.61

	°	′	″			°	′	″
α	3	to 2	21	05	51.8			
3d ∠		&	− 70	16	09			
α	3	to 1	310	49	43			
Δα			+	02	37.5			
			180	00	00.0			
α′	1	to 3	130	52	20			

11—9362 U. S. GOVERNMENT PRINTING OFFICE: 1930

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

COMPUTATION OF TRIANGLES

State: TEXAS

11—9121

NO.	STATION	OBSERVED ANGLE	CORR'N	SPHER'L ANGLE	SPHER'L EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
	2-3						3.929 900 ✓
	1 ARANSAS PASS LT. BUOY	40-59-00 ✓					0.183 202 ✓
	2 KNOLL	68-56-32 ✓					9.969 983 ✓
	3 PASS	70-04-28 ✓					9.973 191 ✓
	1-3						4.083 085 ✓
	1-2						4.086 293 ✓
	2-3						3.659 650 ✓
	1 ARANSAS PASS LT. BUOY	21-46-00 ✓					0.430 828 ✓
	2 RAD	(100-31-59")					9.992 620 ✓
	3 PASS	57-42-01 ✓					9.926 993 ✓
	1-3						4.083 098 ✓
	1-2						4.017 471 ✓
	2-3						3.619 610 ✓
	1 ARANSAS PASS LT. BUOY	19-13-00 ✓					0.482 618 ✓
	2 KNOLL	55-21-03 ✓					9.915 214 ✓
	3 RAD	(105-25-57")					9.984 052 ✓
	1-3						4.017 442 ✓
	1-2						4.086 280 ✓
	2-3					comp. CRR ✓ by W.C.R.	
	1						
	2						
	3						
	1-3						
	1-2						

Do not write in this margin

Comp. CRR
by N.C.R

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	27 - 49 - 23.238 RAD	λ	97 - 03 - 47.325
2. ϕ'	27 - 47 - 31.965 KNOLL	λ'	97 - 05 - 13.904
$\Delta\phi\ (=\phi'-\phi)$	(−) 01 · 51.273	$\Delta\lambda\ (=\lambda'-\lambda)$	01 - 26.579
$\frac{\Delta\phi}{2}$	− 55.64	$\frac{\Delta\lambda}{2}$	
$\phi_m\left(=\phi+\frac{\Delta\phi}{2}\right)$	27 · 48 · 27.60		
$\Delta\phi$ (secs.)	(−) 111.27	$\Delta\lambda$ (secs.)	(+) 86.58

log $\Delta\phi$	2.046 378	**log** $\Delta\lambda$	1.937 418
cor. arc−sin		cor. arc−sin	
log $\Delta\phi_1$		log $\Delta\lambda_1$	
log cos $\frac{\Delta\lambda}{2}$		**log cos** ϕ_m	9.946 707
colog B_m	1.488 284	**colog** A_m	1.490 593
log $\left\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	3.534 662 (opposite in sign to $\Delta\phi$)	**log** $\left\{s_1 \sin\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	3.374 718
		log $\left\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	3.534 662
		log tan $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.840 056 +
log $\Delta\lambda$	1.937 418 — 3 log $\Delta\lambda$	$\alpha+\frac{\Delta\alpha}{2}$	34 · 40 · 48.5
log sin ϕ_m	9.668 855 — log F	**log sin** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.755 108
log sec $\frac{\Delta\phi}{2}$	— log b	**log cos** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.915 052
log a	1.606 273	**log** s_1	3.619 610
a	40.39	cor. arc−sin	+
b		log s	3.619 610
$-\Delta\alpha$ **(secs.)**	40.39		
$-\frac{\Delta\alpha}{2}$	× 20.2		
	00 · 20.2		
$\alpha+\frac{\Delta\alpha}{2}$	34 · 40 · 48.5		
α **(1 to 2)**	34 - 41 - 08.7		
$\Delta\alpha$	− 40.4		
	180		
α' **(2 to 1)**	214-40-28.3		

* 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			

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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	27 - 51 - 49.898 ✓	ARANSAS PASS L.H.	λ	97 - 03 - 22.015 ✓
2. ϕ'	27 - 49 - 23.238 ✓	RAD	λ'	97 - 03 - 47.325 ✓
$\Delta\phi$ $(=\phi'-\phi)$	-02 - 26.660 ✓		$\Delta\lambda$ $(=\lambda'-\lambda)$	(+) 00 - 25.310 ✓
$\frac{\Delta\phi}{2}$	-01 - 13.33 ✓		$\frac{\Delta\lambda}{2}$	12.66 ✓
$\phi_m\left(=\phi+\frac{\Delta\phi}{2}\right)$	27 - 50 - 36.57 ✓			
$\Delta\phi$ (secs.)	(−) 146.66 ✓		$\Delta\lambda$ (secs.)	+ 25.31 ✓
log $\Delta\phi$	2.166. 312 ✓		**log** $\Delta\lambda$	1.403 292 ✓
cor. arc−sin			cor. arc−sin	
log $\Delta\phi_1$			log $\Delta\lambda_1$	
log cos $\frac{\Delta\lambda}{2}$			**log cos** ϕ_m	9.946 564 ✓
colog B_m	1.488 287 ✓		**colog** A_m	1.490 594 ✓
log $\left\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	3.654 599 ✓ (opposite in sign to $\Delta\phi$)		**log** $\left\{s_1 \sin\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	+ 2.840 450 ✓
			log $\left\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	+ 3.654 599 ✓
			log tan $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	+ 9.185 851 ✓
log $\Delta\lambda$	1.403 292 ✓ 3 log $\Delta\lambda$		$\alpha+\frac{\Delta\alpha}{2}$	8 - 43 - 18.1 ✓
log sin ϕ_m	9.669 371 ✓ log F		**log sin** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.180 800 ✓
log sec $\frac{\Delta\phi}{2}$	log b		**log cos** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.994 949 ✓
log a	1.072 663 ✓		**log** s_1	3.659 650 ✓
a	11.82 ✓ (+)		cor. arc−sin	+
b			log s	3.659 650 ✓
$-\Delta\alpha$ **(secs.)**	11.82 ✓			
$-\frac{\Delta\alpha}{2}$	5.91 ✓			
	(+) 00 · 05.9 ✓			
$\alpha+\frac{\Delta\alpha}{2}$	8 · 43 · 18.1 ✓			
α (1 to 2)	8 - 43 - 24.0 ✓			
$\Delta\alpha$	− 15.8 ✓			
	180			
α′ (2 to 1)	188 - 43 - 12.2 ✓			

*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

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DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 662
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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	27 - 51 - 49.898 ✓	ARANSAS PASS L.H.	λ	97 - 03 - 22.015 ✓	
2. ϕ'	27 - 47 - 31.965 ✓	KNOLL	λ'	97 - 05 - 13.904 ✓	
$\Delta\phi$ (=$\phi'-\phi$)	− 04 - 17.933 ✓		$\Delta\lambda$ (=$\lambda'-\lambda$)	+ 01 - 51.889 ✓	
$\frac{\Delta\phi}{2}$	− 02 - 08.967 ✓		$\frac{\Delta\lambda}{2}$		
$\phi_m\left(=\phi+\frac{\Delta\phi}{2}\right)$	27 - 49 - 40.93 ✓				
$\Delta\phi$ (secs.)	(−) 257.93 ✓		$\Delta\lambda$ (secs.)	(+) 111.89 ✓	
log $\Delta\phi$	2.411 502 ✓		**log** $\Delta\lambda$	2.048 791 ✓	
cor. arc−sin	−		cor. arc−sin	−	
log $\Delta\phi_1$			log $\Delta\lambda_1$		
log cos $\frac{\Delta\lambda}{2}$			**log cos** ϕ_m	9.946 626 ✓	
colog B_m	1.488 286 ✓		**colog** A_m	1.490 594 ✓	
log$\left\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	3.899 788 ✓ (opposite in sign to $\Delta\phi$)		**log**$\left\{s_1 \sin\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	3.486 011 ✓	
			log$\left\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	3.899 788 ✓	
log $\Delta\lambda$	2.048 791 ✓ 3 log $\Delta\lambda$		**log tan** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.586 223 ✓	
log sin ϕ_m	9.669 149 ✓ log F		$\alpha+\frac{\Delta\alpha}{2}$	21 - 05 - 25.7 ✓	
log sec $\frac{\Delta\phi}{2}$	log b		**log sin** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.556 112 ✓	
log a	1.717 940 ✓		**log cos** $\left(\alpha+\frac{\Delta\alpha}{2}\right)$	9.969 888 ✓	
a	52.23 ✓ +		**log** s_1	3.929 900 ✓	
b			cor. arc−sin	+	
$-\Delta\alpha$ **(secs.)**	52.23 ✓		log s	3.929 900 ✓	
$-\frac{\Delta\alpha}{2}$	26.12 ✓				
	0 00 26.12				
$\alpha+\frac{\Delta\alpha}{2}$	21 05 25.7 ✓				
α **(1 to 2)**	21 - 05 - 51.8 ✓				
$\Delta\alpha$	− 52.2				
	180				
α' **(2 to 1)**	201 - 04 - 59.6 ✓				

* 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

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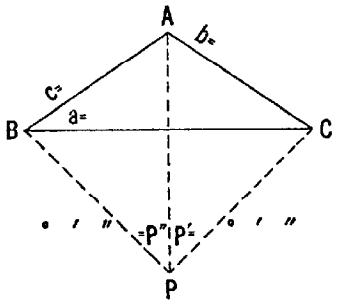
DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 655
Ed. Sept., 1929

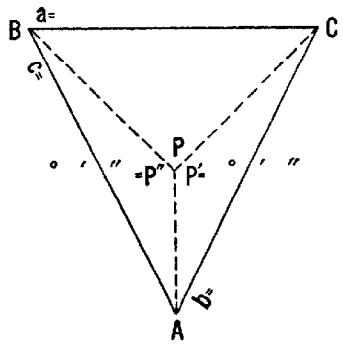
Pos. 20 Q sheet 4 Vol. 4 P. 14

COMPUTATION OF THREE-POINT PROBLEM

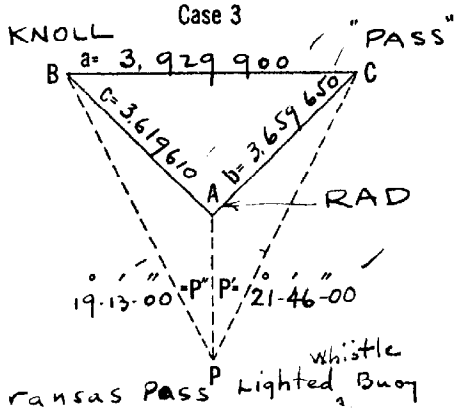
Case 1



Case 2



Case 3



Cases 1 and 2

P'
P"
A

Sum
½ Sum

S = 180° − ½ sum =

Case 3

P'	21-46-00
P"	19-13-00
Sum	40-59-00
A	154-02-03
A − sum	113 03-04
S = ½ (A − sum) =	56-31-32

Log c =	3.619 610
Log sin P' =	9.569 172
Colog b =	6.340 850
Colog sin P" =	0.482 618
Sum = log tan Z =	0.011 750
Z =	45-46-30
Z + 45° =	90-46-30
Log cot (Z+45°) =	8.131 206
Log tan S =	0.179 638
Sum = log tan ε =	8.310 844 (sign −)
ε	1-10-28.7
S	56-31-32

ABC = 13-35-28.7
ABP = 55-21-03.3
CBP = 68-56-32.0

ACB = 12-22-27.8
PCA = 57-42-00.7
PCB = 70-04-28

(Tan ε+)
S + ε = angle ABP
S − ε = angle ACP

(Tan ε−)
S − ε = angle ABP
S + ε = angle ACP

BPA	19-13-00	APC	21-46-00	PCB	70-04-28
ABP	55-21-03	PCA	57-42-01	CBP	68-56-32
PAB	(105-25-57)	CAP	(100-31-59)	BPC	40-59-00
	180-00-00		180-00-00		180-00-00

(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

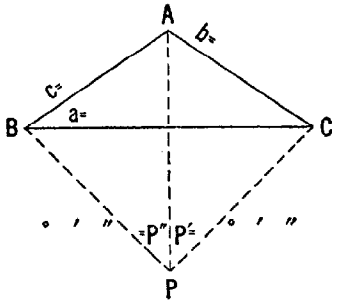
comp CRR
chkd W.C.R.

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

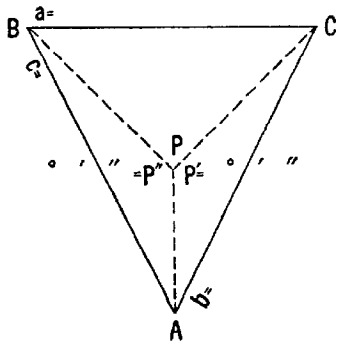
Pos 21Q
sheet 4 Vol. 4 p14

COMPUTATION OF THREE-POINT PROBLEM

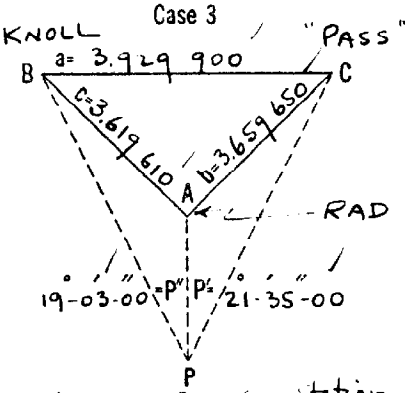
Case 1



Case 2



Case 3



Aransas Pass Con Station Bno 1

Cases 1 and 2

P′
P″
A

Sum
½ Sum

S = 180° − ½ sum =

Case 3

P′	21 - 35 - 00
P″	19 - 03 - 00
Sum	40 - 38 - 00
A	154 - 02 - 03.5
A − sum	113 - 24 - 04
S = ½ (A − sum) =	56 - 42 - 02

Log c =	3.619 610
Log sin P′ =	9.565 676
Colog b =	6.340 350
Colog sin P″ =	0.486 259
Sum = log tan Z =	0.011 895
Z =	45 - 47 - 04.4
Z + 45° =	90 - 47 - 04.4
Log cot (Z + 45°) =	8.136 528
Log tan S =	0.182 525
Sum = log tan ϵ =	8.319 053 (sign −)
ϵ	1 - 11 - 39.5
S	56 - 42 - 02

ABC = 13-35-28.7
ABP = 55-30-22
CBP = 69-05-51

ACB = 12-22-27.8
PCA = 57-53-41
PCB = 70-16-09

(Tan ϵ +)
S + ϵ = angle ABP
S − ϵ = angle ACP

(Tan ϵ −)
S − ϵ = angle ABP
S + ϵ = angle ACP

BPA	19-03-00	APC	21-35-00	PCB	70-16-09
ABP	55-30-22	PCA	57-53-41	CBP	69-05-51
PAB	(105-26-38)	CAP	(100-31-19)	BPC	40-38-00
	180-00-00		180-00-00		180-00-00

(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
31—9912

comp CRR
by W.C.R.

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

COMPUTATION OF TRIANGLES

State: TEXAS

11—9121

NO.	STATION	OBSERVED ANGLE	CORR'N	SPHER'L ANGLE	SPHER'L EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
	2-3						3.929 900 ✓
	1 Station Buoy	40-38-00 ✓					0.186 275 ✓
	2 KNOLL	69-05-51 ✓					9.970 435 ✓
	3 PASS	70-16-09 ✓					9.973 723 ✓
	1-3						4.086 610
	1-2						4.089 898
	2-3						3.659 650 ✓
	1 Station Buoy	21-35-00 ✓					0.434 324 ✓
	2 RAD	(100-31-19) ✓					9.992 635 ✓
	3 PASS	57-53-41 ✓					9.927 921 ✓
	1-3						4.086 609 ✓
	1-2						4.021 895 ✓
	2-3						3.619 610 ✓
	1 Station Buoy	19-03-00 ✓					0.486 259 ✓
	2 KNOLL	55-30-22 ✓					9.916 026 ✓
	3 RAD	(105-26-38) ✓					9.984 028 ✓
	1-3						4.021 895 ✓
	1-2						4.089 897 ✓
	2-3						comp CRR ✓ by W.C.R.
	1						
	2						
	3						
	1-3						
	1-2						

Do not write in this margin

Field Records Section (Charts)

HYDROGRAPHIC SHEET NO. 5613

The following statistics will be submitted with the cartographer's report on the sheet:

Number of positions on sheet	996
Number of positions checked	98
Number of positions revised	20
Number of soundings recorded	6647
Number of soundings revised	334
Number of signals erroneously plotted or transferred	0

Date: July 30th/1935

Inked - M.A Hogel

Verification by C. R. DRAPER July 31, J.A. mc Cormick — Time: 41 hrs 3 hr.

Review by R.J. Christman — Time: Rev. 16½ Cor. 2

Report on H-5613 (1934)

1. The topographic features south of Lat. 27°53' are controlled by Plane Table Sheet "U" (T-6229), north of Lat. 27°53' by air-photo. ✓

2. The Zero Curves at Murray Shoal and north of Lydia Ann Island are plotted from the sounding notes, and do not exactly conform to those indicated on the air-photo. ✓

The 1, 2, 3 & 5 fathom depth curves are shown. ✓

3. The field plotter pencilled all depth curves thru the centers of the soundings. This was corrected, and all curves delineated to include the controlling sounding. ✓

The 4 & 6 fathom curves were delineated unnecessarily by the ✓ field party. They were omitted.

4. Junction with H-5693 (1935) is satisfactory, and shown. ✓

5. Rocks were noted (Vol 1 Page 47) between 68E & 69E, likely ✓ & ℄ the continuation of the North Jetty ~~but the data given was insufficient to plot~~. Sdg. on rocks, probably extension of jetty, Rpt.

An eleven foot sounding between 121L & 122L (Vol 3 Page 31) appears to be too deep, and is noted in the record. Sdg. not plotted. Rpt.

Crossings were satisfactory

Respectfully submitted.
C. P. Draper

Mr. Draper's overlay which is pasted to the sheet was verified. Fifteen positions were checked and none were changed. All soundings ✓ on the overlay were verified.

This field party has a bad habit of throwing extra soundings on the record indiscriminately with no asterisks to indicate odd time intervals. Party could just as easily shorten their interval in shoal areas and avoid such great confusion on the records. Confusion results from recording extra soundings as interlineations between the regular time intervals and on same line spaces.
Rpt.

To: H.M. Strong
From: C.F.M.
Date. Feb. 1, 1935

GEOGRAPHIC NAMES
TEXAS

Survey No. H 5613
Chart No. 1286
Diagram No. 1286

*, Approved by the Division of Geographic Names, Department of Interior.

¢, Not Approved by the Division of Geographic Names, Department of Interior.

R, Referred to the Division of Geographic Names, Department of Interior.

Status	Name on Survey	Name on Chart	New Names in local use	Names assigned by Field	Location
✓	Lydia Ann Island ✓	Same			
✓	St.Joseph Island ✓	"			
✓	Lydia Ann Channel ✓		Same		
✓	Aransas Channel ✓		"		
✓	Aransas Pass ✓	Same			
✓	Port Aransas ✓	"			
✓	Mustang Island ✓	"			
✓	Gulf of Mexico	"			
✓	Murray Shoal ✓	Same			
✓	Corpus Christi Channel ✓		"		
✓	Cline Point ✓	"			
✓	Turtle Cove —	"			

(M 100)

Section of Field Records

REVIEW OF HYDROGRAPHIC SURVEY NO. 5613 (1934) FIELD NO. 4

Vicinity of Aransas Pass, Texas Coast, Texas
Surveyed in July - Nov. 1934
Instructions dated Nov. 5, 1932, Nov. 16, 1933, Mar. 5, 1934
(E. O. Heaton)

Hand Lead and Pole Soundings. 3 Point Fixes on Shore Signals.

Chief of Party - E. O. Heaton.
Surveyed by - W. R. Helm.
Protracted by - C. W. O'Melveny.
Soundings penciled by - C. W. O'Melveny.
Verified and inked by - C. R. Draper, J. A. McCormick, M. A. Hagel.

1. Condition of Records.

The records are neat and legible and conform to the requirements of the Hydrographic Manual except as follows:

a. Many soundings taken between the regular time intervals are recorded as interlineations, thereby crowding the record and making it somewhat confusing, especially the column of "reduced soundings". (See pages 9 to 12 Vol. 5).

b. The use of unusual and unauthorized abbreviations on the smooth sheet should be avoided, example "wkd" for wrecked, "blk" for black. The corrections have been accomplished.

The Descriptive Report satisfactorily covers all items of importance.

2. Compliance with Instructions for the Project.

The plan and character of development are in accordance with the instructions for the project, except that there is an incomplete development of the area and channel east of Lydia Ann Island. The limited depths here probably account for the incompleteness.

3. Shoreline and Signals.

The shoreline originates with planetable survey T-6229 (1934), T-4872 (1934) and air photo compilation T-5369 (1934). Signals are from 1934 triangulation, planetable surveys T-6229 (1934) and T-4872 (1934), and two beacons (No. 4 and No. 6) located by sextant angles recorded in Volume 2 of the sounding records.

4. Sounding Line Crossings.

Depths on cross lines are in very good agreement. The discrepancies noted on page 1 of the Descriptive Report are apparently errors in sounding and the deeper soundings have been rejected.

5. Depth Curves.

Within the limits of the survey the usual depth curves may be satisfactorily drawn including portions of the 6 foot curve.

6. Junctions with Contemporary Surveys.

The junction with H-5693 (1935) is satisfactory. Aransas Pass Entrance Channel and Corpus Christi Channel are maintained by the U. S. Engineers and no soundings were taken in them on this survey, but a satisfactory junction was made with the Engineers' survey. No contemporary surveys in the Gulf of Mexico adjoining this survey have been received. However, the present survey is in fair agreement at its limits with the last prior survey H-1465 (1880).

7. Comparison with Prior Surveys.

Misc. 8	(1851)	H-1465 (1880)
H-386	(1854)	H-2054 (1891)
H-996	(1873)	H-2374 (1899)
H-1288a	(1875)	

These surveys vary from simple reconnaissance to detailed surveys of parts of the area covered by the present survey. Changes have been so extensive that most of them have been superseded on the chart by later surveys made principally by U. S. Engineers, and only a few soundings from H-1465 (1880) on the Gulf Coast of St. Joseph Island have been retained. The soundings charted in the channel passing west of Lydia Ann Island apparently come from H-2054 (1891), although that survey shows much deeper water in parts of the area. The present survey shows that many changes have occurred in this channel. Because of the changeable nature of the area and the adequate development shown on the present survey all the information from the above surveys should be superseded by H-5613 (1934) for charting purposes.

8. Comparison with Chart 1286 corrected to February 12, 1935.

a. Hydrography

Within the area of the present survey the chart is based on miscellaneous information principally from U. S. Engineers' surveys covering the dredged channel and improvements in Aransas Pass. The approach to the channel is charted from blueprint 23464 (1930). The agreement is fair, but apparently some changes have taken place at the entrance since the 1930 survey. Since the present survey (H-5613) was made there has been a survey by the Engineers (not yet charted) in Aransas Pass Channel. (Blueprint 28971 (1935). This

survey overlaps the present survey at the entrance to Aransas Pass channel and at the entrance to Lydia Ann Channel. The Engineers' survey being a year later than the present survey should supersede for charting purposes the area common to both. The submerged portion of the jetties at Aransas Pass (charted from blueprint 23,464 of 1930) is not shown on the present survey nor on T-6229 (1934). Blueprint 28,971 (1935) shows the ends of the jetties differently. The exposed end of the north jetty as shown on the blueprint agrees with the positions on T-6229 (1934). However, the exposed end of the south jetty is further inshore on the blueprint than it is on T-6229 (1934). The exposed ends and submerged portions of the jetties should be charted from blueprint 28,971 (1935) inasmuch as it is a year later than the present surveys.

The sunken wreck charted in latitude 27° 50.04', longitude 97° 02.5', from blueprint 23,464 (1930), was located on the present survey as a wreck baring 5 feet at M. L. W. and should be so charted.

b. Controlling Depths.

Aransas Pass Entrance Channel and Corpus Christi Channel are maintained by the U. S. Engineers and their controlling depths are reported monthly.

The charted controlling depth of 4 feet as of June 1924 in the small channel through Harbor I. in the vicinity of latitude 27° 51.5', longitude 97° 04.5', originates with Chart letter No. 299 of 1925. The soundings of the present survey are consistent with this depth.

The controlling depth of 12 feet charted in the channel, leading to the wharf at Port Aransas, originates with Chart letter No. 475/17 of 1934. The present survey shows a few soundings, the shoalest of which is 13 feet, in this channel. The 12 foot controlling depth should be retained until later information is received.

The controlling depth in the channel west of Lydia Ann Island is found northwest of Murray Shoal. The charted 8, just northwest of Beacon 6, originates with Chart letter No. 479 of 1929. The soundings of the present survey are in agreement with this depth.

c. Aids to Navigation.

The fixed aids to navigation are in agreement with the charted positions. The Descriptive Report (page 2) states that

Aransas Pass Spur Dike Beacon No. 4 has been discontinued but no report to this effect has been received from the Lighthouse Service.

The buoys are in substantial agreement with the chart except as follows:

1. The turning basin buoy in latitude 27° 50.57', longitude 97° 04.15' is charted about 60 meters west of the position given by the survey.

2. The lighted bell buoy latitude 27° 49.50' longitude 97° 01.05' and the buoy marked "Aransas" at the entrance to Aransas Pass are charted 120 meters NW and 90 meters W. of the positions located on the present survey. The Descriptive Report states that they have been moved to the location now shown (see page 2 of the Descriptive Report).

   These buoys serve the purposes of navigation satisfactorily in their present locations.

9. Field Plotting.

The field plotting was fair, about 20 positions were revised in the office.

10. Additional Field Work Recommended.

The survey is satisfactory and no further work is required.

11. Superseding Old Surveys.

Within the area covered, the present survey supersedes the following surveys for charting purposes.

Misc.	8	(1851)	in part
	H-386	(1854)	entirely
	H-996	(1873)	"
	H-1288a	(1875)	"
	H-1465	(1880)	in part
	H-2054	(1891)	entirely
	H-2374	(1899)	"

12. Reviewed by R. J. Christman, October 17, 1935.

Inspected by - A. L. Shalowitz.

Examined and approved:

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

K. T. Adams
Asst Chief, Division of Charts.

F. B. Borden
Chief, Section of Field Work.

G. Rude
Chief, Division of H. & T.

LAC

April 19, 1935

FD

Division of Hydrography and Topography:

✓ Division of Charts: Attention Mr. E. P. Ellis

Tide Reducers are approved in
5 volumes of sounding records for

HYDROGRAPHIC SHEET 5613

Locality Vicinity of Aransas Pass, Texas

Chief of Party: Earl O. Heaton in 1934
Plane of reference is mean low water reading
2.7 ft. on tide staff at Aransas Pass
17.6 ft. below B.M. 1

2.7 ft. on tide staff at Lydia Ann (No bench marks established)

Height of mean high water above plane of reference is 1.1 feet

at Aransas Pass; 0.3 feet at Lydia Ann.

Condition of records satisfactory except as noted below:

Paul P. O'Kelley

Chief, Division of Tides and Currents.

Applied to drawing of chart 1286, Dec 1935 S.B.M.
Applied to " " " 1117 May, 1940 S.H.S.
Applied to Chart 1285 May 1940. P.B.C.
Applied to Chart 623 Apr. 1945. J.S.H.