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RESTRICTED

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RESTRICTED

Form 504 Rev. Dec. 1933 DEPARTMENT OF COMMERCE U.S. COAST AND GEODETIC SURVEY R. S. PATTON, Director	
DESCRIPTIVE REPORT	
Topographic } Hydrographic	Sheet No. B
State British West Indies	
LOCALITY	
Trinidad	
Carenage Bay	
Point Gourde	
1940-41	
CHIEF OF PARTY	
Fred. L. Peacock	

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. B

REGISTER NO. T6771

State Trinidad, British West Indies

General locality Carenage Bay

Locality Point Gourde

Scale 1 : 4800 Date of survey Dec. 4, 1940
Jan. 10, 1941, 19

Vessel U.S.C. & G.S.S. OCEANOGRAPHER

Chief of party Fred L. Peacock

Surveyed by Dale E. Sturmer

Inked by Dale E. Sturmer

~~7.3 on Carenage Bay Tide Station tide staff~~
Heights in feet above M+V to ground in tops of trees

Contour, ~~Approximate contour~~, Form line interval 10 feet

Instructions dated November 9, 1940

Remarks: Project H-T 257

DESCRIPTIVE REPORT

to accompany T-6771
TOPOGRAPHIC SHEET FIELD NO. "B"

TRINIDAD, BRITISH WEST INDIES

Eastern Portion of Point Gourde

Surveyed December 1940 - January 1941

INSTRUCTIONS:

This survey was executed in accordance with The
Director's Instructions to the Commanding Officer, Ship
OCEANOGRAPHER, dated November 9, 1940, Project H.T. 257. ✓

SCALE:

The scale of this sheet is: 1:4800 ✓

LIMITS

The shoreline on this sheet covers the eastern half of Point Gourde from Alice Point (Latitude: $10^{\circ} 40.25'$, Longitude: $61^{\circ} 36.85'$) northwestward to Harts Cut and then north-eastward for 300 meters to Triangulation station HARTS CUT, (Latitude: $10^{\circ} 40' 42.231''$, Longitude: $61^{\circ} 37' 26.179''$).

The contours cover the area from Alice Point westward along the ridge between Masson's Bay and Telephone Bay, ~~1940~~ to station TRAIL, 1940 (Latitude: $10^{\circ} 40' 08.63''$, Longitude $61^{\circ} 37' 21.88''$), then northward (bearing 350° T) to Bench Mark # 16 (Latitude: $10^{\circ} 40' - 640$ meters, Longitude: $61^{\circ} 37' - 690$ meters), then follows the 100-foot curve around the west side of Carénage Bay to a point 125 meters south of Harts Cut.

T-6773 (1940-41)

This sheet joins sheet "D" both in shoreline and contours on the south, joins with the shoreline of sheet "A" T-6770 (1940) on the northeast at triangulation station HARTS CUT, and connects with the contours of sheet "E" ^{T-6774 (1941)} 125 meters south of Harts Cut. Thus the shoreline around Harts Cut is on this sheet while the contours are on sheet "E". All of the above mentioned sheets were executed by the Ship OCEANOGRAPHER under project H.T. 257.

CONTROL:

Horizontal control consisted of triangulation stations of at least second or third order accuracy established by the Ship OCEANOGRAPHER (Fred. L. Peacock, Commanding Officer) in 1940, spaced at about $3/4$ mile intervals along the shoreline, and triangulation stations on the higher hills to serve as additional control for the contours. Triangulation stations POINT GOURDE and HARTS CUT are stations of the Lands and Surveys Department of Trinidad and Tobago. HARTS CUT was relocated by Fred. L. Peacock in 1940. The numbers that follow the names of these stations are identification numbers of the Lands and Surveys Department. The Datum for this triangulation is the Trinidad Trigonometrical Survey Datum.

Vertical control consisted of temporary bench marks along the shoreline in Masson's Bay, the trigonometric determination of the elevation of triangulation stations QUARRY, 1940;

HIGH, 1940; RUFF, 1940; DRUB, 1940; and a line of second-order spirit levels along the old road (trail) to Bench Mark # 16, and then southward to triangulation station TRAIL, 1940. ✓

The zero datum for elevations and contours correspond to a reading of 7.3 on the Carenage Bay Tide Station tide staff. When this plane was selected it was believed to be approximately the plane of mean high water. Later information indicates that this plane is about 0.5 feet above the plane of mean high water and somewhere near the plane of mean spring high water. The elevations given for the bench marks on this sheet are preliminary elevations and are referred to a plane 0.3 of a foot lower than those of the contours. It is assumed that the Division of Tides and Currents will later determine the true elevations of these Bench Marks with respect to the various tidal planes, after an analysis of the tidal data obtained by this party. ✓
Consider plane as M.H.W.

GENERAL DESCRIPTION

The area covered by this sheet is rugged country with vertical rock and clay cliffs along the shoreline, ranging from a few feet to 85 feet. The shoreline in general is very broken and irregular with numerous small bights, cracks and crevices. The trees and heavy underbrush come down to and overhang the shoreline in many places. ✓

The area in the interior covered by the contours is a group of high hills with steep slopes and often cliff like sides. The entire area is heavily wooded with trees and a dense underbrush. ✓

(For more detailed description see paragraphs "Detailed Description of Shoreline" and "Detailed Description of Interior"). ✓

SURVEY METHODS:

Standard planetable survey methods were used in locating the shoreline, buildings, rocks, hydrographic signals, and other kindred data. The shoreline from signal PAR to 30 meters west of triangulation station MASSON is so steep with overhanging trees that it was not feasible to locate it by regular planetable methods. This shoreline was located by taking sextant fixes at short distances on signals on the opposite shore. These fixes were then plotted on the topographic sheet. As a check on this method of locating the shoreline, the signals were first cut in. ✓

In locating the contours there was no deviation from standard planetable methods. However, due to the area covered ✓

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the ruggedness of the country, and the heavy growth of trees and underbrush, it became necessary to clear lines through the brush and run many traverses that would not have been necessary in more open country. The traverses could be listed as control traverses and side or connecting traverses. Control traverses were run from the head of Masson's Bay to triangulation station HIGH, 1940; from HIGH to triangulation station TRAIL, 1940; from the head of Masson's Bay westward through the low valley to the western edge of the sheet and then northward to the vicinity of Bench Mark # 16. This latter traverse connected with a traverse run westward from triangulation station RUFF, 1940. From triangulation station DRUB, 1940 a control traverse was run to hydrographic signal TOW. It will be noted that these traverses are approximately parallel to each other. From these control traverses connecting traverses were run at approximately right angles at intervals of 25 to 50 meters. These connecting traverses were tied into the intercepted control traverses to insure a proper check on all elevations. Northward from the line from station RUFF to Bench Mark #16 the connecting traverses were tied in with a 3-point fix on the ridge above signals NAP, ODE, and PAR, taken on the opposite shore. The side traverses eastward of station DRUB were of only one or two setups and were tied into the cliff line or the high water line. From Bench Mark # 16 to Harts Cut a control traverse was run down the old road. The side traverses were not tied in except to the high water line where possible, as they are very short and tying them would have meant a large amount of additional work.

Due to the dense tropical growth lines had to be cleared for all traverses run. This was done by an officer in charge of a group of about 20 natives. Points of elevation were taken along the cleared lines but side shots were impractical due to the heavy underbrush. What few were taken, lines first had to be cleared by the topographic party.

The contours between the traverse lines were sketched in by the topographer after studying the country. A more thorough survey could only be made by clearing off all the brush, something which would not be permitted.

Elevations were determined by stadia distances, vertical angles and the result computed on a hypsograph. Where vertical angles were over 30 degrees and the hypsograph could not be used, the tables in the Topographic Manual were used.

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TRAVERSES RUN:

No traverses were run in locating the shoreline. The hydrographic signals were first cut in from triangulation stations and these were used as additional control points. This was considered more accurate than traversing because of the character of the shoreline. ✓

Of the many traverses run in the contouring only the closure of the control traverses are given. The connecting traverses closed satisfactorily and because of their large number, are omitted. ✓

1. Masson's Bay through the rock quarry to station Alice, 1/2 meter in azimuth, no error in distance, and 2 feet in elevation. No adjustment was made in azimuth, but the error in elevation was adjusted. ✓

2. Masson's Bay to station HIGH. Closed without error in azimuth, distance, or elevation. ✓

3. Station HIGH to station TRAIL. Closed without error in azimuth and distance, and 1 foot in elevation which was adjusted. ✓

4. Masson's Bay westward through the valley to the western edge of the sheet and then northward to Bench Mark # 16. This traverse connected to the one coming westward from station RUFF. 2 meters in azimuth, no error in distance and 0.1 foot in elevation. Traverse adjusted in azimuth for the portion coming up from Masson's Bay as this was considered the weaker of the two traverses. ✓

5. Station RUFF to a 3-point fix at Harts Cut. 2 meters in azimuth, 1/2 meter in distance, 1 foot in elevation. This traverse was 22 setups long. It was adjusted in azimuth and elevation. ✓

6. The traverse locating the ^{trail} ~~old road~~ from Bench Mark # 16 to triangulation station

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POINT GOURDE failed to close by 7 meters. As this traverse really begins at station RUFF, it is very long, containing 28 setups with many of them very short. Often it was necessary to orient half way up on the rod instead of the base, so this was considered as a satisfactory closure in this case, both by the topographer and the Chief of Party. It was adjusted according to the Topographic Manual.

DETAILED DESCRIPTION OF SHORELINE

The shoreline is very broken with stretches of rock cliffs, clay bluffs, gravel and sand beaches. Bluff and cliff lines could not be shown by the conventional symbol because in most instances the top of the cliffs would have to be farther back into the contours than they really are. The contours together with the notes on the sheet give the necessary information. The showing of the contours was considered to be more important than the showing of cliffs or bluffs. (Note: Hydrographic signals are merely referred to as signals). A detailed description of the shoreline follows:

From station ALICE to signal CAR is a rocky cliff of varying heights except for a clay bluff 10 meters west of the gravel beach just south of signal CAR. There is also a clay bluff about 8 feet high just back of the gravel beach 30 meters west of CAR.

On the hillside just north of station QUARRY is a rock quarry, producing crushed rock and powdered limestone. The railroad is narrow gage over which loads of rock are pushed by hand to the two chutes that lead to the lower level. The railroad at the crusher buildings is also narrow gage. The large building shown near the shoreline, is really a group of connected sheds housing the crusher, a machine shop, the warehouse, etc. Most of the buildings are of one story but the warehouse is 25 feet high. The shoreline in front of the quarry building is a crude stone wharf where small sailing barges come alongside. South of the quarry building is clay bluff, and 20 meters to the southwest is a large rock column (height: 104 feet) with almost vertical sides except on the north.

The rectangular structure just west of the quarry buildings is an area enclosed by a heavy concrete wall about 8 feet high and 8 inches thick.

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The shoreline southwest of the quarry buildings is a gravel beach back by a 3 to 5 foot clay bank, back of which the ground flattens out before reaching the tailings of the clay and rock cliffs. Above the rock quarry to station QUARRY is almost a vertical clay and rock cliff, but mostly rock. A vertical rock cliff, 85 feet high extends from 50 meters southwest of signal DOG to signal EYE. From signal EYE to the bend past signal FIT is a rock and clay ledge from 2 to 3 feet high, backed by alternate bluffs and steep slopes. The steeper portions are bluffs. From the bend southwest of signal FIT for 50 meters to northwest is a rocky cliff about 5 feet high topped by the general slope of the hillside. The point just southeast of signal GOT is a landing made from rock dug from the hillside.

The mangroves west of signals GOT and HAT are about 15 feet high. For 70 meters on each side of signal ITS is a sand beach then there is a narrow gravel beach to signal TOW. The bluff back of signal JAP and extending to signal TOW is mostly clay with occasional rock outcrop. The top of this bluff is about at the 70 foot contour and drops about to the 45 foot level, then the steep tailings extends within a few meters of the high water line. However, just to the southwest of signal TOW there is a flat place before the steep slope begins to rise to the 10-foot contour. Northwest of signal TOW, there are irregular clay bluffs to 50 meters southeast of signal LAY where there is a stretch of sand beach for 20 meters. From the northern point of the sand beach to signal BOB are rocky cliffs varying from 10 to 20 feet in height. A gravel beach extends for 35 meters northwest of signal BOB, where a rock cliff juts out to the shoreline and clay bluffs extend to station MASSON.

From station MASSON to signal NAP are rock cliffs about 15 feet high which increases to 25 feet in height for 50 meters west of signal NAP. Directly inshore from the latter is a vertical rock cliff ranging in height from 35 to 75 feet. Low rocky cliffs extend to signal ODE, except 20 meters to the east of signal ODE there is a short 20-foot vertical rock cliff. At signal ODE there is also a 20-foot rock cliff. From signal ODE to signal PAR the steep clay hillside extends to the water's edge. All of the above is covered by overhanging trees.

A group of mangroves extend out from the point between signals PAR and RAT. Both the mangrove line and the high water line were located, as both were in the bight between signals RAT and SAP. From SAP to signal TOY are clay bluffs from 5 to 10 feet high, except for about 20 meters on each side of signal TIDE which is rocky. From signals TOY to UMP the mangrove line

was accurately determined but the high water line between the marsh and the mangroves was very indefinite. It was estimated to be where the marsh and the mangroves meet, and is shown with a dashed line. ✓

From signal UMP to signal Van are rocky cliffs from 5 to 10 feet high. Northwest of Van is a clay bluff about 20 feet high for 20 meters, and then rocky cliffs, 10 to 15 feet high, extend to the sand and gravel beach, which begins 50 meters south-east of signal WOW. This beach extends to Harts Cut. ✓

Harts Cut is a canal from Carenage Bay to Chaguaramas Bay but only the eastern end is shown on this sheet. The part ~~part~~ shown on this sheet has a width of 6.9 meters, has stone masonry embankments, with stone masonry jetties extending out into Carenage Bay. A steel foot bridge crosses the Cut at signal YOU, with a horizontal clearance of 6.9 meters, a vertical clearance of 8.3 feet above mean high water. The bridge is 2.5 feet wide. ✓

North of Harts Cut is sand beach to 10 meters south of signal ART. From ART to signal BOY is mostly a seawall about 3 to 7 feet high to protect the road along the beach from erosion. From signal BOY to station Harts Cut is a clay bluff varying in height from 10 to 15 feet and is protected by a seawall. This seawall is in many places almost buried by the tailings from the hillside road cut. Just out from station Harts Cut is low sand beach. ✓

DESCRIPTION OF AREA COVERED BY CONTOURS:

Just west of station ALICE is a vertical rock cliff as indicated by the contours. This bluff flattens out but is formed again about 150 meters west of ALICE. These are natural cliffs and are not formed by the rock quarry. The buildings in the center of the lime orchard are turkey sheds. The rock quarry extends westward to Longitude $37^{\circ} 00'$ (80 meters). The area between the rock quarry and the small valley extending southward from Masson's Bay is covered with heavy brush from 5 to 10 feet high. This brush extends southward to a line about 20 meters north of the ridge westward from station QUARRY, where the higher trees begin. On the slope of the hill from Masson's Bay to station HIGH, brush about 10 feet high extends about to the 100-foot curve where the higher trees begin. All of the above mentioned area is clay with occasional rock outcrop, except in the rock quarry. ✓

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The remainder of the area covered by the contours, except the cultivated patches, is covered with trees and heavy underbrush. The terrain consist of valley and ridges, running down from the main ridges. The soil formation is mostly clay with an occasional rock outcrop. The ridge just south of signal NAP and ODE is much rockier than the rest. The formation along the old road from Harts Cut to Bench Mark # 16 indicates that the top layer of clay is often quite thin, from 2 to 5 feet, with a rock formation underneath. ✓

The cleared and cultivated areas as indicated on the sheet are not well kept. Brush and weeds have overgrown over much of it and often the limits are indefinite. (See page 12)

TREES AND VEGETATION:

The trees covering this area are of a broad leaf variety ranging in height from 30 to 50 feet, and with a base diameter of 1/2 to 1-1/2 feet. Most of the underbrush ranges in height from 10 to 25 feet, which is often entangled with a mass of vines. Both the trees and the brush are of a hard wood making fast clearing difficult. ✓

Lime trees are bushy and about 15 feet high, while the pea patches are really pea trees about 10 to 15 feet high. ✓

CHARACTER OF ROCK:

The greater part of the rock covering this area is a limestone formation, especially along the shoreline and on the hill where the rock quarry is located. In other parts there is some schist and streaks of dolomite. ✓

ROADS AND BUILDINGS:

The road from station HARTS CUT around to signal ART and then turning west is about 15 feet wide, is paved with an asphalt surface, and is the main road to the westward. The trail from Harts Cut to station POINT COURDE is an old wagon road with many sharp turns and has deteriorated into a good trail. ✓

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The buildings shown on the sheet are poorly constructed, one story wooden shacks. Many of them are made of bamboo lattice work.

JUNCTIONS:

T-6773 (1940-41)

This sheet joins sheet "D" on the south for the full distance for the area surveyed. To insure a satisfactory connection between the contours of the two sheets, the following method was used. Along the junction line between stations ALICE and TRAIL stakes were set at all points where elevations were determined. In rerunning this line, the topographer of sheet "D" recovered these stakes, checking the location and the elevations. The contours of the two sheets were then matched.

T-6774 (1941)

The junction with sheet "E" at Harts Cut was made by drawing the contours between two closely spaced adjacent lines of elevations. As this area is covered with low brush the resulting contours could be checked in the field.

At places between stations ALICE and QUARRY, the contours may not seem to meet properly. This is due to the vertical cliffs at the junction line in this area.

GEOGRAPHIC NAMES:

The geographic names that appear on this sheet were obtained from maps furnished this party by the Lands and Surveys Department of Trinidad and Tobago, British West Indies and are well established local names.

MAGNETIC MERIDIANS:

The magnetic meridians shown on this sheet were taken with Declinatoire No. 181, which has an index correction of 5' E. This index correction was determined at magnetic station Fort Story at Norfolk, Virginia on February 13, 1940. Sixtieth (60th) meridian time was used in determining the magnetic meridian.

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on this sheet while the declinatoire was standardized with ✓
75th meridian time.

The corrected magnetic meridian at station ALICE, Charted Value
1940 is $6^{\circ} 30' W.$; and at station RUFF it is $6^{\circ} 22' W.$ — approx. $7^{\circ} 20' W.$

LIST OF PLANETABLE POSITIONS:

The only marked hydrographic station on this is ✓
signal TOW, Latitude 10-40 (662 meters), Long. 61-37 (110 meters).
The description of this station is included with this report.

CONTOUR INTERVAL:

The contour interval on this sheet is 10 feet, with
every fifth contour drawn slightly heavier than the rest. ✓
Five foot contours were not drawn because of the ruggedness
of the country. The 10-foot contours show the detail just
as well, and there is not sufficient space on a sheet of this
scale to draw 5-foot contours.

TRACING CLOTH OVERLAY:

Accompanying this sheet as a part of the original
record is a tracing cloth overlay showing the point of each
and every elevation determined, with a small red dot and the
elevation in black figures. While almost all elevations are
shown on the sheet, the drawing of the contours have obscured
many. Overlay attached to this report. ✓

LOW WATER LINE:

The low water line was not located by the topographic
party on this sheet, because the hydrographic party made a very
accurate determination. Except around Harts Cut, and in various
places in Masson's Bay, the high and low are so close together
that the low water line cannot be shown. Wherever there are
sand or gravel beaches, they have been indicated by the con-
ventional symbols. ✓

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STATISTICS

Miles of shoreline.....2.9 miles
Area.....0.2 square miles
Miles of road.....0.2 miles
Miles of trails.....2.4 miles
Miles of railroads.....0.2 miles
Number of elevations.....870

NOTE ON CLEARED AREAS:

Conventional symbols were not used for the cleared areas and pea patches because it would obscure the contours. Instead these areas are shown with a dashed line and are titled by appropriate notes. ✓

Respectfully submitted,

Dale E. Sturmer
Dale E. Sturmer, Ensign, C&GS.
U.S.C. & U.S.S. OCEANOGRAPHER

Approved and forwarded:

Fred. L. Peacock
Fred. L. Peacock, Lt. Comdr., C&GS,
Commanding Ship OCEANOGRAPHER.
Chief of Party

DESCRIPTION OF RECOVERABLE HYDROGRAPHIC OR TOPOGRAPHIC STATION

Name **TOW**
General locality **Trinidad, B.W.I.**

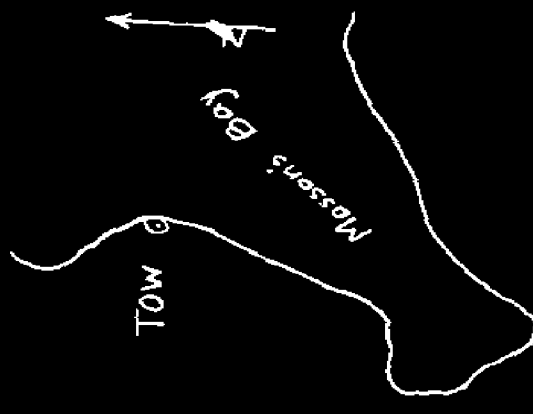
Year **1940**
Sheet No.

Locality **Point Gourde**
Chief of party **Fred. L. Peacock**
Scaled by **Dale E. Sturmer**
Checked by **E.G. Cunney**
Approximate elevation above high watermark **3** feet
Location method: **Plane table, Sextant, Alidade, Air photo interpretation**

Datum: **Trinidad Trig.**
Meters

Lat. **10 40 662**
Long. **61 37 110**

Detailed description: **Station is on the most easterly point of the western shore of Masson's Bay, 8 feet back of high water line. Mark is set in a drill hole in the rock and 2 feet south of the station there is a drop of 2 feet to where the gravel beach begins. Mark is a standard Hydrographic disc, stamped "TOW - 1940"**



Sketch for shore-line data and reference points:

SHORE-LINE DATA AT ABOVE STATION

Object	Distance in meters	Direction	Azimuth
-----		00° 00'	

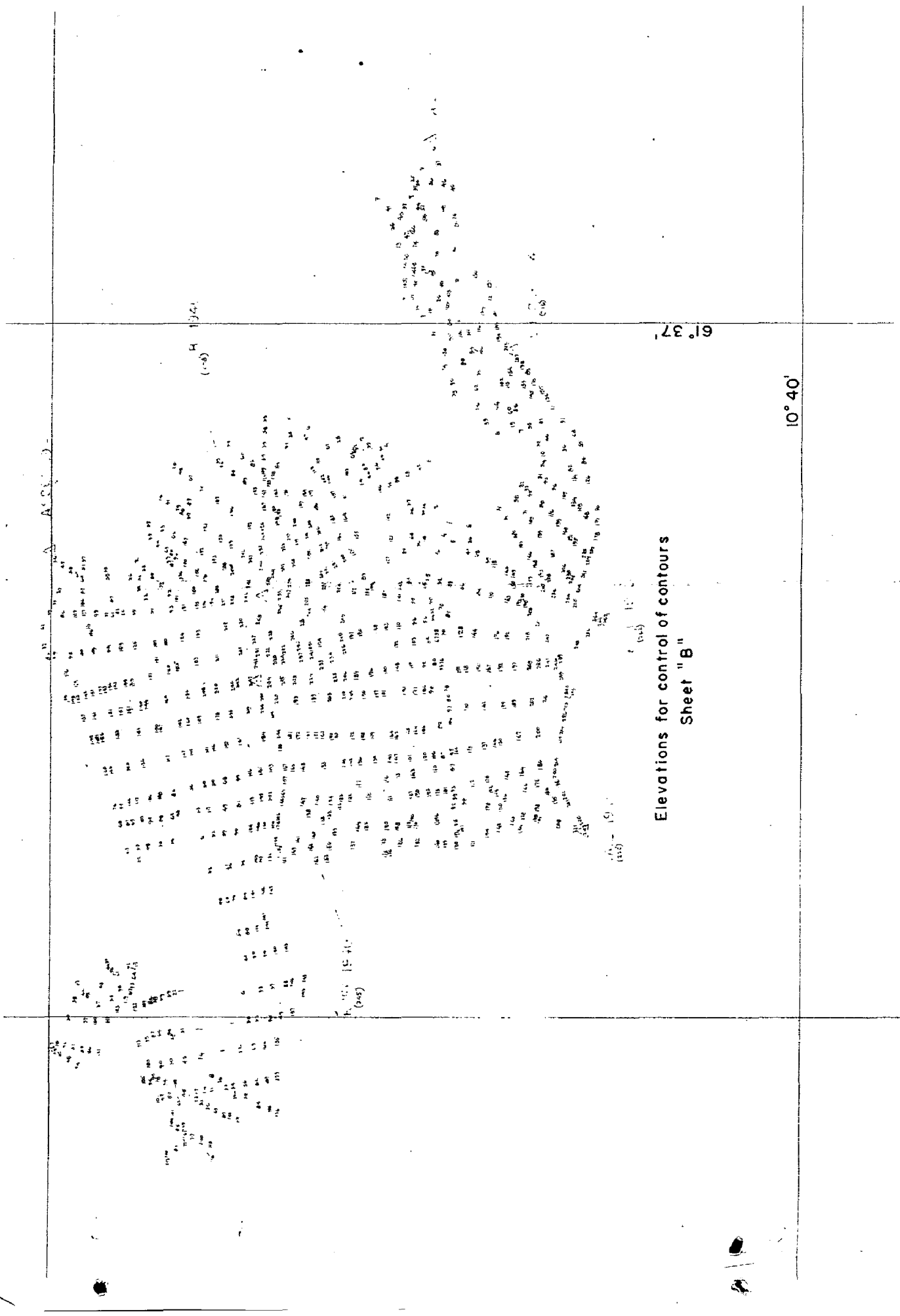
REFERENCE POINTS FOR AIR PHOTO CONTROL

Object	Distance in meters	Direction	Azimuth
-----		00° 00'	

Distances not to be scaled from sheet; must be horizontal distances actually obtained in the field.

Above distances measured by:

REFERENCES: Topographic Manual, paragraphs 16, 23, 30, 57, and page 52; Hydrographic Manual, paragraph 167; Circular No. 30, 1933.



Elevations for control of contours
Sheet "B"

10° 40'

61° 37'

A-55-1

DIVISION OF CHARTS

SURVEYS SECTION

REVIEW OF TOPOGRAPHIC SURVEY NO. 6771 (1940-41) TRINIDAD, T.

Trinidad, B.W.I.; Carénage Bay; Point Gourde
 Surveyed in December 1940 - January 1941, Scale 1:4,800
 Instructions dated November 9, 1940 (OCEANOGRAPHER)

Plane Table SurveyAluminum Mounted

Chief of Party - F. L. Peacock
 Surveyed and inked by - D. E. Sturmer
 Reviewed by - J. A. McCormick, June 20, 1941
 Inspected by - H. R. Edmonston

1. Junctions with Contemporary Surveys

Excellent junctions were effected with T-6770 (1940) and T-6774 (1941) on the north and with T-6773 (1940-41) on the south.

2. Comparison with Prior Surveys

Copies of previous British surveys of this area are not available in this office.

3. Comparison with H.O. Chart 2115 (Corrected to Jan. 1941)

Charted shoreline is in fair agreement with that of the survey. Inland, charted topography approximates that of the survey but differs somewhat in detail. An elevation of 375 feet is charted in Lat. $10^{\circ} 40.36'$, Long. $61^{\circ} 37.20'$ where the survey shows a peak with elevation of 258 feet. The difference can hardly be ascribed to a possibility of chart elevations being to tops of trees as the Descriptive Report, page 9, states that trees range in height from 30 to 50 feet. Elevations on the survey are well determined and their accuracy is not questioned.

4. Condition of Survey

An overlay tracing, showing clearly all elevations determined on the survey, is attached to the Descriptive Report.

5. Compliance with Instructions for the Project

Excellent.

6. Additional Field Work Recommended

None.

Examined and approved:

Thos. B. Row
Chief, Surveys Section

J. S. Borden
Chief, Division of Charts

E. H. Green
Chief, Section of Hydrography

G. W. de
Chief, Division of Coastal
Surveys