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State Isthmus of Panama

DESCRIPTIVE REPORT

Hydrographic Sheets Nos. 2714  
2715

LOCALITY:

Limon Bay and Approaches

Isthmus of Panama

1905

CHIEF OF PARTY:

P. A. Welker, Assistant

2725

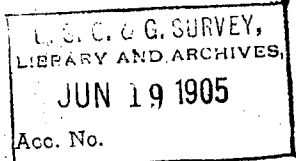
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POST-OFFICE ADDRESS: See address at office.

TELEGRAPH ADDRESS:

EXPRESS OFFICE:

U. S. COAST AND GEODETIC SURVEY. Str. "Bache",



Mr. O. H. Tittmann,  
Superintendent, Coast and Geodetic Survey,  
Washington, D. C.

S i r :-

In obedience to "Instructions and Memoranda for Descriptive Reports", 1887, I beg leave to submit the following report on Hydrographic Sheets, Nos. 2724 and 2725.

2. The work represents an hydrographic survey of Limon Bay and Approaches, Isthmus of Panama. It is in two sheets, each of which is on a scale of 1:10,000, and was almost entirely executed during the month of April, 1905.

3. The method of locating positions of soundings used in the survey was by simultaneous sextant angles and the three point problem, the signals having been located by means of triangulation and the plane table. Lines were run at an average of from 100 to 200 metres apart, according to the necessity shown by indications in the soundings, while special examinations were made in all localities requiring the same.

4. The entire bay seems to be free from all obstructions, there being a gradual and uniform rise from the ten fathom curve,

outside, to the head of the bay. Off Toro Point, there is quite an extensive coral reef, upon which the sea is almost continuously breaking. The depth of water increases very rapidly from the edge of the shoal. The danger limit in approaching the shoal is about  $3/4$  of a nautical mile from Toro Point Lighthouse, anywhere within a radius of one mile from this lighthouse is, therefore, perfectly safe for vessels of any draft that can enter the harbor.

5. Off Manzanillo Point, at the east side of the entrance to the bay, there is another coral reef, but it is not so extensive. A buoy, about one sixth of a mile to the westward of the lighthouse, at Colon, marks the safe distance for a vessel to approach in entering the harbor.

6. There are numerous other coral reefs about the shores of the bay, but they are in localities where they cannot be considered as obstructions to navigation. The general character of the bottom of the bay is hard sand, interspersed with spots of muddy and sticky bottom.

7. To the northward of the shore between the lighthouse at Colon and the entrance to Manzanillo Bay, for a distance of about  $1-1/4$  miles out to sea, there is considerable foul bottom with indications of rocks or coral. This locality should be avoided by vessels of deep draft.

8. The head of the bay terminates in very shoal water for a distance of a mile or more from the shore, with the bottom muddy and sticky. There is evidence of continuous shoaling in this locality, and the shore line ~~at this beach~~ is making farther out

into the bay. As the prevailing winds are from the north, this part of the bay is generally very rough, breakers extending for a long distance from shore and it is seldom that it can be considered safe for any boat to pass far inside of a line from Limon Point, east. The swell at times is so heavy that a boat might strike the bottom and be held there long enough by the sticky mud to be swamped.

9. The entire bay is an open roadstead and during the season of northers there is no safe anchorage anywhere. After a heavy norther, the swell entering is so great that all vessels in the harbor, including those at the wharves, must put out to sea, or seek shelter in some other localities, Porto Bello, distant about twenty miles being the nearest safe harbor for vessels of deep draft. Smaller vessels to the length of about 175 feet, and draft of about 12 feet, can find shelter inside of the entrance to the canal, although great care will be required in entering, as the channel is narrow and crooked. Inside of the entrance there are a number of wharves to which vessels can lie, and sufficient room for a number of smaller vessels to lie at anchor, providing they are moored so as to allow room for passing vessels. The Steamer "Bache", 156 feet long and 10 feet draft, was inside of the entrance for about one week for the purpose of blowing out and overhauling the boilers and taking on board coal. Other vessels of greater tonnage and more draft <sup>than</sup> ~~that~~ the "Bache" have safely entered, discharged cargo and passed out again.

10. Manzanillo Bay is a shallow unimportant body of water

with quite extensive coral reefs skirting about the points, although there is plenty of room and good holding ground for anchorage, it cannot be said that it has any advantage in this respect over Limon Bay, except for small craft drawing five or six feet of water, which can go well up into the bay, around the points and find excellent shelter.

11. Upon the east side of Limon Bay, near the entrance, are the towns of Colon and Cristobal. The former is at present a port of considerable importance being the eastern terminus of the Panama Railroad, engaged in the extensive business of carrying cargoes between the Pacific and Atlantic Oceans. There are a number of lines of steamers entering the port from New York, New Orleans, and from England, via Kingston, Jamaica, besides numerous independent steamers and sailing vessels, chiefly from ports in the United States. Colon is a <sup>port</sup> ~~part~~ belonging to the Republic of Panama, the chief executive being the Governor of the Province. The United States is represented by a Consul. The town of Cristobal is in the Canal Zone, and is under the jurisdiction of the United States. At this place are located the offices, storehouses and residences of the employes under the Panama Canal Commission.

12. The Panama Railroad is now the property of the United States Government, with the exception of only about 1-1/2 per cent, which is owned by private individuals. The road extends from Colon, upon the Atlantic side of the isthmus, to Panama, upon the Pacific side. It follows generally the line of the proposed

isthmian canal, is about 46 miles in length, but has about 146 miles of sidings. The road is not only engaged extensively in carrying freight across the isthmus, but the main road, with all its spurs, is utilized in the construction of the ship canal. Extensive improvements and double tracking are contemplated. The railroad is the only means of communication across the country, the entire region about the isthmus, being without any other roads or trails of consequence, making travel into the interior very difficult. The country about is thickly wooded, with swamps and jungle scattered about.

13. All over the isthmus there is at present great activity on account of the immense amount of work in connection with the construction of the canal. So much has already been published regarding this matter that the subject is quite familiar and need not be repeated in this report.

14. Labor upon the isthmus is very scarce and of the poorest quality. Most of this was imported from Jamaica and is of such poor quality, that it is safe to say that it would require the combined labor of three men to equal that of one ordinary man in the United States. It would not be safe to enter into any undertaking with the expectation of obtaining the assistance of labor in this locality.

15. During the season while this work was being executed, the health conditions upon the isthmus were far from good, malaria was common, <sup>with</sup> occasional cases of yellow fever along the entire route from Colon to Panama. Extensive sanitary improvements,

however, are in progress and it is expected that the conditions will rapidly change for the better. On account of the conditions, the greatest precautions were necessary in order to preserve the health of the crew. No liberty was granted to the officers or men, no one being allowed on shore except when necessary upon business and  $\frac{1}{2}$  even then only during the day time when the danger was at the minimum. In this manner the health of all on board was kept in good condition, without a case of sickness worth mentioning during the entire season.

16. The atmospheric temperature was high and the humidity great, on this account officers and men were occasionally incapacitated for duty owing to physical exhaustion, but there was nothing of a serious nature. Comfort and perfect rest were almost impossible to obtain, night nor day, except upon the open deck of the steamer.

17. The weather, in general, was not unfavorable for work, although there was most of the time a heavy swell in the bay which prevented accurate soundings. The prevailing wind was from the north, usually light, but occasionally fresh, when the sea would get so rough that sounding would be impossible. During the entire season there were no storms worth mentioning.

18. The range of rise and fall of the tide seems to be about one foot, there being one high and one low tide each day. At Cristobal, the engineers of the Panama Canal have a self registering tide gauge, from which observations have been obtained for a number of years. The plane of reference used for the

reduction of soundings was established from the results of the observations from this gauge.

19. There are two lighthouses marking the entrance to the bay. At Toro Point, at the western side of the entrance to the bay, is an iron tower painted red and white, mounted upon a stone base. The elevation of the light is 108 feet and it is visible 16 miles. It shows up distinctly from far out at sea, on a clear day, and is an excellent mark for entering the bay. Colon light, upon the point at the eastern entrance to the bay, is upon an open frame work and is elevated 60 feet. It is supposed to be visible 10 miles, but the character of the light is poor and the structure cannot be seen for any great distance out to sea, on account of the open work and the poor background.

20. Facilities for supplies are fairly good, but everything is very expensive. Fresh meats, vegetables and fruits are scarce and of poor quality. Canned goods can be obtained. Coal can be obtained from the Panama Railroad Company, but water is very scarce and of a very poor quality. Ice is manufactured, but not extensively, only small quantities can be obtained at a time.

21. The Panama Railroad Company and the Isthmian Canal Commission have a number of good shops where arrangements can be made for ordinary repairs.

22. Under the control of the Isthmian Canal Commission there is a dry dock suitable for docking only scows, dredges and small craft. The approximate dimensions of the dock are; length 197 feet, width 30 feet.



23. There is no marine hospital in the locality, but the hospitals under the direction of the Isthmian Canal Commission are open to receive all requiring medical or surgical attendance.

24. Quarantine regulations are very strict, no vessels, at any season of the year, are allowed to discharge passengers or cargo without inspection and permission from the boarding officer.

25. There are no life saving stations.

26. Under ordinary conditions a vessel going ashore upon the outer beach would hold together for a long time, but should the wind be fresh from the northward, it would be best to abandon the vessel at once.

27. Mail from New York and New Orleans arrive upon an average of once per week. There are telegraphic and cable facilities for all parts of the world.

28. Pilotage is not compulsory and cannot be considered a necessity.

29. Vessels can anchor anywhere in the bay, providing that sufficient space is left for other vessels to pass to and from the docks. The best anchorage is from five to six hundred yards to the westward of the most southern of the docks.

30. Sailing vessels bound either for the wharves at the port of Colon or inside of the entrance to the canal, must depend upon their sailing power, as there are no tug boats to render assistance. This state of affairs, however, will probably be remedied within a short time as the necessity for towing facilities is quite apparent.

31. The following is a summary of the work accomplished during the season:

Base lines measured -----	1
Number of geographical positions determined by triangulation -----	16
Number of miles of shore line surveyed-----	28.0
Number of geographical positions determined by plane table-----	27
Number of miles of soundings -----	727.1
Area sounded in square statute miles-----	24.0
Time of begining work -----	March 13th, 1905
Time of ending work -----	April 28th, 1905

Very respectfully,

*P. A. Walker,*

Assistant, C. & G. Survey, Com'd'g,  
Chief of Party.

ACKNOWLEDGED

JUN 20 1905

C & G SURVEY ARCHIVES

Report  
on  
Hydrographic sheet  
No. 2724.  
Approaches to Limon Bay,  
including Manzanilla Bay,  
Isthmus of Panama.  
Assistant Welker.  
1905.

The determination of depth and position are good and the ground is well covered. The broken area north of Manzanilla Point is not thoroughly developed, but by reason of its location it is doubtless of secondary importance.

Though only a few zigzag lines were run, and over shoal areas, it is regrettable that they appear on the sheet at all. The sounding record was made in part with a very hard pencil and is too light and indistinct. Ends of lines should be more definitely described.

7/15/05.

J.T. Watkins. (Signed).

Report  
on  
Hydrographic Sheet  
No. 3725.  
Isthmus of Panama,  
Limon Bay.  
Assistant Welker,  
1905.

Much of the sounding record is too faint. The result is a record easily effaced by handling and difficult to decipher in ordinary light. A softer pencil should be used or more pressure applied to it.

The beginning and ending of every line should be described so that it can <sup>be</sup> readily located on the smooth sheet without the use of a protractor. If not, the work of plotting and verification is more difficult and requires more time.

Reefs, ledges, rocks, shoals, snags, ruins of wharves and other features such as are often referred to in the column of remarks, and location given there in a more or less general way, should always be sketches on the boat sheet by the person in charge of boat and at the same time the entry is made in the sounding record. They should always be transferred to the smooth sheet subsequently. Such features should be described more in detail as to character, extent and whether above or below the plane of reference.

As hydrographic work is usually the most important of our "combined operations" and most dependent upon weather conditions; also the most uncertain in length of time required to complete a given area, on account of unexpected special development required, etc., it seems that it would be well to begin the work of sounding as soon as possible after the arrival of the party on the ground. In the present case,

Hyd. Sheets 2724 and 2725, work began March 13, while the first sounding was not taken till March 30.

Several times there appears in the record the entry "For lead line correction see record on board". It would be better in all cases to state in the sounding book whether or not the leadline is correct, and if not, to give the value of the correction to be applied.

Where the slope of bottom is very slight, the curves are very irregular and show many spots and holes; but the crossings are much better than this would indicate. The differences are generally one foot and rarely more than two; which is as good as could be expected in consideration of the prevailing conditions of wind and wave.

H.O. and B.A. charts show a  $\frac{1}{2}$  fathom reef off triangulation station Coral, where we have nothing less than 17 feet. No note of it was made in the record. Some additional developments seem desirable, however, they do not involve very important areas.

J.T. Watkins. (Signed).

8-10-05.