

5213

Form 504

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

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DESCRIPTIVE REPORT

Hydrographic Sheet No. 252 **5213**

LOCALITY:

Hawaiian Islands

French Frigate Shoals

to Raita Bank

1930-31

CHIEF OF PARTY:

O. W. Swainson

5213

7

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SHEET NO. 252.

DATE OF INSTRUCTIONS

The hydrography covered by this sheet was done in accordance with instructions of February 10, 1930, to the Commanding Officer, Ship PIONEER, for Project 55.

LOCALITY AND LIMITS OF SHEET

Sheet No. 252 takes in the area between the shoals and reefs extending from French Frigate Shoal westward to Raita Bank. It joins the cable ship work on the north and sheet No. 751 on the south.

CONTROL

The control for this sheet is almost entirely astronomical fixes. The lines were adjusted to depth curves around French Frigate Shoal, Gardener Pinnacle, and Raita Bank. The dead reckoning was kept in large books. These books are forwarded separately. The star fixes are also forwarded. The computations of the astronomical sights are not transmitted to the office. All the computations were not checked. Each officer computed his sight absolutely separately and if the position arrived at was close to the others' positions, the sight was considered as checked. Where large differences were obtained the computations were checked for errors.

SURVEY METHODS

This sheet is on a scale of 1:250,000. All the work was done with the fathometer except a very small portion by the sonic depth finder.

CORRECTION TO SOUNDINGS

The method of computing the corrections for the soundings is given in the Season's Report for 1930, Project 55, and that for 1931, same project.

No slope corrections were made.

DANGERS

No dangers were discovered. Two Brothers Reef was found not to exist.

TIDES

No tidal corrections were applied as they were less than 1% of the depth.

CURRENTS

The current was generally WNW, but it varied considerably, especially near shoals.

ADJUSTMENT OF LINES

Line on A day was rejected, used for reconnaissance only. Line on B day was adjusted between visual fixes on 1B and 12B.

Line on C day was adjusted between 1C (bearings and V.A.) and visual fix on 26C; and between visual fixes on 27C and 42C.

Line on D day adjusted between 1D (bearing and V.A.) and 56 D (visual fix)

Line on E day was adjusted as follows: In order to check the shoal sounding on line B it was assumed that the true course and distance was made good between pos. 67 and 75, (visual fix). From pos. 67, the location of the marker buoy was determined, and with this location of the buoy an insert was made on a scale of 1:125,000 covering the shoal area. The positions were plotted back from 67E to 4E. In order to check the soundings on B day it was assumed that there was a southerly set while in the shoal area. The line was then adjusted from 4E to 1E so as to fit the depth curves on Brooks Shoal. The line was adjusted between visual fix on 75E and visual fix on pos. 107, together with depth curve.

Line on F day was adjusted between pos. 1F (visual fix) and star fix on 23F. However, a straight adjustment of the line did not check the depth curves on Gardner Pinnacle and it was assumed that a northerly current existed on the shoals which did not exist after passing the shoal. Pos. 12 and 16 were located so as to fit the depth curves and the distance run, assuming a true course of 296° was made good. This was allowing a 4° set, but however, this course checked the course made good between pos. 23F and 29F. The line was then adjusted

between 1F and 12F, and between 16F and star fix on 23F.

Line was adjusted proportionally from star fix on 23F to star fix on 11G.

Line on H Day adjusted proportionally between 1H and 12H, 1H was a visual fix, and 12H was determined so that the line would check the crossings between 4L and 5L.

The line on J day was adjusted proportionally between pos. 3J and 13J. Pos. 3J was a very poor star fix, and the position was determined by using the line of position by the sight on Polaris, and making the soundings on this line check the crossings between 38K and 39K, and between 17 and 18M. Pos. 13J was a visual fix. Pos. 1 and 2 J were plotted on distance and course.

Line on K day was adjusted according to dead reckoning course and distance between 1K and 7K, checking sun sights on 4K. Pos. 1K is the same as 65JJ, sheet No. 751.

The line was adjusted proportionally between 7K and star fix on 26K. Pos. 1K was the same as pos. 65JJ, sheet 751. Line was adjusted proportionally between 23L and star fix on 56L and between 56L and 63L. Pos. 63L was transferred from sheet No. 751, being pos. 1KK on that sheet.

Line on M day was adjusted between 1M and 8M to fit depth curves. 1M was transferred from pos. 82Z, sheet 251. Line was adjusted proportionally between 8M and 16M, pos. 16 being determined by using the sun sight on that position and the log distance. With this adjustment the crossings on the shoal area between 17M and 18M would check. Line was then adjusted proportionally between 16M and 39M. Pos. 39M was located so that the line between pos. 39 and star fix on pos. 50M would check the 1000 fathom curve. The line was then adjusted proportionally between 50M and 73M; 73M being located by bearing and the 500 fathom curve.

On N day the line adjusted between 1N and 5N so as to fit the 500 and 1000 fathom curves. 1N was a visual fix. Line was then adjusted proportionally between pos. 5N and 36N, using star fix on Pos. 30 for longitude and checking the 1000 fathom curve on pos. 26 and between 34 and 37 N. The line was then adjusted proportionally between 36N and 64N. Position 64N being located so as to fit depth curves on Raita Bank. Position 66N was located from the depth curves and line was adjusted

proportionally between 66 and 91N, the latter being located from depth curves on Gardner Pinnacles. Line was adjusted between 97N and 117N so as to fit depth curves on Gardner Pinnacles and to check crossings between 18F and 26F. Pos. 121F was determined from depth curve and line was adjusted proportionally to pos. 131N. The meridian altitude sight on pos. 131N was given half weight, as evidently a southerly current existed near Raita Bank, as was indicated by the location of pos. 135 which was determined from the depth curves. Line was then adjusted from pos. 140N, which was located from the depth curves on Raita Bank, to pos. 167 which was determined so that the soundings between pos. 157 and 167N fitted the depth curves on Gardner Pinnacles. The line was then adjusted proportionally between pos. 167N and star fix on 179N. Line was adjusted between 179N and 198N, which was located by depth curves and bearings. This adjustment checked the meridian altitude sight on pos. 193. Line was adjusted from pos. 200 N to star fix on 217N, checking depth curves between pos. 200 and 205. Line was adjusted between 217N and 237N, the latter position being located so that the soundings between pos. 236 and 238N checked the 500 fathom curve. Line was adjusted between pos. 237N and star fix on pos. 244. Line was adjusted from pos. 244 to 259. Pos. 259N was located so that the soundings between pos. 254 and 263 checked the existing depth curves. Line was adjusted from pos. 263 to star fix on pos. 272. Line was then adjusted between 272N and 7P, 7P and 14P being located so as to fit depth curves on Raita Bank.

Line on P day was adjusted proportionally between 14P and 21P and between 21P and 42P, 42P being determined so that the soundings between 39P and 42P checked the depth curves. Line was adjusted proportionally between 42P and star fix on 74P and from 74P to 88P. Pos. 88P was determined from meridian altitude and sun sights on pos. 83 and 85P. Line was adjusted from 88P to star fix on pos. 106P and from 106P to pos. 6R. Pos. 6R was located by checking soundings between 4R and 8R with depth curves.

Line on R day was adjusted proportionally between pos. 8R and star fix on 16R, and between 16R and star fix on pos. 36R.

Line on S day was adjusted proportionally between star fix on 3S and 27S; between 27S and star fix on 53S; between 53S and star fix on 78S; between 78S and star fix on 104S and between 104S and pos. 116S. Pos. 116S was determined from meridian altitude and sun sights on 111S and 113S. Line was adjusted between 116 and 131S. Pos. 131S was located from moon sights and sun sights on 120S and 124S. Line was ad-

justed proportionally between pos. 131S and star fix on 161S, and from 161S to 174S. Pos. 174S was determined from meridian altitude and sun sights on pos. 171S and pos. 178S. The line was continued on this adjusted course to pos. 185 which was a moon sight and used to check the longitude. The line was then continued on the adjusted course to pos. 192.

O. W. Swainson
O. W. Swainson,
H. & G. Engineer,
Commanding Ship PIONEER.

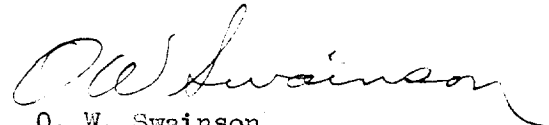
COMMENTS BY CHIEF OF PARTY

I did not check the plotting of this sheet very thoroughly as one of my older officers did the work and compared it with the boat sheet.

Most of the crossings are satisfactory. In one or two instances the straight adjustment was moved a small distance in order to make the soundings check better. These places are indicated under the subject "Adjustments" in the report.

The books containing the computations of sun and star sights will be forwarded when Sheet 751 and 251 are completed.

The star sights and dead reckoning books are forwarded separately.



O. W. Swainson,
H. & G. Engineer,
Commanding PIONEER.

December 16, 1932

Division of Hydrography and Topography:

✓ Division of Charts:

Tide Reducers are approved in
3 volumes of sounding records for

HYDROGRAPHIC SHEET 5213

Locality French Frigate Shoals to Raita Bank, Hawaiian Islands

Chief of Party: O. W. Sainson in 1930-31

Plane of reference is
ft. on tide staff at
ft. below B. M.

NOTE: Tide less than 1 per cent of
depth, no reducers necessary.

Condition of records satisfactory except as checked below:

1. Locality and sublocality of survey omitted.
2. Month and day of month omitted.
3. Time meridian not given at beginning of day's work.
4. Time (whether A.M. or P.M.) not given at beginning of day's work.
5. Soundings (whether in feet or fathoms) not clearly shown in record.
6. Leadline correction entered in wrong column.
7. Field reductions entered in "Office" column.
8. Location of tide gauge not given at beginning of day's work.
9. Leadline corrections not clearly stated.
10. Kind of sounding tube used not stated.
11. Sounding tube No. entered in column of "Soundings" instead of "Remarks".
12. Legibility of record could be improved.
13. Remarks.



Chief, Division of Tides and Currents.

SECTION OF FIELD RECORDS
Report on H. 5213
French Frigate Shoal to Raita Bank
Hawaiian Islands (Westward)
Surveyed May 1930 to November 1931
Instructions dated February 10, 1930 (Pioneer).

Chief of Party - O. W. Swainson.
Surveyed by - O. W. Swainson.
Protracted and Soundings plotted by - P. L. Bernstein.
Verified and inked by - R. J. Christman.

FATHOMETER

Dead Reckoning adjusted to Astronomical positions and to
depth curves on Banks.

1. The records conform to the requirements of the hydrographic manual except that no list of statistics was furnished; "N day" was carried over three days, viz. Nov. 9, 10, and 11, 1931.

2. The plan, character and extent of the development fulfill the requirements of the hydrographic manual and satisfy the specific instructions. There are only two vertical wire soundings and one bottom characteristic recorded. The sheet covers an area of 38,000 square statute miles.

3. CROSSINGS

Sounding line crossings generally are satisfactory.

A penciled note on the smooth sheet stated that "Soundings from 27F to 61G are perhaps 75 fathoms too deep O.W.S.". They were plotted as recorded, although agreements with adjacent lines are not very good.

Excepting pos. 238-N. ($25^{\circ}-24' 168^{\circ}-04'$), and also a number of soundings before and after the position, which have been shown by the large scale in-shore sheets to be displaced, the field adjustment of lines gives satisfactory crossings.

The line represented by position 1 to 12-H in long. $169^{\circ}35'$ does not give satisfactory agreement with adjacent soundings on the 900 fathom bank as finally adjusted. The adjustment of this line and its continuation on H. 5238a was examined and no revision was considered advisable.

4. DEPTH CURVES

Depth curves can be drawn satisfactorily when the soundings are combined with the larger scale developments on the banks embraced by H. 5213. Except in $24^{\circ}-35' 168^{\circ}-23'$ where the 1000 fathom depth curve is not fully defined on this sheet or on H. 5021.

5. FIELD PLOTTING

The field plotting was good - about 2% of the soundings depending on time spacing were replotted and several erroneous depth values corrected.

H. 5213.

6. JUNCTION WITH OVERLAPPING SHEETS.

H. 5012.

The entire work on this sheet including sun sights and positions has been transferred and adjusted on H. 5213, and the records incorporated with those of the latter.

H. 5213 is on double the scale of H. 5012 and, as the latter sheet is no longer of value. H. 5213 should be used for all purposes, for the area covered by H. 5012, by order of Chief of Field Records Section.

H. 4650a.

The portion of the two lines on this sheet falling within the limits of H. 5213 were replotted from the original records in brown on H. 5213.

In 167°-15' the upper line was adjusted to H. 5213. In 167°-55' the lower line was adjusted to conform with H. 5213.

H. 5055a.

In 166°-05' considerable differences in depth were noted. The soundings on H. 5213 in this vicinity are controlled by a good star fix and were not disturbed.

The line on H. 5055a between 40-G and 135-G was adjusted to conform with H. 5213 and the chief of Cartographic section advised of the change.

H-4867, H. 5010 (a and b), H. 5021, H. 5037, H. 5206, H. 5207.

The sounding lines on H. 5213 overlapping the area covered by the above large scale sheets had been adjusted to the depth curves by the field party.

Except in 25°-43' - 169°-25' (H. 5207) where the soundings were further adjusted southeastward about $\frac{1}{4}$ mile the field adjustments to this group were accepted.

On H. 5206 on the north and south sides of Brooks Shoal the undeveloped areas are quite large. On the north side particularly the condition is uncertain owing to the existence of a wide undeveloped gap.

This sheet (H. 5213) joins the cable surveys to northward.

H. 5238a.

Junction with this sheet on the S. E. is a continuing line having the same astronomic control and dead reckoning. No discrepancy was noted here.

H. 5239.

Junction with this sheet is good. A 2400 fathom sounding in 24°-35' - 169°-38' appears to belong further north but it was considered unwise to

H. 5213.

attempt further adjustment here.

Remarks.

1. This sheet which contains the entire work on H. 5012 (transferred and adjusted) and portions of the two lines from H. 4650 (a and b) replotted and adjusted should be considered the basic survey of this area.
2. Chart 4000 does not show the 30 fathom bank 20 miles N. W. of St. Rogation Bank.
3. Attention is invited to a 37 fathom sounding approximately 5 miles S. E. from Gardner Pinnacles.

This sounding which is from H. 4650a was transferred to H. 5021 also.

4. Note a 681 fathom sounding in $23^{\circ}-36'$ - $166^{\circ}-23'$.

This sounding which appears discredited by adjacent depths is confirmed by the succeeding uncharted sounding of 715 fathoms in the record.

5. The descriptive report states that Two Brothers Reef does not exist, but it is noted that there are indications of shoaling about 5 miles to the north and 5 miles to the south of the reported position of this reef.
6. A small bank represented by the 400 fathom depth curve is noted in $25^{\circ}-23'$ - $168^{\circ}-40'$.
7. No further surveying is required in the area covered by this sheet.

Respectfully submitted,

J. Fleming.

May 23, 1933.

Inspected: E. P. Ellis.

Approved: *L. O. Solbert*
L. O. Solbert, Chief, Field Records Section.

J. B. Bonds "Field Clerk"

W. H. Raper, Chief, Charts
G. H. Hude, Chief, Div. of Hydrog.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO. 5213

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. 252

REGISTER NO. 5213

State ~~Territory of Hawaiian Is.~~

General locality ~~Hawaiian Islands~~ Westward

Locality ~~West of~~ French Frigate Shoal to Raita Bank

Scale 1:250,000 Date of survey ^{May} ~~June~~ 1930 to Nov. ~~1932~~ 1931

Vessel Steamer PIONEER

Chief of Party O. W. Swainson

Surveyed by O. W. Swainson

Protracted by P. L. Bernstein

Soundings penciled by P. L. Bernstein

Soundings in fathoms ~~xxx~~

Plane of reference MLLW

Subdivision of wire dragged areas by

Inked by

Verified by

Instructions dated Feb. 10, 1930, ~~1931~~

Remarks: All the work on H-5012 has been transferred to this sheet which should be used for all purposes.

Field Records Section (Charts)

HYDROGRAPHIC SHEET No. 5213

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

Number of positions on sheet	1095
Number of positions checked	100 approx *
Number of positions revised	2 erroneous dist. plotted
Number of soundings recorded	4622
Number of soundings revised	23 erroneous values plotted about 2% spacing corrections.
Number of signals erroneously plotted or transferred

Date: Feb. 9th 1933.....

Cartographer: R. J. Christman.....

* The adjustment of lines by the Field Party was accepted. A description of the adjustment is given in the Descriptive Report.

Position 238 N was adjusted to conform to depths on H-5021.

Applied to compilation 4172 Aug. 1946 L.S.S.