

4650a&b

4650a&b

Form 504
DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

Terr. ~~State~~ Hawaiian Islands
11-5613

DESCRIPTIVE REPORT.

Hyd. Sheet No.'s. 1 & 2 4650a & b

LOCALITY:

Kauai to Lisianski Islands.
Kauai to Gardner Pinnacles
~~Hawaiian Group.~~

1927

CHIEF OF PARTY:
F. G. Engle

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

The finished Hydrographic Sheet is to be accompanied by the following title sheet, filled in as completely as possible, when the sheet is forwarded to the Office.

U. S. Coast and Geodetic Survey.

Register No. **46502**

46502

State . . . ~~Territory of Hawaiian Islands~~

General locality . . ~~Hawaiian Islands~~ Between Kauai and Lisianski I.

Locality . . ~~Kauai Island to Lisianski Island~~ Gardner Pinnacles

Chief of party . F. G. Engle, Hyd. & Geod. Engineer Comdg.

Surveyed by . U. S. C. & G. S. S. DISCOVERER.

Date of survey . March ²⁵ & April ⁵ 1927.

Scale . 1 - 500,000

Soundings in . Fathoms

Plane of reference . No tide reductions made.

Protracted by (~~E.W.B.~~^{#2})(~~T.B.R.~~^{#1}) Soundings in pencil by (~~E.W.B.~~^{#2})(~~T.B.R.~~^{#1})

Inked by Verified by > H46502

Records accompanying sheet (check those forwarded):

- 2 Des. report, No Tide books, No Marigrams, No Boat sheets,
- 3 Sounding books, No Wire-drag books, 2 Photographs, 1 log,
- 103 Star & Sun sights, 9 Precise Dead Reckoning Sheets.
- Data from other sources affecting sheet

Remarks: Fathometer Track Soundings

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

REG. NO. 4650b

HYDROGRAPHIC TITLE SHEET

Prepared at Office, F.R.

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. 2

REGISTER NO. **4650b**

State Hawaiian Is.

General locality Kauai to Lisianski I.

Locality Gardner Pinnacle to Lisianski I.

Scale 500,000 Date of survey Mar. 25~Apr. 5, 1927

Vessel Discoverer

Chief of Party F. G. Engle

Surveyed by F. G. Engle

Protracted by E. W. E.

Soundings penciled by E. W. E.

Soundings in fathoms ~~feet~~

Plane of reference No tide reductions made

Subdivision of wire dragged areas by

Inked by John G. Ladd

Verified by J. G. L.

Instructions dated _____, 192

Remarks: Fathometer Track Soundings

pp0

Applied to chart 4183

*Aug. 12, 1940
G. H. S.*

R E P O R T

T O A C C O M P A N Y

SHEETS NO'S. 1 & 2 FATHOMETER TRACK SOUNDINGS
KAUAI TO LISIANSKI ISLANDS. -- HAWAIIAN GROUP

MARCH & APRIL 1927.

- 1.- These sheets cover a double line of soundings by the U. S. C. & G. S. S. DISCOVERER between Kauai Island and Lisiansky Island, taken with the Fathometer Echo Sounding apparatus as developed and manufactured by the Submarine Signal Co. between March 25 and April 5, 1927 on a trip of inspection by the Chief of the Division of Hydrography and Topography, Commander W. E. Parker.
- 2.- Accompanying the sheets are the following:- Original Log Record of time, courses, log readings, etc. Original record of sights on individual sheets; Precise dead Reckoning abstract form 612; Sounding Records; 1 Topographic Sheet French Frigate Shoals.
- 3.- Mean time Chronometer #1551 was used as the Standard time piece and the correction and rate was established by frequent radio time signals. The hack watch was set to 157°- 30' Mer. (W.) time and the comparisons with chronometer were entered in the log record. Soundings and log record were referred to this watch.
- 4.- The computation of all sights was checked and practically all sights taken are plotted on the sheets in actual line of position in black ink accompanied by a notation of the sight number, object, observer and log reading.
- 5.- Positions were adopted at intervals from groups of the lines of position. For this purpose the lines were moved to a common log reading by the dead reckoning course and distance between this common log reading and that of the sight. After adopting a trial position this movement was altered to agree with the course and distance made good as given by the trial position, in the case of comparatively distant sights, and when discrepancy between D. R. and trial positions was large. (Shown by yellow dashed line with arrow towards adopted pos.) Thus a more accurate placing of the moved sights was obtained. The final adoption of position was then made. The moved positions of the sights are shown in blue ink with a notation of the number of the sight. Some of the actual and moved lines were plotted in an adjacent projection square, so as not to obliterate soundings and anchorages.
- 6.- The first position (#10) at Nihoa Island Anchorage (8 sights, average discrepancy 0.9 mile) indicates that this Island is 2 3/4 mi. S.SE. of its charted position.

The second position #34 at Necker Island Anchorage (12 sights average discrepancy 1.3 mile) indicates that this Island is 1 1/2 mi. W.SW. of its charted position.

The third position #45 (6 sights 0.7 mi. disc.) at French Firgate Shoals anchorage agrees with the charted position of the anchorage.

The fourth position #54 (4 sights av. disc. 0.2 mi.) was at sea.

The fifth position #57 (4 sights av. disc. 1.1 mi.) was also at sea.

The sixth position #77 (12 sights av. disc. 0.85 mi.) was at Lisianski Anchorage and indicates that the Island is 1.6 mi. N. & W. of of its charted position.

The seventh position #85 (7 sights av. disc. 0.4 mi.) was at sea.

The eighth position #94 (6 sights av. disc. 1.7 mi.) was at Laysan Island and indicated that the Island is 1 1/2 mi. N. & W. of its charted position.

The 9th. position #98 (3 sights av. disc. 0.0 mi.) was at sea.

The tenth position #119 (7 sights av. disc. 1.0 mi.) was at sea.

7.- It will be seen that the average discrepancy of a sight from the adopted positions is about 1 mile and some idea of the accuracy to be expected of positions in this area is gained. In good weather three positions in each 24 hours can be obtained one at dawn one at Noon and one at Twilight. On the return line however a run of 540 miles was made without obtaining any sights.

8.- The line run was adjusted between adopted positions and the log readings were used as a basis for plotting the time and the soundings.

9.- In some places the echo was not distinguishable in over 1000 fathoms due to noise in the headset probably caused by grounds in the ships supply line. At times echos were heard in 2600 fathoms.

10.- Accompanying the sounding sheets is a topography survey of the Sand Island at French Frigate Shoals, on a scale of 1:20,000 by Lieut. (J.G.) L. S. Hubbard. From a plane table base on the Island and reef about 1000 meters long, the ship and La Perouse Pinnacle and other sand Islands were cut in. The two Islands about 4 mi. S.E. of the anchorage were cut in and distance estimated from the ship as these could not be seen from the other sand Island visited.

*This topographic survey has been canceled and destroyed.
See descriptive report of T. 4269*

E. K. K.

F. G. Engle

F. G. Engle
H. & G. Engineer,
Comdg. Str. DISCOVERER.

STATISTICS SHEET NO. 1

<u>Date 1927</u>	<u>Volume</u>	<u>Positions</u>	<u>Sdgs.</u>	<u>Statute Miles</u>	<u>Vessel</u>
March 25	1	2	85	26.4	DISCOVERER
" 26	1	15	270	229.1	"
" 27	1	19	345	164.3	"
" 28	1	9	179	78.3	"
" 29	1	5	106	100.0	"
" 30	1	1	6	8.1	"
April 3	2	3	136	123.4	"
" 4	2	6	189	218.6	"
" 4	3	1	45	29.7	"
" 5	3	<u>14</u>	<u>212</u>	<u>177.2</u>	"
	Totals----	75	1573	1155.1	

STATISTICS SHEET NO. 2

<u>Date 1927</u>	<u>Volume</u>	<u>Positions</u>	<u>Sdgs.</u>	<u>Statute Miles</u>	<u>Vessel</u>
March 30	1	8	128	254.0	DISCOVERER
" 31	1	10	100	201.3	"
" 31	2	8	31	4.2	"
April 1	2	13	216	107.4	"
" 2	2	9	296	202.4	"
" 3	2	<u>8</u>	<u>331</u>	<u>144.0</u>	"
	Totals---	56	1102	913.3	



Nihoa Island from South.



Necker Island from Southwest.

11

June 16, 1927.

Division of Hydrography and Topography:

Division of Charts:

Tide reducers are approved in
volumes of sounding records for

HYDROGRAPHIC SHEET 4650a and b

Locality: HAWAIIAN ISLANDS, KAUAI I. - LISIANSKI I.

Chief of Party: F. G. Engle, 1927.

Plane of reference is M L L W
ft. on tide staff at

~~No tide reducers necessary because of great depth and small tidal range -
Range of tide about 1 foot.~~
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 each 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.

April 24, 1928.

Section of Field Records
Report on Hydrographic Sheets No. 4650 a & b
Kauai to Lisianski Islands
Hawaiian Islands.
Surveyed in March and April, 1927.

Chief of Party - F. G. Engle.

Surveyed by - Steamer DISCOVERER, F. G. Engle commanding.

Lines adjusted and soundings plotted by - E. W. Eickelberg and T. B. Reed.

Verified and inked by - John G. Ladd.

1. This survey must be considered as a reconnaissance survey only. It evidently was not made in accordance with any written instructions. My understanding is that the Fathometer had recently been installed and it was desired to test it. The Chief of the Division of Hydrography and Topography was on board the Steamer DISCOVERER and he wished to make an inspection of the area and conditions to the westward of the Hawaiian Islands. Therefore, these two sounding lines were run.

2. The records do not conform to the general instructions in several points, nor to the best practice. This can be excused by the fact that this was a new type of survey and was probably hastily planned. The records in several respects improve after the beginning.

(a) In the sounding record, temperatures are not marked as to bottom or surface. Presumably they are all surface temperatures.

(b) Temperature factors are not entered.

(c) Feet and fathoms columns are not correctly indicated at the top of the page.

(d) The check mark is not entered in the "Reed" column in many cases.

(e) There are no remarks at the head of page 4 as to the type of survey nor to where the data for plotting were recorded.

(f) Soundings on pages 4 - 7 up to position 1 should have been rejected.

(g) Sights should not be recorded nor computed on loose leaves.

(h) Soundings are not inked in north and south. This undoubtedly was intentionally done on account of lack of space.

OK

(1) Descriptive Report is scarcely adequate. It is supplemented by remarks made by me a little farther on.

Questions 2, 3 and 4 scarcely apply to this sheet.

5. In some few places the sounding curves could have been joined a little more fully but in general no complete curves could be drawn on this sheet.

6. The field plotting was completed but it was not done in accordance with what, to my mind, is the best practice. On a sheet of this type, it is very difficult to decide just what has been done without completely replotting the sheet. However, some of the methods are very apparent.

In this adjustment, sights are not always used where taken but are run forward or backward long distances to get fixed positions at desired times. ^{This is not desirable.} Sights should be used when taken, with the ^{exception} of star sights taken at dawn or dusk and in rapid succession. These should be run to one point.

In this adjustment, lines apparently, in general, have been adjusted from one anchorage to the next and individual sights have been disregarded. Several examples of wrong application have been picked out and are called to your attention as follows:

Sight #30 at log 167.4 has not been used where plotted but has been run up to noon and used in conjunction with the noon sight. Now upon examination it is seen that position 53 at 8:00 A.M. was at log reading 167.2 and yet it actually plots more than three miles west of sight 30. Yet sight 30 is used after being run up.

Sights #48 were taken, according to log, previous to position #63 and yet it plots a mile and a half south of sights #48.

Many star sights were taken within fifteen or twenty miles from an anchorage. These were not used at the time of observation but were run up to the anchorage. This is poor practice because the run up includes indeterminate factors such as running at half speed, at slow speed and anchoring.

Lines of this type should be adjusted from one star sight fix to the next star sight fix with intermediate sights used as lines of position, but not run up.

7. The office draftsman checked the spacing of the soundings only and not the adjustment of the lines.

8. No junctions with other sheets are available because of the type of the survey. (See next paragraph).

9. Much further surveying is required to complete and develop this area. In this connection your attention is called to the following comparison with other records, as follows:

The 24 fathom sounding on B. A. chart #782 in Latitude $22^{\circ} 34'$ and Longitude $161^{\circ} 05'$ is undoubtedly indicated by the 181 fathom and adjacent soundings in Latitude $22^{\circ} 45'$ and Longitude $160^{\circ} 58'$.

The 20 fathom sounding on B. A. chart #782 in Latitude $23^{\circ} 16'$ and Longitude $162^{\circ} 46'$ is undoubtedly indicated by the 32 fathom and adjacent soundings in Latitude $23^{\circ} 10'$ and Longitude $162^{\circ} 56'$.

The indications are that the other 20 fathom sounding in this vicinity, Latitude $23^{\circ} 15'$ and Longitude $163^{\circ} 17'$ does not exist as a separate shoal and it is probably identical with the previous 20 fathom sounding.

Frost Shoal, Latitude $23^{\circ} 44'$, Longitude $163^{\circ} 26'$ was not passed closely enough to be indicated.

The distance shoal water was found ESE of Necker Island checks B. A. chart #782 very closely.

The 57 fathom sounding Latitude $23^{\circ} 51'$, Longitude $165^{\circ} 32'$ shown on B. A. chart #782 was not passed closely enough to be indicated.

The 18 fathom St. Rogatien Shoal, Latitude $24^{\circ} 15'$ and Longitude $167^{\circ} 12'$, and Brooks Shoal to the ESE were not passed closely. However, the 200 to 300 fathoms soundings in Latitude $24^{\circ} 45'$, Longitude $167^{\circ} 20'$, are undoubtedly indicative of these shoals.

The indication of shoaling about 55 miles south of Gardner Pinnacle should be investigated. There is no indication near here on the existing charts with the exception of the Two Brothers Reef mentioned in our Coast Pilot but not shown on the B. A. chart. A possible indication of this Two Brothers Reef is also found in Latitude $24^{\circ} 15'$ Longitude $168^{\circ} 33'$.

The 16 fathom shoal, Latitude $25^{\circ} 43'$ Longitude $169^{\circ} 24'$, shown on B. A. chart #782 is clearly indicated by the 13 fathom soundings obtained about 15 miles to the south westward.

Mayo and Dowsett Reefs were not passed closely enough, although the 600 fathom soundings in Latitude $25^{\circ} 52'$ and Longitude $170^{\circ} 56'$ may be indicative of these shoals.

The indication shown by the 600-700 fathom soundings in Latitude $25^{\circ} 10'$, Longitude $172^{\circ} 29'$, are not shown on existing charts.

The 1200 fathom soundings, Latitude $25^{\circ} 44'$ Longitude $172^{\circ} 12'$, the 1100 fathom soundings, Latitude $25^{\circ} 43'$ Longitude $172^{\circ} 37'$, and the 1100 fathom soundings, Latitude $25^{\circ} 43'$ Longitude $172^{\circ} 55'$ should be further investigated. They may be indicative of much shoaler water.

The 26 fathom sounding, Latitude $25^{\circ} 56'$ Longitude $173^{\circ} 30'$, not shown on previous charts should be investigated. It may be the eastern end of the shoals surrounding Lisianski Island or it may be a detached shoal.

10. Further remarks.

(a) No new position of La Perouse Pinnacle is indicated on the sheet although the position near here is located by sights.

(b) Where was the name La Perouse Pinnacle obtained? I can not find it on existing charts or in the Coast Pilot. *Since found on chart #4000*

(c) Evidently the position of Gardner Pinnacles is accepted as correct and the line adjusted to it, inasmuch as very few sights were obtained in this part of the run.

(d) The sunken rocks near Lisianski Island are a mystery. The one in Latitude $25^{\circ} 48'$ Longitude $173^{\circ} 42'$ is accompanied by a pencil note that it was taken from chart #4. The other two sunken rocks in Latitude $25^{\circ} 57'$ Longitude $173^{\circ} 48'$ and Latitude $25^{\circ} 54'$ Longitude $174^{\circ} 00'$ respectively at one time had a pencil note which has been erased. *Since, these three rocks have been found on chart #4000*

None of these three rocks is found on chart #4. The Coast Pilot mentions that a vessel struck 12 miles SE of Lisianski Island and this position corresponds to the sunken rock in Latitude $25^{\circ} 57'$ Longitude $173^{\circ} 48'$.

The Dead Reckoning book gives estimated distances and bearings to two breakers in this general direction which are not plotted on the sheet. *(There are about 3 or 5 miles south of the island and were located on the large scale survey &.)*

The sunken rock in Latitude $25^{\circ} 48'$ Longitude $173^{\circ} 42'$ has been run very close to and no indications of it are found on the sounding line.

(e) The Descriptive Reports have been registered as 4650 a and 4650 b. This is wrong. These are duplicates but they accompany two sheets. Each Descriptive Report should be marked 4650 a and b.

(f) Not enough temperatures were taken.

(g) The putting of original data in permanently bound records rather than on loose sheets can not be stressed too much and the records accompanying this sheet are to be strongly criticized in this respect.

(h) In this connection, please refer to a report recently submitted to this office on "Star-Control Echo-Sounding".

11. Considering this as a reconnaissance survey and the initial use of the Fathometer on the Steamer DISCOVERER (a) the character and scope of the surveying is rated good and (b) the field drafting fair.

Sheet and records reviewed by K. T. Adams April 24, 1928.

Submitted by

K. T. Adams
H. & G. Eng.

Approved: *See recommendation on sheets.*

The lines on 4650 a & b were replotted on other sheets done at latter date and on larger scale. These sheets should be used for charting instead of 4650 a & b.

Chief, Section of Field Records (Charts).

J. O. Collett.

Chief, Section of Field Work (H. & T.).

Applied & checked 4172 Aug 21 1946 D.L.