

# 5038

Original

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Form 504  
Ed. June, 1928

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY.  
R. S. Patton, Director

State: Hawaiian Ids.

U. S. COAST & GEODETIC SURVEY  
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DESCRIPTIVE REPORT

~~Topographic~~ } Sheet No. Field NO. 9.  
Hydrographic } **5038**

LOCALITY

Nihoa Island

1929

CHIEF OF PARTY

K. T. Adams.

# 5038

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DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

REG. NO. 5038

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. 9

REGISTER NO. **5038**

State Hawaiian Islands

General locality Nihoa Id.

Locality Around Nihoa

Scale 1:60,000 Date of survey April 28-May 15, 1929

Vessel G U I D E

Chief of Party K. T. Adams

Surveyed by G U I D E K. T. ADAMS

Protracted by G. W. Lovesee, H. P. Odessey

Soundings penciled by H. P. Odessey

Soundings in fathoms ~~feet~~

Plane of reference M.L.L.W.

Subdivision of wire dragged areas by

Inked by Warren H. Bamford

Verified by WHB

Instructions dated March 26, 1928 and April 12, 1929, 19-

Remarks:

Descriptive Report  
Accompany Hydrographic Sheet #9.  
Hawaii I, T.H.

The hydrographic survey on this sheet was done in compliance with instructions for Project 22, dated March 26, 1928.

SURVEY METHODS.

All soundings taken on this sheet were taken by the Fathometer, red light soundings on the average being obtained to 350 fathoms and white light soundings in greater depths. Owing to the fact that the control was by continuous runs, check soundings were, as a rule, only obtained at the beginning and end of the day.

The control on this sheet was the poorest of any sheet done in the Hawaiian Islands. During the early part of the summer of 1928 this vessel, under the command of Lieutenant-Commander T.J. Maher, had planted a hydrophone near Nihoa Island and laid a cable to the shore. By the time we came here to start work the cable was broken away and lost and the buoy marking the hydrophone was gone and the hydrophone not recoverable.

For some time this vessel lay waiting for good enough weather to plant another hydrophone. This was not obtained and rather than delay longer another method was attempted.

One surveying buoy was anchored about nine miles northeast of Nihoa Island and was located by a double full speed run from Nihoa Island. Two other buoys were anchored west-south-west of Nihoa Island, located by the same method, at distances of twelve and twenty-four miles respectively.

The area was then covered by full speed runs in broken lines from one located point to another or by full speed loops from one located point out into deep water and return to the same point.

This made the method used rather a combination of "Buoy Control" and dead reckoning loops.

As stated above the control on this sheet was the poorest on any sheet done in Hawaiian waters, due to the fact that the buoys were too far apart and the fact that all the personnel were unfamiliar with this type of work. As the season progressed the form of control became more and more accurate.

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DISCREPANCIES.

In this type of control discrepancies necessarily exist and these have been adjusted in accordance with our best judgment on the smooth sheets and in the records. The method used was, after all lines were adjusted for dead reckoning closures, to place all soundings on the sheets, draw the depth curves and see wherein these depth curves did not appear reasonable. The weakest lines were then further adjusted to make the depth curves appear reasonable. ✓

DANGERS.

There are no known dangers within the limits of this sheet. Deep water exists right up close to Nihoa Island, a survey of the inshore area being found on my sheets #14 and #15. ✓

The shoalest water found away from the island was fifteen fathoms, four and a half miles west by south of signal Mid. ✓

ANCHORAGES.

There is no protected anchorage on this sheet. This vessel anchored over the entire shoal area during the progress of the work. The holding ground is poor. The best anchorage, during the prevailing trade winds is west-south-west of Nihoa Island and is discussed more in detail on sheet #15. ✓

COMPARISON WITH PREVIOUS SURVEYS.

Previous surveys of this area are so limited in scope that a comparison is useless. However, the previously shown sketch of the shoal area was surprisingly correct.

LIMITS.

This area was surveyed on 1:60,000 scale, this being the largest practical scale on which the entire area could be surveyed on one sheet. The sheet is joined on its outer limit by my hydrographic sheet #6 and on its inner limit by hydrographic sheet #15.

CURRENTS.

H 5155 a

H 5018

Currents are strong around the edge of the shoals and especially in the deep water channel between the two shoal areas, which is about eight miles west-south-west of Nihoa Island.

Current observations were made on six nights while the vessel was at anchor. The largest measured current was 1.4 knots. All currents were taken while the normal northeast trade wind was blowing.

TIDES.

No tides were observed in this vicinity. Honolulu tides were used, corrected for height and a time difference.

*No tide reductions made on sheet*

SERIAL TEMPERATURES.

Surface temperatures were taken daily. A serial temperature was taken near position 115-K.

REDUCTION OF SOUNDINGS.

All red light soundings have been reduced for temperature and salinity. This reduction has been omitted in white light soundings in accordance with your authority in letter dated December 12, 1929 which was based on the following information, quoted from my letter of December 5, 1929.

"I give herewith a resume' of the reductions necessary on one sheet which has already been reduced.

From zero to 200 fathoms the reductions are plus and gradually increase from zero to three fathoms.

From 200 fathoms to 450 fathoms the reductions gradually decrease from plus three fathoms to zero.

From 450 fathoms to 1500 fathoms the reductions are negative and gradually increase from zero to seven fathoms.

From 1500 fathoms to 2250 fathoms the reductions are negative and gradually decrease from seven fathoms to zero.

From 2250 fathoms to 2635 fathoms the reductions are again positive and gradually increase from zero to eleven fathoms.

It is therefore to be seen that this reduction is always less than one half of one percent and is generally very much less than that. Also this reduction is always less than half of the probable error of observation of a whitelight sounding."

METHOD OF PLOTTING SMOOTH SHEET.

Dead reckoning sheets, submitted herewith, were made up from the sounding records. These included all the data necessary for plotting the smooth sheet. The smooth sheet was then plotted one loop at a time. From a fixed position the line was plotted by dead reckoning to the next fixed position. The closure was then distributed. All bearings and arcs of angles were then plotted and the entire line re-adjusted to fit these angles exactly and the bearings approximately. After the soundings were put on the sheet all depth curves were drawn and where these curves did not look regular and reasonable, the weakest line was re-adjusted.

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RECORDS.

The following records form a part of this sheet:

- 6 Hydrographic records ✓
- 1 Buoy location record ✓
- Descriptive report ✓
- Dead reckoning data sheets ✓
- 1 Smooth sheet ✓
- 1 Boat Sheet. ✓

Respectfully submitted,

*K. T. Adams*

K. T. Adams,  
Chief of Party,  
Steamer GUIDE.

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LIST OF SIGNALS  
Sheet #9.  
Nihoa Island.

Topographic Signals, from Sheet A, 1928, of Nihoa Island.

Mid  
Miller  
Needle  
South Peak  
Tan

Buoy Locations.

East-Miller 328-45.0 )  
Mid-Miller 70-20.73 ) true azimuths.  
Ult-Miller 78-57.5 )

Dot  
Fix

Miller 4-17)  
Mid ) Miller-Dot 53-50  
Ult 138-49)

At Dot ----- Mid-Miller 4-48

Dead reckoning buoy positions were plotted and adjusted directly on the smooth sheet.

✓

STATISTICS FOR SHEET #9 NIHOA ISLAND.

Date	Day	Stat. Miles of sdg.			No. of soundings			Total	No. of Pos.
		R.L.	W.L.	Total	R.L.	W.L.	V.C.		
4-28-29	A	22.8	14.3	37.1	131	34		165	48
4-29-29	B	108.0	12.0	120.0	416	44	2	462	152
4-30-29	C	89.4	29.8	119.2	318	74	2	394	158
5-1-29	D	124.8	3.5	128.3	399	8	2	409	163
5-2-29	E	113.6	14.9	128.5	351	36	2	389	167
5-4-29	F	46.8	12.6	59.4	233	35	3	271	78
5-5-29	G	22.0	10.6	32.6	125	25	2	152	45
5-6-29	H	34.3	3.4	37.7	250	11	2	263	68
5-7-29	J	75.5	33.1	108.6	356	91	2	449	161
5-8-29	K	74.5	9.1	83.6	404	25	3	432	114
5-9-29	L	78.9	44.7	123.6	447	119	2	568	160
5-10-29	M	66.0	47.0	113.0	310	113	2	425	144
5-11-29	N	128.4	----	128.4	555	---	2	557	146
5-12-29	P	69.2	4.7	73.9	332	11	3	346	84
5-13-29	Q	92.9	25.1	118.0	421	63	2	486	144
5-14-29	R	65.7	22.3	88.0	53	268	2	323	103
5-15-29	S	59.0	----	59.0	---	280	2	282	98
TOTAL		1269.8	287.1	1556.9	5101	1237	35	6373	2033

Data Sheet for Ocean Observations  
Sheet #9 Nihoa Id.

Sample No. Date Time	Lat. Long.	Temp °C	Depth	Salinity
133 4/26/29 7:00P.M.	23-04.3 161-24.3	24.1	Surface	35.00
134 4/29/29 7:12 A.M.	23-14.2 161-42.3	24.4	Surface	35.01
135 4/29/29 8:20 P.M.	23-03.2* 161-54.5	24.5	Surface	35.16
136 4/30/29 8:15 A.M.	23-04.2 161-38.6	25.1	Surface	34.97
137 4/30/29 11:11 A.M.	23-17.3 161-54.3	24.7	Surface	34.94
138 4/30/29 8:00 P.M.	23-08.9 161-46.6	24.5	Surface	34.96
141 5/7/29 11:20 A.M.	23-07.2 162-06.6	24.5	Surface	35.00
142 5/8/29 2:57 P.M.	22-54.12 162-01.34		1489 fms	34.79
143 5/8/29 4:25 P.M.	22-54.12 162-01.34	4.85	410 fms.	34.46
144 5/8/29 6:30 P.M.	22-54.12 162-01.34	22.1	Surface	35.03

\*no room to plot

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Sample No.	Lat.	Temp.	Depth	Salinity.
Date	Long.	°C		
Time				
146				
5/9/29	23-10.5			
10:40 A.M.	162-26.0	23.7	Surface	34.97
146a				
5/16/29	23-16.0			
1:00 P. M.	163-08.5	24.1	Surface	35.00
147				
5/16/29	23-15.5			
4:20 P.M.	163-10.0	26.0	Surface	34.93
148				
5/17/29	23-11.28			
10:00 P.M.	163-10.05	24.0	Surface	34.88
150				
5/18/29	22-48.0			
11:00 P.M.	161-27.1	23.7	Surface	35.12

Note: Refer to copy of Salinity observations made by GUIDE, sent to the DIRECTOR by the Scripps Institute of Oceanography of the University of California, under date of September 18, 1929.

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Depth	Temp °C	Sum	Mean °C for Layer	Factor	Corr. Fms.	DEPTH	CORRECTION
13 <sup>1</sup> / <sub>2</sub>	24.6		24.60	+ .0259	+ 0.34	13	+ 0.3
26-2/3	24.4	49.0	24.50	+ .0257	+ 0.69	14.7	+ 0.4
40	23.5	72.5	24.13	+ .0252	+ 1.01	18.5	+ 0.5
53-1/3	21.7	94.2	23.55	+ .0241	+ 1.29	22.3	+ 0.6
66-2/3	21.0	115.2	23.04	+ .0231	+ 1.53	26.1	+ 0.7
80	20.4	135.6	22.60	+ .0222	+ 1.70	30.2	+ 0.8
93-1/2	19.4	155.0	22.14	+ .0213	+ 1.96	34.4	+ 0.9
106-2/3	17.8	172.8	21.60	+ .0202	+ 2.16	38.5	+ 1.0
120	16.8					43.1	+ 1.1
133-1/3	16.2	205.8	20.58	+ .0182	+ 2.43	47.9	+ 1.2
146-2/3	15.4					52.6	+ 1.3
160	14.5					58.0	+ 1.4
173-1/3	13.5					63.6	+ 1.5
186-2/3	12.7	261.9	18.71	+ .0147	+ 2.74	70.2	+ 1.6
200	11.8	273.7	18.25	+ .0139	+ 2.78	78.0	+ 1.7
213-1/3	11.0					82.6	+ 1.8
226-2/3	10.2	294.9	17.35	+ .0122	+ 2.77	85.4	+ 1.9
240	9.4	304.3	16.91	+ .0113	+ 2.71	90.5	+ 2.0
253-1/3	8.5					190	+ 3.0
266-2/3	8.0	320.8	16.04	+ .0096	+ 2.56	231	+ 2.0
280	7.5					325	+ 1.0
293-1/3	7.0					401	
306-2/3	6.7						
320	6.3	348.3	14.51	+ .0057	+ 1.82		
333-1/3	6.0	354.8	14.17	+ .0049	+ 1.63		
346-2/3	5.7						
360	5.5						
373-1/3	5.3						
386-2/3	5.2						
400	5.0	381.0	12.70	+ .0019	+ 0.76		
413-1/3	4.9	385.9	12.45	+ .0014	+ 0.58		

No corrections applied in depths  
greater than 400 fms.

Sheet #9 Nihoa Id.

Log Data

<i>Period</i>	<i>Log No.</i>	<i>Factor</i>	<i>Log No.</i>	<i>Factor</i>
Jan. 11-April 28 5:00 P.M.	194	0.965	195	1.049
Apr. 28-May 31 5:00 P.M.-5:30 A.M.	194	0.931	195	1.013

Compass Deviation

April 23-25/1929

For use April 23-May 20, 1929

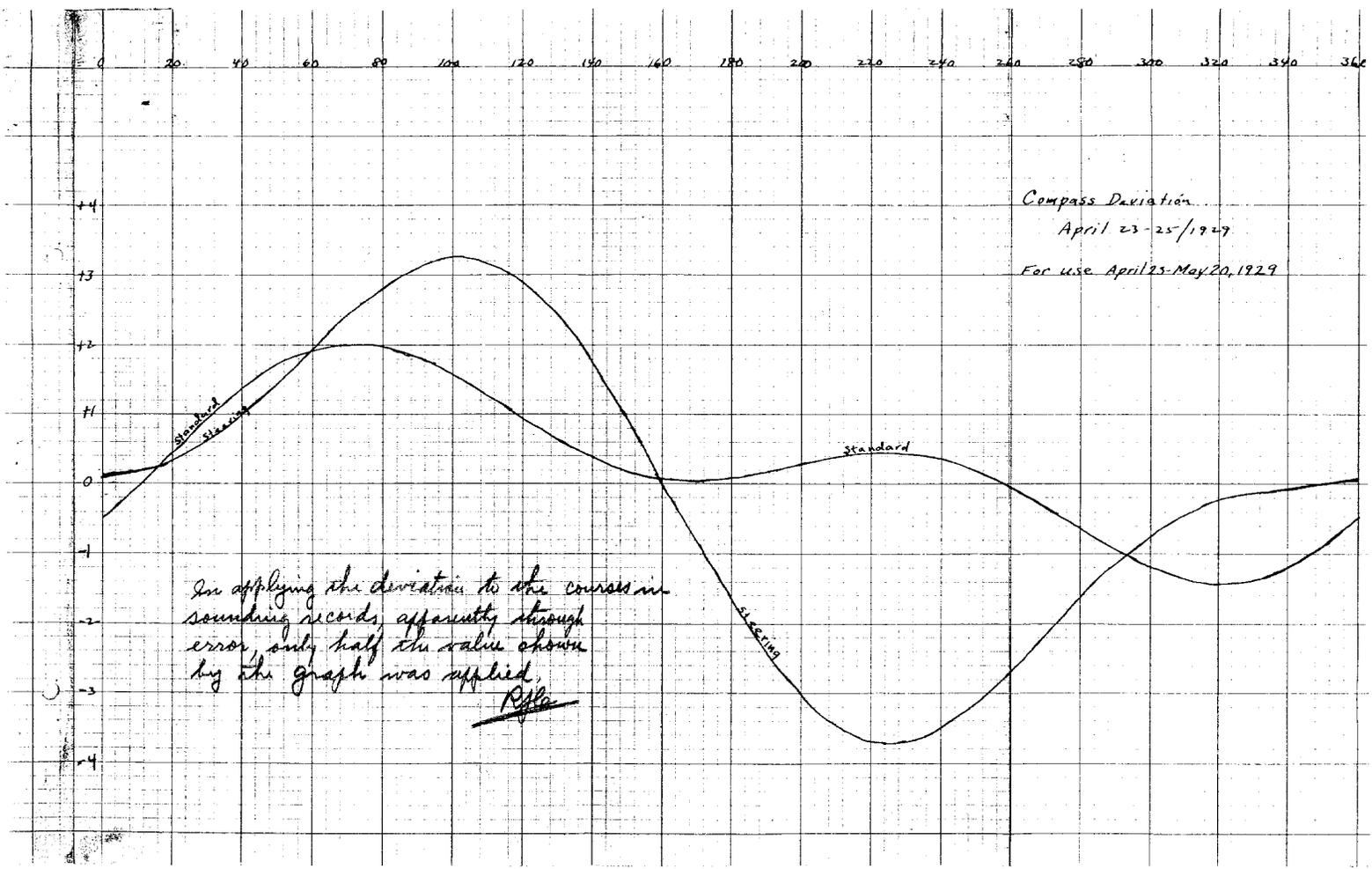
In applying the deviation to the courses in sounding records, apparently through error, only half the value shown by the graph was applied.

R. J. [Signature]

standard  
sounding

standard

sounding



December 5, 1930

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Lae

Division of Hydrography and Topography:

Division of Charts:

Tide Reducers are approved in  
6 volumes of sounding records for

HYDROGRAPHIC SHEET 5038

Locality **Nihoa Island, T. H.**

Chief of Party: **K. T. Adams in 1929**

Plane of reference is **mean lower low water, reading**  
**3.5** ft. on ~~tide staff~~ **tabulations at Honolulu**  
**17.3** ft. below B. M. <sup>2</sup>

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.

*RAW*

Chief, Division of Tides and Currents.

Field Records Section (Charts)

HYDROGRAPHIC SHEET No. 5038

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

Number of positions on sheet	2033
Number of positions checked	295
Number of positions revised	5
Number of soundings recorded	6373
Number of soundings revised	355
Number of signals erroneously plotted or transferred	NONE

Date: June 3 - 1932

Cartographer: Warren H. Bamford

## VERIFICATION REPORT

This is to certify that I have examined the completed smooth sheet and records and hereby approve same.

More than the usual amount of supervision was had over the field work, almost every bit of the work having been done under my direct supervision.

It is to be regretted that this sheet had to be completed by an officer who was not attached to the party at the time the field work was done. In this type of work it is very much to be desired that an officer entirely familiar with the field work, do the smooth plotting of the smooth sheet.

*K. T. Adams*

K. T. Adams,  
Chief of Party,  
Steamer GUIDE.

SECTION OF FIELD RECORDS

REPORT ON SHEET No. H-5038.

JUNE 3, 1932.

SURVEYED BY - K.T. ADAMS

CHIEF OF PARTY - K.T. ADAMS

SURVEYED IN - 1929 (APRIL 28 - May 15)

PROTRACTED BY - G.W. LOVESEE, H.P. ODESSEY

SOUNDINGS PLOTTED BY - H.P. ODESSEY

VERIFIED & INDEXED BY - W.H. BAMFORD.

- 1./ The records were found to conform to the requirements of the General Instructions for Field Work.
- 2./ There were 295 positions checked by the verifier - of the 2033 positions on the sheet - Less than two percent of the positions checked were found to be erroneously plotted -

3/ The plotting of the soundings was found to be fairly well done - about 5% were found to be erroneously plotted.

4/ The sounding line crossings were found to be adequate - although in some cases the agreement was not very good. This disagreement is probably due to the weak control for the entire sheet. No attempt was made to modify any positions to any great extent - as it was considered justifiable to accept the adjustments made by the field party that accomplished the survey.

5/ The development on shoals was deemed to be sufficient.

6/ It was possible to draw completely the 20, 50, 100 and 200 fathom depth waves except the 20 fathom depth curve in the vicinity of Nihoa Island. The inshore

survey around Nihoa Island is found on Hydrographic Sheet No. 5018. The 1000 fathom depth curve was drawn where possible and sketched in with a dashed line - in areas not completely covered by the survey.

7/ The sheet was fairly clean and the work was found to be legible.

8/ The field plotting was completed to the extent prescribed in the Hydrographic Manual.

9/ Attention is called to the fact that in the sounding records, the correction of 0.7 fathom, noted on page 3 - Volume I - was applied to uncorrected soundings of over 100 fathoms as one whole fathom, whereas this correction was applied to uncorrected soundings of less than 100 fathoms as one-half of a fathom.

10./ The soundings on this sheet that would influence the position of the 20 fathom depth curve on H-5018 were transferred to that sheet and the curve adjusted accordingly - Very close agreement was found to exist between the two surveys. It was not deemed expedient to make a complete transfer of all the overlapping work to H-5018.

Respectfully Submitted,

Warren H. Bamford

Section of Field Records  
Review of Hydrographic Sheet No. 5038.  
Around Nihoa Island, Hawaii  
Surveyed in April and May 1929  
Instructions dated March 26, 1928 (Guide)  
Chief of Party - K. T. Adams  
Surveyed by K. T. Adams  
Protracted by G. W. Lovesee, H. P. Odessey  
Soundings plotted by H. P. Odessey  
Verified and inked by W. H. Bamford.

Fathometer soundings.

1. The records were well kept and generally conform to the requirements of the Hydrographic Manual. An apparent error in reading the deviation graph resulted in entering the deviation into the sounding records at half the value given in the Deviation Table.

In transcribing bearings from the sounding records to the dead reckoning sheets, many bearings were questioned (?) without making any explanatory notes.

The correction to bearings for the setting of the pelorus ( $\pm 1.07$ ) was not noted in the records of this sheet but was given in the compass data for H. 5055a. The correction was used in making up the dead reckoning sheets.

2. The reason for the change from the specific instructions is explained in the Descriptive Report. The development is sufficient for the purpose outlined in the instructions.
3. Soundings were all made by the fathometer method. No wire soundings nor bottom characteristics appear on the sheet. Vertical casts were taken daily to determine and check the fathometer constant but not plotted on the sheet. The lines as adjusted and plotted by the field party were disturbed as little as possible. The crossings are fair and the soundings consistent. An interesting formation is indicated in latitude  $23^{\circ}10'.5$ , longitude  $161^{\circ}53'$ . Although the development is not sufficient to show its exact nature, it appears to be an underwater landslip or break in the otherwise regular contour of the bank.
4. Depths curves have been drawn on the sheet. The 1000 fathom curve was harmonized with the curve on H. 5055a, except that line 3AA to 12AA as now plotted on that sheet does not agree with the depths shown on H. 5038 (lat.  $22^{\circ}57'$  long.  $161^{\circ}50'$ ).
5. The junction with the inshore sheet around Nihoa Island (H. 5018) is satisfactory.

This sheet (H. 5038) is a development of a small part of H. 5055a (scale 1-500,000) in the vicinity of Nihoa Island. Although in fair agreement with the depths shown on the latter sheet considering its small scale, the soundings on H. 5055a should not be used for charting purposes ~~until~~ *within* ~~adjusted to~~ *the area of this sheet.* The depths shown on H. 5038. ~~See depths in lat.  $23^{\circ}15'$  long. in blue~~ *161 $^{\circ}$ 50. are transferred from 5055a and may be used as junction points between the two surveys.*

The depths now shown on chart 4000 are from the smaller scale sheet. No larger scale chart covering this area is now published.

6. Character of the field drafting is good. Field adjustment of work of this kind is usually accepted by the verifier as information is seldom available to warrant changes.
7. Recommendation. This sheet (H5038) should be given preference for charting purposes for the area covered. This has been indicated and noted on H. 5055a. However the depths now shown on chart 4,000 are not in conflict with this sheet.

No further surveys in this area are deemed necessary.

8. Reviewed by R. J. Christman, June 1932.

Approved: A. M. Sobieralski. (*Signed*)

Applied to chart 4181. 7/28/40 g. H. S.