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Form 504
Ed. June, 1928

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

U. S. COAST & GEODETIC SURVEY
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MAR 28 1933

State: Hawaiian Is.

Acc. No. _____

DESCRIPTIVE REPORT
5238^{a+b}

~~XXXXXXXXXX~~ Sheet No. 571 - 572
Hydrographic

LOCALITY

Westward

South of Oahu to Two Brothers Reef

1930 - 31

CHIEF OF PARTY

O. W. Swainson

DESCRIPTIVE REPORT

5238a

5239

TO ACCOMPANY HYDROGRAPHIC SHEETS NOS. 751 & 752.

HAWAIIAN ISLANDS - PROJECT NO. 55 - 1930 - 1931

U.S.C. & G.S.S. PIONEER

O. W. SWAINSON - CMDG.

INSTRUCTIONS

Instructions for work done on sheets 751 and 752 are dated February 10, 1930.

SURVEY METHODS

The area covered by these sheets was done by Precise Dead Reckoning with control by star fixes twice a day. (In the few cases where the stars were obscured by clouds the sun sights were used to fix the noon position, and in a few other cases noon sun sights were given weight if they showed an abnormal set or change of set.) (In general, the adjustment was a straight line Adjustment between star fixes.) Stars were taken by two to three observers at each fix, and generally five to seven stars by each observer. Stars were selected so as to form a quadrilateral. Each observer plotted his own sights and plotted his Sumner Lines on graph paper. The point equidistant from all sides of his quadrilateral was taken as his position. The position arrived at by each observer was plotted on the graph of one of the observers, and the mean of all the positions taken to give the star fix. (The sight books were not checked in the office smooth-sheet plotting as in the process of computing the sights, the observers would check any sight that did not come near the mean, or if one observer's mean was too far from the mean of the other two, his computations were checked by one of the other observers.) The computations are thought to be without appreciable error. (No error in the vertical angles occurred due to difference in temperature of the water and air as they were nearly the same temperature.)

(The dead reckoning data for sheet 751 is contained in three volumes, labeled Dead Reckoning, Sheet 751, Vols. 1, 2, and 3; and for sheet 752, in one volume labeled Dead

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Reckoning, Sheet 752, Vol. 1.

The star fixes are contained in an envelope, labeled Star Fixes, and form a part of this report.

(Where the sounding lines crossed surveyed areas they were adjusted to the depth curves of that area.)

DISCREPANCIES

(There are some discrepancies in crossing, due in most cases to the difference in sounding apparatus. The first year the Navy Sonic was used on these sheets, but during the second year the Fathometer was used, having been adjusted and improved to such an extent as to get soundings at those depths by the FRx6 method, and are considered the more accurate.)

DANGERS

There are no dangers in the surveyed area covered by these sheets.

CHANNELS

There are no channels.

ANCHORAGES

There are no anchorages.

COMPARISON WITH PREVIOUS SURVEYS

This area joins the work of the U.S.C. & G.S.S. GUIDE, but does not cross the GUIDE'S work except in a few spots. Additional work was done in Lat. $21^{\circ} 20'$, Long. $162^{\circ} 25'$ around the 1240 fathom shoal, no lesser depth was found, (C Day, 751).

Line was run across ³1025 fathom shoal, Lat. $21^{\circ} 46'$, Long. $165^{\circ} 15'$, but no lesser depth was found. In Lat. $23^{\circ} 00'$, Long. $165^{\circ} 30'$, a line on which there were no soundings by the GUIDE, was found to be the beginning of the long sunken range running southwestward. ^{shown on H-50552}

The beginning of F day, and end of H day, sheet 751, cross previous work satisfactorily.

The breakers reported by S.S. Celtic, June 30, 1925 in Lat. $20^{\circ} 50'$ and Long $166^{\circ} 10'$ was searched for, and although no breakers exist, a least depth in this area of 1596 fathoms was found in surrounding depths of 2700 fathoms. There might have been a

shown on H-50552

subterranean disturbance on this mountain peak at the time of the passing of the Celtic which caused surface disturbance.

(During the progress of the work a number of soundings were obtained using the chronograph and oscillator or bomb. These soundings were not plotted on the sheet. They were obtained by multiplying the number of seconds by 800 fathoms per second. In some cases these soundings check very well with the soundings taken before and after, after correcting them for salinity, temperature, etc. (Theoretical correction).

(The sonic corrections for 1930 were plotted on a graph and a smooth curve drawn for each table. The corrections were entered to the fathom from the curves. The curves were extended to correct for those soundings for which no data was available. For 1931 no corrections for the sonic were worked up as insufficient data was available, due to the discontinuance of sonic sounding after a short period on the first line on sheet 751 for the year 1931. Approximate corrections were derived for these soundings from the comparison at the vertical casts. For tables 3A' and 3A" these corrections were less than 1% over the range in which they were used. For table 3A there was one V.C. at 1068 fathoms. The comparison gave a correction of -50 and -54 fathoms. The soundings in this depth on table 3A were corrected by -50 fathoms. As the fathometer was used intermittently at the time, the fathometer soundings were plotted in preference to the sonic wherever possible. (See Table A of this report). See Season Reports P 55, 1930 & 1931

As nearly all the soundings are over 100 fathoms, no tide corrections are entered. Those few soundings under 100 fathoms are over surveyed areas, done on a larger scale and it was not deemed necessary to correct for tide.

Lists of sounding corrections used are pasted in the front of the first sounding volume of each sheet. There will be one set for each year, 1930 and 1931.

In 1930 where fathometer soundings were taken and no Hydrophone or oscillator noted, the soundings were corrected as large oscillator, No. 3 hydrophone.

Deviation tables will be found in the first volume for Dead Reckoning Data.

As all the soundings could not be plotted, soundings were plotted at equal intervals along the line, unless there was a change of depth equal to 1% and then the shoaler soundings were plotted.

A sub-plan of scale 1:250,000 was made to cover the area on the southeastern end of the sheet (751), because the soundings were under 1000 fathoms. No sub-plan was used in the long sunken range on the western end of the sheet as there were only a very few soundings under 1000 fathoms and only one under 900 fathoms. The development is clearly shown on the main sheet.

B Log was not used on LL day (#751) as there is no factor for this log. Around 56LL a log factor for B Log was computed to make it check A Log. This factor came out as 1.04 and was used when A Log was taken in for inspection.

The vertical casts taken during progress of the work are shown on the sheets as red circles, ~~with the wire sounding plotted inside the circles.~~ *The list is contained in Season's Reports.*

Graphic adjustment was used until 43G (751) to plot the intermediate positions between changes of course and fixes, after this position the distances were computed with slide rule and shown in the D.R. book as adjusted distances.

Closures are shown in the remarks column until the end of E day (751). Then they are placed in the closure column in red pencil. The direction of the closure is shown at the fixes as the direction of the correct position from the D. R. Position.

CONTROL OF EACH LINE

Sheet 751.

1. A Day was not plotted.

B Day: 3B, (point of departure) visual fix on tri. sta. on island of Oahu.

Straight line adjustment to good star fix at 17B.						
" " " " fair " " "						11C.
" " " " good " " "						46C.
" " " " good " " "						12D.
" " " " fair " " "						47D.
" " " " fair to poor " " "						12E.

at 30E.

2. Departure taken at Buoy #3, Brook Shoal - 1F.

Straight Line adjustment to 14F, excellent star fix.						
" " " " 11G, fair " " "						" "
" " " " 42G, good " " "						" "
" " " " 15H, poor " " "						" "

Fix would normally have been different but position inside triangle assumed to keep Pos. 10H (2625 fms) east of 52G (2434 fms).

Straight Line adjustment to 45H, fair star fix.

Straight Line adjustment to 26H, visual fix to tri. sta. on Oahu Island.

3. Point of departure is 1K, visual fix tri. sta. on Oahu Id.
 Straight Line adjustment to 10L, fair star fix.
 " " " " 38L, good " "
 " " " " 10M, good " "
 " " " " 39M, good " "
 " " " " 13N, excellent " "
 " " " " 48N Closed on buoy #3, Brooks Shoal.

4. Transferred from sheet 752 at 1P, good star fix.
 Straight Line adjustment to 30P, good star fix.
 " " " " 12Q, good " "
 " " " " 41Q, good " "
 " " " " 11R, poor " "
 " " " " 40R, fair " "

End of line fixed by visual fixes on tri. sta. on Oahu Id.
 Pos. Nos. 20, 21, 22, and 23 S day.

5. Point of departure taken at 1P, visual fix on tri. sta. Oahu.
 Straight Line adjustment to 17U, fair to poor star fix.
 " " " " 10U, good " "
 " " " " 38U, " " "
 " " " " 11V, poor " " Sun sights
 at 14 and 19V were considered in fixing the most probable location
 for this fix.

Straight Line adjustment to 40V, fair star fix.
 " " " " 14W, fair to poor star fix.
 " " " " 34W(8A-752) poor star fix, selection made
 after running up 5:30 sun sight. This position gives adjusted position
 of 20, 22, 23, and 25, close to the Summer Lines of the sun taken
 at these positions. The location of the line as shown should be without
 great error.

6. 1X - star fix. Plotted on 751 to locate line as it overlaps onto
 752 also. Good star fix.
 Straight Line adjustment to 31X, good star fix.
 " " " " 51X, " " "
 " " " " 79X, " " "
 " " " " 99X, " " "
 " " " " 125X, fair fix (one observer - 4 stars)
 " " " " 143X, fair to poor (2 stars - one observer,
 3 stars other observer).
 " " " " 167X, Visual fix on tri. sta. on Oahu Id.

7. Visual fixes until 7Y which was used as point of Departure.
 Straight Line adjustment to 31Y, good star fix.
 " " " " 62Y, " " "
 " " " " 81Y, " " "
 " " " " 107Y, " " "
 " " " " 125Y, Excellent star fix.
 " " " " 154Y, " " "
 " " " " 174Y, " " "

8. 1Z is not very strong fix. Means of the observers differed by 4 miles, but most probable location was mean of the two means. No stars obtained in A.M. and line was adjusted to 36Z. This point was fixed by the noon latitude sun sight and the fathom curves across the long sunken range. The sun sights at 30 and 34Z could not be used because soundings before and after would not cross the curves.

Straight Line adjustment to 52Z, good star fix. ✓

" " " " 72Z, fair " " ✓

" " " " 100Z, good " " ✓

" " " " 121Z poor " " , but ap-

pears to be close and next adjustment at noon sights is same distance and direction.

Straight Line adjustment to 135Z, point fixed by noon latitude sights and running up sun sights at 132Z and running back sun sights from 144Z.

Straight Line adjustment to 167Z, this point fixed by plotting line on Chart 4116 and fixing line by soundings, taken across Penguin Bank. The bearings do not check and are not used. This position was decided upon immediately after line was run and used on smooth sheet.

The part of line 121Z to end of line is considered to be more likely in error than the lines controlled by star fixes.

9. Position 2AA taken as point of departure, tri. sta. on Oahu.

Straight Line adjustment to 17AA good star fix. ✓

" " " " 40AA poor star fix. ✓

" " " " 68AA good " " ✓

" " " " 88AA " " " ✓

" " " " 113AA " " " ✓

" " " " 133AA " " " ✓

" " " " 160AA fair " " . Means taken

differently from method given in manual, the observers studied their sights and decided on the most probable location at the time. Sun sight at 150AA check the adjusted position, though the noon latitude at 147AA is about 1 mile south of the adjusted position of 147AA.

Straight Line adjustment to 191AA, this point was determined by sun sights on sheet 752 and transferred to sheet 751.

10. 1BB is the same as 30D (752) and was transferred from 752.

No star sights or sun sights were obtained until position 41BB. 46BB was fixed by running up sun sights taken at 41BB, 44BB to the noon latitude and ex-meridian taken at 46BB, and running back sun sights taken at 43BB, 50BB and 51BB. This gave a large triangle and mean was placed on the noon latitude. A straight Line adjustment from 1'BB to 46BB gave a fair crossing over the sunken range, 22 to 27BB.

Straight Line adjustment to 61BB, fair star fix.

" " " " 85BB, fair " " ✓

" " " " 98BB, noon latitude fix. ✓

Fixed by running up sun sights taken at 90 and 95BB and running back sun sight sights at 101, 106, and 108BB to noon latitude at 98BB.

Straight Line adjustment to 112BB, fair star fix.
 " " " " 138BB, visual fix on tri.sta. on Oahu.

11. Visual fixes taken at 1, 2, and 3CC taken as departure.

Straight line adjustment to noon position at 56CC determined by running up sun sights taken at 53CC and running back sun sights taken at 60CC. to noon latitude and two ex-meridians taken at 56CC. See sub-plan on scale 1:250,000 for soundings and arbitrary adjustment over shoal. This adjustment was less than a mile and large sheet was not changed. ~~See report on verification~~

Straight Line adjustment to 68CC, good star fix.
 " " " " 87CC, good star fix.
 " " " " 112CC, good star fix.

Noon latitude sights were not used as they appeared to be in error and would make an abnormal bulge in the line.

Straight Line adjustment to 133CC excellent star fix.
 " " " " 159CC fair " "

Noon latitude sight were not used. Though the difference would be only about 1.5 miles at 147CC.

Straight Line adjustment to 182CC, good star fix.

Straight Line adjustment to 197CC, Noon position determined by running up sun sight at 190CC and running back sight at 200CC to the noon and ex-meridian sights at 197CC. The line after 197CC was adjusted on 753 and transferred to 751.

12. 1DD is star fix, poor. 2 stars each, 2 observers.

Straight Line adjustment to 24DD, good star fix.
 " " " " 48DD, " " "
 " " " " 71DD, " " "
 " " " " 98DD, " " "
 " " " " 120DD, " " "
 " " " " 154DD, " " "

See sub-plan on 1:250,000 scale for ~~re~~plotting of soundings from 141-154DD. Positions 141-154DD transferred to subplan from the adjusted line on #5235a. 299.

Straight Line adjustment to 177DD, good star fix.
 " " " " 186DD, visual fix on tri. sta. Oahu.

13. 3EE - star fix (fair). 1 and 2EE plotted by D.R. back from #3.

Straight Line adjustment on sheet 751 to 34EE, good star fix.
 See sub-plan on 1:250,000 scale for arbitrary adjustment of line between 13 - 30EE to fit the soundings on DD day. This adjustment is

small and the large sheet was not changed. Soundings were plotted on the sub-plan only. ~~See report on sub-plan~~

Straight Line adjustment from 34EE to 56EE, good star fix.
 " " " to 81EE, good star fix.
 " " " " 102EE, excellent star fix.
 " " " " 139EE, good " "
 " " " " 157EE, excellent " "
 Line to 132EE transferred from sheet 752 (3J day)

14. LTF is good star fix. (transferred from 752 (41K)).

Straight Line adjustment to 23TF fair star fix.
 " " " " 52TF good " "
 " " " " 99TF excellent star fix.

One star was taken by two observers at 72TF. The lines of position of the star is plotted on the sheet and comes at the adjusted position of 72TF. The sun sights at 74, 81, 89, and 90 are all within 1.4 miles of the adjusted positions to which they refer, but the noon latitude at 84TF is poor and is too far off to be given weight.

Straight Line adjustment 99TF to 119TF. Excellent star fix. Line 119TF to 157TF is straight line adjustment on large sheet but line was replotted on sub-plan scale 1:250,000, and a small arbitrary adjustment placed in the lines over the shoal to make the soundings fit better. The soundings were plotted on the sub-plan.

Straight Line adjustment 157TF to 178TF, very good star fix.
 Adjusted line extended to plot positions 179 and 180TF, end of line.

15. Pos. ⁶⁶37TF was plotted on chart and checks 100 fathom curve and was used as point of departure. Straight line adjustment to 37GG, which was fixed on sub-plan and transferred to 751. No star fixes till 60GG, good star fix. D. R. Pos. 50GG was plotted on the sub-plan and line plotted on that sheet. By means of soundings on TF day (141 - 144), the line from 47 to 52GG was held to make soundings check. Positions 40 to 41GG were also held to make the soundings check those on EE and FF day. Sun sights at 34, 37, and 44 GG were given weight. The noon latitude at 40GG was given very little weight. The soundings and line were plotted on the sub-plan from 37 to 60GG. - ~~See report on sub-plan~~

Straight Line adjustment 60GG to 81GG, good star fix.
 " " " to 107 GG, good star fix.
 " " " " 128 GG, excellent star fix.
 " " " " 159 GG, good " "
 " " " " 182 GG, fair " "
 " " " " noon latitude at 196' GG. This adjustment was necessary to make the soundings at 194GG cross line 7 to 8 TF. Straight Line adjustment from 196GG to 199GG, excellent star fix.

16. 1HH - fair star fix, transferred from 752 (36M).
 Straight Line adjustment to 21HH, good star fix.
 " " " " 36HH, noon latitude fix, determined by running up sun sights at 31 and 32HH and running back sun sights at 41 and 42HH.

Straight Line adjustment from 36 to 50HH, good star fix.
 " " " to 76HH, good star fix.
 " " " " 104HH, excellent star fix.
 " " " " 125HH, " " "
 " " " " 153HH, good " "

156HH to 175HH plotted on the 1:250,000 sub-plan and adjusted. 166HH was determined by the soundings crossing FF and EE days, as a straight line adjustment would not have checked. Straight line adjustment from 156HH to 166HH. Also straight line adjustment was used from 166HH to 175HH, which is a poor star fix. 175HH to 183HH was plotted as Dead Reckoning, as 183 is end of line. -

17. 1JJ fixed by bearings on tri. sta. Miller Peak 1928, Nihoa Id.
 Straight Line adjustment to 19JJ, good star fix. 28JJ is fixed by bearings on tri. sta. Top 1928, Necker Id. Straight Line adjustment would throw soundings off as regards two lines across the sunken range, (D Day and KK Day). The direction of the adjustment was held and the positions adjusted to make the soundings fit the curves. This adjustment is not believed to be exact, but is not much in error.

48JJ is good star fix.

Straight Line adjustment 48JJ to 65JJ, good star fix.

Line 65 to 70JJ is transferred from sheet 252 (K Day).

18. 1'KK, fair star fix.

Straight Line adjustment to 21KK.

" " " " 35KK - end of line.

19. 3LL, visual fix on tri. sta. on Oahu. Point of departure.

Straight Line adjustment to 27LL, fair star fix.

27 to 60LL (poor star fix) plotted on sub-plan (1:250,000 scale).

Sun sights were given weight in adjusting the line, though the adjustment differs little from the straight line adjustment. The soundings were plotted on the sub-plan. Replotted in office. See report verification

Straight Line adjustment from 60 to 85LL, good star fix.
 " " " to 112LL, good star fix.
 " " " " 135LL, " " "
 " " " " 161LL, " " "
 " " " " 187LL, " " "
 " " " " 211LL, good star fix.
 " " " " 227LL, star fix on sheet 752 (11M Day).

COMPARISON OF VERTICAL CASTS
AND SONIC SOUNDINGS

1931

V. C.	SONIC			
	#3A	#3A'	#3A''	#4
1068	1118 1122			1103 1118
2650		2652 2664 2676 2652		
2741		2712 2712 2724	2736	

COMPARISON OF SONIC AND FATHOMETER
SOUNDINGS TAKEN NEAR EACH OTHER

Fathometer Corrected	SONIC		
	#3A'	#3A''	#4
2361	2372		
2376	2404		
2437		2450	2478
2478		2463	
2811		2805	
2832		2775 2808	

1. Line was adjusted by straight line adjustment from 1A, which was transferred from Pos. 12H, Sheet #251, to star fix on 17A. ✓

Straight Line adjustment from 1A' to 24A'. Pos. 1A' was transferred from sheet 751, Pos. 34W, and 24A' transferred from sheet #252, Pos. 1J.

2. Straight Line adjustment from star fix on 1B to star fix on 29B, and from 29B to 43B. 43B was transferred from sheet 751, Pos. 14Z. ✓

3. Straight Line adjustment from 1C to 11C. 1C was transferred from sheet 751, Pos. 189AA; 11C was determined from meridian altitude and sun sights. Straight Line adjustment to 44C, star fix. ✓

4. Line on D day was adjusted as follows: the Dead Reckoning position from 22E, sheet 251, was transferred and run up to position 27D. This position was determined from meridian altitude and sun sights on 24D and 30D, and the amount of adjustment for 1D then determined. Straight Line adjustment was then made between 1D and 27D, and from 27D to 32D. 32D was transferred from 1BB, sheet 751. ✓

5. Line on E day was adjusted as follows: Pos. 197CC, sheet 751, was transferred and this line was continued up to 37E. 37E was located from meridian altitude sights and sun sights on 31E and 31E. Straight Line adjustment was then made from the transferred position of 197CC, sheet 751, to 37E, and the remainder of the line extended proportionally. ✓

6. Straight Line adjustment from 1F (transferred from sheet 251, Pos. 18G) to 13F, a star fix; Straight Line adjustment to star fix on 39F; and to 42F, which was transferred from sheet 751, Pos. 4DD. Sun sights on 19, 21, 25, and 29F, checked fairly well. ✓

7. Straight Line adjustment from 1G (star fix, same as 28A, 251) to 19G, which was transferred from sheet 751, Pos. 19X. ✓

8. Straight Line adjustment from 1H (star fix, same as 174Y, 751) to 27H (star fix, same as 5B, 251). ✓

9. Straight Line adjustment from 1J (star fix, same as 157EE, 751) to 27J, star fix, and from 27J to 41J, which was transferred from sheet 251, Pos. 1H. ✓

10. Line on K day adjusted as follows: The Dead Reckoning Position 1K was transferred from sheet 251, Pos. 58L, and carried to 11K. The proportional closure for Position 1K was then determined, and Straight Line adjustment made from 1K to 11K, star fix. Straight Line adjustment to 41K, star fix, same as 1FF, 751. ✓

** star fix*

11. Straight Line adjustment from 1L to 17L. 1L was the same as 196GG, 751, and positions between 1 and 17L were transferred from sheet 751. Straight Line adjustment was made between 17L and 37L, star fix; and between 37L and 44L (same as 1M, 251). ✓

12. Straight Line adjustment from 1M (transferred from 251, 34T) to 5M, star fix; and between 5M and 36M, star fix, same as 1MH, 751. ✓

13. Line on N day was adjusted by Straight Line adjustment from 1N (transferred from sheet 751, 226LL) to 11N, star fix; to 32N, star fix; and to 39N, star fix. ✓

STATISTICS FOR SHEET NO. 751. 5238a

Satute Miles Sounding Lines15,324.0
Number of Soundings.12,800.0
Number of Positions. 2,827.0
Area - square statute miles. 132,909.0
Number of Sumner Lines 1,404
(Including Star, Sun, Moon, and Planets)
Total Number of sumner line sights taken during progress
of Project 55 was 2437.

STATISTICS FOR SHEET

NO. 752. 5239

Day	No. of Positions	No. of Soundings	Sta. Miles.
A	17	96	97
A'	24	139	120
B	43	250	215
C	44	151	219
D	32	110	195
E	42	125	180
F	42	137	199
G	46	295	99
H	26	162	147
J	44	84	225
K	41	119	229
L	44	124	220
M	36	95	182
N	<u>60</u>	<u>120</u>	<u>270</u>
Totals	541	2007	2597

Number of Sumner Line sights 227
 (Sun, Moon, Star and Planets)

J. W. Swainson
H B Engineer
Comdg. St. Pioneer.

CHIEF OF PARTY'S REPORT OF INSPECTION
OF THE SMOOTH SHEET.

Dead Reckoning Records were not carefully checked.

Plotting of star fixes were checked by tracing plotted positions from Boat Sheet and comparing with smooth sheet. Discrepancies were investigated. Plotting of soundings was not checked, but officer plotting sheet was instructed to note any irregularities in soundings and these were investigated and disposition noted in the record. The sheet is believed to be without serious error.

O. W. Swainson

O. W. Swainson,
H. & G. Engineer,
Chief of Party, C. & G. Survey.

DEPARTMENT OF COMMERCE

AND REFER TO No. 82-DRM

U. S. COAST AND GEODETIC SURVEY

WASHINGTON

July 25, 1933.

SECTION OF FIELD RECORDS

Review of Hydrographic Sheets 5238a and b

Offshore work westward of Oahu Island
Surveyed in 1930-1931

Instructions dated February 10, 1930 (PIONEER)

Chief of Party, O. W. Swainson

Surveyed by O. W. S.

Protracted and soundings plotted by C. J. Wagner

Verified and inked by B. G. Jones

1. Records - The records conform to the requirements of the Hydrographic Manual with the following exceptions:

(a) No explanation is given anywhere in the sounding records or the descriptive report of the meaning of the B, C and D tables in connection with the sonic soundings. It was noted, however, that whenever the B, C and D tables were used the sonic corrections for the A tables, as listed in Table N of Report No. 43, 1931 were used, presumably in accordance with the note given in sounding vol. 1, page 9, as follows: "Table 3A = 3A - 3B - 3C - 3D." Not knowing the significance of the B, C and D tables the correctness of the procedure could not be verified. Therefore the sonic soundings based on the B, C, and D tables were accepted as reduced by the field party. However, as a matter of general information it would be interesting to learn more about this aspect of the work and it is suggested that the matter be referred to the Chief of Party for clarification.

(b) The hydrographic names of signals used for shore fixes were not listed in the sounding records, nor were they inked on the smooth sheet.

2. Specific instructions - The work conforms to the requirements of the instructions with the exception that the outer portion of the bank running southwesterly from Necker Island should have been developed on a larger scale (see paragraph 14,e of instructions).

3. Office adjustment of sounding lines - Several adjustments were made to the sounding lines on this sheet where they overlapped previous inshore work. In connection with the inshore sheet, H. 5054, consideration was given the advisability of throwing part of the adjustment into the lines on that sheet which were also dead reckoning lines. But since this would have necessitated making extensive corrections to the charts,

and the resulting adjustment would still be an approximation, it was decided to hold the work on H. 5054 fixed and adjust the work on this sheet (H. 5238a) to agreement with H. 5054.

4. Junctions with surveys - The junction with H. 5213 at the north-west corner is satisfactory, as well as the junction with H. 5055a on the north. In the vicinity of Oahu, the junction with H. 5054 is adequate. The junction with H. 5239 will be considered in the review of that sheet. There are no surveys to the southward or to the eastward of this sheet (H. 5238a)

5. Field plotting - The field plotting was well executed except for the plotting of the star fix at position 27 LL on the sub-plan (H.5238b). This fix was plotted one mile too far south and necessitated a replotting of the line 27 to 69 LL.

6. Additional work - If and when work is resumed in this locality, the following additional work should be considered:

(a) An extension of the development of the 573 fm. bank in lat. 18° 50', long. 158° 00' on all sides to deep water.

(b) An examination for less water of the indication in lat. 19° 31', long. 158° 50'. A similar condition may exist between the 2008 and the 2081 fm. soundings to that on the banks to the southward.

(c) An extension of the development to the southwestward of the bank in lat. 20° 50', long. 166° 15'. This is the locality where the S.S. CELTIC reported breakers on June 30, 1925 (see page 2, descriptive report). No breakers were found but a least depth of 1596 fms. was found in surrounding depths of 2700 fms. The reported breakers have never been charted.

(d) An extension of the development of the submerged ridge running southwestward from Necker Island to deep water and to include a development of the indication in lat. 21° 51', long. 168° 30'.

7. Information for compiler -


(a) The discolored water report charted in lat. 23° 35', long. 167° 20' from H. O. Notice to Mariners 36 of 1927 falls at the junction of this sheet with H. 5213. The nearest line of soundings to it is on H. 5213 about 1 mile away with absolutely flat bottom indicated. The closest line on H. 5238a about 6 miles away also shows flat bottom. It is recommended that the note and danger curve be removed from the charts.

(b) The charted 1467 fm. sounding in lat. 19° 35', long. 158° 30' was taken from H. O. chart 1216 (filed as blue print 23717). Since it falls in depths of over 2000 fms. with no indication of shoaling, it is recommended that it be removed from the charts.

8. Reviewed by A. L. Shalowitz, July 1933.

Approved:


Chief, Field Records Section


Chief, Field Work Section


Chief, Chart Division


Chief, Division of H. and T.

Section of Field Records

Report on Sheet No. 5238a and No. 5238b (Subplan)

Chief of Party: O.W. Swainson

Surveyed in: 1930 and 1931.

Surveyed by: O.W. Swainson

Plotting and adjustment of Dead reckoning lines by: C.F.W.

Plotting of Sdgs. by: C.F. Wagner

Verified and checked by: B.G. Jones

I. The work on this sheet conforms to the general instructions except as follows:

a. Records - (1) The Hydrographic names of signals used for shore tapes were not given in the list of signals in Sdg. Vol. 1 nor were they inked on the smooth sheet. This was done in the office. (2) The note on Page 9, Sdg. Vol. 1, as to the use of the several sonic tables is not clear. See also Par. II of this report.

2

I. b. - (1) The smooth plotting was done correctly except for the erroneous plotting of 1 star six on the subplan, see Par. III of this report; and ^{the} adjustment of Pos. 1672 to the depth curves on H 3433 see Par. III of this report.

II. Only sixteen vertical east edg. and two bottom specimens were obtained on this survey.

III. Plotting and adjustment of the dead reckoning lines:

The plotting of the 3 ft. lines used as departures and courses has been checked in verifying the sheet.

The adjustment of the inshore ends of the lines to the depth curves has been checked on the larger scale sheets Nos. #3433, #5054, and #5213, #4867 and #5206.

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Soundings on several sections of lines not plotted on the sheet because of limited space are shown on overlay tracings Nos. 1, 2, and 3 attached to the ~~sheet~~ Descriptive Report.

The plotting and adjustment of ~~of~~ the dead reckoning lines have been inspected on the ~~charts~~ ^{banks} and in some cases on overlapping lines and crossing. On the large open areas of regular bottom the lines have generally been accepted as plotted by the Field Party without further investigation.

Thus follows a list of discrepancies noted and adjustments made in the office:

#5238a - (D) on lat $20^{\circ}-42'$, long $158^{\circ}-10'$ - The soundings from 126 to 138 B.B. are shown on overlay tracing #1. Soundings from No. 130 to 132 B. show up to 300 fms. less water than is shown on lines 14 and 5. This section of line B.B. has not been plotted on the sheet as it seems probable that

the adjusted portion of the line is too far westward possibly due to an error in one angle of the fix at 138 BB. The line has not been readjusted as it is not needed in this area and lines K and S have stronger control. ✓

(2) Pos 167 Z, lat. $20^{\circ}-50'$, long $157^{\circ}-45'$, was moved 1 mile inshore along the line to place the 183 fm. edge inside the 200 fm. curve as defined on #3433. The line was then re-plotted back to pos. 159 Z. ✓

(3) On lat. $20^{\circ}-45'$ long. $157^{\circ}-45'$ line 4 to 9 CC, #5238a, shows discrepancies at the crossings with lines 72 to 75 D and 23 to 28 A, #5054; the 784 fm. edge between positions 7 and 8 CC falling well outside the 1000 fm. curve as defined on #5054. ✓

The 1000 fm curve ~~is~~ shows rather marked irregularity in this vicinity and #5054 was inspected for errors in plotting in this immediate locality: ✓

The sharp bend in the 1000 fm curve at Lat 20°45' Long. 157°-44' is probably due to an undetermined slope correction on the 900 fm. edge on Pos. 49 X. Careful inspection of the plotting of Positions 45 to 52 X showed no errors. The 900 fm. edge was not changed.

Lines A and D are dead reckoning lines adjusted to fit the edges on lines X and Y which are in turn controlled by shore fixes.

Shifting of lines A and D, #5054, south west to eliminate the discrepancy at the crossing was considered. However, this would necessitate some chart correction (as the edges on these lines have been applied to the charts) and the resulting adjustment would be only an approximation with very little change in the 1000 fm. curve. Therefore, the

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work on H5054 was held as plotted and line
cc, H5238a, moved N.E. to agreement
with H5054: The fixes at positions 2 and 3
cc are very weak. Positions 3 and 4 were moved
1 mile east and fitted to the depth curves
as defined on H3433. The line was then
replotted out to Pos. 16cc. The distances 1c to
16cc ~~are~~ as now plotted are given in a
note on Page 83 of Reed Reckoning Vol 2.
The readjustment of line cc was not
carried out to ~~the~~ the 1456 fm bank
Pos. 17cc as the shift from the original
plot would be very small.

(A) In Lat. $20^{\circ}-00'$, Long. $157^{\circ}-52'$
the soundings around the 1456 fm. bank
have been selected from lines cc and FF.
On crossing this bank line 170 to 172 FF shows
considerably greater depths - as much as
600 fms. This discrepancy is due to the
adjustment of the lines on a steep slope.
Line FF in the run from 160 to 178 FF, a distance
of 90 miles, instead of being a straight

line probably bent out around the western edge of the bank. Any readjustment here would be only a rough approximation as both lines are far from fixed positions. To re-plot line FF would make no material change ~~on~~ in the contour north and south of the bank. The plot has not been changed. The deeper ridges between positions 170 and 172 FF and between positions 27 and 29 CC have not been plotted.

#5238.6 - Subplan.

(D) Position 27 LL (Star F4) was plotted 1/2 mile too far north on the subplan. This fix was re-plotted and the line 27 to 60 LL was plotted accordingly.

Enough of the soundings in this area have been inked on #5238a to show the least depths on the ~~sub~~ banks and to define the 1000 fm. curve.

The Corrections to Soundings: The methods of obtaining and applying the corrections to soundings on this sheet are explained in considerable detail in the seasons reports of O.W. Swainson No 43, 1931, and No 218, 1931.

The corrections to fathometer soundings are comparatively small and generally have not been applied when less than 1% of the depth.

The Sonic Depth Finder was used for nearly all of the sounding in 1930 and on part of EE day in 1931.

The ^{note on} Page 9, Vol 1, of the sounding records is not clear. The use of the A Tables and of Table 4 is explained in seasons report No 43. but no explanation is made of the use of the B, C and D sets of Tables. Soundings from the B, C and D Tables are corrected from the same curves as used for the A tables and as tabulated on the inside cover of July, Vol 1.

Impression of Table N (Seasons Report No 43) and Table P (Seasons Report No 43) indicates

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that groups of sonic sdgs. taken in the same depths may vary up to 3% of the depth. In the depths on this sheet this variation is relatively unimportant but it should be considered in connection with discrepancies at crossings.

V Plotting of Soundings

In selecting the soundings to be inked differences of 1% of the depth were not considered. ✓

The chronograph-oscillator sdgs., and the Bowl sdgs. recorded in the Sdg. Volumes have not been inked on the sheet. ✓

VI Additional Development

① To complete the development of the 573 fm. bank in lat. $18^{\circ}-50'$, long. $158^{\circ}-00'$ an extension of the survey westward and northward is needed. A short split joint north of this bank between lines 48 to 50 LL and 30 to 32 GG is also needed. ✓

(2) Lat. $19^{\circ}31'$, Long. $158^{\circ}50'$ -

The banks to the northward indicate that considerably less water may exist between the 2081 and the 2005 fm ridges and a short uplift here would be desirable.

(3) Lat. $20^{\circ}50'$, Long. $166^{\circ}15'$

An extension of the development along this bank to the south ~~eastward~~^{westward} is needed. See Par. 2 of the Descriptive Report.

The 1596 fm. ridge on Pos. 67## is questioned in the record on account of a very faint echo. The fathometer missed several ridges before and after Pos. 67## which may indicate a steep slope. The ridge is also supported by the 1735 on Pos. 66##.

(4) The development along the submerged ridge at the western end of the sheet needs to be extended southward and eastward from Lat. $21^{\circ}40'$ Long. $167^{\circ}45'$. A short line is also needed just north of the 863 fm. ridge between positions 38 and 39##. Additional

development in this ^{vicinity} ~~area~~ should also include the area around the 1422 fm. ~~rdg.~~ ^{rdg.} in lat. $21^{\circ}50'$, long. $168^{\circ}30'$ ✓

VII junction with other surveys

(1) #5054 - Soundings from this sheet have been transferred in brown ink to #5054 ~~as far~~ ^{as far} inches ✓ to just inside the 1000 fm. curve. See Par. III for adjustment of line cc on #5238, in this area.

(2) #5055a. - Soundings at the junction with #5055a are shown ✓ in red on that sheet.

The additional lines across the 1035 fm. rdg. in lat. $21^{\circ}45'$, long. $162^{\circ}15'$ and the 1240 fm. rdg. in lat. $21^{\circ}20'$, long. $162^{\circ}25'$ ✓ are shown in red on #5055a. Short lines to the N.E. and S.W. of the 1785 fm. rdg. in lat. $21^{\circ}30'$, $162^{\circ}29'$ #5055a would also have been desirable.

* #5239 a continuation of this survey
~~west~~ eastward has not been verified. (12)

(3) #5213 - Soundings in the
overlap are shown in green on #5213. ✓
Soundings have been transferred in to the
1000 fm curve. The agreement in the overlap
is satisfactory.
*

VIII charts 4000 and 4116

This sheet represents the first
close survey of the area covered.

The soundings in this area on
chart No. 4000 agree with this sheet except
for the 1467 fm. rdg. in lat. $19^{\circ}35'$, long. $158^{\circ}30'$.
The 1467 fm. rdg. was taken from H.O. chart 1216,
now filed as B.P. 23717. This chart shows a
least depth of 2264 fms. at the position
given of the 1467. ✓

The 2250 fm. rdg. shown
on chart 4116 in lat. $20^{\circ}56.5'$, long. $158^{\circ}15.7'$ ✓
is a 25.50 - Pos. 236 to 24T #5054. This has
been entered on the standard for correction

Respectfully Submitted
B. J. Jones.

Section of Field Records

Report on #. 5239

Hawaiian Is. - Westward

South of Mono Reef

Surveyed in 1930-31 - Fathometer & Sonic

Instructions dated - Feb-10, -1930 - Pioneer

Chief of Party O. W. Swainson

Surveyed by O. W. S.

Protracted by P. L. Bernstein

Soundings by - J. R. Jahn & P. L. B.

Verified and Indexed - J. Fleming

-
- (1) The records are complete and legible and comply with the requirements of the hydro. manual except that the meaning of the expressions Table 3A = 3A-3B-3C-3D etc. is not explained (see vol. 1, ^{sounding record} Page 2, for reference.) These expressions appear also on page 4, vol. 1 ^{sounding} records. H. 5246.

In connection with the above see par. (a) review of H. 5238^a

(2) The plan character and extent of the survey satisfy both general and special instructions.

(3) Sounding line crossings

There are no discrepancies at the crossings.

(4) Depth curves

The depths exceed those at which inked curves are to be drawn.

(5) Field Plotting

The field plotting was satisfactory but it should be noted that possible displacements may be screened by the level bottom.

The log distances checked very well with sun sight and star fixes.

Junction with adjacent sheets

The control for this sheet is the same astronomic control as for H. 5238^a and H. 5246 and the lines continue from one sheet to the other.

Therefore, no transfer of overlap or junction is effected on the two sheets referred to. Junction with H. 5213 on the N.E. is satisfactory.

There are no contemporary surveys to the south and S.W.

Indications

An indication of 1492 fms is noted in $21^{\circ}45' - 168^{\circ}32'$ which was recognized by J.W.S. (see note on H. 5238^a).

The 2100 fm soundings in $24^{\circ}28' - 169^{\circ}00'$ are the indications of Gardner Pinnacles and apparently represent the foot of that formation.

In $23^{\circ}47' - 169^{\circ}32'$ - and also 15 miles W. S.W. of this point are some ~~7400~~²⁴⁰⁰ fm indications which, however, appear relatively unimportant.

Comparison with previous surveys

There are no previous surveys in this area.

No further surveying is required in the area covered.

respectfully submitted,

July-Aug-14-1933 J. Fleming

SECTION OF FIELD RECORDS

Review of Hydrographic Sheet No. 5239.
South of Maro Reef, Hawaiian Is.
Surveyed in 1930 and 1931
Sonic and fathometer soundings.
Instructions dated February 10, 1930. (Pioneer)

Chief of party - O. W. Swainson.
Surveyed by - O. W. S. and party.
Dead reckoning lines plotted by - P. L. Bernstein.
Soundings plotted by - J. H. Jahn, P. L. Bernstein.
Verified by - J. Fleming.


1. The records conform to the requirements of the Hydrographic Manual except that the tables used for the correction of sonic soundings are not fully explained. (See review of H. 5238a, par. 1 a).
2. The plan, character, and extent of the survey satisfy both the general and specific instructions.
3. The sounding lines cross well, but the bottom is so uniformly level and flat that they could not fail to do so.
4. The lines on this sheet are a continuation of the lines on H. 5246, and on the eastern limits of this sheet the lines are further continued on H. 5238a. As these lines are continuous no overlap was made on either of these sheets.

The junction with H. 5213 on the north east is satisfactory.

There are no contemporary surveys on the southwest.


5. The bottom in the area covered by this sheet is entirely flat with no shoal indications with the exception of a sounding of 1492 fathoms in Lat. $21^{\circ} - 46'$, Long. $168^{\circ} - 36'$. This is part of a shoal of fairly large extent which is shown more fully on H. 5238a and on which the Chief of party recommends further development.
6. With the exception of the spot mentioned in the preceding paragraph, which is covered in the review of H. 5238a, no further surveying is required.
7. Reviewed by R. L. Johnston. August 25, 1933.

Examined and approved:


Chief, Field Records Section.


Chief, Field Work Section.


Chief, Chart Division.


Chief, H. & T. Division.

March 30, 1933.

Division of Hydrography and Topography:

✓ Division of Charts:

Tide Reducers are approved in
7 volumes of sounding records for

HYDROGRAPHIC SHEET 5238 a & b

Locality South of Oahu to Brothers Reef, Hawaiian Islands

Chief of Party: O. W. Sainson in 1930 - 1931

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.

March 30, 1933.

Division of Hydrography and Topography:

Division of Charts:

Tide Reducers are approved in
2 volumes of sounding records for

HYDROGRAPHIC SHEET 5239

Locality South of Maro Reef, Hawaiian Islands

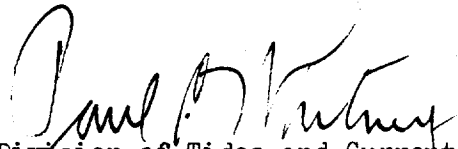
Chief of Party: O. W. Swainson in 1930-1931

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.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

U. S. COAST & GEODETIC SURVEY
LIBRARY AND ARCHIVES

MAR 22 1933

REG. NO.

52382

HYDROGRAPHIC TITLE SHEET

Acc. No. _____

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. 751 52382REGISTER NO. 52382State ~~XXXXXXXXXX~~ Hawaiian Is.General locality Westward south of Oahu Id.Locality ~~XXXX~~ South of Oahu to Two Brothers ReefScale 1-750000 Date of survey 1930 and 1931, 19Vessel U. S. C. & G. S. S. PIONEERChief of Party O. W. SwainsonSurveyed by O. W. SwainsonProtracted by C. J. WagnerSoundings penciled by C. J. WagnerSoundings in fathoms feetPlane of reference MLLWSubdivision of wire dragged areas by ----Inked by ----Verified by ----Instructions dated February 10, 1930

Remarks: _____

applied to chart 4181 Aug. 27, 1940 g.H.S.
" " " 4182 Sept. 26, 1940 g.H.S.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO. 5238b

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. Sub-plan 751

REGISTER NO. 5238b

State Hawaiian Is.

General locality Westward

Locality Southwest of Hawaii

Scale 250,000 Date of survey 1930 and 1931, 192

Vessel Pioneer

Chief of Party O. W. Swainson

Surveyed by O. W. S.

Protracted by C. J. Wagner

Soundings penciled by C. J. W.

Soundings in fathoms XXXX

Plane of reference MLLW

Subdivision of wire dragged areas by

Inked by

Verified by

Instructions dated February, 10, 1930, 192

Remarks:

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

U. S. COAST & GEODETIC SURV
LIBRARY AND ARCHIVES

MAR 22 1933

REG. NO. 5239

HYDROGRAPHIC TITLE SHEET

Acc. No. _____

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. 752

REGISTER NO. 5239

State Hawaiian Is.

General locality ~~Se~~ Westward

Locality South of Maro Reef

Scale 1-750,000 Date of survey 1930-1931, 19

Vessel U. S. C. & G. S. S. PIONEER

Chief of Party O. W. Swainson

Surveyed by O. W. Swainson

Protracted by P. L. Bernstein

Soundings penciled by J. R. Jahn and P.L. Bernstein

Soundings in fathoms ~~feet~~

Plane of reference MLLW

Subdivision of wire dragged areas by ---

Inked by -----

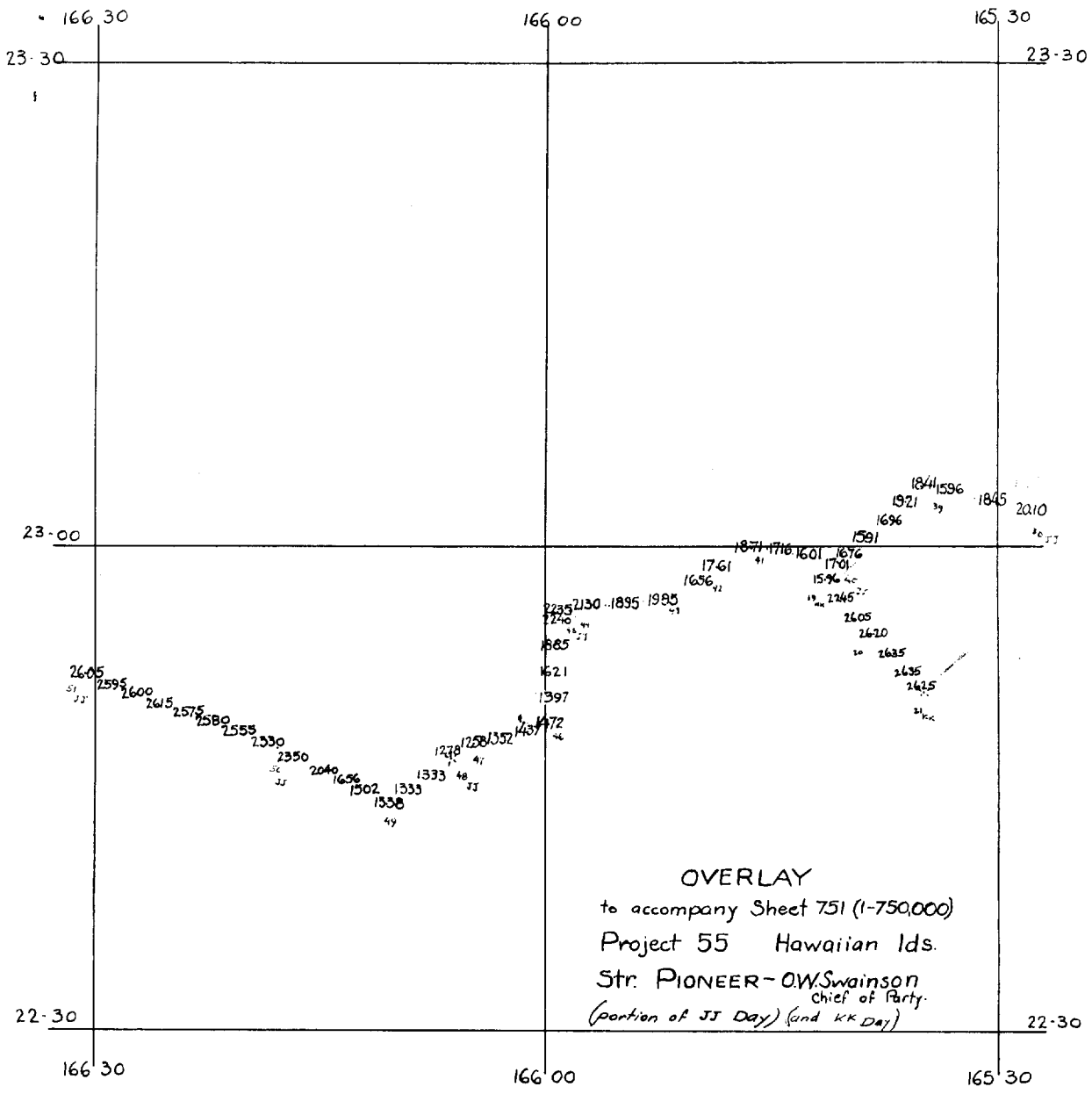
Verified by --- J. Fleming

Instructions dated February 10, 19 30

Remarks: _____

Applied to chart 8182 Sept. 25, 1940 J.H.S.

#2



OVERLAY
 to accompany Sheet 751 (1-750,000)
 Project 55 Hawaiian Ids.
 Str. PIONEER - O.W. Swainson
 Chief of Party.
 (portion of JJ Day) (and KK Day)

To accompany 11-52382

#3

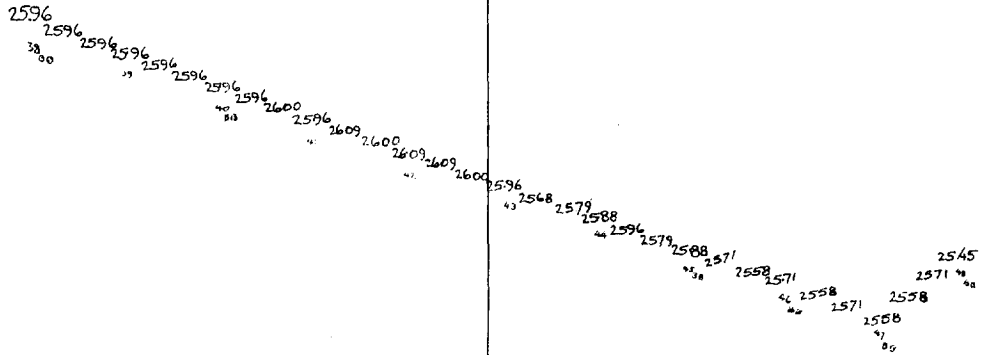
165 30

165 00

164 30

22-30

22-30



22-00

22-00

165 30

165 00

164 30

OVERLAY to Accompany Sheet 751
Project 55 - Hawaiian Islands
U. S. C. & G. S. S. PIONEER
(portion of BB day) scale 1-750 000

To accompany H-52382

Applied to Chart 4172 Aug 2 1946
D.L.