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3252 Declassified by Director's Ltr. 17 Feb 1960 D.R.E.

Diag. Cht. No. 4116

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC

Field No. Office No. H-3252, 3253, 3287, H-3289, 3290, 3291, H-3292, 3293, 3294.

LOCALITY

State HAWAII

General locality OAHU

Locality

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CHIEF OF PARTY

W. C. Dibrell

LIBRARY & ARCHIVES

DATE JULY 15, 1911.

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Acc. No.

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See Letter # 151-1923

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Department of Commerce and Labor
COAST AND GEODETIC SURVEY

Superintendent.

State: Hawaii

DESCRIPTIVE REPORT.

3252, 3253, 3287, 3289
Hydrographic Sheet Nos. 3290, 3291, 3292, 3293, 3294

LOCALITY:

Oahu

1910-11

CHIEF OF PARTY:

H. C. McNeel

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See Hyd Ms Rept #3253

Department of Commerce and Labor
COAST AND GEODETIC SURVEY

_____
Superintendent.

State: T. Hawaii

DESCRIPTIVE REPORT.

Sheet No.

LOCALITY:

Oahu Island

1910-11

CHIEF OF PARTY:

L. H. Smith, Jr.

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Box 707

Form 504

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

....., *Director*

State: Hawaiian Islands

DESCRIPTIVE REPORT

~~*Topographic*~~ *Hydrographic* } *Sheet No.* 3252

LOCALITY

Oahu, E. Coast

Kaneohe Bay and Approaches

1910

CHIEF OF PARTY

L.W. Smith, Jr.

GOVERNMENT PRINTING OFFICE

3252

[redacted]

R.P. Smith 1910

Corr

3252A

C. & G. SURVEY
APR 5 1911

Descriptive Report

Hyd.
To accompany sheet #3252 of Kaneohe Bay
Oahu Island.

Kaneohe Bay lying North West of Mokapu Head is about 6½ miles in length and extends in a N.W. direction parallel to the general direction of the shore line. It is separated from the open sea by small islands and coral reefs, and has two channels by which it may be entered.

The south eastern entrance is about half mile west of Kekepa or Coffin Island, and 1½ miles west of Pyramid Rock a prominent pyramid of lava on a point two miles west of Mokapu crater. The master of one of the boats calling here, reports that he often scrapes bottom, carrying 9 feet through this channel. The bottom is sand and soft coral, and is very uneven. It is often breaking across the entire channel.

The north western entrance lies about half a mile south east of Mokolii Island, a well defined rock about 150 feet high with almost perpendicular sides. The best ap-

approach is from the direction of Pyramid Rock, as the best water and most even bottom lies on the line from Mokolii Island toward Pyramid Rock. Just to seaward of this line and near the entrance it breaks in moderate weather.

There are no ships calling here of more than 10 feet draught, and the channels are most probably not safe for vessels of much greater draught.

There are no aids to navigation here, except a few beacons constructed by the owners of the small vessels calling in the bay. None of these would tend to confuse a stranger who tried to make use of them.

The water in the bay is from seven to ten fathoms with mud bottom, which makes excellent holding ground. Many coral heads or flats rise almost perpindicularly from this depth to within a few inches of the surface of the water. These are so numerous that no one without local knowledge should attempt to enter the bay.

As to outlying dangers the "Explorer" will furnish a report.

The N. E. Trades are the prevailing

winds and are at times very strong. In heavy weather it breaks across both channels.

The country bordering on the shoreline is rolling. The hills are covered with guava bushes, and a few larger trees. There are no hills that are of use to the navigator, as shoals in the bay are so numerous as to make poorly defined ranges useless.

There are two wharves at which small vessels call. Heela Wharf is near the southern end, and MacFarlans is near the middle of the bay. Both of these are shown on the sheet.

The old chart of the bay is very much in error. It shows the bay to be a continuous body of water, whereas it is entirely cut into two, by a flat that extends out from the shoreline.

The outlines of all of the flats inked in on the sheet were determined by taking positions at intervals along the edges. Care was taken to get everyone determined, and days on which they could be easily seen were selected for that work.

Statistics for Hyd. Sheet 3252. A

(These statistics should be combined with the statistics for L.H. Smith's work)

(Statistics for H.C. Dibrell's work)

Date	Letter	Volume	Angles	Soundings	Miles	Vessel
Dec. 9th, 1910	L	5	242	120	27.0	Steamer Explorer
" 10, "	M	5	222	136	35.0	" "
" 14, "	N	5	120	63	6.75	" "
" 15, "	O	5	24	12	2.0	" "
" 20, "	R	5	34	17	9.0	" "
" 14, "	d	3	18	47	2.0	Launch
" 15, "	e	3	108	268	8.0	"
" 16, "	f	3	40	57	3.0	"
Totals		2	808	720	92.75	Totals

Soundings plotted in feet.

3253A

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Statistics for L.W. Smith's work

Kaneohe Bay

(these statistics should be combined with the statistics for H.C. Dibell's work)

Day	Miles	Angles	Soundings	Day	Miles	Angles	Soundings
a	04	6	21	r	4.8 Part of day running outlying reefs	152	235
b	9.7	140	529	s	6.1	100	291
c	12.6	144	584	t	1.8 "	74	67
d	90	100	466	u	"	24	
e	4.6	72	251	v	1.7 "	56	109
f	5.6	90	314	w	2.7 "	302	152
g	11.3	142	496	x	5.8 "	190	341
h	2.8	28	105	y	8.1 "	124	262
j	3.2 Part of day running outlying reef	156	251	z	6.1 "	248	188
k	21.9	244	694	a'	8.3	206	426
l	11.2	130	386	b'	2.4 "	174	86
m	5.5 Part of day running outlying reef	234	228	c'	5.3 "	164	266
n	10.1	130	363	d'	1.9 "	180	168
p	6.1	100	233	e'	"	30	
pc	Running outlying of reefs	152	37	f'	8.1	128	411
q	Same	84		g'	11.1	200	428
				h'	4.7 "	166	334
	Soundings plotted in feet						

3252A

FORM 65.—Field Letter.

Telegraph Address:

Express Office:

Department of Commerce and Labor

COAST AND GEODETIC SURVEY

11—644

C. & G. SURVEY,
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APR 15 1911
Acc. No.

, 19

Kaneohe Sheet

			Metres			Metres
Church Tower - Kahana	21	33	580	157	52	726
Rock - Highest Point of Mokolii Island	21	30	1408	157	49	1602
Seaward Gable of Red Warehouse.	21	29	413	157	51	247
Pyramid Rock	21	27	1704	157	45	1688
Cone - Highest Point of small Island	21	26	192	157	43	577

VEC
May 5,1911.

HYDROGRAPHIC SHEET 3252 A

Kaneohe Bay, North East coast of Oahu, Territory of Hawaii, by Asst. L. W. Smith, Jr., in 1910.

TIDES.

	Heeia Wharf ft.
Mean lower low water, or plane of reference on staff	0.8
Lowest tide observed " "	0.8
Highest " " " "	4.3
Mean range of tide	1.7

Coast and Geodetic Survey
MAY 5 1911
TIDAL DIVISION

Hyd. Sheet No. 3252. A

This sheet is a combination of two hydrographic surveys by N. C. Dibrell and L. W. Smith.

The ground is very well covered except a few small spots at the entrance of "Kanana Bay" and the entrance east of Mokolii Id, and the character of the work is good.

The rough character of the ground inside the eighteen foot curve, from Mokolii Id. to Kekepa Id, makes it practically impossible to show any curves. By direction of the Chief of the D. & E. Div., the six ft. curve is the only one shown in this area. The six ft. curve is shown around a great many spots which contain no soundings at all, these spots are abruptly shoaling coral reefs.

As this sheet is both topo. and hyd., the topographic features were also inked.

R. L. Johnston

Verified; July 10, 1911.

R. L. Johnston

Department of Commerce and Labor
Coast and Geodetic Survey
O.H.Tittman,Supt.

TITLES FOR HYDROGRAPHIC SHEETS, OAHU, T.H., STEAMER EXPLORER, WALTER C.DIBRELL, CHIEF OF PARTY.

SHEET #1. Hyd. 3287 Scale 1-20 000

Keke Head to Mokapu Pen.

Begun November 12,1910

Finished December 14,1910

C. & G. SURVEY,
LIBRARY AND ARCHIVES
JUN 21 1911
Acc. No.

Hydrography in charge of Walter C.Dibrell,Ass't;John W.Maupin,Ass'T;A.R.Hunter,W.O;
L.W.Smith,Ass't.

Observers,Walter C.Dibrell,John W.Maupin,L.W.Smith,P.M.Truebleed,W.G.Wills,S.W.Tay,
R.R.Lukins,A.R.Hunter.

Recorders,E.M.Clark,Ass't Surg.,H.L.Hansen,C.Wr.,H.Olsen,Wr.,H.R.Smith.

Tide guage at Heeia and Honolulu.

SHEET #2: Hyd 3252 Scale 1-20 000

Mokapu Pen. to Kahana Bay.

Begun December 9,1910

Finished December 20,1910

Hydrography in charge of Walter C.Dibrell and A.R.Hunter

Observers,Walter C.Dibrell,A.R.Hunter,P.M.Truebleed,R.R.Lukens.

Recorders,E.M.Clark,Ass't Surg.,H.L.Hansen,C.Wr.,H.Olsen,Wr.

Tide Guage at Honolulu.

SHEET #3 Hyd. 3289 Scale 1-20 000

Kahana Bay to Kahuku Point.

Begun December 15,1910

Finished January 6,1911

Hydrography in charge of Walter C.Dibrell and A.R.Hunter

Observers,Walter C.Dibrell,A.R.Hunter,P.M.Truebleed,R.R.Lukens

Recorders,Dr.E.M.Clark,H.L.Hansen,C.Wr.,H.Olsen,C.Wr.Wm.Duker,S.Wr.

Tide guage at Honolulu.

SHEET #4 Hyd 3290 Scale 1-20 000

Kahuku Point to Waialua

Begun December 21,1910

Finished January 9,1911

C. & G. SURVEY,
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JUN 22 1911

Hydrography in charge of Walter C.Dibrell,A.R.Hunter,R.R.Lukens

Observers,Walter C.Dibrell,A.R.Hunter,P.M.Truebleed,R.R.Lukens.

Recorders,H.Olsen and Wm.Duker.

Tide guage at Honolulu.

SHEET #5 Hyd 3291 Scale 1-20 000

Waialua to Kaena Point

Begun January 9,1911

Finished January 26,1911

Hydrography in charge of Walter C.Dibrell,A.R.Hunter,R.R.Lukens

Observers,Walter C.Dibrell,A.R.Hunter,P.M.Truebleed,R.R.Lukens

Recorders,H.Olsen,C.Wr.,WM.Duker,Wr.

Tide guage at Honolulu

SHEET #6 Hyd 3292 Scale 1-20 000

Kaena Point to Lahilahi Point

Begun January 16,1911

Finished January 28,1911

Hydrography in charge of Walter C.Dibrell,A.R.Hunter,R.R.Lukens

Observers,Walter C.Dibrell,A.R.Hunter,P.M.Truebleed,R.R.Lukens

Recorders,H.Olsen and Wm.Duker.

Tide guage at Honolulu.

SHEET #7 Hyd 3293 Scale 1-20 000

Lahilahi Point to Barbers Point

Begun January 27,1911

Finished February 2,1911

Hydrography in charge of Walter C.Dibrell,A.R.Hunter,R.R.Lukens

Observers,Walter C.Dibrell,A.R.Hunter ,P.M.Trueblood,R.R.Lukens,H.W.Pearce,O.J.Bond

Recorders,O.J.Bond,Aid,H.Olsen.C.Wr.,Wm.Duker,W r.

Tide guage at Honolulu

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SHEET #8 Hyd 3294 Scale 1-20 000

Barbers Point to Honolulu

Begun February 11,1911
Finished
February 20,1911

Hydrography in charge of Walter C.Dibrell,A.R.Hunter,R.R.Lukens

ObserversWalter C.Dibrell,A.R.Hunter,P.M.Trueblood,R.R.Lukens,H.W.Pearce,O.J.Bond

Recorders,O.J.Bond,H.Olsen,Wm.Duker

Tide guage at Honolulu

SHEET #9 Hyd ~~3295~~ 3253 Scale 1-20 000

Honolulu to Koko Head

Begun January 13,1911

Finished February 14,1911

Hydrography in charge of Walter C.Dibrell and A.R.Hunter

Observers,Walter C.Dibrell,A.R.Hunter,P.M.Trueblood,R.R.Lukens

Recorders,H.Olsen,Wm.Duker .

Tide guage at Honolulu.

Department of Commerce and Labor

Hawaiian Islands -30
South Coast of Oahu -40
Honolulu Harbor To Barber Point (70)

Str. Explorer
W. C. Dibrell, Asst. Chief Of Party
1911
Scale 1/20000

Plotted by H. L. Simons
Verified by R. L. Johnston

Soundings shown in feet.

No. 204
Ed. 1-23-11—500,000

JUL 11 1911
Assistant in Charge.

ASSISTANT IN CHARGE,
U.S. C. & G. SURVEY,
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JUL 12 1911
C. & A. DIV.

Department of Commerce and Labor

Coast and Geodetic Survey

O.H.Tittmann, Supt.

GENERAL DESCRIPTIVE REPORT OF OAHU ISLAND, TERRITORY OF HAWAII, TO ACCOMPANY HYDROGRAPHIC SHEETS 3252-3253, 3287-9-3290-3291-2-3-4

1910-1911

Walter C.Dibrell, Assistant, C.& G.Survey, Chief of Party.,

Steamer EXPLORER

GENERAL DESCRIPTIVE REPORT OF OAHU ISLAND, TERRITORY OF HAWAII, TO ACCOMPANY HYDROGRAPHIC SHEETS NOS. 3287 TO 3295, INCLUSIVE (FIELD NOS. 1--9), SCALE, 1---20 000.

C. & G. SURVEY,
LIBRARY AND ARCHIVES
JUL 15 1911
Acc. No.

I. Introductory.

These nine sheets include the entire coast of Oahu Island on a uniform scale of 1 to 20 000. They are numbered in consecutive order beginning with 3287 at Makapuu Head and continuing around the island in a counter-clockwise direction.

2. This report had not been completed on June 30th, when my resignation from the service became effective, and most of it has therefore been written at a personal sacrifice of time. The report might otherwise have been given a better arrangement and more attention devoted to facility of reference. Information that is obvious or that can readily be obtained from other sources is to some extent omitted. Coast pilot data is largely compiled from notes made by the writer while on the working ground. Much of it is a repitition of what could be derived from other sources, but, if the Coast Survey is to issue a coast pilot of the Hawaiian Islands, it is desirable that as much as possible of the data be obtained first hand. Little information for this report could be taken from the hydrographic sheets for the reason that they have not been plotted at the time the report is written. Many elevations are omitted, as few were determined by this party, and the Office is in possession of the best information available on this subject.

II. The Execution of the Work.

3. Kaneohe Bay and the inshore work of Maunalua Bay were done by the party of Mr. L.W. Smith, and details relating to those localities should be found in his reports. The sounding between Honolulu and Diamond Head, out to the twenty-fathom curve, was done by Assistant French. Honolulu and Pearl Harbor were not resurveyed.

4. All of the off-shore work was done with the ship (Steamer EXPLORER). The development is complete out to the hundred fathom curve, and along the greater part of the coast soundings were obtained much farther out, the lines ending from three to five miles from shore. Southward of the coast between Honolulu and the eastern end of the island the work was not carried beyond one hundred fathoms, as the chart shows many soundings off that part of the coast. In the execution of the off-shore hydrography the direction of the lines was governed by economic considerations.

5. The ship lines were run as close to shore as possible, and in smooth weather additional soundings were obtained closer in with the launch. Outside of Waimanalo and Kahana Bays the small-boat work of this party includes only a narrow belt along the edge of the shore or reef. Owing to the comparatively few days on which the weather was suitable for this class of hydrography, the launch work was cut down to a minimum, and that done was hurried as much as possible. An inspection of the finished sheets indicates that in some places additional soundings would have been desirable.

6. Along the open parts of the northeast and northwest coasts, the shoal soundings are affetted to some extent by the ground swell. On the southwest and southern sides the swell was less felt, although not entirely absent. In the immediate proximity of the shore or the bordering reef, the lines of both ship and launch were run parallel thereto in order to obtain soundings as close in as possible without undue exposure of the boat to danger of grounding or being caught in the breakers.

7. Along the outside coast the belt of hand lead work is so narrow that it was not considered necessary in general to cross the lines.

Cross lines were run at the anchorages; and, the area bordering the coast between Barbers Point and Honolulu being considered of special importance, the original lines were run parallel to the reef, and they were crossed by a double system of oblique lines. In reference to the matter of direction in running lines of soundings, it might be well to remark here that with increased experience my conviction becomes stronger that near steep coasts lines parallel to the shore are not only the more economical and the safer for the boat, but give more accurate results, and, if the work be carefully done, furnish data just as useful for the purposes of the navigator.

8. Reduction of soundings. No tidal data was obtained by this party for the deduction of soundings to the plane of low water. An automatic guage was in operation at Honolulu, and, as the range of rise and fall in this region is small, the records of this station should furnish sufficiently accurate reductions for any part of the coast of Oahu. A staff was maintained by Mr. Smith in Kaneohe Bay during October and November, readings being recorded only during the daytime.

III. Charts---Recommendations

9. In regard to harbor charts I would recommend that special charts (say on a scale of 1--20 000) be issued of Waimanalo, Kaneohe, Kahana, Waialua and Pokai Bays. The demand for these charts would not be great, however. The railroad now skirts the coast from Honolulu by way of Barbers Point, Kaena Point and Kahuku Point to Kahana, and nearly all of the shipping is by rail. The small ports have, therefore, less importance now than before the railroad was built. Waimanalo, Heeia and Waikane have no railroad connection, and two small vessels make regular calls at Waimanalo and Kaneohe Bays. Occasionally by special arrangement they call for cargo at Kahana, Punaluu, Hauula, Mokuleia, Waialua or

Waianae.

IV. General Notes.

10. The northeast coast of the island is exposed to the full force of the trades, and usually a heavy sea or swell is encountered on that side. There are times, however, when the trades are suspended for several days, and the swell diminishes accordingly. The northwest coast is only partially exposed to the trades, but there usually is a northwest swell. In northeast trades there is no shelter, excepting for small craft that can get into Waialua. In east-northeast trades the wind blows off the land from Waiamea to Waialua, and there is protection from the sea, but if the wind be strong and continuous for more than a few hours, a heavy swell rolls in from the northwestward, making it undesirable, if not impossible, for a vessel to anchor anywhere on this coast. The southwest coast is well sheltered in trade weather, and vessels will find good anchorage anywhere near the shore. Along the southern coast the only stretch sheltered in all trade weather is that from Diamond Head to Honolulu. East-northeast trades, if strong, stir up a choppy sea from Koko Head to Diamond Head and from Honolulu to Barbers Point. If the wind be northeast this whole coast is fairly sheltered.

11. Landings. In connection with surveys of Oahu Island the subject of landings is one of unusual importance on account of its relation to defence in time of war. As much data in regard to landings as could be gathered by the party is included in subsequent pages of this report in connection with the general description of the coast, but a vessel party having but little work on shore and visiting certain coasts only under certain conditions of weather, is not favorably situated for obtaining full information on the subject. Additional notes doubtless will be furnished by the topographic parties, but, if more

complete information is desired by the War or Navy Departments, the suggestion is offerred that such data could be best secured by a small party of their own officers or employees stationed on shore and making a special study of the subject.

12. The slope of the bottom near the coasts of Oahu ~~are~~ is in general steep, and the hundred-fathom curve is generally found from one to three miles from shore. The most noticeable projections of this curve from the shore are, off Makapuu Head, off Ulupau Point, off Kaena Point and to southward of Barbers Point. There are very few places along the coast, however, where a vessel cannot find shoal enough water to anchor when the weather conditions permit. These exceptions are off Makapuu Head and Manana Island and off Koko Head.

B.B.N. call this Mokapu Pt.

V. Relief--Mountain ranges.

13. In relief, the island of Oahu is said (H.O.pub.115, p 104) to present to almost any direction a more rough and jagged sky-line than that of any other island of the group. This statement appears to be true as far as the observations of this party extend, but Hawaii was not sighted by the party and some of the others were seen only from one general direction. The island is mountainous and includes two important systems, the Koolau and the Waianae ranges.

14. The former lies near the northeastern side of the island and in a general way parallels the trend of the coast. The latter occupies the southwestern part of the island, its axis trending about parallel with the shore. Between the two ranges lies a broad, fertile valley, comparatively low and level, which extends across the island from Pearl Lochs to Waialua. This valley is for the most part under cultivation, and includes many extensive plantations. Southward of the eastern end

of the Koolau range is a group of detached summits. This includes Punchbowl, Diamond Head, Koko Head and Koko crater, all of which are plainly volcanic in their origin.

15. The southeastern part of the Koolau range is characterized by a sheer, rocky precipice, or pali on the northeastern face and long sloping ridges separating narrow, deep valleys on the opposite side. The abrupt rock bluff, or pali, is almost or quite continuous from Makapuu Head to a point about abreast of Heeia, on Kaneohe Bay. Nothwestward of this position the sheer cliff gives way to a steep slope. Between the palis and the sea is a low plain, much of which is under cultivation. The valley tapers to a point near Waimanalo landing, about 2½ miles westward of Makapuu Head, and it is intersected by two or three ranges of hills, which trend toward the coast from the foot of the higher range of mountains. One of these includes Olomana, a group of two or three sharp spires, the highest of which has an elevation according to the chart of 1644 feet. For further topographic details see topographic surveys made by other parties.

16. Northwestward of Kaneohe Bay the mountains draw nearer to the shore and the coastal plain becomes narrow. The slope is steep and rugged seaward, and several detached summits stand just to northwestward of Kaneohe Bay. The southwestern slope of the range is more gradual and somewhat of the same general nature as along the southeastern portion of the range.

17. From offshore the northwestern half of the Koolau range presents a long ridge sloping gradually upward from some low but noticeable bluffs near Kahuku Point to a summit back of Kahana Bay. The seaward slope is rather steep and is very much marked by ridges and val-

leys. Excepting near the point, the crest of the ridge and about half the seaward slope is thickly wooded. The lower half is grass covered but shows many splotches of bare, red soil or rock.

18. Immediately to northwestward of Kaneohe Bay there are three isolated mountains rising steeply from the shore. These are partly timbered, and, on account of their steep and very rugged character, and the marked contrast of color produced by bare rocks, grassy slopes, and trees of both dark and light foliage, they present a very beautiful as well as striking appearance. These three mountains are good landmarks, but from offshore their summits are not conspicuous on account of the higher background. Between the three peaks are two deep but short valleys, Kaaawa and Kahana, the latter being the northern one. At the head of the two valleys, to northeastward of the main range, is the heavily timbered spire peak, Ohulehule. This shows prominently to eastward out over Kaneohe Bay, but to the northeastward it is not conspicuous owing to the peaks between it and the shore and the higher backbone of the Koolau range behind.

19. To the southeastward of a point inshore from Kahana Bay as far as a position nearly abreast of Honolulu, the Koolau range is continuously high. The crest is not of uniform elevation and there are a number of small fairly definite summits, but no deep intersections or conspicuous peaks are noted from seaward.

20. In that part of the range back of Honolulu there are three noticeable gaps, each being the head of a long narrow valley draining to the southwestward. The gaps are therefore open from seaward when seen near the bearings northeast or southwest. All three valleys terminate at their heads in rocky precipices descending abruptly to the plain on the opposite side of the range. The southeastern valley is

known as the Nuuanu, is the deepest of the three, and at its head is the celebrated pali so much visited by tourists, from which a magnificent panoramic view of the northeastern coast and plain is spread out before the observer. A road constructed at considerable expense leads up Nuuanu valley to its head then winds down the face of the cliff to the plain below, thus providing a highway between Honolulu and the opposite side of the island.

21. Immedately to southeastward of Nuuanu pali is Mt. Konahuinui (3105 ft. chart), the highest peak in the Koolau range. From northeastward and southwestward it shows a double summit, the two apparently of equal height and both dark and sharp. The mountain towers well above everything else in the vicinity. To southeastward of Konahuinui the crest of the ridge is ragged, and the range decreases irregularly in elevation toward Makapuu Head.

22. Between Nuuanu and the next valley to the N.W. southwestward is Lanihuli, a conspicuous summit on account of the valleys on each side.

23. The range terminates at Makapuu Head in a bold, rocky and barren promontory 642 feet (chart) high. The seaward faces both to northward and to eastward are sheer precipices, dark in color, conspicuous from seaward, and on the shore side the land slopes steeply down to a comparatively low valley separating the headland from the rest of the mountain range. A trail crosses this divide, providing communication by foot between the two sides of the island. There is no wagon road and the trail is too steep for horses.

24. Along the greater part, the Koolau range is timbered near the summit, but the southeastern part is barren. The leeward slopes of this part of the range, and the detached summits previously mentioned

receive little rainfall, and they are therefore brown and sterile in appearance, presenting a marked contrast with the more well watered parts of the island. The Punchbowl being closer to the Koolau range and receiving more precipitation than the others, varies in color with the rainfall.

25. The Waianae range is slightly curved, the concave side toward the sea, and from the main range several spurs extend toward the shore, forming short valleys between. Mt. Kaala is the summit of the range, and is the highest point on the island. This range is much broken, and there are a number of high peaks. Descriptions were not obtained by the party owing to the fact that much of the time the summits are obscured by clouds, and the greater part of the hydrographic work lay near to the shore, where a clear view of the summits is not obtained. Kaala may be identified by its height and the short flat ridge trending northeast and southwest, which forms the summit. From southeastward this flat summit appears to slope slightly downward toward the left.

26. The Kolekole Pass through the range, located back of Waianae, is noticeable from seaward when on a northerly or northeasterly bearing.

27. Detached mountains near the shore will be mentioned in connection with detailed descriptions of the coast.

VI. The Coast

28. Makapuu Head has been described in paragraph 23. It is a conspicuous landmark and usually is the landfall for vessels bound from San Francisco to Honolulu. A lighthouse stands upon the brow of the hill. There is good water close to eastern end of the point, but between it and a position about abreast of Koko Crater is a flat ledge.

The sea always breaks here close to shore, and the ten-fathom curve bends off shore to a distance of about 3/4 mile. Vessels should keep outside of ten fathoms along here.

29. A sunken rock over which the sea always breaks lies about 100 yards off shore, ½ mile south of the point under the lighthouse. This rock was never seen to uncover, but the appearance of the sea indicates a rock very near to the surface, and it was therefore shown on the boat sheet by the symbol of a rock awash.

30. Manana Island is high (359 feet according to the topographic sheet) and steep. It is nearly circular in shape and about 1/3 mile in diameter. This island is part of an old crater, the inner rim of which does not show from seaward. It is composed of a light shade rock and presents a different color from any other land in the vicinity. The summit, which is near the southern part (Tom), is definite but not sharp. The island shows a bluff to seaward, with a low flat ledge of dark rock about 10 feet high extending a few yards out from the foot of the cliff. On north and south sides island is also steep, but on the western side there is a short sloping point with sand and gravel beach. There is deep water close to the island on offshore (N.E.) side.

31. Kaohikaipu Island lies between Manana Island and Makapuu Point. It is a low black mass of rock about three hundred yards across. In shape it is semi-circular on inshore side and on the other side is a small bight not noticeable from seaward. The island is flat, and highest on offshore side, where according to the topographic sheet it is 70 feet above the water. The summit (Red ●) shows from the shore as a small dome-shaped knob, which is not noticed from seaward.

32. One hundred and seventy yards southwest of the last named

island, between it and the shore, is a small black double rock, just showing above the water. Diametrically opposite this rock, on the offshore side of island, the same distance from its shoreline, is another black double rock about ten feet high. In a heavy swell the sea breaks about 100 yards outside of this rock.

33. In light to moderate east-northeast trades fair anchorage may be had behind Manana Island, with its left tangent or center bearing northeast magnetic and the small black rock inshore of Kaokaipu Island in line with the lighthouse, in four to six fathoms water. The bottom here is rock, however, and there is danger of dragging should the wind freshen. The wind is less felt here than off shore, since it rises to pass over the bluff to leeward. In northeast, north or northwest winds the anchorage is open to a heavy swell and should not be used. The anchorage is approached around the north side of Manana Island, avoiding on the one hand the shoal water close to the west point of Manana Island, and on the other the reef along the main shore. The water is clear and the dangers can be seen unless one is blinded by sun glare.

34. There is a navigable depth in the channel between Manana and Kaokaipu Islands, but it should not be used. Shoal water extends off from ~~either~~ each shore.

35. The boat sheet shows no soundings between Kaohikaipu Island and the shore, but this is believed to be shoal, and by no means should a passage be attempted with a vessel.

36. The bight between the island and Makapuu Point has deep water excepting near the shore. There is a sand beach at the head, upon which the sea usually breaks heavily.

37. From this bight to the Waimanalo landing (Sugar e) the shore-

line is irregular and rocky,with a few short patches of sand beach. Landing can usually be effected in the small bight abreast of Manana Island (between Lay e and Goat e),behind a rocky ledge jutting to the northwestward,which in some measure breaks the swell. The beach in the bight is sand with occasional boulders. Along this part of the shore, immediately back of a narrow strip of comparatively low land, rise the towering cliffs of the Koolau range,unbroken excepting for the pass close to Makapuu Head. At a distance of about two miles from the lighthouse,the cliffs,although preserving the same general characteristics, draw farther from shore.

38. Immediately northward of the landing above described is the beginning of the coral reef that fronts the whole of Waimanalo Bay. For a distance of about one mile from this end the reef is joined to the shore,and officers sent to investigate reported that it was not possible for a boat to pass into Waimanalo Bay around this end of the reef. I judge that in very smooth weather a sampan might find a passage among the coral heads. The reef bares in places at low water,and nearly always is indicated by breakers.

39. Waimanalo Bay is sheltered from all directions,with a best depth of about five fathoms. It is entered through a break in the reef near the northern end,where the best depth on the bar is only about two fathoms. It can therefore be used only by small, light draft vessels,and the entrance is closed in strong trades by breakers. The landing is in the southern part of the bay,where there is a small wharf connected by a tram road with the sugar mill at Waimanalo. The small craft that call here for sugar lie off the end of the wharf,where the depth appears from the boat sheet to be from two to three fathoms, and lighter their cargo. The range used for entering is defined by

a white horizontal board mounted on a post nearly half a mile from shore, in line with a distant white house two miles from the front range. The back range is at the left hand edge of a grove of large trees and a house similar in appearance is seen at the right hand edge of the same grove. The range is indicated on the topographic sheet. The shoreline of the bay is a sand beach. Two miles from Manana Island there is a sort of break in the reef through which small-boats might pass when there is little swell. Between the main entrance and the Mokulua Islands is a strip of shoal water included between the soundings of the launch and ship, which appears to be partly rocky and partly sandy. It probably would be best to show it on the chart as a reef. It apparently joins the Mokulua Islands.

40. The red brick mill chimney at Waimanalo and the wharf at the landing are useful marks in approaching. A small house stands at the head of the wharf, and Sugar e is a pile driver which was standing close beside the house.

41. Between Waimanalo and Kailua Bays the shoreline is gradually rounding, and a group of grass covered hills stand near the shore. The two most marked changes in direction of the shoreline are called Wailea and Alala Points.

42. Three-quarters of a mile off the coast between the two points just mentioned, are the Mokulua Islands. These are two in number, the higher to the northward. Both are steep with definite summits, but the higher one is especially sharp; they are rocky with grassy slopes. They are small in extent and their heights according to the topographic sheet are respectively 182 and 206 feet.

43. Three hundred eighty yards off Alala Point is a small, flat, unnamed islet. This is on a reef that extends half a mile to north-

westward and in the opposite direction to the Mokulua Islands. Between this reef and the shore there is a shallow boat passage leading through from Waimanalo Bay to Kailua Bay. There is also a boat passage between the reef and the Mokulua Islands.

44. Kailua Bay has an irregular depth and is of no importance. Much of the bottom is rocky. There is no shelter from the trades, and it is not believed that landing can be made in such weather, unless the swell is very small. The shoreline at the head of the bay is sandy and along other parts rocky.

45. Mokolea is a small black rock about 20 feet high located about 1 mile off shore in the northern part of the bay. It has deep water all around it, especially on offshore side, where 20 fathoms is found at a distance of 650 yards

← Mokapu Pt., Board Geo. Names

46. Ulupau Point is a bold rocky promontory, a conspicuous landmark. It is the western rim of an old crater. The highest part of the rim is near Mokapu ▲, a little more than half a mile southwestward of the end of the point. On the extreme end of the point there is a definite summit about 300 feet high, and between the end and the highest part the rim is somewhat lower. The headland is barren of vegetation, excepting grass on the lower slopes. It may be of interest to note that Ulupau Point seen from the eastward through a rain squall was observed to be very similar in appearance to Makapuu Head seen on the same bearing.

47. On the western part of Mokapu Peninsula there some grass covered hills, one of which, Hawaii Loa, is conical and definite. Pyramid rock is at the northwest point of the peninsula. It is a mass of black rock with a sharp summit. In the bight on north side of peninsula, about

west true from Mokapu, a landing is indicated on the Territorial map of Oahu. There are some rocks awash here just off the shore, and, if the swell is not too heavy, there is just room to take a boat through a break in the rocks, and once inside, there is good landing on a sand beach.

48. Mokapu Peninsula is joined to the main land by a low neck, which is almost severed by a fish pond. (Nuupia)

49. The Moku Manu Islands, two in number, are small in extent and flat-topped. The sides are almost vertical, excepting that the larger (inshore) one has a steep slope on eastern side. The two are partially joined by a mass of rock over which the sea washes. They are good landmarks. There is a clear passage between the islands and Ulupau Point, but there is little or no occasion for any other craft than small fishing boats to use it.

50. The sea usually breaks on east northeast side of islands to a distance of about 300 or 400 yards. A very narrow bank over which a least depth of from 14 to 16 fathoms was found, extends seaward (about northeast) to a distance of nearly 3/4 mile. It was carefully examined, the weather being quiet and the water clear, and it is not believed that there is materially less depth than that shown. Over this bank strong tide rips usually are found.

51. For description of Kaneohe Bay and the coast as far as Kahana Bay, see reports of Mr. L.W.Smith. The offshore soundings along this part of the coast were made by the party of the EXPLORER. Prominent objects noted are the MokuManu Islands, Ulupau Head, Pyramid rock, Ohulehule peak, Mokolii islet, a chimney on north side of Mokolii Passage, and a house 1/3 mile south of the chimney. The two church spires (red and white) at Waikane show, but not prominently. Kaneohe Bay is used only by very small vessels. The EXPLORER was taken in through the Mokolii

Passage two or three times, but the place was not used as a regular anchorage on account of the danger of being shut in by breakers or a heavy swell at the entrance. Fifteen feet was the least depth found in the entrance. The sailing directions used were obtained from Mr. Smith and doubtless are included in his reports.

52. Between Kaneohe Bay and Kahuku Point there is but a narrow strip of low cultivated land between the foot of the mountains and the shore. This strip widens toward the point. There is both a wagon road and a railroad paralleling the coast, and numerous buildings and a few villages are seen from offshore. Objects prominent from seaward are: two school houses with their flag poles (native and Japanese) standing close together on the shore 1-1/4 miles southeastward from Kahana Bay; the Catholic and Protestant church spires, 1/8 mile apart, 1-1/2 miles northwestward of Kahana Bay; the Morman church at Laie, which is a large prominent building surmounted by a cupola; a large black mill stack (Fire •); wireless pole (Wire •); and a tall black mill stack (Oil).

53. This part of the coast is partly a sand beach, partly rocky, and there are no high bluffs on the immediate shoreline. The whole of it is fronted by a coral reef of varying width. A few small openings in the reef permit boats to approach the shore. The most important of these are, Kahana and Laie Bays, which were surveyed. At Punaluu and at Hauula there are small breaks, where the small power boat/Mokolii, goes inside the reef to pick up cargo in very smooth weather. There is said to be ample depth for light draft vessels, but the entrances are narrow.. These two places were not surveyed, as they are of little importance and there was no weather that would permit the work being done while the party was in that locality. Local knowledge is necessary for

entering and a chart would have but a limited value for the pilot.

54. Kahana Bay lies at the mouth of the second valley to northwestward of Kaneohe Bay It affords good shelter for small craft, but its extent is too limited and depth too small for vessels of any size. The place has no commercial importance. Kahana village at the head of the bay is small and partly hidden by the trees, so that little of it can be seen from the outside. The church shows on some bearings, but it is not favorably situated for use as a guide in entering. The head of the bay, which is fronted by a sand beach, is about 5/8 mile from a line joining the two entrance points, and the bay has a width between shores of about half a mile, but it narrows a little at the head and flares at the mouth. The navigable width is much restricted by coral reefs that border ~~either~~ each shore, and as these extend far offshore on each side at the entrance, Kahana Bay is in reality but a long narrow opening in the reef, a mile or more in length.

55. No directions for entering can be given. The small craft, which alone can make use of the bay, will be guided into the entrance by the breakers on ~~either~~ each side. Large vessels desiring to anchor off the entrance should approach with caution, as a deep submerged valley lies off the bay, and the depth shoals rapidly on each side near the reefs.

56. It is recommended that in drawing the chart the reef line be interrupted off Punaluu and Hauula, on account of the information that we have from other sources that there are small breaks in those localities. Off each of these villages the soundings indicate narrow channels of deep water running in toward the land, although at the time the lines were run it appeared to the observers that the breakers were

continuous on inshore side of the launch.

57. Laie Point is a low, narrow, nearly level tongue of land with rocky shoreline. Near the end of the point are two small, flat, rocky islets. (Kukuihoolua & Mokualai Rks.) About 1/3 mile east-southeast from the end of the point is a small sunken rock over which the sea nearly always breaks. It is a little farther out from the general line of the shore than the outer islet. (Mokualai) Southward of Laie Point for about 1 mile the bottom is rocky and the depth irregular.

58. Laie Bay is a very narrow opening in the coral reef, where small boats can find shelter and a landing made. The entrance is about one mile north of Laie Point and leads between two islets, passing close to the righthand and larger one. (Mokuaiai) Both of these islets are flat and rocky. The outer (Pulemoku) (southeastern) one is very small in extent, but the other is larger and is not easily distinguished from the shore. The guide for entering is the Mormon church, but no further information can be furnished than can be taken from the hydrographic sheet or from the sailing directions and chart published by the Hydrographic Office. An eleven foot patch, hitherto uncharted, was found in the middle of the entrance. An inspection of the hydrographic sheet indicates the need of more soundings between the small islet and the head of the bay. The one line of soundings across this area shows good water and the area should have been fully developed.

59. One half mile northward of Laie Point, a little more than half a mile off an ajacent point, is another small rocky islet, (Kihewa-moku) very similar in appearance to those to southward. A sunken rock marked by breakers lies 1/8 mile outside the islet.

60. From Laie Point to Kahuku Point the shoreline is generally sand beach, but with black rock showing in places, especially at the

projections in the shoreline. From Kahana Bay to Kahuku Point the ten-fathom curve lies at a nearly uniform distance of one mile from the general position of the shore, and outside of this curve there are no dangers.

61. Kahuku Point is very low, covered with sand dunes, and has a few scattering cocoanut palms. At the base of the point are some noticeable bluffs, from which the land rises gradually toward the mountains. The shoreline rounds gradually, and there are a number of little irregularities not noticeable from outside the breakers. Some small black rocks are seen close to shore. Off the point the ten-fathom curve draws in to about 1/3 mile from shore. A heavy surf nearly always beats upon this coast. In daylight the breakers afford sufficient warning to guide one clear of danger, but at night care must be exercised in rounding the point on account of the low elevation of the adjacent land and the absence of aids or any prominent objects.

62. From Kahuku Point to near Waialua there is a narrow strip of low land along the coast, and back of this is a sort of plateau or table land, cultivated or grass covered, with steep grassy slopes facing the sea. The plateau rises on the one hand to the Koolau range and on the other merges into the Ewa plain. A number of deep gorges are noticeable. Much of the upland from a point near Waimea to Waialua is covered with plantations.

63. Along the shore at the foot of the slope are a number of buildings and windmills. The Waialee industrial school 3 miles from Kahuku Point is a group of prominent buildings. Abel e is a pump stack standing close beside a windmill in front of the group. Neither shows far off shore. Other prominent objects are Cane e, a smoke stack standing at

the end of a high flume, some large houses at Waimea, the pumping station between Waimea and Waialua identified by two tall smokestacks (Dub e). Back of the pumping station, on the brow of the hill, is a grove of trees and a large collection of plantation dwellings. In the vicinity of Waialua the prominent objects are the church spire, the two flag staffs on the Haleiwa hotel, the roof only of which shows over the trees, a large black chimney with a mill beside it (Mill e).

64. At Waimea there is a small indentation in the shoreline and an opening in the reef. There is no shelter, and landing can be made only in very smooth weather. The place has no commercial importance. The bay lies at the mouth of a deep gorge which divides into two large branches some distance up. A small stream flows down the gorge, but its mouth is closed. The railroad bridge across the stream can be seen when close in. There are several scattered buildings to left of the bay. Off southern entrance point (Wananapaoa), are two ragged masses of black rock against which the sea dashes heavily. There is a navigable depth close to the rocks on the offshore side. Close to the northern entrance point are some sunken rocks marked by breakers. No directions are necessary other than to stand in for the middle of the bight and anchor according to depth.

65. Waialua is at the bend near the middle of the northwest coast. The locality is identified by the turn in the shoreline and the prominent objects previously mentioned. There is a slight indentation in the shoreline and a break in the coral reef, which permits small craft to get in far enough to get some protection in trade weather. The area is very restricted, however, and vessels of any size must stay outside, where there is no protection at all. The rule used in anchoring the

EXPLORER was to bring the church spire between the two flagstaffs on the hotel and stand in on this range until in about twelve fathoms then let go. There is nothing gained by going closer in, excepting ease of communication with the shore, as there is no shelter from the ocean swell and the ground swell is more felt in the shoaler water. Care should be exercised in going in and out not to pass too close to the reefs on either side.

66. The shoreline in this vicinity is black rock with sand patches in the bights; it is all low. The islet in Waialua Bay is a small, low black rock and is not easily identified. The tripod at Ena is a good mark as long as it stands. Only a few of the houses of the village itself can be seen from offshore on account of many large shade trees. A stream discharges into the head of the bay and boats can enter the mouth.

67. The whole of the coast from Kahuku Point to Waialua, excepting at Waimea is bordered by a broad reef or ledge. This seems to be rocky, but it does not have the appearance of coral. At no place is there a barrier reef enclosing deeper water. The sea always breaks along this coast, the distance of the breakers from the shore varying with the amount of swell. Just northward of Waimea the limit of the shoal water draws farther off shore than elsewhere.

68. Kaiaka Bay is about one mile southward of Waialua. There is an indentation in the shoreline, and a narrow channel leads around behind a reef and into the bight. There apparently would be good boat landing but the place is unimportant.

69. The country back of Waialua is low for some distance and is largely under cultivation. Toward Kaena Point, the spur of the Waianae

range that extends in that direction in the form of a long sloping ridge (Kuaokala) showing steep faces on both sides, encroaches upon the coastal plain, and at three or four miles from the point reduces it to a narrow bench. The shoreline along this stretch is largely white sand beach from near Waialua to a position about three miles from Kaena Point, where it changes to a dark colored rock with occasional patches of white sand. There are many buildings excepting within about four miles of the point. Near It are 2-3/4 miles from the point, is a group of two or three white houses that are noticeable on account of there being few others in the vicinity. Another prominent object is the tall stack called "Pump" in the records.

70. The whole of this stretch of coast is fronted by a strip of shoal water which narrows toward Kaena Point. The distance of the breakers from the shore depends upon the amount of swell. The limit of the breakers may be sketched in just inside of the inshore line of launch soundings.

71. Off the village of Mokoleia a rock awash lies ~~nearly~~ half a mile off shore. The breakers or the rock itself can almost always be seen. There is said to be a place near Mokoleia where a small vessel can get in close to the shore and land or receive cargo. The only place where this seemed at all possible was just to eastward of the rock, where the deep water seemed to approach a little closer to the shore, but at the time the party was working here that area was covered with breakers, the swell being only moderate.

72. At Kaena Point a low tongue of land extends a few hundred yards out from the foot of the high Kuaokala ridge, which ends rather abruptly. This low land is rocky, but there are two or three noticeable sand dunes,

The triangulation station is on the highest of these, near the end of the point. Low, ragged rocks, over which the sea washes, lie just off the point, and the sea breaks to a distance of about 1/4 mile from the shoreline.

73. The soundings show that the ridge continues, submerged, for a long distance to seaward, but there are believed to be no dangers where soundings are shown. The work of developing the area off the point was exceedingly difficult, as there was considerable current and the "lay of the land" was such as to afford poor fixes. The results are considered satisfactory, however.

74. Along the southwest coast of Oahu Island the slope of the bottom is steep and very deep water is generally found very close to the shore. There is no coral reef, but in places rock or sand shoals extend a short distance off shore, the most important one of these being the one at the point 2-1/2 miles below Waianae. The shoreline consists of alternating ledges of rock and white sand beaches.

75. The land near the coast is in general high. There is a growth of timber in the valleys and on some of the summits, but most of the summits, slopes near the coast are rocky and devoid of trees. Spurs extend toward the coast from the Waianae range, forming valleys between. The largest of these is the one about midway between Kaena Point and Barbers Point, occupied by the Waianae plantation. This valley is quite extensive but is intersected by a few detached ranges of hills.

76. Prominent landmarks are Kaena Point, Makua church, Barking sands (Bark ●), Kepuhi Point, Lahilahi, Waianae mill stack, Puuohula and Barbers Point lighthouse.

77. Makua is a small village at the head of the first bight below

Kaena Point.The red church spire,beside which is a white house,shows well from seaward. Two or three other houses,a windmill or two and two railroad trestles can be seen from off shore. There is a sand beach at the head of the bight, and vessels can anchor very close to shore. Boats can land when there is little swell. From Makua to Kaena Point the shoreline is rocky,excepting for one short sand beach, (Keáwaúla) and the mountains rise steeply from the shore. Back of the village is a small crater-shaped valley. One mile southward (at Ohikilolo) are a group of noticeable white sand dunes,known as the"barking sands".

78. To the lover of the beautiful in nature that part of the southwest coast near Kaena Point presents scenery of which the eye never tires. The bold,rugged mountains,rising out of a calm and peaceful sea, are clothed in the most exquisite shades of coloring,into which are blended and softened by distance the various shades that are reflected by dark,bare rocks,and by verdure that changes with locality and conditions from a dead, dull brown to richest green.

79. At Kepuhi Point a bold, rocky mountain spur comes to within a few hundred yards of the shore. At the base of the bluff there is a low, narrow strip of land thickly covered with trees.

80. Lailahi is a detached hill standing on the shore 2 miles to northwestward of Waianae and forming a narrow point projecting about 1/4 mile. It is a steep ridge of dark rock 234 feet high (chart), and seen on an easterly bearing,it is very narrow and sharp,the northern slope being the steeper and giving to it an apparent lean in that direction. Seen along the coast it is broader,but the summit is still definite.

81. Mailiilii is a narrow isolated rocky hill 720 (729 ch. Hill 723 USGS Quad) feet high (chart) standing near the shore one mile southeastward of Waianae. Its gener-

al trend, although slightly curved, is approximately at right angles to that of the shoreline.

82. Puuohulu is a similar narrow, rocky, barren ridge 1-1/2 miles long, located two miles farther to the southward at the southern one of the two important projecting points of the southwest coast. The western part of the hill is close to the shore, trending parallel therewith, and near the summit an almost sheer precipice (Pakahoa) faces the sea. At the eastern end the ridge (Hulu) curves inshore and becomes lower.

83. The last mentioned three hills, together with one or two other similar formations farther inshore, are prominent and useful landmarks.

84. At Kahe another spur comes down close to the shore, and from here the foot of the hills trends to eastward away from the shore.

85. Pokai Bay is a small indentation at the town of Waianae. On the south side is a small, low tongue of projecting land (Kaneilio Pt.), not easily identified from a distance. No directions can be given for approaching the anchorage, as the soundings have not been plotted, but the mill stack is the leading mark, and there is no difficulty. Waianae is on the railroad and there is practically no shipping by water. Little of the town can be seen from the anchorage, and the writer had no occasion to go on shore. Landing can usually be made, excepting in southerly weather.

86. Barbers Point is a low, flat coral plain covered with (algarroba) trees. The shoreline curves gradually and is white sand beach with outcrop of dark rock in places. The land is nearly level back to the foothills of the Waianae range, which are about three miles from the shore. The slopes of the hills are rather steep and partially covered with verdure, the bare, red soil showing in places and giving them a noticeable reddish appearance.

87. From Barbers Point to Honolulu the coast is all very low, and covered with trees. The beach is for the most part white sand. Near Honolulu there is an extensive inlet, much of which bares at low water, and the shoreline cannot be clearly traced from seaward. The whole of this stretch of coast is bordered by a coral reef over which the sea nearly always breaks. The limit of the breakers is to some extent variable, depending upon the swell. The only openings in the reef besides Pearl Harbor and Honolulu is Kalihi. It is possible that in very quiet weather landing might be made at other places.

88. On the low ground back from the coast several mills can be seen, the most prominent of these being the Ewa. As seen from offshore, it consists of a large building around which are grouped several small ones, all white. There three stacks, the northwestern one, which is of brick, being the one determined by the triangulation.

89. Southward of Barbers Point a bank extends out from the shore, and the hundred-fathom curve draws off to a distance of 3-1/4 miles. The dangerously shoal water close to the point usually is indicated by green water, but the discolored area sometimes extends farther out into deep water. Five miles east of the point the hundred-fathom curve draws in again to about 2 miles from shore, and although somewhat irregular, it holds about that distance to Honolulu.

90. The bank southeastward of Barbers Point has a regular depth, which increases gradually off shore. Twenty-three to twenty-five fathoms, in which a vessel can readily anchor, in quiet weather, is found as much as 2 ½ miles from the beach.

91. The entrance to Pearl Harbor is at present well marked by several large dredges at work in the channel, and by some buoys. The dredging operations, until completed, will restrict the use of the chan-

nel to a considerable extent. Pearl Harbor was not included in the surveys of this party and will not be described.

92. Kalihi entrance was not surveyed. It is of no importance at the present time, and if it should be found suited to any particular purpose, a survey should be made with this special purpose in view.

93. Honolulu need not be here be described. A large amount of the material needed for the coat pilot can be compiled from various sources, and an officer is now visiting the islands for the purpose of gathering coast pilot data. The entrance is well lighted and is easily made either by day or by night. The leading marks for approaching are, Diamond Head lighthouse, the crematory chimney, the lighthouse, the quarantine station with its white flag staff, and the shipping in the harbor. Usually the Punchbowl shows well, contrasting its brown and corrugated slopes against the greener mountains behind. Konahuinui and Lanihuli show well if clear, but Tantalus is not so easily identified until familliar. Few buildings of the city show on account of the trees. In approaching from the westward I found it a good rule after rounding Barbers Point at a safe distance to steer for Koko crater until abreast of the port, when the buoys can be picked up. If necessary to anchor outside, vessels usually choose the western or lee side of the entrance. Caution is necessary in approaching the depth desired.

94. From Honolulu to Diamond Head the coast is low and covered with trees. A number of houses can be seen along the beach. The most prominent of these is the Moana hotel with its flag staff, and a large building close to Diamond Head.

95. The whole of this coast has the coral reef, usually marked by breakers. There is a sort of opening at Waikiki beach, where boats can sometimes land, and another (Kapua) immediately on western side of Diamond

Head, through which the cable is landed. Smooth weather is necessary for landing at either of these two places.

96. Diamond Head is a distinctive and conspicuous landmark. It is an old crater, the highest part of the rim being at the seaward end, not far from the shore. Trees grow about the base of the mountain but the slopes and the crater rim are barren and brown or grayish in color. The slopes are steep, and at the foot of the mountain toward the sea there is a narrow bench about 100 feet above the water, showing a broken bluff line to seaward. The lighthouse is on this bench.

97. Kupikipikio Point is a flat-topped dark hill with rocky shoreline. A search light on the summit is a well defined object.

98. Maunalua Bay was sounded by Mr. Smith and probably is described by him. The coast is low and covered with trees, and a few buildings and a wimdmill or two show from offshore. The spurs of the Koolau mountains come down nearly to the beach.

99. The coral reef continues around DiamondHead and along the shores of the bay to Koko Head, where it ends. There is a narrow opening in the reef at the head of the bay, where a landing can usually be made. In very quiet weather a boat might approach the shore over the reef at other places between this and Kupikipio Point.

100. The depth in the bay is regular, and vessels may anchor almost anywhere in suitable weather. In eastnortheast trades much swell rolls around Koko Head and it is impossible to get out of it entirely, but fair anchorage may be obtained close up in the head of the bay. In northeast trades and in northerly weather there is little swell.

101. Koko Head (=Kawaihoa Pt., Kuamookane Hill) is a high, bold promontory, a fine landmark. It is flat on top, slopes down to low land inshore, and drops off abruptly on

seaward end. This face is eroded, and shows arched strata in places. The Kuamookane hill has a few small trees on lower slopes toward Maunalua Bay and inland, otherwise it shows bare rocks or a scant growth of grass, and is brown in color. There is very deep water close to shore off the head.

102. Hanauma Bay is a small inlet of no importance on eastern side of Koko Head. It looks promising as a shelter for small boats or a landing, but in eastnortheast or easterly weather the sea is very choppy off the entrance and some of the swell makes inside. In such weather the landing is only fair. A large part of the bay is taken up by the reef at the head. Soundings were made in the bay by the party of Mr. Smith.

103. Koko crater is a very high, sharp cone, brown in color. It is a fine land mark for vessels approaching from the eastward.

104. From abreast of Koko crater to and around Koko Head the shoreline is steep and rocky and is somewhat irregular. From the crater to Makapuu Head the shoreline is low and made up of sand, rock and shingle

105. Deep water is found close to shore from Koko Head to Koko crater, but abreast of the latter a flat ledge begins and makes offshore. This was described in paragraph 28.

VII. Wind and Weather.

106. But little original information under this head could be obtained by an observer stationed in the locality only for a period of four months. Some brief notes in regard to the weather experienced by the party during the season will be found in my general report covering that period, and nothing further of value on the subject can be added.

VIII. Currents

107. The demands of the regular survey work upon the time and attention of the party would not permit a systematic study of the currents along the coasts of the island, but a number of measurements of current were made, and the record of these will be found in the current book, which has been transmitted to the Office. A complete current survey would require many observations extending over a long period, and would be very expensive. The results of direct measurements and the experience of the party while sounding indicate that the currents about the island of Oahu are variable in strength and direction. However it may be safely be stated that the general movement of the water near the coast of the island is toward the westward or northwestward, the direction being modified of course by the adjacent land. One or two inter-island navigators questioned in regard to currents, confirmed the statements contained in the last two sentences.

108. Between Honolulu and Makapuu Head a current usually was experienced setting along the coast. It appeared to be tidal, the ebb setting eastward and the flood westward. The ship anchored on different days in Maunalua Bay near the head rode to the current on the ebb, lying broadside to the eastnortheast trades, and on the flood rode to the wind. The ship changed her heading very near the predicted time of high or low water at Honolulu. At the end of the season the current was measured at hourly intervals for 24 hours off Barbers Point and off Kaena Point. The trade wind was very strong and the results not accurate, but the current was found to hold about the same direction, setting southwesterly off the former point and northwesterly off the latter. It was my hope to make a series of measurements off Diamond

Head, but a vessel cannot anchor there in ordinary trades and there was no opportunity to do this work without neglecting the hydrography.

109. While sounding with the ship, the current near Kaena was found always to set about N 60°W magnetic. Off KAhuku Point it usually set along the coast to northwestward or westward, but at times there was no current at all. In the vicinity of the Moku Manu Islands there was at times a current setting easterly, but it is not known whether or not this current is constant. This current is the cause of the tide rips in this locality previously mentioned. Some additional information can be derived from an analysis of the current record of the party.

IX. Notes and Suggestions Relating to H.O.Publication number 115, "The Hawaiian Islands."

Library archives
Acc. № 25933
527.5
:83
:161

110. Page 104, par 2: The writer is of the opinion that this paragraph gives an exagerated idea of the irregularity in outline of the Koolau range.

111. Page 106, par 2: The division of the air current was not observed. In shifting from side to side of Makapuu Head and Koko Head no change in the direction of the wind could be detected. Variability in direction and strength of ocean currents was confirmed. A weather current caused tide rips or an exagerated sea.

112. Page 106, next to last par: The entrance to the bay is not in the place stated. See paragraph 39 of this report.

113. Page 106, last par: Height of island given by the topographic sheet is 70 feet, instead of 20 feet.

114. Page 107, Height of Mokulua Islands is greatly underestimated. See paragraph 42 of this report.

115. Page 107: There is no resemblance between Mokolea rock and

the Mokulua Islands.

116. Page 107:Moku Manu Islands seem to have no bushes but there are a number of black rocks resembling bushes. The rookeries were noted.

117. Page 115: Pacific heights is no longer of any importance; the railway has been taken away,and the locality cannot be readily identified.

118. Page 116: Western side of the entrance to Honolulu is recommended by the harbor master for anchorage instead of the eastern.

119. Pages 116,117,118: Directions for Honolulu will have to be written on account of changes in the aids,which have been published. The range lights are used only as a guide in approaching,and the range leads between the two outer buoys. Once in the channel,however,the range obviously cannot be followed and the pilot must be guided by the lighted beacons on either side. The rear range does not show over the front one,and when they are in line the former is obscured. See also paragraph 93 of this report.

Respectfully submitted,

Washington,D.C.,July 11,1911.

To the Superintendent,

Coast and Geodetic Survey,

Washington,D.C.

Hyd 3252

C. & G. SURVEY,
LIBRARY AND ARCHIVES
JUN 21 1911
Acc. No.

STATISTICS

Sheet #2, Oahu, T.H., Steamer EXPLORER, 1910, Walter C. Dibrell, Chief of Party.

Boat	Date 1910	Letter	Vol.	Miles	Soundings	Angles	Remarks
Ship	Dec. 9	L	5	27	120	242	Continued from sheet #1
"	10	M	5	35	126	124	
"	14	N	5	6.8	63	120	Continued from sheet #1
"	15	O	5	2	12	24	Continued on sheet #3
"	20	P	5	9	17	34	Continued on sheet #3
Totals, ship		5	1	79.8	338	544	
Launch #38	Dec. 14	a	3	2	47	18	Continued from sheet #1
"	15	c	3	8	268	108	Continued on sheet #3
"	16	f	3	3	57	40	Continued on sheet #3
Totals for launch		3	1	13	372	166	
Grand totals Sheet #2		8	2	93	710	710	Area, 27 sq stat mi

3253
Hyd. ~~3246~~

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STATISTICS

Sheet #9,Oahu,T.H.,Steamer EXPLORER,1911,Walter C.Dibrell,Chief of Party

Boat	Date	Letter	Vel	Miles	Soundings	Angles	Remarks
Ship	Jan.13	Y	10	27	109	220	
"	14	Z	10	16.5	75	145	
"	Feb.14	PP	10	6.5	38	76	
Totals,Ship		3	1	50	222	441	
Launch 38	Feb.14	P	11	4	110	42	
Grand totals,sheet 9		4	2	54	332	483	Area,7 sq stat mi

Hyd. 3287

C. & G. SURVEY,
LIBRARY AND ARCHIVES
JUN 21 1911
No.

STATISTICS

Sheet #1, Oahu, T.H., Steamer EXPLORER, 1910, Walter C. Dibsell, Chief of Party.

Boat	Date	Letter	Vol.	Miles	Soundings	Angles	Remarks
	1910						
Ship	Nov. 12	A	1	26.5	114	214	
"	21	B	1	16	114	220	
"	23	C	1	15	79	158	
"	25	D	2	25	96	192	
"	26	E	2	26	264	262	
"	30	F	2 & 3	18.5	143	210	
"	Dec. 1	G	3	8.5	42	84	
"	6	H	3	5.2	32	71	
"	7	J	3	19.5	236	168	Letter I omitted
"	8	K	3	30	380	258	
"	9	L	4	2.5	67	34	Continued on sheet #2
"	14	N	4	6	78	80	Continued on sheet #2
Totals		12	4	198.7	1645	1951	
Launch #38							
	Nov. 22	O	1	14.5	471	182	
"	Dec. 12	Ō	1	20	462	248	
"	13	C	1 & 2	29	892	364	
"	14	Ō	2	14.5	344	154	Continued on sheet #2
Totals		4	2	78	2169	948	
Launch Carrie	Dec. 20	G	14	2.2	83	52	Party of L.W. Smith
Grand totals	Sheet #1	17	7	279	3897	2951	Area, 108 sq stat mi

Hyd 3289

C. & G. SURVEY,
LIBRARY AND ARCHIVES
JUN 21 1911
Acc. No.

STATISTICS

Sheet #3, Oahu, T.H., Steamer EXPLORER, 1910 & 1911, Walter C. Dibrell, Chief of Party

Boat	Date	Letter	Vol.	Miles	Soundings	Angles	Remarks
Ship	1910-11 Dec. 15	O	6	29.5	81	162	Continued from sheet #2
"	16	P	6	44	190	270	
"	17	Q	6	25.2	58	116	
"	20	R	6	9.5	56	100	Continued from sheet #2
"	Jan. 6	V	8	19	50	100	Continued from sheet #4 Continued on sheet #4
Totals, ship		5	2	127.2	435	748	
Launch 38	Dec. 15	E	4	5	159	46	Continued from sheet #2
"	16	F	4	26	570	274	Continued from sheet #2
"	17	G	4	14	152	136	
Totals, Launch		3	1	45	881	456	
Grand totals, Sheet #3		8	3	172	1316	1204	Area, 75 sq stat mi

Hyd 3290

C. & G. SURVEY,
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JUN 21 1911
Acc. No.

STATISTICS

Sheet #4, Oahu, T.H., Steamer EXPLORER, 1910 & 1911, Walter C. Dibrell, Chief of Party.

Boat	Date	Letter	Vol.	Miles	Soundings	Angles	Remarks
Ship	DEc. 21	S	7	42.5	97	194	
"	22	T	7	15.5	120	138	
"	23	U	7	25	67	132	
"	Jan. 6	V	7	11	50	100	138 to 87 on sheet #3
"	7	W	9	40.2	97	194	
"	9	X	09	12.2	22	44	
Whaleboat	9	a	9	3	138	90	Recorded with ship work
Totals, ship & W'bt		7	2	149.4	591	892	
Launch 38	Dec. 21	Z	5	26.5	402	247	
"	Jan. 9	[illegible]	5	16	370	250	Continued on sheet #5
Totals, Launch		2	1	42.5	772	497	
Grand totals	Sheet 4	9	3	192	1363	1389	Area, 84 sq stat mi

Hyd 3291

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JUN 21 1911
Acc. No.

STATISTICS

Sheet #5,Oahu,T.H.,Steamer EXPLORER,1911,Walter C.Dibrell,Chief of Party.

Boat	Date	Letter	Vol	Miles	Soundings	Angles	Remarks
Ship	Jan.16	A A	12	4.5	18	36	Continued from sheet 6
"	17	B B	12	26	63	126	
"	18	C C	12	12.5	47	96	
"	19	D D	12	32	99	198	
"	20	E E	12 & 13	28	268	222	
"	26	I I	13	11	141	110	Continued on sheet 6
Totals,ship		6	2	114	636	788	
Launch 38	Jan. 9	J	6	5	126	56	Continued from sheet 4
"	26	K	6	16	458	178	Continued on sheet #6
Totals,launch		2	1	21	584	234	
Grand totals	Sheet5	8	3	135	1220	1022	Area,56 sq stat mi

Hyd 3292

C. & G. SURVEY,
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JUN 21 1911
Acc. No.

STATISTICS

Sheet #6,Oahu,T.H.,Steamer EXPLORER,1911,Walter C.Dibrell,Chief of Party.

Boat	Date	Letter	Vol	Miles	Soundings	Angles	Remarks
Ship	Jan.16	A A	11	9	46	78	Continued on sheet 5
"	20	E E	11	12.5	40	80	Continued from sheet 5
							Continued on sheet 5
"	21	F F	11	24	79	156	
"	24	G G	11	22	181	166	
"	25	H H	14	24.2	88	150	
"	26	I I	14	10.8	140	102	Continued from sheet 5
"	27	J J	14	35	97	164	
"	28	A K	14	42	18	36	COntinued on sheet 7
Totals ,ship		8	2	141.7	689	932	
Launch 38	Jan.25	J	7	29.5	774	280	
"	26	K	7	2	11	14	Continued from sheet 5
Totals,launch		2	1	31.5	785	294	
Totals sheet #6		10	3	173	1474	1226	Area,62 sq stat mi

Hyd 3293

C. & G. SURVEY,
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JUN 21 1911
Acc. No.

STATISTICS

Sheet #7, Oahu, T.H., Steamer EXPLORER, 1911, Walter C. Dibrell, Chief of Party.

Boat	Date	Letter	Vol	Miles	Soundings	Angles	Remarks
Ship	Jan. 28	KK	15	22	165	148	Continued from sheet #6
"	30	LL	15	8	28	56	
"	31	MM	15	19.5	34	68	
"	Feb. 1	NN	15	27.5	68	150	
"	2	OO	15 & 16	24.2	92	168	
Totals, ship		5	2	101.2	387	590	
Launch 38	Jan. 27	L	8	32	811	322	
"	31	MM	8 & 9	26	572	250	
"	Feb. 1	N	9	32.5	697	286	
Totals, launch		3	2	90.5	2080	858	
Grand totals, sheet 7 & 8			4	192	2467	1448	Area, 79 sq stat mi

Hyd 3294

C. & G. SURVEY,
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JUN 21 1911
Acc. No.

STATISTICS

Sheet #8,Oahu,T.H.,Steamer EXPLORER,1911,Walter C.Dâbrell,Chief of Party.

Boat	Date	Letter	Vel	Miles	Soundings	Angles	Remarks
Ship	Feb.11	Q Q	17	1.8	5	10	
"	13	R R	17	25	44	90	
"	14	S S	17	16	27	54	
"	15	T T	17	36	44	92	
"	16	U U	17	29	140	202	
"	17	V V	17 & 18	27.4	323	294	
"	18	W W	18	7.8	79	92	
"	20	X X	18	37.5	321	274	
Totals,ship		8	2	180.5	983	1108	
Launch 38	Feb.13	O	10	22.5	503	258	
"	14	P	10	11.5	290	96	Continued from sheet #9
"	15	Q	10 & 12	27	643	222	
"	16	R	12	31.5	750	288	
"	17	S	12 & 13	17	376	196	
Totals,launch		5	3	109.5	2562	1060	
Grand totals,sheet 8		13	5	290	3545	2168	Area,92 sq stat mi

VEC
June 10,1911.

HYDROGRAPHIC SHEET 3289.

Northeast coast of Oahu, Hawaiian Islands, by Asst. W. C. Dibrell in 1910.

TIDES.

Mean lower low water, or plane of reference below mean sea level = 1.2 ft.

Mean rise and fall of tides = 1.6 "

Predicted tides were used for reduction of soundings.

Coast and Geodetic Survey
JUN 10 1911
TIDAL DIVISION

VEC
June 10, 1911.

HYDROGRAPHIC SHEET 3291a.

Northwest coast of Oahu, Hawaiian Islands, by Asst. W. C. Dibrell in 1911.

TIDES.

Mean lower low water, or plane of reference below mean sea level = 1.0 ft.

Mean rise and fall of tides = 1.5 "

Predicted tides were used for reduction of soundings.

Coast and Geodetic Survey
JUN 10 1911
TIDAL DIVISION

Hyd. Sheet No 3287 Aug 10 1911

The work inside of the 60 foot curve is incomplete.

The line of soundings from 60 to 63 F (red) off Makapuu Pt. appears to be in error as the two lines crossing show much deeper water.

The work in Hanauma Bay is not plotted on this sheet for the reason that the data, giving the position of the signals, could not be found.

The records are clear and well kept.

H L Simons

Several positions fall "off sheet", these have not as yet been plotted. These positions are protracted and plotted on the tracing accompanying the sheet. Sept 26, 1911.

Verified; Aug 11th, 1911

R. L. Johnston.

Soundings shown in feet.

Protracted by R.L.J.
Plotted by H.L.S.
Verified by R.L.J.

Department of Commerce and Labor

Hydc Sheet #3289

The sounding positions are well determined and the records well kept

The depth curves could not be accurately drawn owing to a lack of cross line development in the inshore hydrography.

The entrance to Lair Bay, south of the middle ground island was not sufficiently developed, the hydrography does give indications of a good entrance from this side of island.

P. B. Castle

6/22/11.

Verified by
H L Simons
7/20/11

No. 205
Ed. 5-20-10—500,000

Department of Commerce and Labor

Hyde * 3291

The sounding positions are well fixed and records well kept. The development of the inshore hydrography is incomplete - evidently on account of the abrupt nature of the bottom along this coast——

P B Castle.
7/19/11.

Verified by H L Simons
7/19/11

No. 205
Ed. 5-20-10—500,000

Hydrographic Sheet #3292.

Inshore hydrography lacking for proper development, due, evidently, to nature of bottome along shore.

Sounding positions for offshore hydrography appear to be well selected and records well kept.

J. S. Tossey

July 22. 1911

Verified by
H E Simons 8/7/11

Hyd Sheet No 3293 Aug 7 1911

The area inside of the 30 foot curve between lat 31°24' and 31°26 and the 18 foot spot about 700 meters off shore between O Buck and O Stem back development. With the exception of these two areas the ground appears to be sufficiently well covered.

The records were kept in a satisfactory manner

H L Simons

Soundings plotted by P B Baetler

Curves drawn and soundings verified by A L Simons

Hyd Sheet No 3294 Aug 5, 1911.

The ground is fairly well covered outside of the 18 foot curve. A more complete survey inside of this depth is probably not necessary.

The crossings are good and the records kept in a satisfactory manner.

H L Simons

Verified; August 9th, 1911.

R. L. Johnston

NAUTICAL CHARTS BRANCH

SURVEY NO. 3292 - 3293

Record of Application to Charts

DATE	CHART	CARTOGRAPHER	REMARKS
4/9/46	4136	D. H. Benson	~~Before~~ After Verification and Review
1949	reconstruction 4131	L. A. W.	H. 3253 H. 3287 applied ~~Before~~ After Verification and Review
H-3294 11-17-61	4109	G. R. Johnson	~~Before~~ After Verification and Review Applied During revision of limits.
			Before After Verification and Review
			Before After Verification and Review
			Before After Verification and Review
			Before After Verification and Review
			Before After Verification and Review
			Before After Verification and Review
			Before After Verification and Review

M-2168-1

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.