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Department of Commerce and Labor
COAST AND GEODETIC SURVEY

O. Pittman
Superintendent.

State: *Hawaii*

DESCRIPTIVE REPORT.

Top Sheet No. *31*
3435

LOCALITY:

Lanai-North
East- & South coast

1914

CHIEF OF PARTY:

J. B. Miller

11-404

DEPARTMENT OF COMMERCE
Coast and Geodetic Survey

O. H. Tittmann, Supt.

HAWAIIAN ISLANDS

LANAI ISLAND.

DESCRIPTIVE REPORT TO ACCOMPANY TOPOGRAPHIC SHEET Z.

Surveyed by the Steamer PATTERSON, Jan. and Feb.

1914.

1. REPORT, LIMITS, SCALE, METHODS, OBSERVER.

I have the honor to report as follows upon topographic sheet Z, which shows the topography of the eastern part of Lanai Island, Hawaiian Islands, as done in January and February, 1914 by a party from the steamer PATTERSON. On the south and west the sheet starts at Δ Kaea, on Cape Kaea, and thence extends east, north, and then west, around the southern, eastern, and northern sides of the island respectively, ending at Δ Kaena, near Kaena Point. The scale is 1: 20,000 and the plane table was used exclusively. The work was done by a party in charge of William V. Hagar, Aid, C. & G. Survey.

2. CONTROL, TRAVERSES, HEIGHTS.

The work was done in advance of the triangulation and was afterward fitted to the projection. The traverses were supported by frequent stations determined by triangulation and a proportional linear adjustment made. West of $\odot$ Ip the traverse was not correctly oriented and was therefore adjusted, the error amounting to 1270 meters at Δ Kaena. The amount of adjustment for error of closure of each signal is given in the list of positions of plane table signals. All heights as given were determined by the plane table and are above high water level.

3. GENERAL REMARKS, GENERAL CHARACTER OF SHORE LINE; VEGETATION.

The shore line of the island is very regular and there are no deep bights. The southern shore of the island is very rugged and, except at Manele Bay, is bordered by perpendicular bluffs ranging in height from twenty to four hundred feet. From Kama-ike Point to the west end of the sheet, there is a coral reef, extending from 200 to 450 meters off shore. Within the reef the shore is with few exceptions either sandy or pebbly. There are few breaks in the reef. Vegetation is very scarce near the shore

line. Commencing near Kamaike Point and extending a little west of the village of Kehamoku is a fringe of algaroba trees varying in width up to about half a mile. Among the algaroba are also a few coconuts. On the south side of the island are numerous steep gulches. Here there is very little vegetation and the ground is in many cases almost completely covered with large, somewhat weathered, volcanic rocks. On the north side of the island close to the shore line in many places are sand hills, while further inland one again finds a large amount of volcanic rock. There is little rain fall on the island and what rain does fall rushes off quickly. The small streams to be found near the shore are usually nearly or quite dry except immediately after a rain fall. On the northeast side of the island are several gulches leading up toward the mountain, two of which are especially prominent.

4. DETAILED DESCRIPTION OF SHORE: PROMINENT POINTS.

CAPE KAEA is a short rocky point about 60 feet high at the extreme southwest part of Lanai Island. From this cape the shore bears nearly due east for about 4 1/2 miles to Puu Pehe Rock. Throughout this stretch the shore is bordered with bluffs varying in height from 20 to 200 feet, except at two or three places where gulches break through. Beneath the bluffs in many places are flat shelves a few meters wide over which the water breaks at high tide. The shore line here is very irregular but none of the irregularities are at all conspicuous. Two and a half miles eastward from Cape Kaea is a small rocky island 40 meters wide, 130 meters long, and 78 feet high lying about 30 meters off shore in a small bight. 3 1/2 miles eastward from Cape Kaea is PAAKAI POINT, a small projecting point with high bluffs. PUU PEHE ROCK is a large offlying rock about 45 meters in diameter and 110 feet high. Its sides are perpendicular bluffs. It lies about 40 meters off the point which forms Manele Bay. Between it and the point is a rocky reef which is partly bare except at high water. In the bights at either side of the point off which Puu Pehe lies, is a short sand beach. Southeast of Puu Pehe Rock about 270 meters is a rock which bares about 3 feet at high water. A rocky spit extends out about half way to the rock. At the east side of Manele Bay is another rock about 270 meters off shore and also baring about 3 feet at high water. From Puu Pehe Rock the shore extends generally in a northeast direction a distance of about 3 1/2 miles to Kamaike Point. For the first half of this distance the shore is bordered by high bluffs cut through by several deep gulches. These bluffs attain a maximum height of over 400 feet just east of Manele Bay and then gradually decrease to about 50 feet. 3 miles from Manele Bay is an offlying rock 30 feet high and about 20 meter off shore. From this rock to Kamaike Point the shore is bordered by low bluffs 40 - 50 feet high. From Cape Kaea to Kamaike Point the beach is in many places impassable even at low tide and suitable points for plane table sta-

tions were few in number and difficult to get to. KAMAIKE POINT is an indefinite point projecting but little from the general curve of the adjoining shore line. From Kamaike Point the shore line bears about NNE about 3 1/2 miles to Wahapuu Point, a broad sandy point at the extreme eastern part of the island. About 1/4 of a mile from Kamaike Point the bluffs give way to a sandy beach. A coral reef extends out about 200 meters from the shore line, while inland is a narrow fringe of algaroba trees. From Wahapuu Point the shore bears north and west to a broad rocky point with low bluffs known as Wahie Point. Throughout the greater part of this stretch the off-lying coral reef is quite wide, ranging from 300 to 500 meters. About 4 miles from Wahapuu Point the fringe of algaroba trees ends. Three miles from the point are the ruins of two large fish traps. A mile and a half from the northeastern fish trap is a conspicuous deep gulch leading up into the mountains. 2 1/2 miles from this gulch is Kuahua Gulch, another gulch which is especially conspicuous because it is forked. From Wahapuu Point to the end of the sheet the shore line continues to be sandy for the most part and inland in many places are sand hills. West of Kuahua Gulch the coral reef gradually becomes narrower. A mile west of Wahie Point is Papau Point, a low point of sand not very conspicuous. From Papau Point the shore bears nearly due west about 3 1/2 miles to the end of the sheet

5. SETTLEMENTS: NATIVE: RESOURCES: FISHING: GRAZING: COMMERCE.

There are few settlements on the island and these are all on the eastern and northern sides of the island. Kahale Palaoa, Kehamoku, and Kaa are the only villages within the limits of the sheet. At Kehamoku there are about a dozen families, at Kahale Palaoa about half that, and at Kaa only two. The inhabitants are nearly all natives except for one or two Japanese families. There are also a few inhabited houses hid by the algaroba trees between Kamaike Point and Kahale Palaoa and two or three scattered houses just west of Kaa. In several places the ruins of abandoned villages were found, especially on the northern coast. Fishing is practically the only resource of the natives along the shore and there is not rain enough for them to raise even their own taro. In the interior of the island are two quite large ranches, one cattle ranch and one cattle and sheep ranch. Commerce is confined to trade with the other islands. At Manele there is a fair landing for pulling boats. Cattle and sheep are shipped from here to Honolulu, and there is a regular steamer service. At Kahale Palaoa is a wharf extending out 90 meters with 3 feet of water off the face at mean low water. The wharf was built originally for a proposed sugar plantation but the project later abandoned. At Kehamoku there is a small fish trade carried on with small boats to Lahaina.

6. GEOGRAPHIC NAMES, AUTHORITIES, LIST.

Below is given a list of geographic names of the most prominent points. The authorities taken were the old charts and names obtained by inquiry among the natives. Many of the villages shown on the old chart are now abandoned.

Cape Kaea	Kuahua Gulch
Paakai Point	Wahie Point
Puu Pehe Point	Papau Point
Manele Bay	Kamaike Point
Wahapuu Point	Kahale Palaoa Village
Kaa Village	Kehamoku Village

7. MAGNETIC DECLINATION.

The magnetic declination was carefully determined with the plane table in orientation at Δ Puu Pehe and found to be 11° - 38' East.

Respectfully submitted,

William V. Hagar

APPROVED:

Aid, C. & G. Survey.

James B. Miller
Assistant, C. & G. Survey,
Commanding.

Honolulu, T. H.,
April 1914.

LANAI ISLAND, SHEET Z

1.

LANAI ISLAND, SHEET Z										1.
SIGNALS		LATITUDE			LONGITUDE			REMARKS		
		Seconds in M's			Seconds in M's					
		before after			before after					
		adjusting			adjusting					
	Last	20 - 44	450 1395	415 1430	156 - 58	215 1521	188 1548	W. W.		
	Run	44	541 1304	506 1339	58	30 1706	03 1733	Windmill		
	Kaea	44	333 1512	298 1546.2	57	1716 20	1690.5 173.4	△ W.W. Cairn		
	Xer	44	410 1435	379 1466	57	1108 628	1084 652	W.W. Cairn with flag.		
	Wen	44	453 1392	424 1421	57	681 1055	659 1077	W.W. Cairn with flag.		
	Var	44	513 1332	485 1360	57	415 1321	394 1342	W.W. Cairn with flag.		
	Us	44	685 1160	660 1185	56	1675 61	1655 81	W.W. Cairn with flag.		
	Tup	44	603 1242	579 1266	56	1254 482	1236 500	W.W. Cairn with flag.		
	Sit	44	527 1318	506 1339	56	387 1349	371 1365	W.W. Cairn with flag.		
	Rol	44	566 1279	550 1295	55	1176 560	1164 572	W.W.		
	Isle	44	572 1273	557 1288	55	797 939	786 950	W.W. Cairn		
	Help	44	731 1114	722 1123	54	1422 314	1415 321	W.W.		
	Qui	44	845 1000	840 1005	54	471 1265	467 1269	W.W. Cairn with flag.		
	Ral	44	942 903	938 907	54	255 1481	252 1484	Flag on fence post.		
	Oar	44	1104 741	1101 744	53	1650 86	1648 88	Flag on pole.		
	Fen	44	1134 711	1132 713	53	1529 207	1527 209	Fence post.		

2.

SIGNALS		LATITUDE			LONGITUDE			REMARKS
				Seconds in M's before after adjusting			Seconds in M's before after adjusting	
	Cor	20 - 44	1024 821	1023 822	156 - 53	1317 419	1316 420	Rt. hand near cor. of corral.
	Puu Pehe	44	634 1211	634.4 1210.5	53	1017 719	1016.7 719.3	△ W.W. Cairn
	Buk	44	909 936	910 935	53	668 1068	668 1068	W.W. Cairn
	Cas	44	1059 786	1061 784	53	594 1142	595 1141	W.W. Cairn
	Roof	44	1170 675	1172 673	53	691 1045	692 1044	Gable of shack
	Lift	44	1252 593	1254 591	53	690 1046	691 1045	Post on end of sm. breakwater
	Shak	44	1283 562	1285 560	53	917 819	918 818	Center of shed
	Post	44	1457 388	1459 386	53	653 1083	654 1082	Fence post
	Dot	44	1495 350	1497 348	53	612 1124	613 1123	W.W.
	El.	44	1454 391	1457 388	53	249 1487	250 1486	W.W.
	Fat	44	1414 431	1419 426	52	1309 427	1311 425	W.W.
	Gut	44	1799 46	1806 39	52	788 948	790 946	W.W.
	Hap	45	568 1277	578 1267	51	1689 47	1692 44	W.W.
	It	45	717	729	51	1264	1268	W.W.

SIGNALS		LATITUDE			LONGITUDE			REMARKS
				Seconds in M's before after adjusting			Seconds in M's before after adjusting	
	Mac	20 - 45	1222 623	1239 606	156 - 50	1134 602	1140 596	W.W.
	Nin	45	1380 465	1398 447	50	818 918	824 912	W.W.
	Ot	45	1637 208	1656 189	50	432 1304	438 1298	W.W.
	An	46	110 1735	131 1714	50	227 1508	234 1501	Stick with flag
	Ak	46	281 1564	303.7 1541.4	50	116 1619	102.6 1612.4	W.W. cairn with flag.
	Bil	46	760 1085	780 1065	49	1509 226	1512 223	Stick with flag
	Pum	46	1234 611	1253.4 591.7	49	1355 380	1353.7 381.8	Windmill
	Can	47	51 1794	71 1774	49	946 789	945 790	Flag
	Do	47	1225 620	1246 599	49	11 1724	08 1727	Flag in cairn
	Es	48	359	381	48	1243	1240	Flag

SIGNALS		LATITUDE			LONGITUDE			REMARKS
			Seconds in M's before after adjusting			Seconds in M's before after adjusting		
	Lus	20 - 50	1558 287	1512 333	156 - 49	517 1218	666 1069	Flag
	Mid	50	1776 69	1722 123	49	577 1158	744 991	Flag
	Smoke	51	144 1701	78.4 1766.7	49	795 940	787.6 747.0	Church spire
	Nop	51	444 1401	353 1492	49	1043 692	1261 474	Flag on range pole
	Ole.	51	1099 746	964 881	49	1296 438	1556 178	Flag
	Pot	51	1395 450	1237 608	50	1544 190 1687	89 1645	Flag
	Qua	51	1623 222	1446 399	50	111 1623	350 1384	Flag
	Ras.	52	458 1387	225 1620	50	652 1082	945 789	Flag
	Son	52	840 1005	574 1271	50	1013 721	1338 396	Flag
	Tal	52	1633 212	1302 543	51	1664 70	318 1416	Flag
	Uf	53 52	38 1807	1523 322	51	261 1473	676 1058	Flag on fence post
	Mo	52	1665	1385.4	51	379	791.5	Windmill
	Vi	53	180 640 1205	539.7 226 1619	51	1355 740 994	942.9 1210 524	Flag
	Won	53	991 854	549 1296	51	1077 657	1577 157	Flag on cairn
	Xel	53	1556 289	1072 773	51 52	1465 269	276 1458	Flag
	Yok	54 53	137 1708	1460 385	52	214 1520	800 934	Flag in cairn

Minutes in red or for adjusted positions.

SIGNALS		LATITUDE		LONGITUDE		REMARKS	
		Seconds in M's before after adjusting		Seconds in M's before after adjusting			
Zip	20 - 54	862 983	281 1564	156 - 52	842 892	1491 243	Flag on end of boat shed.
Al	54	1307 538	695 1150	52 53	1089 645	36 1698	Flag in cairn
Boss	54	1390 455	763 1082	52 53	1355 379	319 1415	Fence post with flag.
Cake	54	1679 166	1024 821	53	0 1734	728 1006	Flag in cairn
Doll	55 54	218 1627	1380 465	53	271 1463	1029 705	W.W. barrel
Elk	55 54	441 1404	1583 262	53	510 1224	1289 445	Flag in cairn
Far	55 54	572 1273	1698 147	53	745 989	1542 192	Flag
Gil	55	{ 903 942 912 933 }	{ 146.4 1698.7 }	53 54	{ 1253 481 1322 412 }	{ 356.2 1377.4 }	W.W. cairn with flag
Hut	55	1047 798	266 1579	53 54	1551 183	590 1144	W.W.
Ike	55	1282 563	471 1374	54	299 1435	1081 653	Flag
Jag	55	1412 433	575 1270	54	747 987	1538 196	Flag
Kow	55	1569 276	702 1143	54 55	1239 495	305 1429	Flag
Lot	55	1618 227	731 1114	54 55	1589 145	661 1073	Flag in cairn
May	55	1779 66	863 982	55	360 1374	1176 558	Flag
Nut	55	1803 42	873 972	55	616 1118	1436 298	Flag
On	56 55	80 1765	977 868	55	907 827	1733 01	Flag

Minutes in red are for adjusted positions.

SIGNALS		LATITUDE			LONGITUDE			REMARKS
		Seconds in M's before after adjusting			Seconds in M's before after adjusting			
	Pet	20 - 56 55	88 1757	966 879	156 - 55 56	1226 508	323 1411	Flag
	Quo	56 55	228 1617	1083.1 762.0	56	1634 100	758.8 924.8	W.W.cairn with flag
	Rek	56 55	147 1698	1004 841	56	601 1133	1438 296	Flag on shack
	Fence	56 55	82 1763	939 906	56	747 987	1584 150	Flag on fence post.
	So	56 55	239 1606	1099 746	56 57	1661 73	761 973	Flag
	Tas	56 55	270 1575	1132 713	57 58	915 819	12 1722	W.W.bb1.with pole on top.
	Ula	56 55	311 1534	1176 669	58	114 1620	941 793	Flag
	Pao	56 55	753 1092	1621 224	58 59	1254 480	343 1391	Flag on desert- ed house
	Vir	56 55	868 977	1737 108	58 59	1671 63	759 975	Flag
	Wal	56 55	794 1051	1664 181	59	226 1508	1047 687	Flag
	Xon	56 55	729 1116	1601 244	59 157 - 00	1126 608	210 1524	Flag
	Spot	56 55	235 1610	1107 738	59 157 - 00	1100 634	184 1550	Wt.Rk. on hillside
	Ava	56 55	460 1385	1334 511	59 157 - 00	1562 172	645 1089	House
	Yal	56 55	545 1300	1420 425	157 - 00	341 1393	1156 578	Flag
	End	56 55	449 1396	1327 518	00 01	1641 93	719 1015	Flag in cairn
	Kaena	56 55	169 1676	1047.4 797.7	01	1560 174	638.9 1094.9	△

Minutes in red are for adjusted positions.