

Hawaiian Volcano Observatory Record Book 1923

This volume is one of a series of record books compiled by the Hawaiian Volcano Observatory (HVO) from 1912 through early 1966. The pages for this volume were transferred by HVO to the Bishop Museum, in Honolulu, Hawai'i, in 1972 and are held at that institution (accession number 1972.265). In 2010, HVO entered a cooperative agreement with Bishop Museum to scan many of the record books in their repository. The scanning was done by HVO volunteer Frances Wong using a flat-bed scanner at a resolution equivalent to 600 dpi. The raw scans were then delivered to HVO volunteer Ben Gaddis, who processed each of the scanned pages by cropping and by adjusting the exposure and contrast using a photo editing program. The scanned and photographed pages for this volume were then combined to form this digital version of the record book. Quality control and posting was done by Tim Orr of the U.S. Geological Survey Alaska Volcano Observatory.

1923

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ABBREVIATIONS

A-A	Wratten A filter
Anas.	Anastigmat
B-A	British Anschutz camera
cam.	camera
C-A	Cook Aviar lens
dist.	distance
elev.	elevation
ex.	exposure
f/	F. system of stops
G.	Wratten G filter
h.i.	height of instrument (5 feet when not specified)
hor.	horizontal angle
H.V.O.	Hawaiian Volcano Observatory
Ilf.	Ilford
I.P.J.	I.P.Jaggar
K 2	Wratten K 2 screen
Kil.	Kilauea
lev.	level reading
L (survey)	left
no.	number
O.H.E.	O.H.Emerson
P.	Premo camera
pan.	panorama
panch.	panchromatic
pl.	plate
pt.	point photographed or located
R.H.F.	R.H.Finch
R (survey)	right
scr.	screen
sta.	station
t.	time
T.A.J.	T.A.Jaggar
vert.	vertical angle
V.H.	Volcano House
W.P.	Wratten panchromatic

Day Monday Date January 1, 1923
Tuesday " 2, "

January 1.

9:00 a.m. Southern half of pit collapsed with walls 30 to 40 feet high making one basin from wall to wall. Aa lava tumbling into the depression from the new walls. One aa stream pouring into the depression from the NE floor -- this floor having been the scene of rapid flooding for several days previous. A pahoehoe stream from old SE lake and some aa pouring into a sinkhole near SE wall of Halemaumau at the location of old SE fountain.

Resounding reports of escaping gas heard occasionally from SW fountain site.

Banks of NW lake were falling in though the lava in the lake appears to be higher than the remnant pool of SE lake.

The source of the NE aa stream was in a breakdown resembling the aa sources in the Mauna Iki ridge.

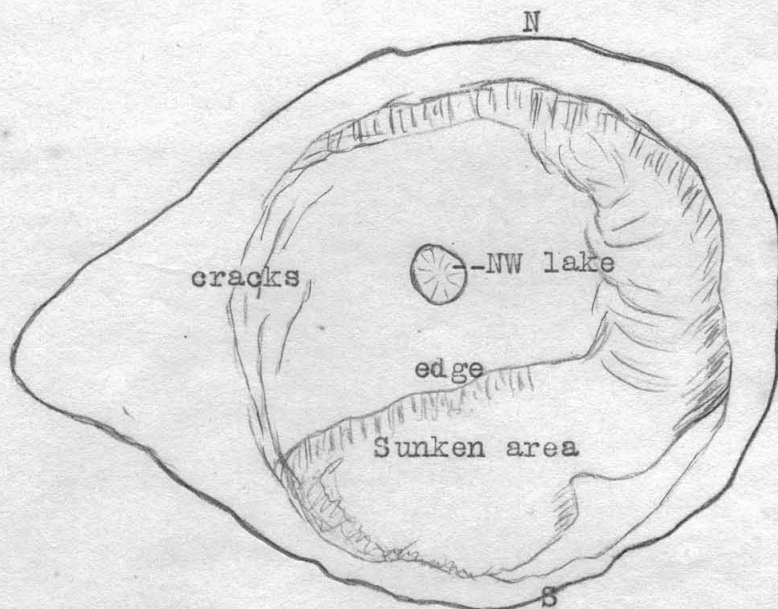
R H F

January 2.

9:00 a.m.

The area of the breakdown is extended along the wall to NE and NW. Glowing cracks visible all over the floor. The area around NW lake seemed to be sinking with but little cracking.

Later in the day the floor around this lake collapsed and small aa flows from E side of floor moved toward the center of pit.



R H F

PHOTOGRAPH RECORD

Day Monday Date January 1, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
9 a m	NE	S collapse	1	Ilf. Pan	4x	f/5.6	1/8	4x5
	SW	" "	2	"	"	"	"	"
	SW	" "	3	"	6x	f/8	"	"
		Cooke Aviar lens						

R H F

1923, Jan. 1



1. South collapse from NE station.

Jan. 1, 1923



2. South collapse from SW station.



3. South collapse from SW station.

Day Wednesday Date January 3, 1923
 Saturday " 6, "

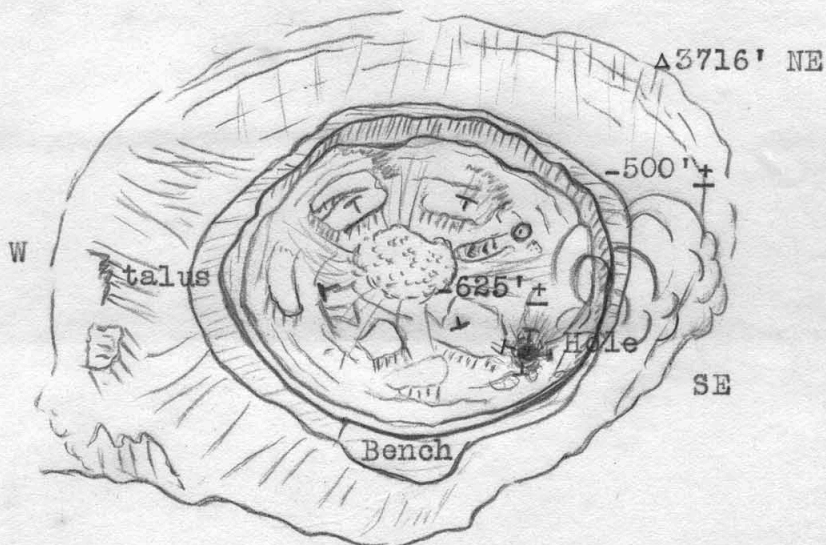
January 3.
 4:00 p.m.

Pit suggests Asama as I saw it in 1909. Concentric tumbles of red and part-glowing crags of pahoehoe and interstitial aa. Like the cirque of Mauna Iki. Bench left around edge, widest on side of W talus, very narrow NE. Big crag blocks on the W side parting from bench.

Deepest hole at SE grotto locality which is smoking and in one place shows bright glow in crack. Lowest place, however, is about where the NW lake was. It appears 625+ feet down. Here an aa flow pool fed by sluggish aa, semi-festooned, glowing, stiff stream from the east. Above this up the tumble saw a rough cone-like mass glowing and spitting a little on top.

Occasional falls from the inner crag blocks. Eight or ten glow areas, all of aa quality like the cirques, glowing paste in cracks amid the tumble. Little fume.

Halemaumau from SW:-



January 6.
 11:45 a.m.

Avalanche debris under N shelf and NW station. NW station fallen in. Wide floor shelf W. Smoke hole SE. No glow in daylight. Slight rock falls. Some fallen matter E. Aa flow frozen at N lake site. Source of this was freshest lava fill NE. This shows aa throughout its crevices under thin shell of pahoehoe crust, all broken down in cirque fashion.

N lake depression a distinct funnel of down-tilted pahoehoe surfaces. Bright red iron oxide on old wall NE where the fresh shelf has broken away. Fume at SW rift chasm very thin.

T A J

PHOTOGRAPH RECORD

t	sta	subject	no	pl	scr	stop	ex	cam
10:30 a.m.	S	edge (over SW corner floor) to NW talus	1	Ilf. Pan.	8x	f/16	$\frac{1}{2}+$	P
	same	to N talus	2	"	"	"	"	"
	same	to W ledges	3	"	"	"	"	"
	Near NNW sign	to SW active flows	4	"	"	"	"	"
	NNE	to SW flows	5	"	"	"	"	"
	"	to smoke hole SE	6	"	"	"	1+	"

T A J



1. Northwest talus from south edge of Halemaumau pit



2. North talus from same



3. West ledges from same

Jan. 8, 1923



5. Southwest flows from N.N.E. rim
of Halemaunau



4. Southwest active flows from
N.N.W. rim



6. Southeast smoke hole from N.N.E.

Day Monday Date January 8, 1923
Tuesday " 9, "January 8.
10:30 a.m.

Some glow over pit seen at 3 a.m. in moonlight; there has been no glow visible since January 3. Now the cause is seen to be revival of SW floor cone at foot of SW talus opposite rift. Two vents just inside the bench at edge of collapsed area. These hissing, puffing, snorting and flaming, and lifting lids. Pahoe-hoe flow from them in two main belts northward and eastward. Flows cascading and trickling toward the bottom places of the tumbled S depression. SE smoke-hole also has a glowing pahoe-hoe cone on its bottom.

Remainder of bottom area unchanged. Note an avalanche talus S side of pit at bottom.

T A J

January 9.
4 p.m.

No streams of liquid lava visible but new outpourings have spread over bottom area in considerable amount, still maintaining the leaf pattern. Flows have crossed the new aa flow of January 1 or 2. Some little cracking of crust in the accumulation in depression that corresponds nearly to lake that formed in September last. The southern of the two cones at source has built up from spatter, has a hole about two feet wide in summit from which lava spray is emitted, not in volume but to a height of about 10 feet. The other cone is almost closed and is hissing.

Smoke from SE seems a little less than yesterday.

I P J

Several pahoe-hoe pools in crater floor occupying all lowest portions except SE smoking vent. A few of these pools deep enough to exhibit cracking and foundering. Numerous small live toes visible around all the pools but no rapid streaming visible. The pools are being fed through tubes from SW cone through tunnels. SW cone coughing loudly and splashing lava on to adjacent floor. Small cone NW of and close to large SW cone hissing.

R H F

Day	Thursday	Date	January 11,	1923
	Friday		"	12, "
	Sunday		"	14, "
	Tuesday		"	16, "

January 11.

2:40 p.m.

N lake again a large sheet of pahoehoe lava drowning the aa in the depression. Small fountain at lake margin S where flows pour in. These flows come from SW cones. SW cones are two beehive constructions, the one nearest the shelf thudding, snorting and lifting a lid. The inner one has glowing and flaming crack across top. The flows from cones have spread over S half of bottom, into depression there, and out from this region in steep flows into N depression. Some flows running in glowing ribbons, others crusted over and running in tunnels. All seem to end at N lake.

The SE vent is glowing but has not produced any flows; smoke there has disappeared. The pit almost wholly free from smoke.

N lake surface probably about 600 feet down.

T A J

January 12.

3:30 p.m.

Bottom rapidly filling. Pit becoming bright at night. SE vent has developed splashing cone pot and strong flows, supplementing the work of SW cones. Latter still hissing and flaming, and their flows running to N lake in tunnels. Bright floe 15 feet wide running to N lake from SE cone. N lake and the fill of S depression now almost at a common level; will soon merge. One fountain in N lake, otherwise crusted.

T A J

January 14.

Afternoon.

Alec reports no striking change in pit after the strong earthquake of 2:30 a.m.

N and S pools have merged into one, shaped, with flow tentacles from SE and SW, like a squid.

T A J

January 16.

10 a.m.

After Kona storm. Pit dim last night. Now a large crusted lake covering N and S depressions. Feeding flows from SW and SE cones. SE cone a large structure with open splashing pot on top. Flow from it to NE side of lake, SW cone a single heap with hissing glow-hole on top, flow steep and snaky from it down to lake. Lake about 75 feet below the Christmas bench. New small avalanche falls NE and E, probably started by the quake. Lake shows fresh toes and moving lava all around its edges, and cracking and foundering patch seen to spread out in concentric rings from center. Smoking crust near center not engulfed by the breakup, hence probably top of a crag remnant. Pit clear. Little smoke now at W crevasse near SW chasm.

General condition a rising lake fed by the cones steadily through tunnels and also on surface. No lake fountains.

T A J

SURVEY RECORD

t	sta	pt	hor	vert	lev	dist	elev	h. i.
2 p m	NE	S	0					
	(NNW	S						
	(sign	(edge near sign)	0					
	SW chasm	S	0					
	S	NE	0					
	NE	Center smoke N	R 48	20-32	08	836	-525	
	NNW	same	R 3	05-33	23	798	-526	
	Chasm	same	L 33	42-24	35	1139	-520	
	S	same	L 62	56-37	01	700	-528	
	NE	Center smoke S	R 35	17-35	00	751	-525	
	NNW	same	L 0	23-28	06	988	-527	
	Chasm	same	L 23	55-24	06	1168	-522	
	S	same	L 58	53-45	58	507	-525	
	NE	Bench W	R 50	35-20	26	1307	-488	
	NNW	same	R 38	22-32	12	772	-486	
	S	same	L 87	29-25	47	1012	-489	

Below NE station: (3716') :-
 Central pool524 feet
 W bench (Dec. 31 level)....486 "
 Bench 38 feet high.

T A J

Day Thursday Date January 18, 1923
Sunday " 21, "January 18.
2 p.m.

There has been a quiet spell and the pool of recent origin is now a dead floor. Over this a new flood is now pouring on the surface from the group of three SW cones. These are hissing steadily and puffs are heard in addition.

The new flow is a glowing stream and a large round lake of accumulation. Several smoking spots out in the center. SE cone 15 feet high with glowing pot on top. Around its edges the lake is sending out tongues into the broken ground. Level 30 to 50 feet or more below Christmas bench; floor highest at the west.

T A J

January 21.
11 a.m.

Notably little change in conditions. SE and SW cones giving vent to silvery pahoehoe flows. Greater volume appears to have come from SW as the W side of floor is more built up than E side. Bench of December 31 appears 25 feet high W and 50+ feet E.

Three cones SW; one hissing, one puffing and thudding, and one appears inactive. One large oven cone SE, open to the N, with heavy viscous lava flung out as in a grotto, the pool at its opening continuous with a flat flow on E and S sides of floor. Flows from the SW cones are pushing in various directions, and they cover the center, NW, W and SW sides of floor, all alive. Pattern of flows is wide bands with loose festoons.

One avalanche heard from N wall.

Remnants of the aa and craggy tumble of January 1 still protrude through the new floor around the edge, and there is a wide belt of it making an uphill slope NE to the bench level. The bench plaster is nearly continuous all around, and on the W side its surface is 30 to 50 feet wide. There is an overhanging edge of recent floor in two oval lobes with a depression enclosed, 2 or 3 feet deep, near N border of floor, suggesting a pond border, but otherwise there is nothing that resembles a lake. The floor pattern is in the main a darker under-floor with three leaves or folia of flow covering it; one SE, a big one across center with its stem at SW vents, and a subsidiary one NW following base of W bench.

Last night the floor pools broke up brightly during a heavy shower.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

Day	Date	January 22, 1923
Monday		
Wednesday	"	24, "
Thursday	"	25, "
Saturday	"	27, "
Sunday	"	28, "
Tuesday	"	30, "

January 22.
4 p.m. Conditions as before. SE cone less active. SW cones source of most of the flows. These are in the center and W part of floor. W bench less high.

T A J

January 24.
4 p.m. Conditions the same, with slow gradual filling. West bench 20 feet high. SE cone bright but not visibly productive of flows. Western flows gushing at front. NE bench still 50 feet high. Avalanche from N wall.

T A J

January 25.
8 p.m. No noticeable change in activity. Moderately loud hissing from SW vent. One fairly large area of moving lava at the N side of new fill and a few small toes elsewhere. Center of pit very black without any glowing crack.

R H F

January 27.
5 p.m. Loud hissing from SW vent. Dense fume from SE. Several small trickling flows. The fill on the E and SE side of pit comes from the N.

R H F

January 28.
3 p.m. Pit very quiet. Considerable smoke from both SE and SW vents. Occasional splashing from SE cone. SW cone coughing about every 4 seconds. Two small trickling flows on N side of new fill.

The volume of steam arising from foot of talus near S wall appears to be increasing.

R H F

January 30.
10 a.m. Both SE and SW vents quiet with no live lava visible. Considerable fume from SE vent and from a spot about 40 feet N of SW cone. New lava has covered all of January 1 collapse except a sector at the NE.

R H F

January 31. Glow SE seen at night.

T A J

CP 121, 270



Effects of tidal wave at R.R. bridge across river near Waiakea station

CP 121, 271



Track approaching Kuhio wharf; near lagoon between it and roadway



Hilo beach looking toward waiakea

Day	Thursday	Date	February 1,	1923
	Saturday	"	3,	"
	Tuesday	"	6,	"
	Wednesday	"	7,	"
	Friday	"	9,	"

February 1. No activity except an occasional hiss from SW vent.

February 3.
2 p.m. Pit dull with no activity. A glow can be seen far down the SE vent. Smoke issues from a place in the talus SW of SW cone and from the SE vent.

R H F

February 6.
10 a.m. Conditions the same. Glow in SE vent. No hissing.

February 7.
5:30 p.m. Conditions the same. Bright glow in SE vent, illuminated cloud after nightfall. An avalanche of considerable proportions has fallen from NW wall; debris covers some of the January fill.

R H F

February 9.
4 p.m. Pit very quiet. Occasional rock falls and one small avalanche south. A large avalanche SSE into throat of recent SE cone vent has fallen very recently, making large dry whitish or salmon-colored talus. It fell from lower wall SE and probably since the noon rain; other taluses are dark and wet.

No glow perceptible and little smoke from SE vent. SW floor cones are glowing through cracks. Finch reports night glow at a few points of SW chasm bottom and talus.

Smoke from December bench SW. Large red talus N overlapping December bench. Floor still 20 feet below W bench.

The SSE debris pile was mostly a single big avalanche, as the dust halo in front of it on the floor extends in an arc halfway across floor.

T A J

Day Saturday Date February 10, 1923

February 11 to 15, "

Friday, February 16, "

February 10.

4 p.m.

Main change since yesterday is the reopening of SE pot as a dark hole 4 feet in diameter with glow below and rather dense white fume rising through it. This hole has cleared itself of much debris seen yesterday, probably by engulfment. The glow and fume were not seen yesterday. The fume has greatly increased the smokiness of pit, rising in billows from the cauldron as seen at H. V. O., first diffuse, then concentrated. This has been noticeable all day.

Earthquake felt last night.

Rumor unconfirmed of smoke NW side of Mauna Loa and supposed eruption seen from ranch at Puu Waawaa.

T A J

February 11 to 15.

Glow at night very slight. Fume thinning somewhat during week. Some noise from SE vent reported.

T A J

February 16.

2 p.m.

Glow plainly visible in SE vent in the intervals when smoke decreased. Splashing of lava could be distinctly heard when the smoke was thin and sometimes faintly during heavy smoking spells. One lava splash was visible.

R H F

SE vent smoking and glowing. Noise of rumbling sometimes. No other changes.

T A J

February 17.

12 noon +

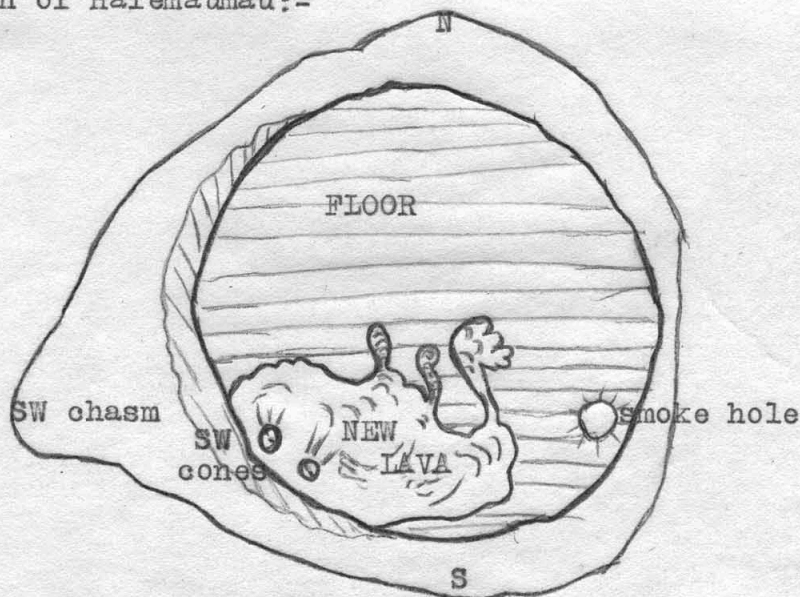
SW cones on floor started flowing. Prior to that everything quiet and even the SE vent had ceased to show visible glow. Spurting gas and trickling pahoehoe at SW cones.

8:30 p.m.

Flows had extended from two spurting and flaming cones SW over S third of floor, trickling E and N. Pudding of glowing lava with three flow streaks at front moving N from E side of pudding. Some outbreaks of flow in cascade-like streaks along main course of river from W to E. SW cones puffing and spraying. SE funnel glowing and smoking.

SW chasm has several glowing areas like hot coals in the yellow spots of top of talus and the outcrop of W bench fissure.

Sketch of Halemaumau:-



February 18.

2 p.m.

Pit dull, no visible flowing. No glow in SE hole. Smoke there. Glow hole on top of SW cone, no puffing. Slight fall of rocks heard. Flows had advanced since previous evening very slightly.

T A J

Day Monday Date February 19, 1923
Tuesday " 20, "

February 19.

Forenoon.

Slight puffs and occasional spitting out at SW cone; glow slight; again visible at SE cone. No flowing.

Evening.

Same as in morning, with glow in cracks of flows and fountains in SE and SW vents.

T A J

11 p.m.

Continuous fountain in SE vent sometimes throwing spray to a height of 35 or 40 feet. Occasional fountain in SW cone.

R H F

February 20.

12 noon₊

Hobart reports slight glow and puff at SW cone. Faint glow SE hole. Nothing else.

9 p.m.

The lava rose in the SE vent and started overflowing the floor toward the N. Low massive fountains were nearly continuous over the vent at first but later on the spray was going to a height of 20 or 25 feet. There was intermittent hissing from the SW cone which had a small glow hole in the top from which flames were issuing. Within four or five hours about one-fifth of floor on E side was covered.

R H F

Day Wednesday Date February 21, 1923

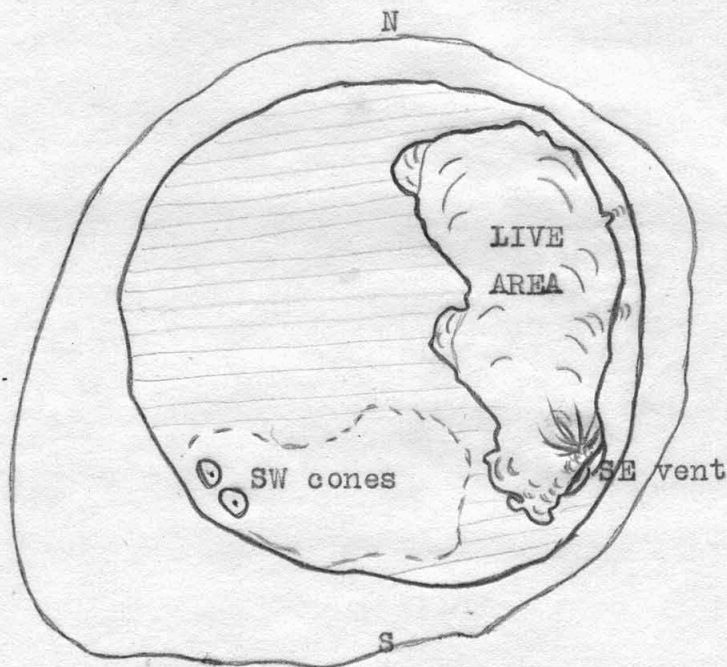
Thursday " 22, "

February 21.

6 p.m.

SE vent a fountaining grotto, splashing from opening toward NW. Large tract of flows covering a quarter of floor on E side. Toes putting out from flow area. Surface broke by swelling and lifting -- the crack-and-founder process spread over a third of the live area from the vent outward, with overflows gushing into S talus and over floor westward.

Sketch of Halemaumau:-



Night.

SW cone flaming conspicuously and pit brighter.

T A J

February 22.

Night.

Pit much brighter. SW cones break out and flow so that flows join the eastern live area. Two-thirds of floor covered. SE vent becomes quieter and crusted.

T A J

February 23. Floor four-fifth (more or less) covered with new lava. West edge remaining uncovered. SE and SW vents both active, SE most so.
 Brighter glow from pit at night as seen from H.V.O.
 T A J

2 p.m. Several glowing toes around edges of new fill. All of the depressed floor except a small area at W side covered. Small cracking and foundering areas at several places in new fill. Low massive fountains at SE vent. Lava splashing from SW cone. This cone was flowing over surface on February 22, but today all flows were under the crust. A small spatter bank has formed at SE vent.

R H F

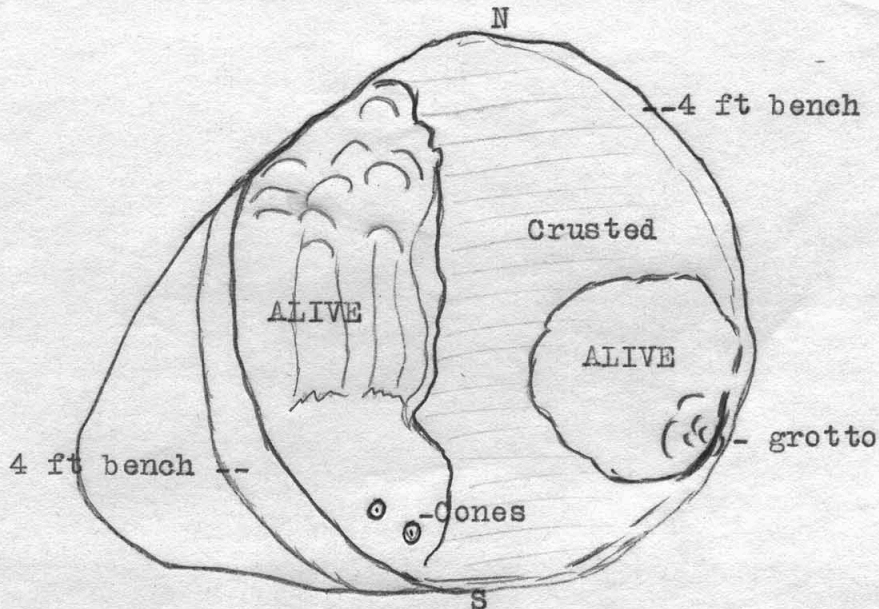
SW cones reported flowing later.

February 25.
 2:30 p.m.

SW rainstorm.

Flows vigorous on floor, especially from SW cones. Whole floor covered and filled with pahoehoe, apparently smooth, up to 4 feet below December bench on both NE and SW sides, making bottom 490 feet below NE station. SE vent a splashing grotto with round live pool in front of it. Flows rapid from SW cones in broad bands across W side of pit.

Sketch of Halemaumau:-



T A J

Day	Monday	Date	February 26,	1923
	Tuesday		"	27, "
	Wednesday		"	28, "

February 26.

4:30 p.m.

Live toes and flowing areas over most of western half of pit. The northern part of December ledge along W side buried. SW cone not fountaining but two glowing vents could be seen. A lake with fairly well defined borders extends about one-third across floor from SE vent. The crust over the whole of the lake cracked and foundered.

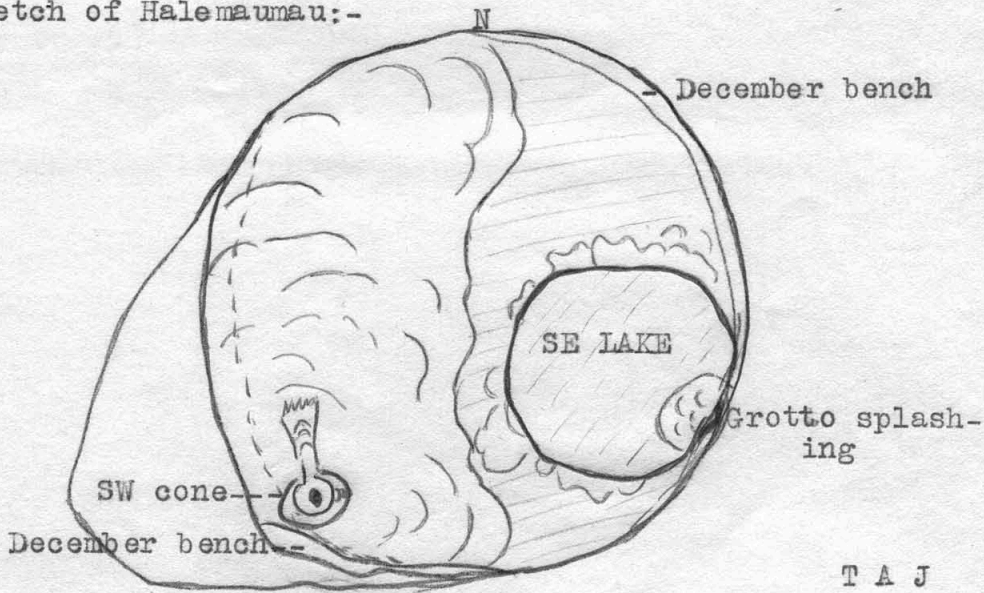
R H F

February 27.

2:30 p.m.

Live pool covering the W bench and about 3/5 of floor, but NE bench is still 3 feet above floor. Round lake at SE grotto. SW cone large with hole on top revealing fountain inside. Rapid narrow torrent of melt northward from cone. SE grotto splashing. Falls of rock from wall N over deepest fill of new pool. SE lake has a plateau surface and marginal spills. West lake is not well defined; it is a flat fill flowing and spreading. Depth 485+ feet.

Sketch of Halemaumau:-



T A J

February 28.

9 p.m.

Lava splashing from SE vent and SW cone. Three flows on floor along N wall. SE lake overflowing, one branch toward center of pit and two branches toward NE wall. When crust of SE lake cracked and foundered no fountaining action occurred anywhere in the lake. The crust over most of the floor slowly cracked and foundered.

R H F

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

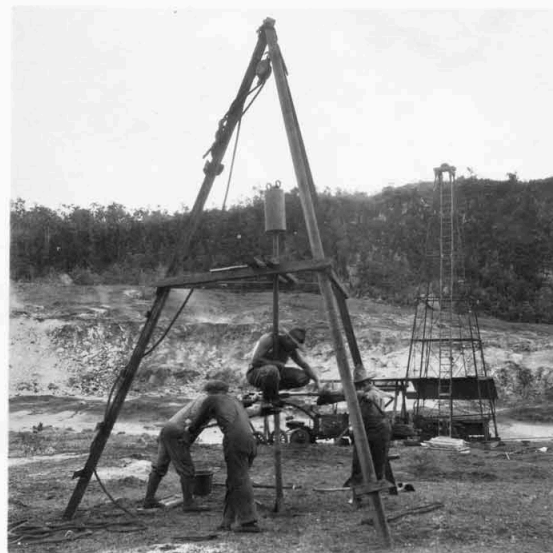
Hawaiian Volcano Observatory

Day Wednesday Date February 28, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
<u>BORING</u>								
10a m		A-frame and clay auger at Sulphur Bank	1			f/16	1/25	Stereo Kodak
		Men rotating clay auger. Calyx drill in back- ground	2			"	"	"
								T A J



1. A-frame and clay auger at Sulphur Bank.

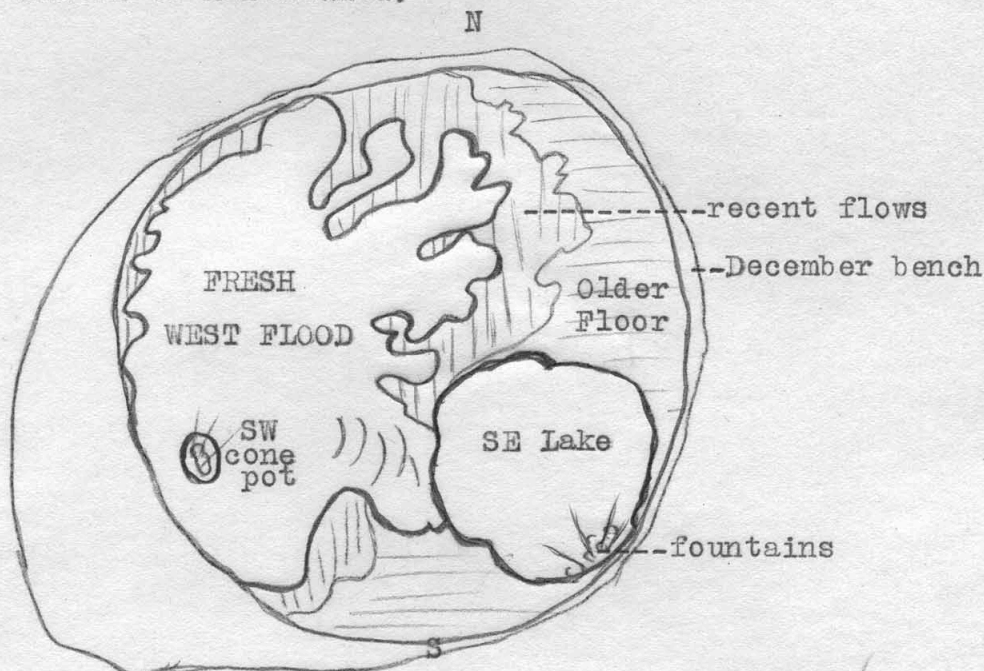


2. Men rotating clay auger. Calyx drill in background.

SP200251

March 2.

12:20 p.m. Sketch of Halemaumau:-



Floor about 450 feet down. Very hot on edge of pit. SW cone a single large pot with five foot rampart. Fountains inside, and under N side of cone.

Three or four fountains along edge of SE lake where SE vent was. Cracking and foundering both in W flood and in SE lake. Latter shows an edge. W flood making border flows, one of them into SE lake.

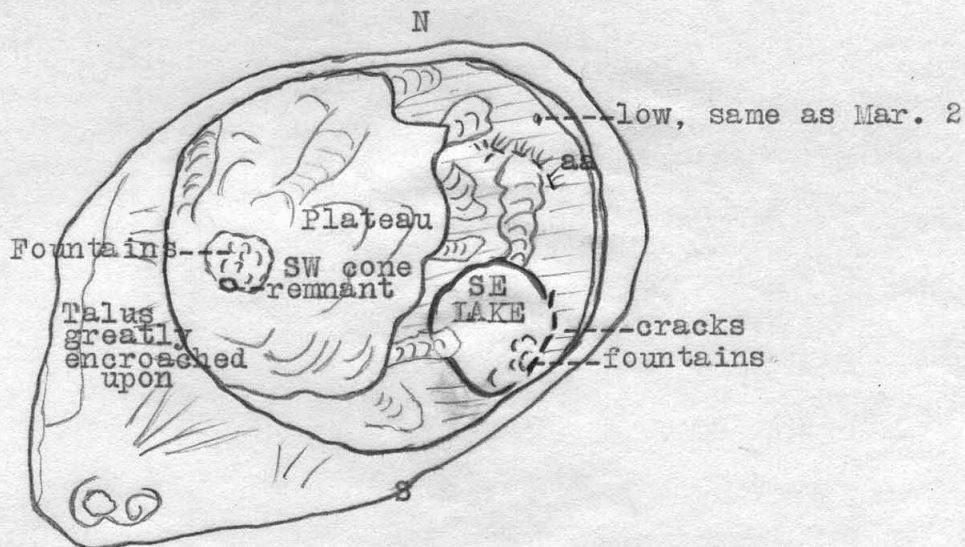
NE corner unchanged; 3 feet below December bench. Small rock fall N wall.

Fresh W flood is over an older flow surface of recent days. Fountain in SW pot is 4 feet down.

Smoke from sulphur spot on S floor. Pit has thin hot fume; seeing clear.

T A J

March 3.
3 p.m. Sketch of Halemaumau:-



Very hot pit; flooding and rising rapidly. West talus heaps becoming short and relatively low. Major rising at SW cone, now an open fountain. SW cone remnant seen to founder.

Spattering fountains at SE lake margin. Cascades from edge plateau of western flooding. One continuous cascade into SE lake, and from SE lake N to a pressure ridge with aa lava glowing in the cracks. Other chasms along E border of SE lake.

Continuous crackle of crusts in motion. Cracking and foundering and advancing overflows everywhere. One rock-fall N.

NE December bench still 3 feet above floor. Evidently W and SE pools are both plateaus above this NE floor by many feet, and W plateau is higher than SE pool. Western and southern weight is crushing out the floor beneath into a ridge E, like the ridge of March, 1921, SE of Halemaumau that gave vent to the short aa streams.

T A J

Day	Sunday	Date	March 4, 1923
	Monday	"	5, "
	Wednesday	"	7, "

March 4.

9 p.m.

No fountaining in SE lake. Continuous fountaining at SW vent. Lava flows along N and NE walls emerging from tunnels. One flow in center of pit moving toward the E. An overflow of short duration from the N bank of SE lake followed a cracking and foundering spell.

R H F

March 5.

9 p.m.

Flinging fountains at SW vent locality; lava streaming in broad sheets northward from there. Small fountains at SE vent; northward stream from edge of SE lake. Whole NE region full of glowing lava, probably over December shelf.

Larhe flood develops E from western plateau, cascading into SE lake which in turn overflowed. At other times, earlier and later, small streams ran down flank of W heap. Much cracking and foundering, and many flames seen.

Light from pit so bright that only one place could be seen glowing in SW chasm.

T A J

March 7.

Afternoon. At 3 p.m. SE lake was 3 feet down W and S, flush with bank NE. Small bubble fountains over vent.

Soon after 3 p.m. SW plateau pool overflowed voluminously NW and E, fountaining at source.

About 4 p.m. SE fountain became enormous, 80 feet high (like Mauna Loa fountains) for about 2 minutes, and SE lake overflowed on all sides.

Soon after 4 o'clock both lakes dead, SW pool 2 feet below banks and reveals flat island 2 feet high W of center of lake.

The margins of floor now well over the December bench NE. At base of N wall the floor margin has subsided and two aa flows lie in the wall valley, flows with even rough surfaces, which appear to have debouched from the pressure ridge NE.

The location of a new NNW station indicates that whole NNW edge of pit has caved away 20 feet during falls that made the last NNW talus below (February 7).

T A J

SURVEY RECORD

Day Wednesday Date March 7, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
3 p m	NNW							
	edge	NE (NNW new position)	0					
	SW							
	chasm	S	0					
	S	NE	0					
	NNW	SE fountain	R 23	26-18 54	0	1315	-451	
	Chasm	same	L 13	03-16 44	0	1451	-438	
	NNW	SW fountain	R 53	06-19 19	0	1223	-430	
	Chasm	same	L 15	56-27 33	0	796	-417	
	NNW	Base NE wall	L 7	16-23 33	0	1089	-475	
	chasm	same	L 29	19-13 43	0	1932	-472	

Check readings for stations:-

NNW	S station	R 34	52
Chasm	NNW station	L 63	37
S sta.	" "	L 57	19

Below NE station:-

SE fountain	444 feet
SW fountain	423
Base NE wall	474

In 4 days SW pool up 19 feet, average 4.7
 NE floor up 23 feet, average 5.6

T A J

March 8.
 2 p.m.

The large lake on top of the plateau that covers a large portion of the western half of the pit was quiet except for the fountain at SW vent and some small patches of cracking and foundering.

SE lake quiet except for fountain at S bank and some very small cracking and foundering patches.

No flowing lava visible. The subsidence area in the N floor showed no glow either on the bottom or in the aa banks at the N and NE.

R H F

March 10.
 3 p.m.

Rising rapidly as shown by freshly overflowed SE lake with glowing floods around it, and every sign (westward overflows) of being not much lower than SW lake, while latter shows fresh overflows down steepish slopes around its southern margin and floods to N and W, latter making glowing toes in talus. W talus greatly encroached upon.

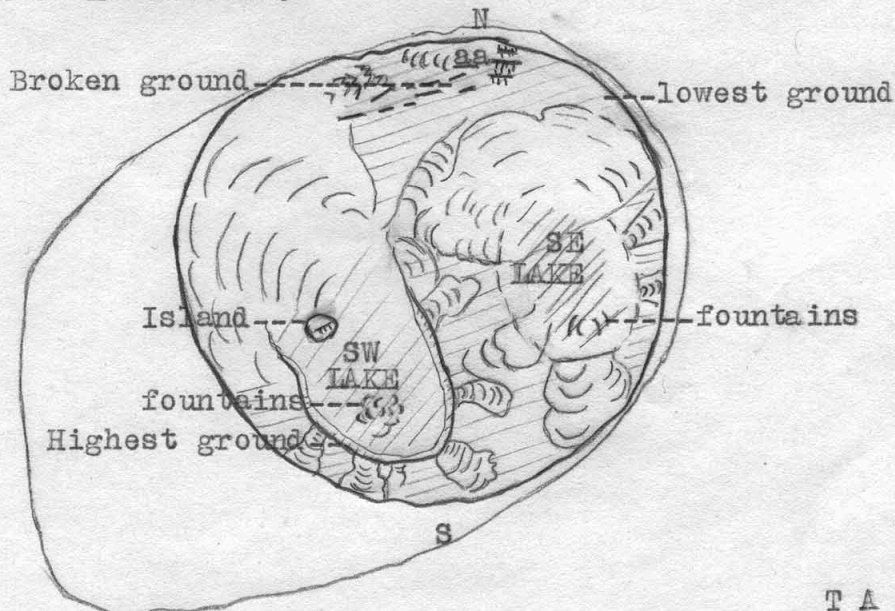
SW pool shows 2-foot bank around its southern half, and the small island more tilted up then before. Cracking and foundering in SE lake. SW and SE fountains both in action and their positions are now out from banks in southern parts of pools.

Marks noted on March 7 at base of NE wall are now buried. Estimated depression 400 feet to SW fountain and 450 feet to base of NE wall.

The broken and aa-covered region of the base of N wall looks much as before but it must have risen by slow accretion or uplift. Details have changed.

Large rock fragments on new surface W and smaller falls at other places.

Sketch of Halemaumau:-



T A J

Day	Date	March 11, 1923
Sunday		
Tuesday	"	13, "
Wednesday	"	14, "
Friday	"	16, "

March 11.

4 p.m. SW lake high and overflowing on three sides. Crag island nearly submerged, appears as a bunch of crusts.

T A J

March 13.

11 a.m. SW lake heavily crusted, 6 or 8 feet down in its banks, and the fountaining action at source cone not continuous. Multiple fountaining at SE vent. Vigorous overflow of SE lake, the rapid stream following wall of pit around to N side where tongues were pouring down toward the depression at N end of SW lake. The whole floor at N end of this lake has subsided a little so that the lake banks are higher at S end than at N end. SE lake nearly level with SW lake. Three islands, 7 to 8 feet high, in center of SW lake.

Pit dull at night.

R H F

March 14.

11 a.m. SW lake nearly bank full without any fountaining and heavily crusted.

SE lake depressed 5 or 6 feet within its banks. A small stream from a recent overflow to the NE was cascading into the lake at a point near the wall. SE fountain quite vigorous. The flow along E and NE wall progressed but little after 12 noon of the 13th.

Pit dull at night.

R H F

March 16.

11 a.m. SW lake collapsed, the floor sinking 10 to 15 feet in southern half and 7 to 10 feet in northern half without breaking up. The dividing line between N and S being the islands. Some of the banks at the southern end have fallen in and the floor is more or less cracked back of the banks on center side.

SE lake smaller but overflowing slowly in eight places. SW fountain active and small flows from it are pouring on to collapsed floor. Considerable smoke from a vent near N wall.

R H F

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

Day	Saturday	Date	March 17,	1923
	Sunday	"	18,	"
	Monday	"	19,	"
	Tuesday	"	20,	"
	Wednesday	"	21,	"
	Friday	"	23,	"

March 17.

11 a.m. One small intermittent fountain at SW vent. The floor of SW lake was being flooded by overflow from E lake. Floods from E lake also pouring to the E, NE and N. SE fountain playing continuously.

R H F

March 18.

3 p.m. Small overflows from E lake toward the S and the center of pit. These flows progressed but a few feet. SW lake area still depressed within its bank. SW fountain continuous.

R H F

March 19.

4 p.m. SW lake bank full and overflowing to the N on to the old N half of the lake. SE lake very slightly depressed in its banks. Vigorous dome fountains at both SE and SW vents. E side of floor considerably higher than western. During the evening a rapid flow spread over SW, W and NW portions of the floor.

R H F

March 20.

3 p.m. Some overflow of SE lake both toward the center of pit and toward E wall. SW lake overflowing toward the N. Fountains over the two source vents playing continuously.

R H F

March 21.

4 p.m. SE and SW fountains continuous and of the dome type. SE lake overflowing in a small stream toward E wall. SW lake overflowing to the N. Both lakes crusted.

R H F

March 23.

11 a.m. Small but continuous fountain in SW lake. Large dome fountain in SE. Rapid overflow of SE lake to SW, one branch of the overflow going under the crust of SW lake and two others pouring on to floor. Small trickling flow at several spots in N half of pit.

R H F

SURVEY RECORD

Day Tuesday Date March 20, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
3 p m	S	SW (3714')		0				
	SW	S (3720')		0				
	S	SW fountain SE edge	22	33-38	17	516	-406	
	SW	same	13	53-25	28	805	-383	
	S	S tip island SW lake	45	10-30	18	690	-403	
	SW	same	32	06-23	07	906	-387	
	S	N end grotto SE ftn	114	20-45	40	360	-365	
	SW	same	13	10-14	05	1442	-363	
		Below NE station (3716'):-						
		SW fountain 394 feet						
		SE " 363						

R H F

Day Saturday Date March 24, 1923
 Tuesday " 27, "

March 24.
 12 noon.

SE lake overflowing toward the E. Numerous small flows on N half of floor. The plateau which is surmounted by the SE lake appears to be higher than ever above the rest of the floor. SW and SE fountains active. Occasionally other fountains break out in SE lake. A smoking patch on N floor is colored yellow.

R H F

March 27.
 10:30 a.m.

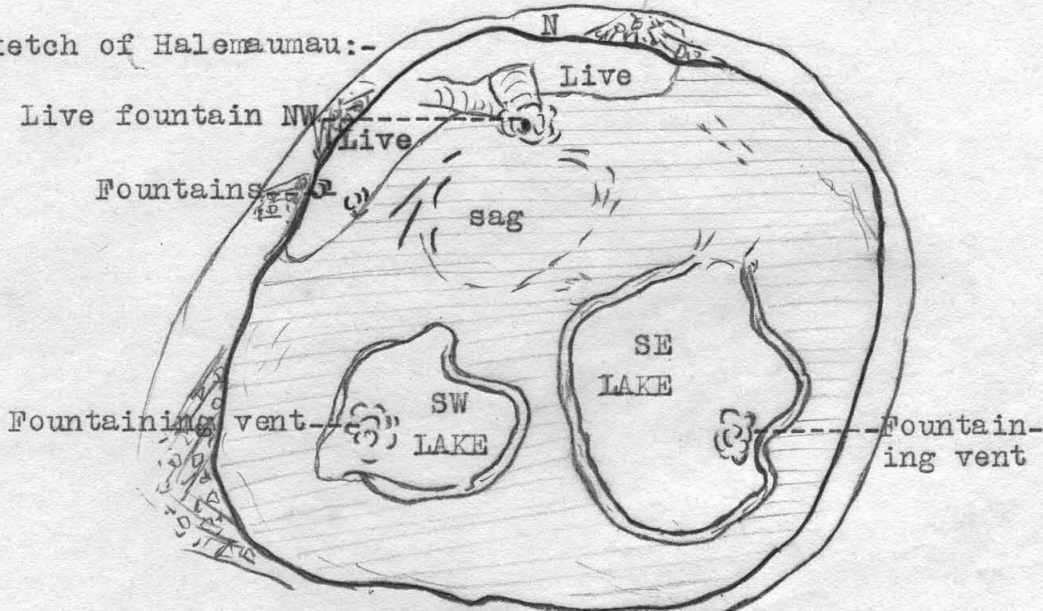
At this time SE lake started overflows through gaps in its border rampart N and W. These flows developed during the next hour. Previously a small spurting vent was seen putting out a flow from cracks NNW edge of sagged depression in NW central part of pit. This flow moved NW to join an elongate fountaining wall-pool there. Big avalanche from wall W at 10:15 a.m. Other small rock falls.

SE and SW lakes have 4-foot banks around greater part of their margins. Fountains over usual source vents, the larger group being SE. SE lake much higher than SW lake, with slopes covered with fresh festooned flows N and W and a humpy spur to its slag-heap in direction of center of pit. Cracks on N and W sides of sagged depression.

SW lake margin is above SW border floor to judge by flow pattern. Northern and northeastern edges of floor show sag, now being filled by big overflow from SE lake.

All taluses are buried except N, NW and SW.

Sketch of Halemaumau:-



BORING. Hole No. 2. Abandoned core barrel in hole 68 feet down. Concrete from 40+ feet up. Odor without the spicy sulphur. Temperature bottom 95.5°C.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Tuesday Date March 27, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9:35	a.m.							
	S	NE		0				
		Pt. next SE fountain (lake level)	L 6 30	-43 32	0	375	-356	
		SW fountain	L 103 00	-35 09	0	522	-367	
		NW fountain vent	L 69 26	-19 47	0	1054	-379	
		Edge floor N talus	L 53 55	-15 19	0	1425	-392	
		" " SW "	L 113 57	-24 54	0	816	-379	
		" " E	R 4 53	-31 31	0	589	-361	
		Fume spot center pit	L 51 29	-27 59	0	675	-359	
10:30	a.m.							
		16' from SW chasm to S		0				
		(SW chasm to S	R 45 12)					
		16' from SW chasm to:						
		Pt. next SE fountain (lake level)	L 12 43	-13 21	0	1476	-352	
		SW fountain	L 15 27	-24 57	0	801	-373	
		NW " vent	L 52 30	-18 24	0	1122	-373	
		Edge floor N talus	L 58 34	-13 35	0	1597	-388	
		" " SW "	L 21 54	-37 56	0	490	-381	
		" " E	L 14 56	-11 31	0	1701	-349	
		Fume spot center pit	L 31 11	-15 41	0	1261	-354	

T A J

Day	Wednesday	Date	March 28,	1923
	Thursday		" 29,	"
	Friday		" 30,	"
	Saturday		" 31,	"

March 28. Visitors to the pit report active flows and travelling fountains.

March 29.

9:45 to 11 a.m. Around pit by S and W. SE lake at first overflowing by way of a flow N, crusted across its upper channel so that the outlet at lake is masked; outlet is a tunnel under the rampart bordering the lake, 6 feet high at the tunnel. This rampart only 2 feet high at S end of lake. The flow N is glowing for 50 feet and pours under crusted fill in wall-valley N and NE.

Lake outlines are like March 27 except that the sag NW has become a live pool fed from the NW cone and the NW wall pool has gone out of action. This sag pool not fountaining, but edges trickling. Usual source fountains SW and SE.

About 10 a.m. five explosive fountains of the "travelling" variety developed in N central part of SE lake. All the crust broke up and the slabs migrated to the fountain line. Fountains migrated to the NE bank and other fountains developed elsewhere under banks of lake. Lake lowered two feet. The travel fountains were clearly exaggerated editions of the "crack-and-founder" fountains, the bubbling between slabs which accompanies a general breakup. The source fountain continued undisturbed. Later the stream NE crusted over completely. Notable quantity of strong SO₂ from the travelling fountains.

This increase of fountaining and of gas illustrates the deepening of the lakes and the setting up of a pulsation within them of gas confinement vs. gas release. The release is by bursting of inflated surface layers and a general foundering, so adding to release of pressure and effervescence of gas. Thus the fountaining spasms in a large lake come about, just as small fountaining developed in the wall-pool NW on March 27. The action this morning resembled the NE lake of 1917 (January). The plan of three lakes in clover-leaf pattern also recalls 1917.

The increase of sulphur fume must mean increased heat and release of gases hitherto trapped by solidification, or increased volume of lava entering pit.

T A J

March 30.

4 p.m. SE lake overflowing to the N through a tunnel much the same as on the 29th. The rampart on the E side of lake remains unchanged. Two small overflows from SE lake toward SW lake. SW lake overflowing to the NW sag. One small fountain at NE edge of SW lake. SW and SE source fountains show usual action.

R H F

March 31. Condition of pit reported much the same as on the 30th.

JOURNAL

Day	Sunday	Date	April 1, 1923
	Monday	"	2, "
	Tuesday	"	3, "
	Wednesday	"	4, "

April 1.
11 a.m.

A rapid overflow that appeared to have come from the SW vent occurred some time during the morning. The entire floor of pit was nearly level and covered with hot lava that had a very thin crust. A little of the S end of the bank of SE lake was still visible. Cracking and foundering took place slowly at many places. Vigorous fountaining at SW, occasional fountaining at SE.

R H F

April 2.
10 a.m.

Lava down 8 or 10 feet as shown by black ledge around edge of pit. SE lake area again well outlined and SW lake not visible. Small fountains at the two vents.

3 p.m.

Vigorous fountaining at SE vent with strong overflow of SE lake toward the SW, small overflow to the N. Small fountain at SW.

Seventeen quakes from 9:01 p.m. April 1 to 9:48 a.m. April 2.

R H F

April 3.
11 a.m.

SE lake depressed within its banks 5 to 8 feet. Small fountain at SE vent. Vigorous fountaining at SW vent; three or four dome fountains in action at all times. Lava flows pouring over the NE floor from SW lake by way of N side of pit. By 11:30 a.m. two cascades were pouring into SE lake.

8 p.m.

The SE lake was overflowing to the SW and there were eighteen fountains in action over the whole floor.

R H F

April 4.
11 a.m.

Overflow from SE lake into SW pool continues. Trickling flows due to above overflow on N floor. Whichever of the two source vents that has the most fountaining is the locus of principal upwelling of lava. SE vent has three or four dome fountains in action. Small fountain at SW. The eastern floor has subsided a few feet.

R H F



1. From S.E. rim to center of pit.



2. From S.W. rim to center of pit.

Apr. 4, 1923



3. Southeast side of pit from S.W. rim.

11 a.m.

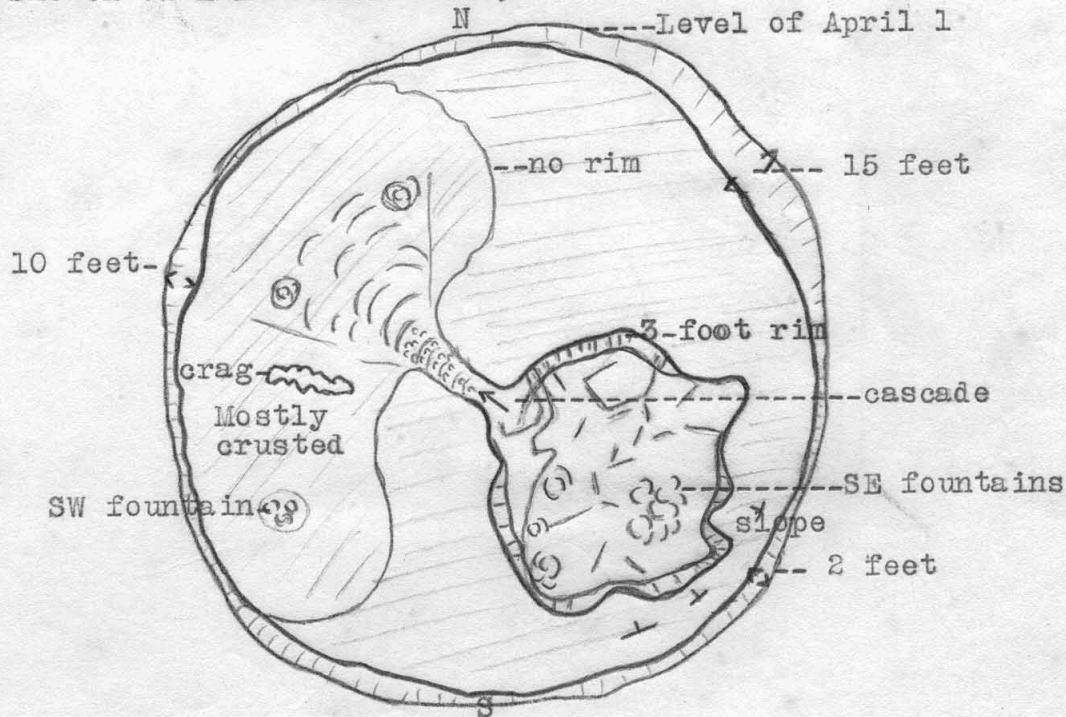
On April 1 the flood level of lava appears to have reached about 308 feet below rim. Floor now appears 15 feet below black ledge of April 1 on the NE, 10 feet below it NW and 5 or 6 feet below it SE, this last being a 2-foot ledge and a slope of inward dipping floor.

SE lake highest and from it a steep chute of cascade to W pool in northwesterly direction. SE lake has 3-foot bank and is fountaining vigorously and continuously at source well, and making migratory fountains that move to the bank by cracking and foundering in W portion of lake. Chute shows gas bubbling 50 feet from SE lake.

W pool fountaining idly in one or two places and has a permanent scar and feeble fountaining at its well. Pool is merely a fill withour rim. Small crag or island in it. Rest of floor is flat slumped pahoehoe. Some little aa in NE bank edge of floor.

Cascade has been rushing for two days like a fixed circulation. N talus covered, NW not.

Sketch of Halemaumau floor:-



BORING. Hole No. 5. Dirt to 5 feet. Hard pan 5 to 9 feet. Steam at 10 feet. Now abundant steam. Temperature 96° C, 12 feet down, puffing steam.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Thursday Date April 5, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
11 a.m.	SW							
	chasm	S		0				
	S	NE		0				
	Chasm	Top central cascade						
		(SE lake level)	L 24 42	-14 51	+02	1194	-317	
	S	same	L 55 49	-31 30	+03	528	-312	

Mean below NE station 314 feet

SE lake up 39 feet since March 27, averaging per day 4.3'.

T A J

3 p.m.

SE and SW wells making each several bubble fountains, the SE larger. Stream pouring steadily as before from SE pool to W pool. Latter still below black ledge of April 1 about 10 feet.

Floor N of SE pool has swelled up and cracked and similar development of height in bench magma shows in ground SW of SE pool and in a peninsula making out into W pool from S side of cascade-stream.

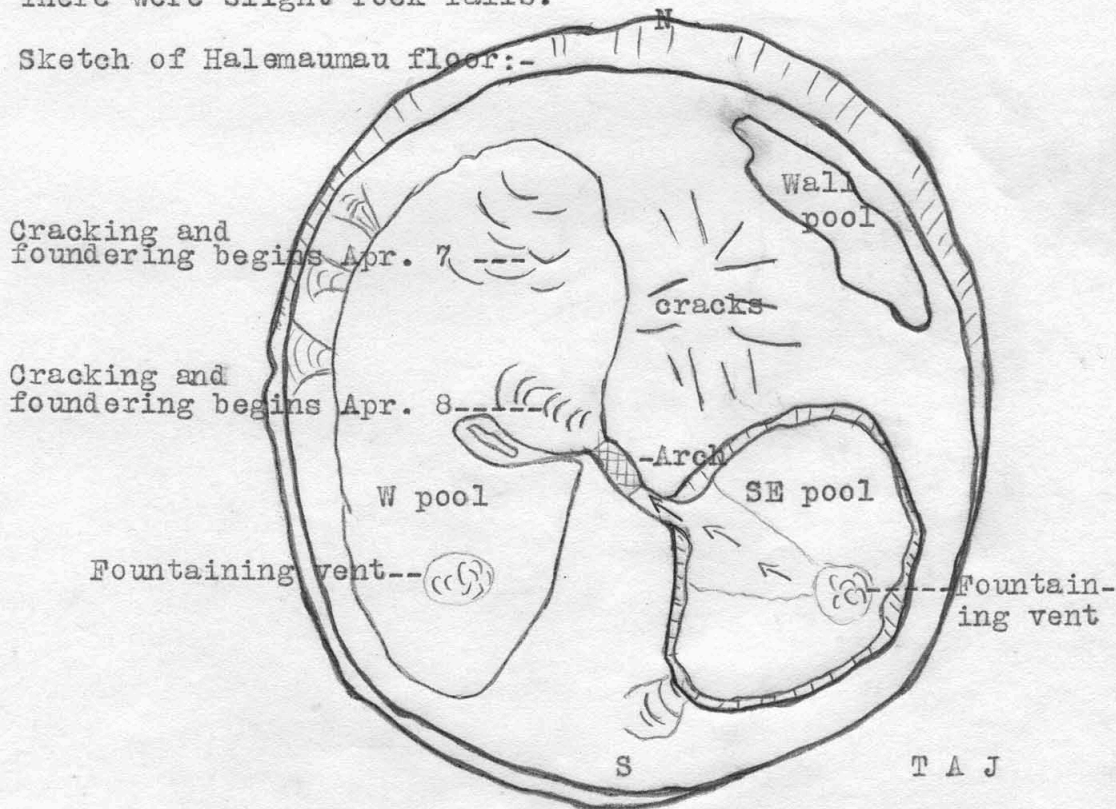
A new wall pool is developing between the high ground of N central part of floor and the NE wall of pit. Source of this lava appears to be from the wall-crack below it. It is a sluggish scoriaceous pahoehoe without gas pressure. It may have percolated through the crevasses of the domed floor. The wall-pool appears to lie in a depression lower than before, for the black ledge of April 1 is 20 feet above it.

The edge of SE pool on wall side SE appears to have overflowed toward the wall and built up. The cascade-stream has built an arch over itself in middle part of its course.

Cracking and foundering was seen to start in N corner of W pool and spread slowly clear across pool and around the peninsula to and beyond the SW well fountains. It reached the mouth of cascade-stream, where the stream plunged under crust, broke up the older black festooned surface there and a new festooned surface formed. During the cracking and foundering there were overflow gushes around edges of W pool on W side.

Mostly the SE pool gas pressure was in adjustment to the outlet, but some slight cracking and foundering and shifting of the bright-line pattern on the pool occurred. There were slight rock falls.

Sketch of Halemaumau floor:-



9 p.m.

Cascade-stream covered with an arch of crust over its lower half. Its speed increases and diminishes from time to time. W pool crusted, SE pool dull; fountaining at wells as before. Fresh border overflows from SE pool toward the S, from W pool toward the W and NW, and from NE wall pool toward the NW.

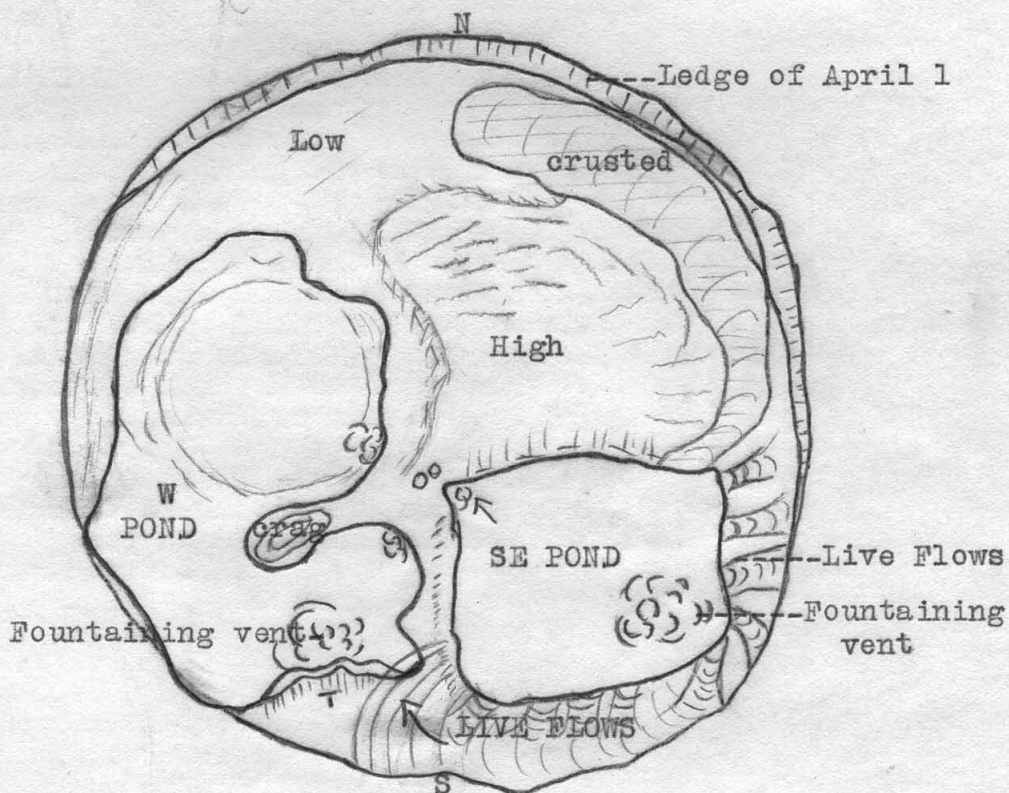
During an hour W lake cracks and founders gradually as before, starting at mouth of cascade-stream which there emerges from tunnel. Very spectacular color bands during the break-up, from bubbling golden with scintillating effect to copper bronzy on cooling.

A different type of cracking on N part of SE lake, started by a large fountain and spreading as the fountain lowered the level of the pool. This made the outlet stream sluggish.

Great increase of heat radiation during the breaking-up spells.

T A J

2:30 p.m. Sketch of Halemaumau floor:-



About 3 p.m. SE lake began strong overflows E and S and filled space to wall of pit, all of this fill pouring westward into W lake. This continued, making pit very bright at night.

Changes evident are the flooding of April 1 black ledge all along W side of pit. N and NE the black ledge persists same height as before (10 to 15 feet). N central region cracked and raised as though pulled toward SE, which is the highest part of floor. SE lake dominates everything, and recent flows from it have filled NE wall-valley. Southern part of W lake (former SW pond) appears more active than northern part. Latter is slightly sagged.

The bubbling fountains at SW and SE vents are both increasing in gas pressure and in numbers of fountains. Craggy bits of shoreline have appeared just S of SW fountains. Crag peninsula is more prominent.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date April 11, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
2:30 p.m.	S	NE						
	SW							
	Chasm	S						
	S	Top SE lake outlet	L 53 51	-30 39	+07	505	-300	
	Chasm	same	L 23 34	-13 44	+07	1210	-299	
	S	Fountain NE side SW pond	L 75 09	-28 22	+06	567	-307	
	Chasm	same	L 26 11	-16 36	+07	1010	-304	
	S	Spot on floor N of SE lake	L 49 19	-23 26	+06	686	-299	
	Chasm	same	L 31 12	-12 48	+07	1295	-298	

T A J

Below NE station:-
 Top SE lake outlet 297 feet
 SW pond 304
 N floor 298

Day	Thursday	Date	April 12,	1923
	Friday		" 13,	"
	Saturday		" 14,	"
	Sunday		" 15,	"
	Monday		" 16,	"

April 12
5 p.m.

Vigorous fountaining activity at both SE and SW vents and three fountains near wall S of SW fountain. A hissing vent that shows several glowing spots is located near SW bank of SE lake about where the persistent stream of a few days ago was located.

A sloping crust from SW talus indicates that the fill due to the flooding of April 11 has subsided 8 or 10 feet.

R H F

April 13
3 p.m.

Vigorous fountaining activity at SE vent. SW vent fountaining about once a minute. Six islands in W part of pit, one in center of pool is tilted with slope toward the N. Crust cracking and foundering in NE pool and along NW wall. There is a bank about 8 or 9 feet high along S and W side of SW pool, no bank at center side. SE lake flush with its banks.

8 p.m. Numerous flame jets of about one second duration in cracks of all lakes.

R H F

April 14. Fountaining activity at both SE and SW vents. Near the center of the pool on W side there is a small continuous fountain that is building up a small spatter cone. Travelling fountains were frequent in SE lake. The streaming to the W from about the location of the open channel between SE and SW lakes of a few days ago still continues.

R H F

April 15
2 p.m.

SW lake a few feet higher than yesterday though surrounded by well defined banks. Fountaining continuous at SW and SE vents. One small flow at N side of pit. SE lake crusted and bank full with an overflow pouring toward the E from a point near the wall.

R H F

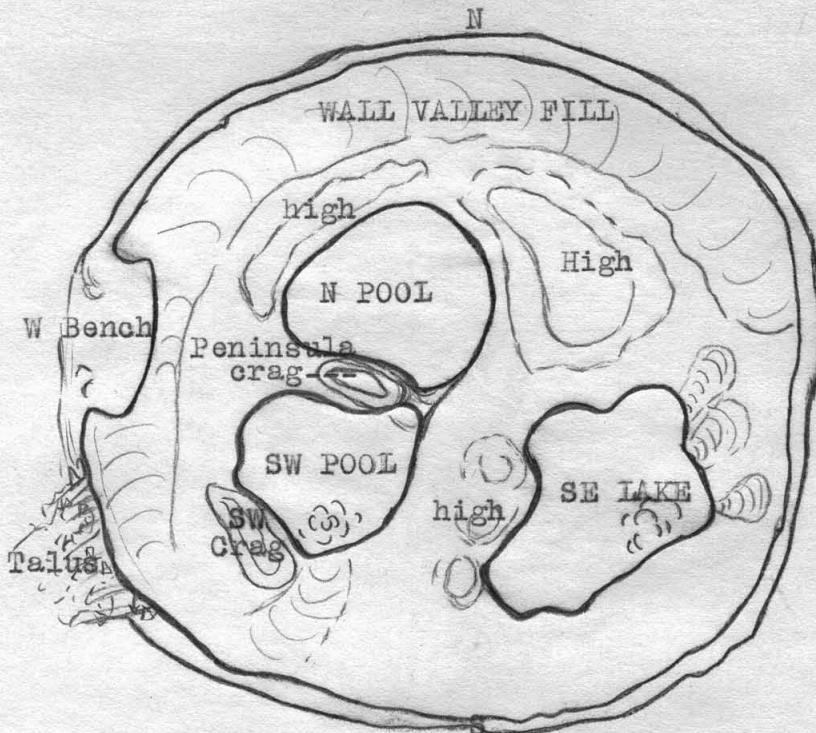
April 16
4 p.m.

Fountaining at SE and SW vents. S end of SW lake bank full. N end which is separated from the S by an island is depressed within its banks 6 to 10 feet. The bank on the W side appears to be due to tumescence as it slopes toward the outer wall of pit. A wall pool with one permanent fountain appears to be developing near N end of SW lake. SE lake overflowing into S end of SW lake. NE wall pool crusted.

R H F

Day Thursday Date April 19, 1923
Saturday " 21, "April 19
11 a.m.

Sketch of Halemau mau floor:-



Floor of pit constantly enlarging and rising on the wall contact. Slight slump of three feet around edges but none of this black ledge appears to be the ledge of April 1. Crags very pronounced on S side of SW pool, and other marked high ground lies around the N pool and W of SE lake.

Fountains over source wells SW and SE.

No trace of tunnel cascade visible between SE and N pools. N pool is more pronounced in outline.

Wall-valley fill all around W, N and NE sides of floor. Rise of floor area by this fill very marked in contact with the W inner benches which are partly submerged, and the NW talus is now gone.

T A J

April 21

11:20 a.m.

Situation like April 19, except that a new flood is pouring over W lip of SW pool and filling anew the wall-valley, its front cracking and foundering and advancing eastward on N side of floor area. Edge of floor higher and W bench still more submerged. Whitened smoking cracks in NE part of floor. SW crag appears higher above lake than Peninsula Crag, and latter is 18 feet high. Some small fountaining in W wall-valley flood and the usual triple or quadruple dome fountains in both SE and SW lakes, nearly alike.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Saturday Date April 21, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
11:20 a.m.	S	NE		0				
	SW chasm	to S		0				
	S	SE fountain	L 11	07-36 29	+05	366	-272	
	Chasm	same	L 13	00-10 11	+05	1455	-265	
	S	SW fountain	L 101	30-26 52	+05	531	-270	
	Chasm	same	L 16	10-18 07	+05	812	-267	
	S	Top Peninsula Crag	L 79	40-21 27	+05	636	-251	
	Chasm	same	L 29	20-14 51	+05	948	-252	
	S	Spot on N floor fum- ing	L 41	43-14 56	+05	1006	-270	
	Chasm	same	L 40	33- 9 33	+05	1538	-262	

Below NE station:-
 SE lake 268 feet
 SW lake 268
 N floor 265

T A J

Day Sunday Date April 22, 1923
 Tuesday " 24, "

April 22
 3 p.m.

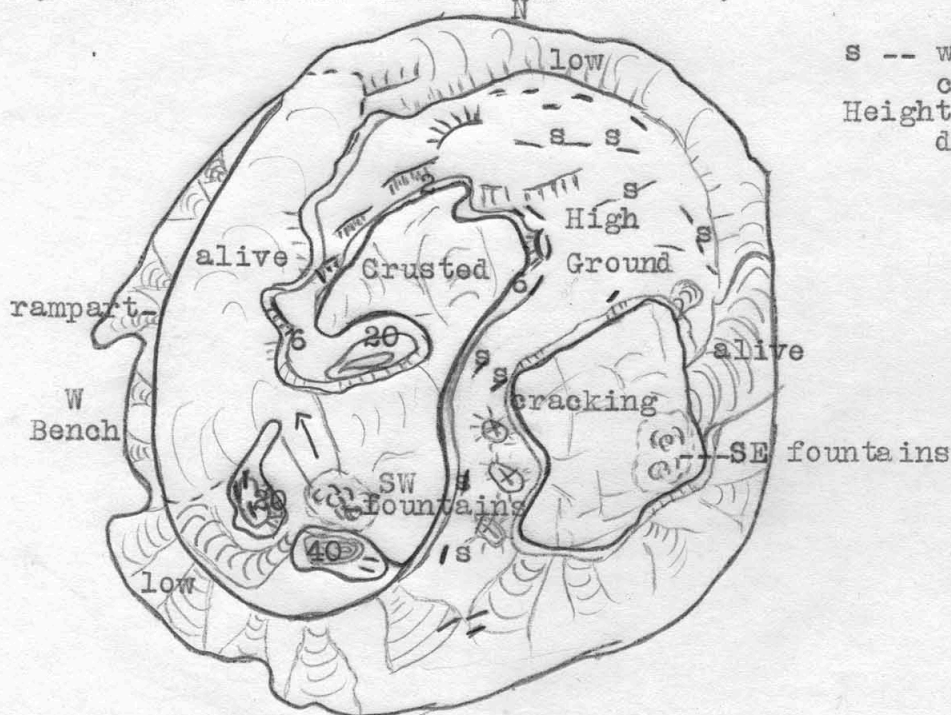
Cracking and foundering in N and SW pools. Fountains over wells, two or three domes to each well. A rampart alongside the great W flow pool that extends from the SW lake. This rampart incessantly overflowing here and there with short festooned streams. Similar rampart overflows from S side of SE lake. W bench and SW talus increasingly encroached upon.

Crags and crevassed ground higher. Lake areas probably 20 feet above much of the wall-valley depression. The bench magma containing the lakes has thus risen with the lakes, and the whole lake and swollen area tends to make high ground, arching in a flat dome, relative to the wall-crack that remains low. Lake borders 1 to 6 feet high, crags 20 to 40 feet high.

Cracking and foundering in many places, and much small fountaining with it. Majestic stream pouring W out of SW lake.

T A J

April 24
 9:10 a.m. Sketch of Halemaumau floor:-



s -- whitened smoke cracks
 Height of crags indicated

Conditions much the same as April 22. Fresh overflows S and E from SE pool. The three pools occupy high ground. The Peninsula Crag appears to have changed its axis from E-W to NE-SW. A recent flow has poured between the two SW crags. Numerous crevasses have developed into small crags N of N pool. Wall-crack region is in general low. Cracking and foundering in SE lake; straight flow across SW lake; N lake crusted.

T A J

Day Wednesday Date April 25, 1923

Thursday " 26, "

April 25
11 a.m.

An important crisis, like April 1, going on this morning. It began in early morning. At 7 a.m. there was yellow fume at pit; there is none now. At 8 a.m. National Park laborers saw subsidence beginning.

There has been a complete filling of whole floor above the highest crag level with liquid lava, making a new black ledge all around and leaving fresh crusts on top of the crags. W bench has been entirely submerged. Now there is an even black ledge all around, due to the reaction from the rising. Ledge is 15 feet high generally, a little higher NE, and only half as high SE, where there is a sloping bank next SE pool. The reaction leaves four crags, of which two are SW, one is the peninsula and one is the E bank of N pool. There is a promontory of new lava at W bench locality. The black ledge as usual shows aa where the wall of subsidence is left, and the lower slopes of crags show aa. General pattern of floor developed by the sinking back is the same as yesterday.

A big stream is pouring along the S wall of pit from S corner of SE lake. Fountains as usual at SE lake and occasional ones at SW lake. A big stream shows its outline NW from SW fountains like yesterday.

NE high region is appearing. SE lake now an oval with slabby rampart developing.

General pattern flattish and very hot pahoehoe. Much cracking and foundering in progress. Hissing noises abundant. No fume whatever except from SW chasm talus.

Emergent flats at edge of floor NW and W of N pool. A circular arc is marked by change of pattern to flatter lava inside of W edge of floor, indicating the area over the W taluses, marked yesterday by the outer rampart slope. This new flat wall-valley pool or fill extends in a zone clear around S side of floor, and the stream from SE lake lies as a festooned band between it and the SW crags.

Noise of cracking and clanking crusts. Black ledge has fallen away at two places NE and was seen to fall at one place N. The new black ledge has encroached on the foot of the square W pinnacle and the only taluses left are those N and S of this pinnacle. Black ledge must be approximately 235 feet down and lakes 250 feet down.

T A J

April 26
10 a.m.

Heavy rains in progress; began last evening 4:30 p.m. From that time until this morning 6+ inches. (Final record 14+ inches in 36 hours). Waterfalls at Uwekahuna and "bridal veil" falls N end Uwekahuna cliff. Went there and found anastomosing drainage over the two lower steps of fault block S end of Uwekahuna, uniting to multiple cascades down the soldiers' trail to Kilauea floor. No pools on floor except very small ones near base of cliff Volcano House trail. Large pool at Sulphur Bank flat. Big steam clouds rising from Halemaumau.

At Halemaumau got glimpses of bottom from S rim. Wind SE. Bottom more down than yesterday, crags 30 to 40 feet

Day continued Date April 26, 1923
Friday " 27, "

April 26. high. Crevassed ground W and N of N pool. Large (cont'd) streams from SE and SW pools around wall-valley S and W. Tails of steam from flat ground. General pattern same as before. Black ledge higher NW. Fountains as usual.

T A J

April 27.
11 a.m.

Details same as yesterday but more plainly seen. NW black ledge 20 feet high; SE 5 feet high. SE lake highest. Torrents pouring from it to S wall-valley and between the two SW crags from SW lake to S wall-valley. This all united into a big stream moving N along W side of floor. SW pool starts overflows W to join this stream. Fountains SE and SW as usual.

Heavy crevassing W and N of N pool. High ground N of SE lake. Crags 40 feet high SW, Peninsula Crag 25 feet high. Black ledge has fallen in many places.

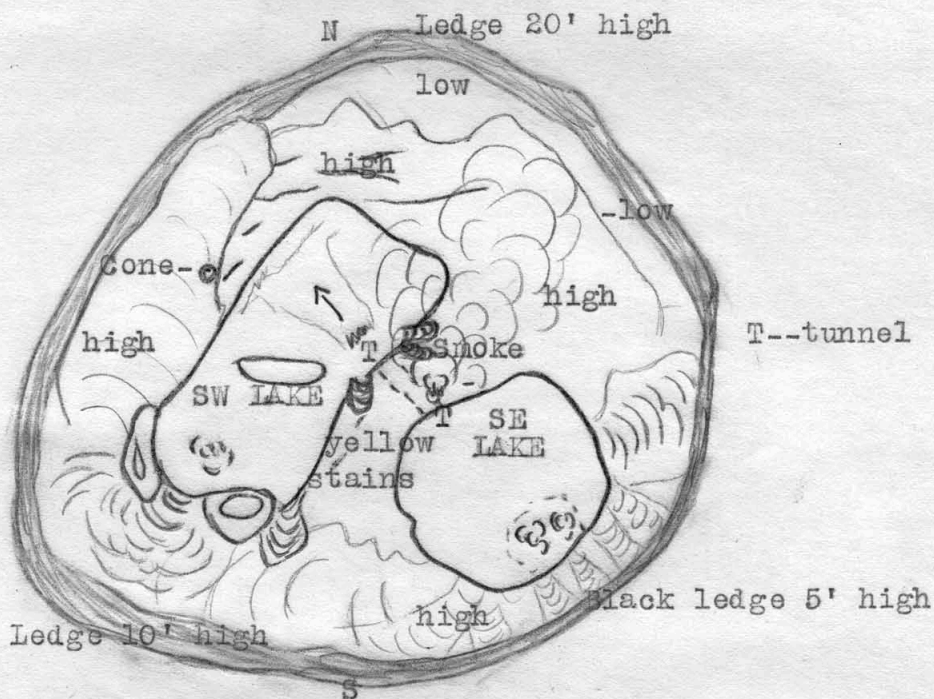
New tumble in SW chasm. Wall of pit wet and dripping. At SW rim drops of this drip rising from below impelled by convection currents of hot air. Debris in SW chasm wet, and the pale yellow glow patches have mostly disappeared.

Large convection column and cumulus over Mauna Iki.

General situation in Halemaumau appears to be: lava rising SW and SE wells, SE well dominant, same pattern of lakes and bench magma as before the crisis, liquid now drowning the black ledge, etc, gradually.

T A J

10:30 a.m. Sketch of Halemaumau floor:-



Both lakes brimming and SW lake starting overflows. Big S and W fill high, flush with SW lake.

Beehive cone has formed at end of one of the crevasses W of N pool. N and SW pools are joined.

Peninsula Crag is an island 15 feet high. Large SW crag about 30 feet high. Crevassed crags NW of N pool appear about 30 feet above pool. Central floor covered with yellow stains.

Tunnel between SE lake and N pool is evidently flowing, as bright-line streaming crosses N pool from tunnel in NW direction and there are smoking cracks over the tunnel. Fountains are as usual at the wells.

Some fresh avalanche debris noted.

Big stream develops through SW crag gap, causing cracking and foundering at its fronts across SW wall-valley pool.

SE lake about 240 feet down, SW and W and N pools 245 feet, N and NE wall-valley 255+ feet.

T A J

3:45 p.m. Arrangement the same, with rise of liquid pools. SE lake overflows within one foot of the black ledge. W overflow pool within 5 feet of black ledge. Ledge still 20 feet high N and NE.

Torrent pouring from SW lake between the two SW crags and keeping the whole W pool alive. Bright lines in N pool show the same NW streaming from the smoking tunnel between SE pool and N pool. SE pool has built up its edge and overflowed E, S, and W to SW pool. Festooned short overflows around it.

N and NE wall-valley unchanged. N pool has spread northwestward into the craggy region.

The surface circulation is SE lake to N pool; N pool to SW pool; SW pool S through gap; gap around SW and N the whole length of W side of floor. This W pool has a rampart bounding it N, which is now slightly overflowing toward the much lower N wall-valley.

The SE lake is fountaining in convulsions every four or five minutes. The fountaining patch over source well becomes a mass of bubble fountains and three or four dome fountains. The skins break in a rosette of bright lines and the melt rushes centripetally to the fountaining. Then the rest of the pool's skin breaks concentrically out to the far side of pool. Then the fountains diminish and travel to the SE bank. When this great fountaining activity was first noticed on arriving at pit at 3:40 p.m., the SE pool was overflowing. The succession of fountaining convulsions and inflowings brought the overflows to a stop. The inflowing to fountaining center is certainly the same phenomenon as what takes the form of cascading into a funnel of subsidence in extreme times. The convergence of the streaming and the multiple fountaining is quite like the funnel action, and the concentric breaking and inflowing of crust blocks show a distinct slope of surface centripetal to the source well.

Probably these convulsions brought to a close a spell of overflow when the pressure restrained gas and the gas expansion was relieved by the flooding. The reaction released gas fountains with decreasing pressure, these released deeper gas down the well, and the void left by the gas ejected caused the inrush from all sides. Action and reaction of this sort set up the rhythmic convulsions. "Old Faithful" fountains are another form of the same balance of gas in a well.

T A J

5 p.m.

Rapid flooding in progress with entire floor of pit nearly level. Small bubble fountains at two source wells and occasionally a large fountain. Lava streaming slowly in all directions from SW vent. Five fountains in a row along W border of N end of SW lake.

Vigorous fountaining continuous at NE wall. Fountaining of short duration from time to time at one place or another all over floor.

Much blue fume escaped wherever there was fountaining.

The black ledge of April 25 showed from 1 to 2 feet above flood. Avalanches from NW wall at 10:20 p.m.

R H F

9:30 a.m. Liquid lava extends from wall to wall and a slight black ledge shows all around about the lava level. Some notches in the eastern ledge apparently identical with ledge of April 26. Higher SW crag is just beginning to show as a flat island. W talus almost completely covered by the black ledge of this rise.

Eleven groups of fountains and these especially numerous in NW part of pit. Fountains of SW and SE wells notably inconspicuous.

Outline of W bench below reappearing rapidly as the liquid subsides. This subsidence was rapid during the morning so that by noon black ledge and SW crag were 10 feet high and lake outlines and marginal shelves NW and SE were appearing. Continuous fountaining with many bubblings appeared at SE well and something similar about E side of N pool and in NW region. SW well developed feeble fountaining. Banks around margins caved in and revealed cavernous chasms and red hot aa in a few places. The whole performance repeats what happened April 1 and April 25, but the interval between such spurts seems to be decreasing and the volume of inflow increasing for each spurt.

Fume over pit excessively thin, noxious sulphur gas stronger than before owing to the increased fountaining. Twenty-four fountains were counted at one time and the whole appearance of pit was like the end of December, 1911. Heat felt on rim very strong.

Fume at SW chasm very slight now.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Tuesday Date May 1, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9:45								
a.m.	NNW	S						
	SW chasm	to S						
	NE	S						
	NNW	Top black ledge	L	9 11- 8 08	+06	1482	-216	
	Chasm	same	L	5 59- 8 05	+08	1458	-212	
	NE	Top black ledge	R	103 52-15 29	+04	784	-219	
	NNW	same	L	57 05-20 30	+05	583	-219	
	Chasm	same	L	45 44- 6 40	+08	1829	-221	
	NE	Top SW crag	R	23 25-11 00	+04	1148	-224	
	NNW	same	R	17 21- 9 37	+05	1307	-224	
	Chasm	same	L	9 02-14 57	+08	795	-215	
	NE	Base SW crag (lake level)	R	24 21-11 24	+05	1160	-236	
	NNW	same	R	18 04-10 07	+09	1300	-236	
	Chasm	same	L	9 12-15 57	+08	777	-225	
	NE	Top black ledge	R	64 11- 7 40	+05	1582	-217	
	NNW	same	R	69 12-18 04	+07	652	-214	
	NE	S tip W bench (lake level)	R	40 15- 8 11	+05	1605	-236	
	NNW	same	R	45 22-10 44	+07	1200	-231	
	NE	Central crag (just appearing; lake level; former Peninsula Crag)	R	40 42-13 04	+05	996	-233	
	NNW	same	R	15 15-13 22	+07	961	-230	
	Chasm	same	L	30 28-13 33	+08	938	-229	
	NNW	E bank SE lake (lake level)	L	19 27-10 08	+07	1276	-232	
	Chasm	same	L	16 46- 8 11	+08	1603	-236	
	NE	S bank SE lake (lake level)	R	5 37-18 27	+05	701	-236	
	NNW	same	L	4 45- 9 21	+07	1376	-230	
	Chasm	same	L	7 58- 9 49	+08	1319	-232	

Below NE station:-
 SE lake 234 feet
 SW " 233 "
 Black ledge 217 "

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
 Hawaiian Volcano Observatory
 Day Tuesday Date May 1, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
9:30 a	SW	chasm Pinnacle	1	film		f/16	1/25	Stereo Kodak
10 a.m.	NNW	SW pinnacles	2	"		"	"	"
	NNW	S side pit	3	"		"	"	"
	NNW	NE side pit	4	"		"	"	"
11:40a	Chasm	S wall pit)	5	"		"	"	"
	"	Center)panorama	6	"		"	"	"
	"	W bench)	7	"		"	"	"

T A J

1923, May 1

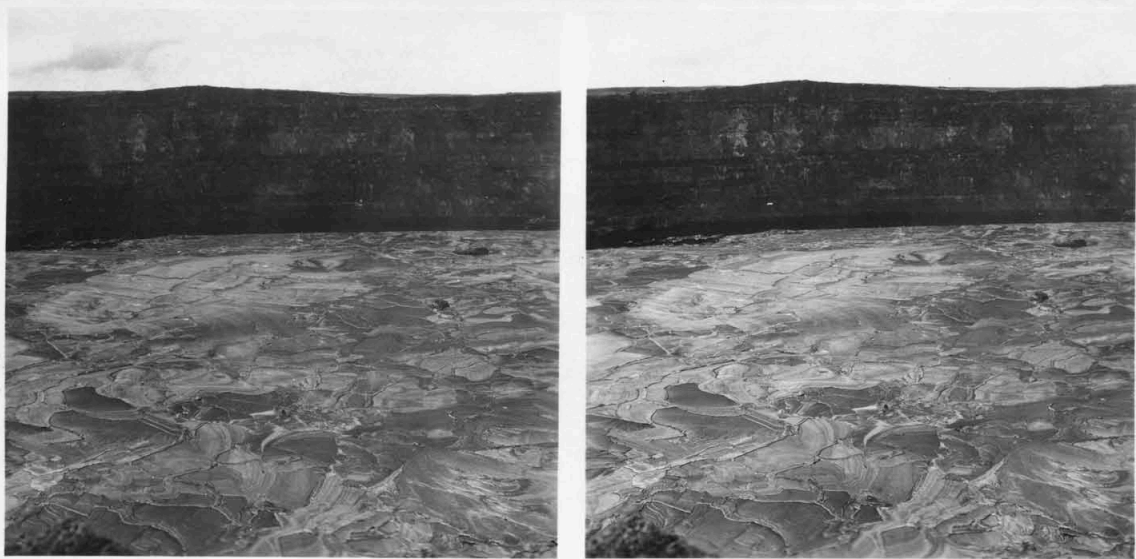


1. Southwest pinnacles from S.W. chasm.

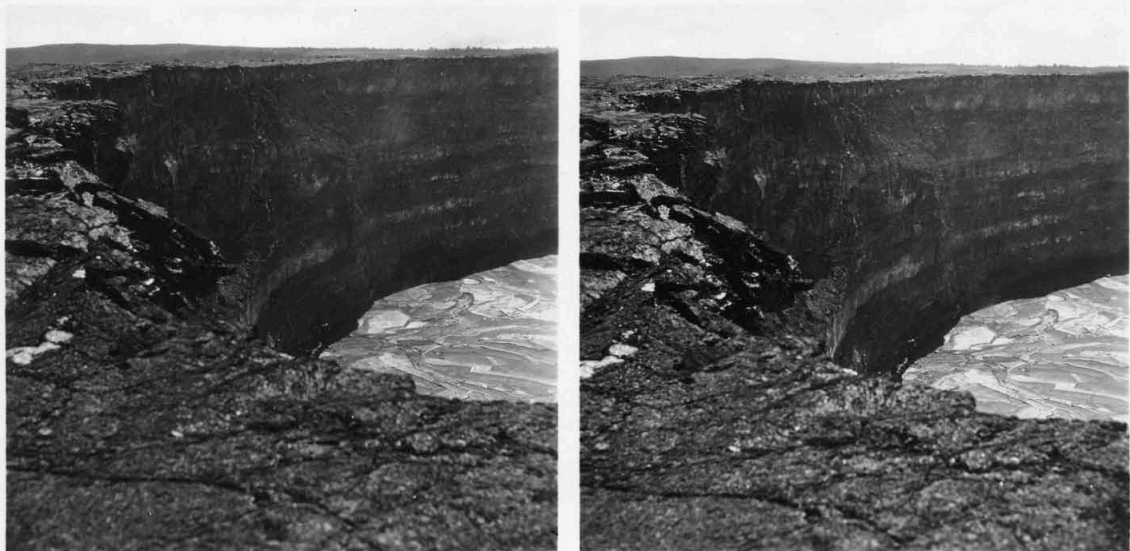


2. Toward southwest pinnacles from N.N.W. station.

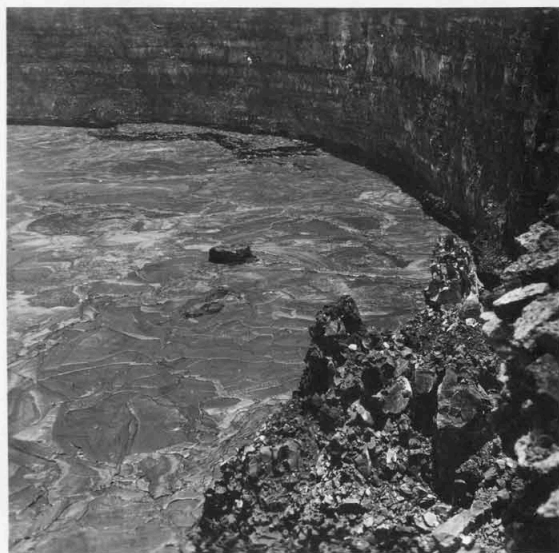
May 1, 1923



3. South side of Halemaumau from N.N.W. station.



4. Northeast side of Halemaumau from N.N.W. station.



5. South wall of pit from S.W. chasm.



6. Center of pit from S.W. chasm.

May 1, 1923



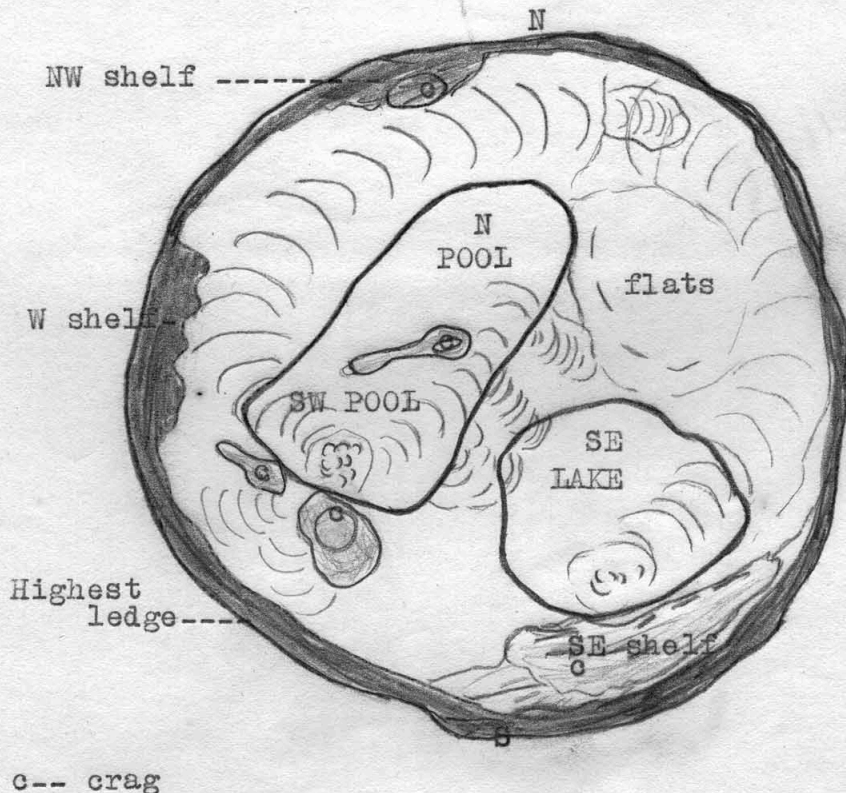
7. West bench from S.W. chasm.

10 a.m. General condition as when last seen yesterday, but re-covering. The black ledge 15 feet high SW, 5 feet high NE. This means that this rising was dominantly SW and probably it is true that the April 25 broken black ledge still persists as the topmost ledge NE and SE. SW and W the new ledge certainly overtopped the April 25 ledge.

The inner landscape now shows the three crags of the SW and N pools, fountaining equal at SE and SW wells, big craggy benches along base of wall SE, a crag near NW wall, and big streams from SW fountains and SE fountains, respectively NW and NE, meeting in a circle that follows the wall-valley NW and NE, the meeting place being N. SW pool is very slightly higher than SE pool. Cracking and foundering general. N flats stand slightly above the pools. The crags and cracked ground that before lay N and NW of N pool are entirely submerged by the general burial of W side of floor that results from the recent rise. The new NW crag near wall of pit is entirely different, corresponding to the border flats of the previous floor.

It looks as though steady filling from both wells equally were being resumed. Hot cracking and foundering SW, and across SW and N pools around the peninsula crag and eastward (with flowing) to the SE lake.

Floor of Halemaumau:-



10 a.m.

The general situation is the same as to the two lakes, the half-circle flows around floor to NE, the fountains SW and SE. The crags are as before but somewhat more extended. A small spouting cone W of N pool has appeared.

The new feature is the relative heights of black ledges. SW black ledge is losing height and NE black ledge is now highest. Whereas yesterday SW ledge was highest, it is now apparent that the two lake cups are building up, SW probably most and their overflows near them are drowning base of black ledge. SW ledge now 8 feet high.

On the other hand the wall-crack pool NE is ever filling and yet its surface is lower, i. e., its bottom is lowering faster than it fills. The isostatic adjustment appears to be in full swing, the source wells rising and the weighted pooling region sinking. NE ledge 20 feet high.

Another change is the stream NE from SE lake, now a steep bubbling cascade instead of a broad river. The stream from SW lake is much as before, its ultimate destination the NE wall-pool, where it produces cracking and foundering. This process is frequent everywhere.

There has been some general overflowing tending to drown the W and SE shelves. There is no marked difference of elevation of SE and SW lakes.

T A J

10 a.m. Four fountaining areas respectively SE and NW sides of SE lake, at SW well, and at NW shelf. A little blue smoke from crags and shorelines. A new crag heap, oval and slabby, between SE and SW lakes. Four crag heaps SW and two at center group between N and SW pools. Large center crag is much bigger and shows northwesterly tilt.

Spurting cone between W river and N pool. West river a broad festooned stream around to NE wall pool. Stream from SE lake to this pool is crusted over. Much cracking and foundering in NE pool.

Lakes bright last night and the floor shows that overflowing has covered the shelves and the sides of the crags. Shelves are no more in relief than central floor. This has built up the SW region but the crags are more in relief than ever. Lake shorelines are low slabby ramparts.

Migratory fountain outbursts along NW shore of SE lake. Short overflows of lake shores. The two lakes same height. Black ledge seems least high along southwestern taluses and highest NE. High bank developing N of N pool. Veneers of black ledge in patches have fallen in many places.

Much the biggest live feature is the great western river flowing from the SW lake in an arc greater than a semicircle around to the flat crusted NE wall-pool and never filling it. Apparently SW cup and crags are lifting most and extravasating most liquid. Central floor is lifting. SE lake is holding its own but is slightly lower than SW region and the NE pool has gained on it.

The eternal flood to the NE, however, keeps 20 feet below the highest marks of the black ledge NE, as though there were steady compensation between SW vent and NE destination, whereby the former lifted and the latter sank. The river even under N wall of pit moves steadily and majestically eastward sweeping along huge skins, and filling up or backing up not at all.

It looks as though SE lake might be getting to be a sinkhole pool. The fountaining there is multiple bubble fountaining over the well with insucking action and border fountaining at W and N banks of lake. The fountaining over SW well is steadier, three or four domes in a puddle which is stagnant as to streaming. The difference is marked. If SE lake is a sinkhole, then a stationary convection is accomplished.

The NW shelf fountaining is sporadic: there were four fountains there at 10 a.m. and none at all at 11:30.

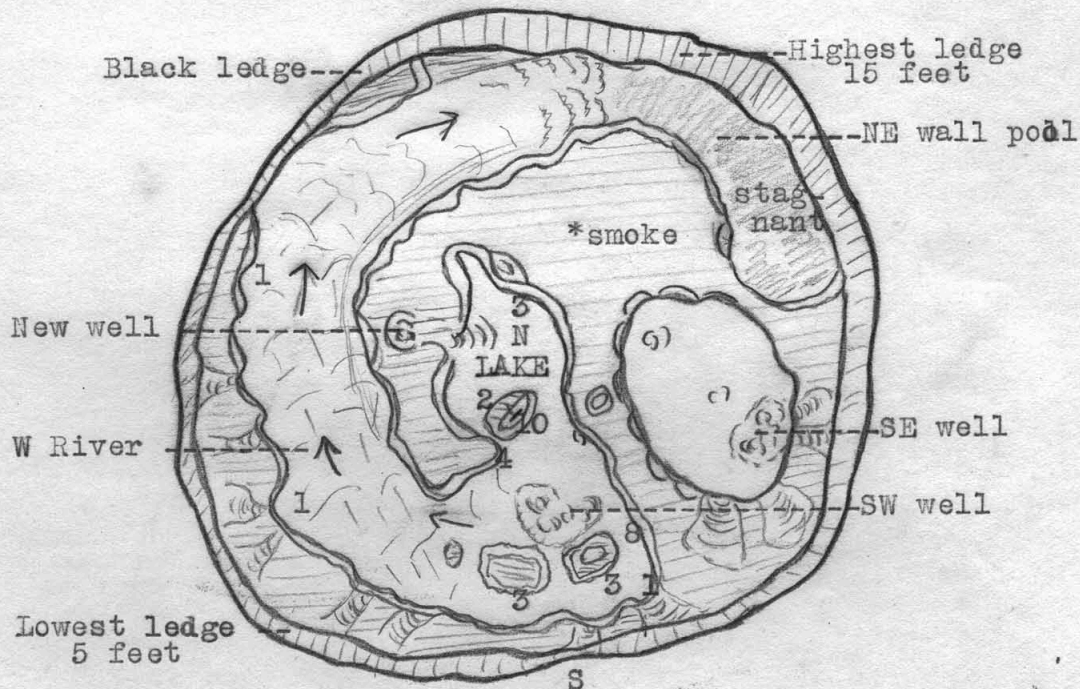
The noises are puffings and splashings of fountains and steady crunching of skins on the great river. This great river recalls the 1919 flow in Kilauea Crater, but the motion and incandescence of this present river are more continuous.

9:15 a.m. Seven fountaining patches in action. Banks of N and SW pools and of W and N river have all become higher relative to liquid, whereas SE pool remains up to rampart and overflows a little E and S. Fountaining at SE well three dome fountains just like SW well. Highest points of floor probably the two larger crag islands.

The new spouting vent W of N pool has become a small well fountaining with a stream from it to N pool.

Height of banks around the western lake and river system -- really all one lake now, with four islands -- is higher at pit center and lowers out to south and west edges of the liquid. The central crag island and N lake shores are 2 to 10 feet high, whereas the three S crags have platforms 3 feet high; the edge of pool and river S and W is 1 foot high. This is a definite edge of differential movement between liquid and bank, whereas at SE lake the border is a slab rampart and the cup proper is practically brimming.

Sketch Halemaumau floor:- N



Cracking and foundering, with bubble fountaining, in many places. Steady crunching noise of the W river. Puffing from the well fountains. Large smoke patch N floor. This goes hand in hand with the movement of bench magma uplift. Relative height of black ledge to floor appears same as yesterday, but central bench magma is probably relatively higher.

Fresh festooned dribble flows around pool margins E of SE lake, S and W of western lake system prove centrifugal slope.

Small fountaining groups develop here and there,

sometimes on banks, but do not build spatter grottoes. Throughout this period this contrasts with 1917.

There is rising and sinking in W lake. The lava is ordinary pahoehoe of dull lustre and the river is covered with skins pulling apart along bright lines, forming polyhedra; this changes gradually at the NE to stagnant crust. Lakes are crusted, now and then cracking up.

Floors are flat, with slabby pressure ridges and frozen festoons. Recalls December, 1918, without the grottoes.

T A J

5:15 p.m. From SE station:

Floor of Halemaunau one smooth flood, the only break being the even top of the higher SW crag. It was just emerging, for visitors who had arrived a little earlier said that it was not in evidence before. All the older black ledge was submerged except a few disjointed sections on wall NE. No sign of lake or stream margins.

Fountains were doming at SE and SW source wells and splashing in various places in pit -- sometimes more than twenty at once. At times the SE well locality would completely crust over; then great domes of red lava would break through in several places.

Large blocks of crust could be seen moving around wall W, NW and N, being carried by a broad stream that ended in surf-like splash against pit wall NE.

The subsidence that revealed the top of SW crag above mentioned continued slowly until a larger flat island just beyond and two smaller ones in center appeared. Glowing floor margin all around pit wall, in most places showing through cracked-up pieces of sloping crust.

Before leaving, at 7:15 p.m., the surf action against NE wall stopped and the only streaming seen was that of two opposing currents which met in location of central lake, forming a line of fountains about 30 or 40 feet long.

Almost no fume seen.

I P J

10 p.m.

Subsidence since this afternoon's rise so that W lakes have 2-foot banks, crags are 8 or 10 feet high and SW well has inward streaming and a single fountain. SE lake streaming across the flat to cascade into SW lake. Cascade 2 feet high and 8 feet long, with curves, carrying over and breaking crusts. In the SW lake there is streaming in a live patch to the cascade. Twenty-two fountains counted. Border fountains in SE lake building spatter niches. Some flames. Glow in the black ledge.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Sunday Date May 6, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
10 a m	SW	view point to E	1			f/11	1/25	Stereo
	" "	" " center	2			"	"	Kodak
	" "	" " W river	3			"	"	"
								T A J

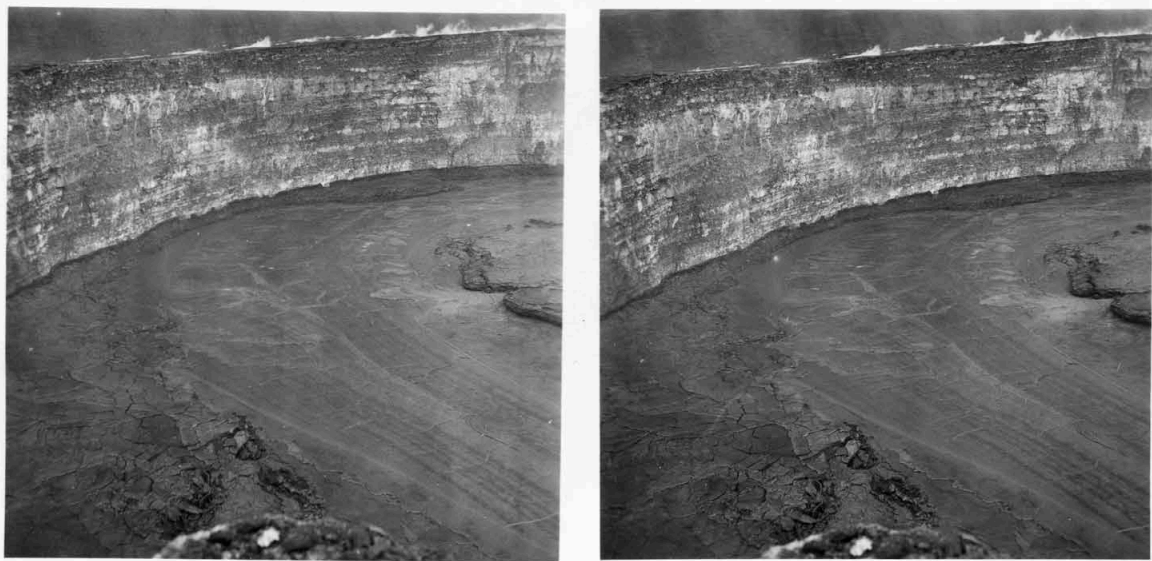


1. East side of Halemaumau floor from S.W.



2. Center of Halemaumau floor from S.W.

May 6, 1923



3. West river from S.W.

JOURNAL

Day	Sunday	Date	May 6, 1923
	Monday		" 7, "
	Tuesday		" 8, "

May 6.
10 a.m.

New black ledge in pit, 15 feet high in places; only 10 feet SE (including slope inside of ledge); some red hot aa caving in from ledge N. Central crag has migrated north 15 or 20 feet. New crevassed ground N of N pool. NW fountaining well is now in a canal that goes through from N pool to W river.

SE pool still cascading into SW pool, two cascades with 4-foot drop, each 10 or 15 feet wide. SE pool brimming and overflowing S. Other pools down with fresh banks 2 to 4 feet high: 2 at S, 4 at center.

Same general landscape as yesterday morning. New small crag island in NE wall pool. W river has bright line at liquid origin and smooth crusted course. Fountains SW and SE as usual, and a second group in SE pool. Some fume from floors.

T A J

5:45 p.m. Conditions the same as described by T.A.J in morning.

I P J

May 7. Afternoon and evening another strong rise reported, drowning the crags and showing many fountains.

T A J

May 8.
9 p.m.

Lakes dull, banks 3 to 4 feet high in places. Crusts crack in SE lake and send out hissing flames. Flaming spots seen on black ledge W and at NW canal vent. SE and SW fountains in action. W river as usual. S crag high. Black ledge 10 feet high W and 20 feet high N.

During a cracking of crust near the SE fountain group, fountains show yellow flames and puffs of smoke for a few minutes. No apparent possibility of wood fragments. Flames of the spume variety.

T A J

9:20 a.m. About fourteen fountains, mostly in the two groups SW and SE. Much cracking and foundering. Usual broad river W and N and NE. Stream S between two S islands. Flats W of N pool 4 feet high. E and SE overflowing. SE pool brimming at S end and bank progressively higher to the N, mostly 2 to 3 feet high. N banks of N pool and SE pool 6 feet high.

S crag about 20 feet high. Black ledge is a sloping bank SE, a steeper bank SW, 6-foot ledge N and NE. Central crag only a small slabby patch 1 foot above liquid. Another small patch N of it. No crag in NE wall-pool.

Canal NW is wider and its vent hissing. Blue smoke from N pool region.

Rising now in progress.

8:30 to 10:30 p.m.:

Bright glare over pit and clouds of bluish fume going up in spots observed about 7 p.m. from H.V.O.

Now find this due to a big rise with welling up at SW source. At first about seventeen fountaining patches and twenty-two or twenty-three individual fountains not counting many bubblings over SW well. W stream moving from SW well southward, westward, northward and eastward; the river ending in bombardment fountains along E wall of pit. This like the border bombardment of July, 1912.

SW well bubble fountaining increases to swarms of larger fountains in spasms, each such access of fountaining being preceded by a depression of the liquid surface creating a concentric wave action. Then the swarm of fountains would expend itself and be reduced to bubble fountaining. Distance across swarm 100 to 150 feet. Type of fountaining like December, 1910, December, 1911, and July, 1912.

At this time there was a slight glowing black ledge as though from temporary subsidence and some such subsidence was seen. SE well was very quiet with only occasional small fountains and ESE lake was covered with skin and rather stagnant. The E wall bombardment did not visibly extend to SE well.

Then began intense upwelling at SW source with zigzag radial bright lines and centrifugal streaming of the surface in a marvellous pattern with waxing and waning bubble fountaining swarms at the center. Gradually the border ledge everywhere became submerged; and also the top of the S crag. W talus was entirely submerged, all ledge remnants disappeared and trickles were seen encroaching on SW talus between W buttress and SW pinnacles. Readjustments of debris and puffs of blue smoke were seen at SW chasm. The scorching hot cracks back of SW rim of pit were heard creaking and snapping, making tinkling noises of the surface slabs, and there were many deep rumbles and small earth tremors. These were not noticed elsewhere on rim of pit.

Southwestern upwelling settled down to brilliant gold epaulette pattern without much bubbling and violent explosive fountains started breaking out E, NE, NW and SW

tending to form lines of conflicting inrush of skins and travel-fountains radial to the center. Each explosive group of "perpetual" fountains would send up clouds of dark fume, make noisy rumblings and thuddings and blowings, shoot spray 40 or 50 feet into the air and sucked toward the fountaining center so developed, all the skins and bright-lines from the surrounding region. The W river went nearly out of action and this turbulent central fountaining replaced the eastern wall bombardment which entirely stopped. Two places that seemed to be notable centers of explosive fountaining were the SE lake and NW side of pit. NW side formed most striking linear fountaining radial to the center of upwelling. This explosive fountaining sent up notable clouds of fume with greenish and reddish tinge and probably flame, with jets of brown smoke occasionally; and the hot convection made over the whole pit a veil of fume 1000 or more feet high, capped with a small cumulus cloud hung with vertical streamers downward of condensing moisture. Maximum luminosity was from the explosive fountaining.

Seismographs show some small earthquakes but notably weak harmonic tremor considering the violence of this fountaining. SW tilt now strong.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date May 9, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9:20								
a.m.	S	NE		0				
	SW chasm	S		0				
	S	SE fountain (well)	L 8 28	-28 19	+01	386	-208	
	Chasm	same	L 13 27	- 7 54	+01	1479	-207	
	S	SW fountain (well)	L 99 53	-21 28	+01	528	-208	
	Chasm	same	L 17 13	-14 17	+02	821	-211	
	S	Top S crag	L 109 53	-22 04	+01	435	-177	
	Chasm	same	L 8 52	-12 52	+01	849	-196	
	S	Black ledge NNE	L 40 09	- 8 50	+01	1355	-212	
	Chasm	same	L 49 05	- 6 28	+01	1794	-208	
	S	Black ledge SE	R 5 03	-20 39	+01	561	-211	
	Chasm	same	L 14 32	- 6 53	+01	1681	-206	
	S	Black ledge SW	L 118 45	-10 30	+01	1106	-206	
	Chasm	same	L 45 18					
	S	Top central crag						
		remnant	L 80 28	-16 31	+01	696	-207	
	Chasm	same	L 33 19	-12 29	+02	928	-206	

Below NE station (3716') :-
 SE lake 206 feet
 SW " 208
 S crag 185
 Mean black ledge 206

Wall-valley lower than lakes.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

Day Thursday Date May 10, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
10:15								
a.m.	S	NE						
	SW chasm	S						
	S	Black ledge NNE	L 33 25	- 7 53	+03	1307	-183	
	S	" " SW ch'm	L 121 37	- 9 11	0	1076	-174	
	S	SE fountain	L 6 07					
	S	SW " (old source)	L 97 48	-20 46	+02	601	-229	
	S	New standing fountain SW	L 125 06	-16 01	0	743	-214	
	S	Top S crag	L 110 59	-23 17	+01	439	-189	
10:50	SW							
a.m.	chasm	Black ledge NNE	L 44 27	- 5 22	0	1786	-171	
	"	Blk Ledge SW chasm	L 27 46					
	"	SE fountain	L 12 35	- 7 55	+02	1485	-209	
	"	SW foun.(old source)	L 21 46	-13 53	+02	789	-192	
	"	Top S crag	L 8 05	-13 15	+01	844	-189	
11:12	NNW							
a.m.	NNW	New standing fountain SW	R 28 48	- 8 24	+01	1417	-211	
		Below NE station (3716'):-						
		SE lake	211 feet					
		SW "	210					
		S crag	194					
		Mean black ledge	173					

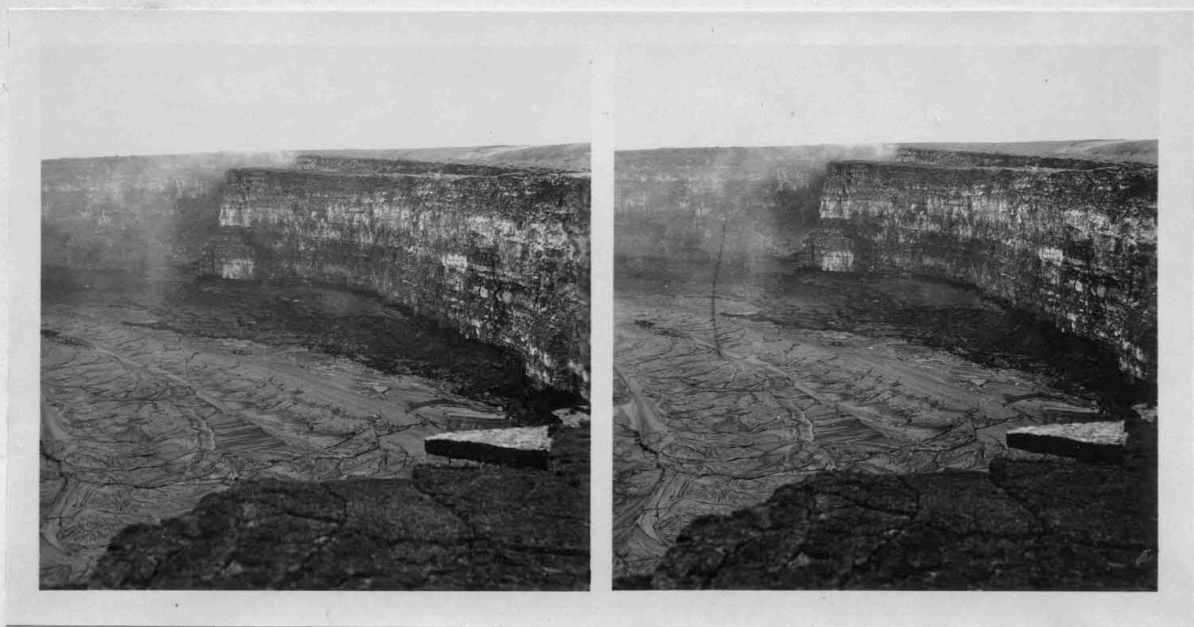
T A J

PHOTOGRAPH RECORD

t	sta	subject	no	pl	scr	stop	ex	cam
11:20 a.m.	NNW	SW wall	1			f/16	1/25	Stereo Kodak
	"	Center	2			"	"	"
	"	E wall	3			"	"	"
		(Panorama)						

T A J

1923, May 10

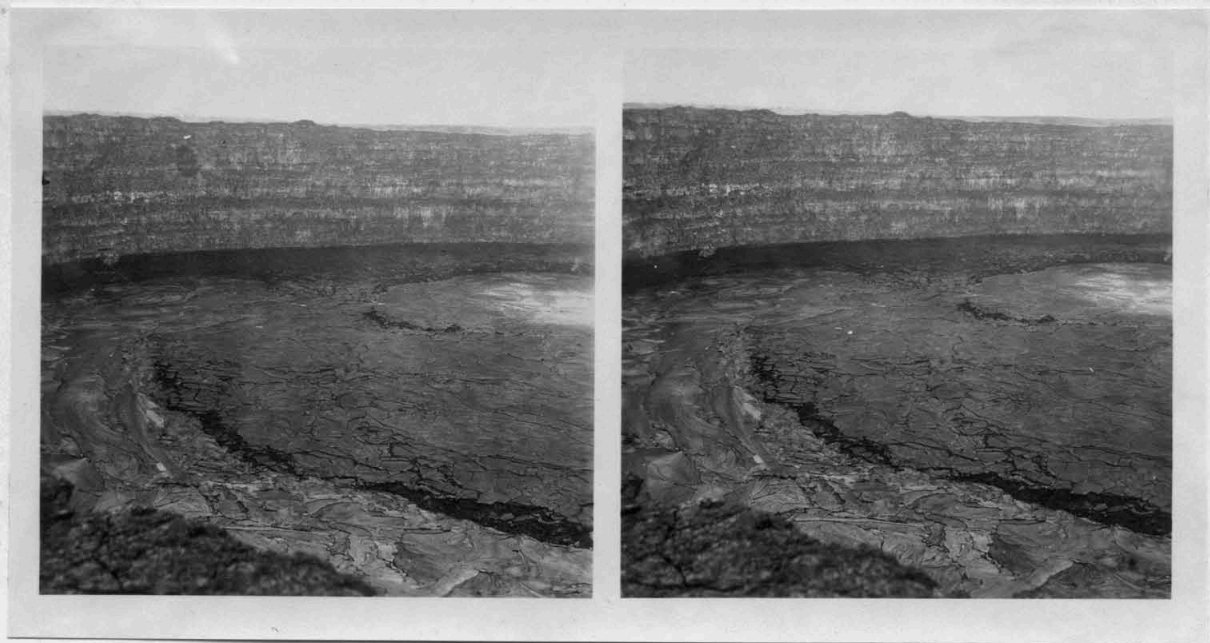


1. Southwest wall of pit from N.N.W. station.

May 10, 1923



2. Center of Halemaumau floor from N.N.W. (Panorama with #3)



3. East side of Halemaumau from N.N.W. (Panorama with #2)

Day Thursday Date May 10, 1923
Friday " 11, "May 10
10 a.m.

Liquid lava down, lakes and banks restored. W river as before except for its source. New standing fountain near SW wall is source of river. Stream from this fountain toward former SW well. Latter marked by only trivial bubble fountains and slight outward streaming to its lake. Maximum fountaining is in NE wall-pool where the river flows vigorously.

W bench and SW-chasm bench left by the high level have black ledge about 40 feet above river; elsewhere black ledge about 30 feet high. This bench and a similar one between SE lake and wall show downfaulted aa steps veneered over with pahoehoe. Aa glowing in places. Similar bank of red hot aa under thin shell of pahoehoe at edge of N central flats.

S crag about 15 feet high. Five other slabby crags around central lake and in W river. No trace of central crag. This leaves SW and N central pools all one central lake.

Forty-three fountains counted; mostly small and continuous spurting type. Steady fountain in NW canal. Surface of river is patterned with wide skins and broad festoons. Much moiré effect. Glow pattern near SW gusher similar to last night. In SW corner under black ledge is a small lava spring spitting, higher than lake level, with crusted stream from it to SW gusher.

Black ledge falling in places. Spatter marks along NE wall over black ledge.

Noises of crunching, puffing and splashing. A little blue fume from aa banks and SW chasm.

Pit at night dull; fume from SW chasm chiefly.

T A J

May 11

9:30 a.m. to 1:30 p.m. Same general features and no apparent difference in height of black ledge. About ten fountains. Both the SW wells fountaining mildly; the new one is not so steady as yesterday. Spatter niches forming around N and W edges of SE lake. This appears to indicate a stationary lake. No fluctuation of height observed during the morning. Main supply of W river from the new SW well which sends out broad streams in strong motion to the central lake as well as along the river. This river is active with open surfaces and loose festoons all the way to NE wall-pool.

Some fume, notably at SW chasm.

New fall of rock at W buttress. Crag island in W river and none W of the S crag; looks as though this one had drifted northward like a shifting mud flat. Crag has reappeared in central lake.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday

Date May 11, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
9:30 a.m. to 1 p.m.								
		N rim (E of N niche) to W river	1	W P	K 2	f/16	1	6½x8½
		Same to Center	2	"	"	"	1	"
		SW view point to SE lake	3	"	"	"	1	"
		S rim to SW pinnacles	4	"	"	"	1	"

T A J

May 11, 1923

2. Center of Halemaunau, from N. rim.



1923, May 11



3. Southeast lake, from S.W. rim.

May 11, 1923



4. Southwest pinnacles from S. rim of pit. Mauna Loa in background.

9:15 a.m. General conditions the same and level same. SW lake has 4-foot banks and SE lake no banks. Fifteen fountains counted.

There are three islands now in W river as though the fresh current from new SW well had carried blocks and sediment out as clots of accumulation. Yesterday's island here is bigger and tipped northward, just W of point separating central lake from W river. The other two islands lie N of this. Central island is larger.

Fountain vent in NW canal as before. The open spatter niches of SE lake are now small curtained grottoes. Cracking and foundering in NE wall-pool and S of S crag. New rock fall SE.

7 to 10 p.m. evident

It became from the brightness of pit that a change had occurred. (Alec reports that at 3 p.m. the SE lake was overflowing and making cascades. This probably began about noon.) Now there is a brilliant light and fume over SE half of pit and a roar was heard on approaching rim.

SE lake overflowing its heap in five principal cascades, two to NE wall-pool and three to central lake. Difference of level of SE lake and the other pools is 20 to 25 feet. Biggest cascade pouring W to S end of central lake, making a rotary current around S crag. SW well fountains almost imperceptible.

NW canal fountain spitting. New SW source not in evidence. W river moving quietly along W and N walls to N and E. Black ledge 30 to 40 feet high except opposite SE lake where it is 6 to 10 feet high.

The great feature is the SE lake and its big cascades and its upwelling source. Scintillating bubble fountains over source -- about 50 at once. Radiating streaming from source with breaking skins. Pool is on a high plateau relative to NE wall-pool and central lake.

The big cascade W is 100 feet wide with crags protruding through it. One of these crags seen to split, break off, showing incandescent interior, and roll into lake below.

The S crag appears 20 feet high and the banks of central lake 10 or more feet high.

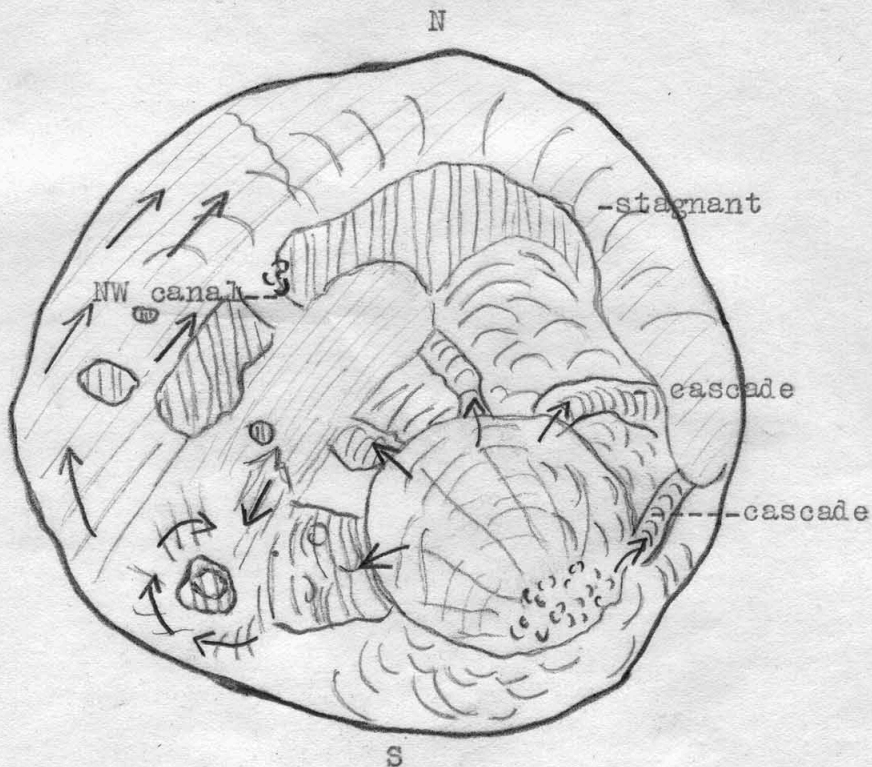
The other cascades are rivers with curving golden courses above and steep chutes below. Around the SE pool is a banked flood not cascading which during three hours migrated out over N floor and was continuously piled up and crusted against SE wall of pit. Much small flaming in spots where skins burst.

During three hours there was no certain appearance of filling up shown by rising of W and N fills against the black ledge. There was only the spread of the SE lake pudding or puddle.

This display rivalled in beauty that of March, 1921.

(Sketch next page)

Sketch Halemaumau floor:-



T A J

PHOTOGRAPH RECORD

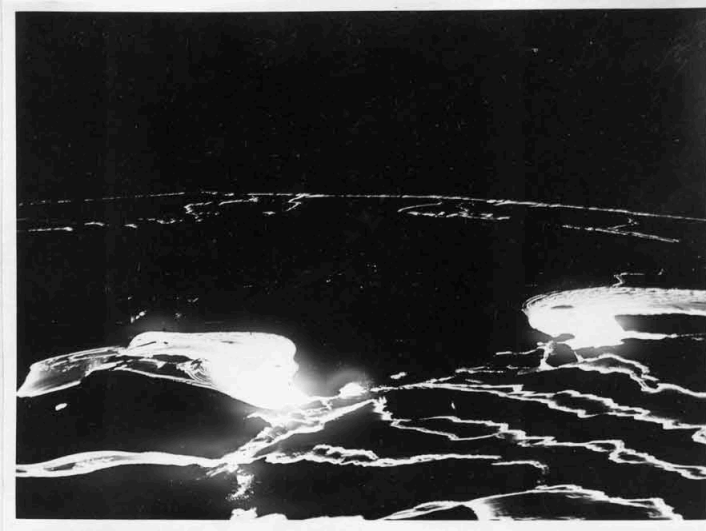
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Hawaiian Volcano Observatory

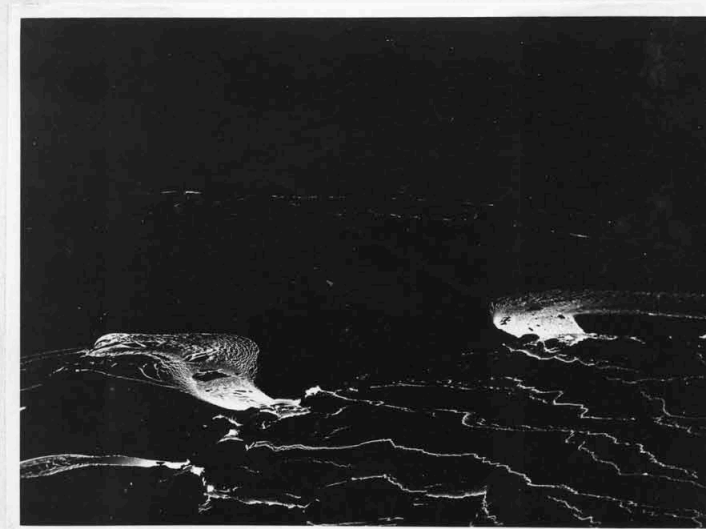
Day **Saturday** Date **May 12, 1923**

t	sta	subject	no	pl	scr	stop	ex	cam
7-10 p.m.	S	Central cascade	1	Ilf panc		f/6.3	2	P
	S	" "	2	"		"	1/25	"
	S	N cascade	3	"		"	"	"
	S	W "	4	"		"	"	"
		SW viewpoint to SE pool	5	"		"	1	"
	"	" " " "	6	"		"	10	"

T A J



1. Central cascade, from S. station. (2 sec.)



2. Central cascade, from S. station. (1/25 sec.)

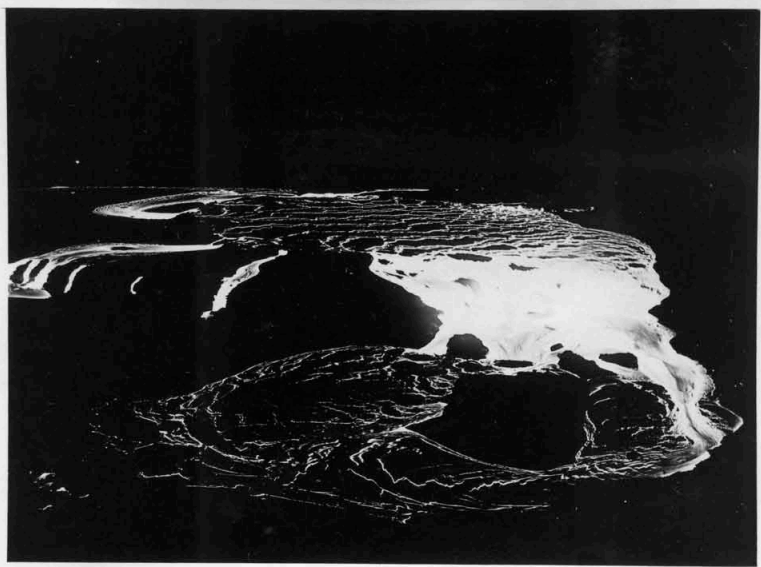


3. North cascade, from S. station.

May 12, 1923



4. West cascade, from S. station.



5. Southeast pool, from S.W. (1 sec.)



6. Southeast pool, from S.W. (10 sec.)

Day	Date
Sunday	May 13, 1923
Monday	" 14, "
Tuesday	" 15, "

May 13

9:30 a.m. Lake fills whole pit, with fresh lava higher than former black ledge. Radiating flood with bubble fountaining at SE well. The two main surface streamings are to W and N. No crags or banks to be seen. No visible fume, much SO₂ perceptible. No outlying fountains. Steady roar of crusts.

6 to 8 p.m. Fifteen fountaining patches. Upwelling at SE with small bubbling. SW well fountains hardly recognizable. Streaming around a line of still crusts extending NW; streaming N and W from source. Big fountains in NW line at first. Many fountains along N wall of pit. No sign of new SW well. Black ledge 5 feet high at first. Later all fountaining except source stopped, liquid rose slightly and bright toes showed around edge. Bright-line pattern on surface. Still crust at S crag locality. Black ledge practically disappeared. The flat beaches of bench magma SE, NW and SW remained.

Largest lake since 1894. About 200 feet down. No sign this time of rapid fall making new black ledge. Streaming pattern recalls the cascades to N and W of yesterday night.

T A J

May 14

9:20 a.m. Lake remains high, 3 feet below highest black ledge. This ledge same height as on May 10. Source has changed to SW pool and new SW wall vent. Streaming is N from latter and in a sector NE from former. SE source almost unmarked; some little bubbles there.

Flat live pool as before. Flats SE, NW and SW 2 feet above lake; S crag 1 foot above lake.

Mild fountaining at SW pool, two or three stronger fountains at new SW vent. Very hot. Thin blue fume.

T A J

May 15

In the forenoon there were three islands and the southwest was the source, with but little change from yesterday.

In the evening there was some subsidence and the pit was very bright with more than 40 fountains.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Sunday

Date May 13, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
9:30 a.m.	S	SW pinnacles	1	W P		f/16	1	6½x8½
	SW	SE lake	2	"		"	"	"
								T A J

1923, May 13



1. Looking toward S.W. pinnacles, from S. rim of pit.

May 13, 1923

2. Southeast lake, from S.W. rim of pit.



SURVEY RECORD

Day Monday

Date May 14, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9:20 a.m.	S	NE		0				
	SW chasm	S		0				
	S	NNE black ledge	L 32	23- 7 55	+06	1313	-186	
	Chasm	same	L 43	56- 5 21	+04	1889	-183	
	S	Lake by S crag	L 108	02-22 06	+08	447	-183	
	Chasm	same	L 9	50-12 21	0	848	-187	
	S	Black ledge SW chasm	L 121	38- 9 05	+07	1076	-177	
	Chasm	same	L 28	00				

T A J

Below NE (3716'):-

SW lake 184 feet

Mean black ledge 178

Day Wednesday Date May 16, 1923

Thursday " 17, "

Friday " 18, "

May 16
2 p.m.

Pale blue transparent fume and great heat from pit. From one to six large fountains in W region and many bubblings SE. SE well the source of strong rising; liquid flush with last black ledge and a half-foot or more above it locally. Streaming outward in wide sector from SE, and very rapid. Traces of shelf at lake level SE, SW and NW. Some rush to the wall with fountaining S.

S crag summit an island of piled skin and some stagnant piled crusts in N central region.

The biggest streaming is to SW, W and N from SE source. There are four festooned streams to the NE wall from the curve of a wrinkled skin that bounds the SE fountaining area, as though across a shelf nearly at lake level.

The western fountaining patches are tumultuous and changing. These tumultuous fountains are often migratory to the wall. The bubble fountaining of the source wells in these risings is of the "swan" quality, like the migratory fountains of February, 1921.

During all this time of heat and gas the high cumulus over the pit only appeared in evening, and not invariably then.

T A J

May 17
9 p.m.

The pit appeared much the same as on the 16th except that there was less fountaining. During one 15-minute interval no fountains were playing. At times there were four fountains. The streaming was radial from the SE.

R H F

May 18
9:15 a.m.

The pool higher and certain landmarks of black ledge were submerged. The liquid was against the walls of pit except for shelves at lake level SW, NW, NE and SE. A patch of bubble fountains in SE but streaming was to-ward the fountains, not away from them. No definite center of dispersion. SW vents not marked by fountains. Toward the W there were three or four large fountaining patches, sometimes migratory and linear. Streaming was irregular. Some fountains against bank N and S.

Steady grating of crusts where slab ramparts were being piled up on all sides. The slab heaps piled on the black ledge were like those of the W niche rampart of 1894. There are three islands, with slabs of crust, to be seen. The largest is the S crag island with spatter heap on its W side. One was near the SW source locality and the other about N floor locality; both small.

When fountains bombarded the bank, smoke rose.

Pit was bright and clear last night.

T A J



1. From S.E. rim looking toward S. station.



2. From S.E. rim looking toward S.W. pinnacles.

May 16, 1923



3. Southeast source fountains, from N.E. rim of pit.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday Date May 18, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9:15 a.m.	NE	S		0				
	NNW	S		0				
	NE	SW edge pool (whole pit full)	R 25 26	5 45	+04	1639	-170	
	NNW	same	R 35 04					
	NE	SSE edge of pool	L 0 30	11 19	+05	782	-159	
	NNW	same	L 3 17					
	NE	Top S island	R 22 06	7 30	+07	1165	-156	
	NNW	same	R 17 36					
	NE	Top N island	R 77 30	12 56	+08	680	-158	
	NNW	same	L 23 48					

Below NE (3716'):-
 Lake level 164 feet
 S island 156

T A J

Day Saturday Date May 19, 1923
 Sunday " 20, "

May 19
 4 p.m.

Recently the border bombardment of fountains has made high spatter zones above the black ledge in places. Now a marked example of this is noted on W side of pit opposite the SE source well. Latter is functioning as a center of rising and dispersion. Liquid lava is higher and reaches walls. Border shelves and islands submerged. Only trace of S island is a stagnant skin.

Bubbling source area notably extended; much blistering and ballooning of skins. Surface skin divided into large polyhedra by glowing lines.

There are three or four big fountaining patches W with shifting bombardment of wall and travelling fountains. Abundant fume over fountains. Pit is very bright at night.

NE tilt and increasing harmonic tremor shown on seismograms.

T A J

May 20
 11 a.m.

The lava has risen and has reached the pit wall in SW chasm back of the pinnacles.

On arriving at rim of pit there were 10 to 14 fountaining patches, besides the bubbling at SE source. Then pool sank to 3 feet below ledge and S island emerged one foot above surface of pool. It had a fountain playing against its W side. Intense bombardment W where the veneer of black spatter was noted. Some of the fountains are migratory and some of the blowing type that do not move their position. The SW source wells have letterly not been marked by any sign, such as bubbling.

Fall of fragment from black ledge NE. Intense heat from pit.

In the course of 30 minutes the number of fountaining patches decreased and the lava simultaneously rose. Finally the only large fountain was that bombarding the W wall. The small fountains at SE source did not change noticeably, but the outspreading pattern there made by glowing lines was increased in area. Fountain at S island stopped. Lava rose one foot and continued to rise. Blue fume over fountains.

The fume notably increased at 4 p.m., probably another subsidence spell.

10 p.m. Sudden increase in number and size of border fountains; twenty-nine, including those in center, counted. Pit very bright.

T A J

JOURNAL

Day	Monday	Date	May 21, 1923
	Tuesday		" 22, "
	Wednesday		" 23, "

May 21
10 a.m.

Lava down 10 feet with reference to black ledge. Increased spatter marks on wall, notably along N walls; 30 feet above black ledge. Ledge fallen away in places.

Upwelling still at SE source. S island 8 feet high. Line of five fountains SW, radial to center, trending in their migration towards SW chasm. In the SE there are bubbling fountains with the golden epaulette pattern of the skins around them and with outward streaming.

Border shelves in places, notably in SW chasm and SE.

Increased and decreased fountaining (five to ten fountains) observed, and changeable currents: increase with sinking, decrease with rising. This means short term rising and falling spells of an hour or less.

Fountains develop against N wall. Rounded spatter ledges along upper course of black ledge, in layers at two or three levels. Bluish milky fume over border fountains and thinner fume over central fountains. Very acid fume to leeward of pit.

T A J

May 22
4 p.m.

A settled type of activity. Pool a little lower, 12 or 15 feet below black ledge. Upwelling at SE vent, small bubbling and radiation of skins from skin polyhedra. Five or six fountains in radial line opposite SW chasm. Two places of fountain bombardment, NW and N wall base. Occasional but rare central fountains migrating to NW wall.

Slight fluctuation, but very slight, during an hour. Occasional fountain against the island which is 10 feet or more high. Blistered skins and moiré pattern. No ballooning of skins; some wrinkled patches. No islands other than S island. Pit less bright at night. Thin blue fumes.

T A J

May 23
6-8 p.m.

Lake a little higher, 6 feet below ledge. Line of fountains SW has ceased action. Three big bombardment patches NW and N wall, with grottoes, stalactites and flame banners. Spray 50 feet high.

Source SE as before. Occasional small dome fountains at SW well. Island 3 or 4 feet high.

Some rising in lava took place with decrease in fountaining. Flames at tearing skins. Fume very acrid; whirls at S station and clouds of it at W wall from NW fountains; brick color against evening sky. Pit clear for seeing; moderate glow at distance.

T A J

Day Thursday Date May 24, 1923
Friday " 25, "May 24
9 a.m.

Liquid lava slightly lower, 10 feet below ledge. S island 3 feet high and flat with slabby upper surface. Bench fallen in places. Five fountaining patches; three against wall; one a line of travelling fountains moving to wall W. Inrush of lava to wall fountains where grottoes are forming.

Fume pale yellow to salmon against morning sky, bluish in reflected light. Very hot fume from fountains, consenses above. Fume from SE bench.

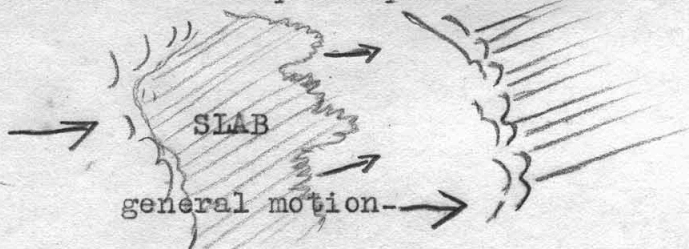
May 25

9:15 a.m. Notable change at SE source. No more dispersion of streaming from nodal skin over well. Streaming is straight out from E bank, with about thirty bubblings over the well in the track of the streaming; then the current courses W across S half of pit making wrinkled skins. Line of four or five big tumultuous fountaining patches leads to SW chasm. S island is bigger than before, is 5 feet high and is S of the current. Large central fountain and a small border fountain develop W.

Black ledge 15 to 18 feet high. N half of pit covered with large polyhedra of crust cracking rectangularly and pulling apart, making moiré pattern. Crusts migrate against N and W banks but pull out from S and E banks of lake. Heat on edge less than before. Bright margin of subsidence all around one foot wide. Big overhanging spatter ledges W, N and NE. Small bubble fountains in places.

Black ledge SE has cracked parallel to wall and stands out from wall; a steamy vapor rises from crack different from the sulphurous fume of the fountains.

There appears to be a very slow subsidence in progress. There are no longer any marked border shelves of the black ledge, though in places the thick spatter banks stand out 10 to 15 feet from the wall. Marginal grotto fountaining began NE, N and W about 9:40 a.m.. Much sulphur gas. Noted a change in the crust block action to bright-line streaming by slow engulfment of the wide blocks. Query? Is not bright-line streaming always a current slowly making and engulfing slabs? These surfaces show bright line on downstream side and overlap on upstream:



At 10 a.m. there were fifteen fountaining patches and some recurrence of the nodal dispersion of skins SE.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory -

Day	Saturday	Date	May 26,	1923
	Sunday		" 27,	"
	Monday		" 28,	"
	Wednesday		" 30,	"
	Thursday		" 31,	"

May 26

8:45 a.m. Pit bright with fountains last night, making greenish yellow light. No important change noticed now. Six fountaining patches SW and two against W wall. Some dome fountains at SW well. Large bubble fountains SE. Lava still about 15 feet below highest level of black ledge. Wrinkled skins N of center. S island has broken down on its W side; fountaining grotto there now; longer axis N-S while yesterday longer axis was E-W. Broken rock on new lava in SW chasm marked a small avalanche from W fault bench.

T A J

May 27

9 a.m. Pit bright last night but there has been no intervening high level over black ledge since yesterday. At the moment only two fountaining patches. Lava only 8 feet below top of black ledge. Island a flat 1 foot high. Streaming to NE from SE bubbling source. Evidently the streaming changes greatly.

T A J

May 28

9 a.m. Pit very bright last night. Nine fountains in action. A line of fountains from SW well westward. Island a little higher, 3 feet above lake. Black ledge 10 feet high. Hot blue fume. Streaming N from SE bubbling source. The pattern of radial streaming from nodes of skin over SE well is now replaced by a border crust and streaming straight away from this crust, with much bubbling.

T A J

May 30

11 a.m. Rapid streaming outward from S wall. Five border fountaining patches along W and NW walls. Four fountains in a line in SW part of pit. S island appears about 4 or 5 feet above liquid. Very small bubbling fountains all over floor except large fountains of the bubble type at SE source. Lake 4 or 5 feet below overflow platform in SW chasm.

R H F

May 31

5:30 p.m. Lava a little lower than on 30th. S island and rampart of black ledge 5 or 6 feet above liquid. Three border fountains along W wall. No central fountaining. Streaming to the NE from S wall was conspicuous.

R H F

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday Date June 1, 1923

Saturday " 2, "

June 1
5 p.m.

Lava lower than on May 31. Island stands 10 to 15 feet above liquid. Very slow streaming to N from S wall. One fountain in N part of pool and four to seven in W part. Three border fountains along W wall; one has developed a grotto with a stalactite curtain in front.

R H F

June 2
2 p.m.

No important change. Black ledge 15 feet high and spatter marks 15 or 20 feet higher in places. Island 15 feet above lake and rather lumpy and small. Five or six fountaining patches SW and against W wall. Usual bubbling SE and outward streaming. Current to NE. Some fume SE and at the fountains.

Avalanche debris on SW chasm floor just as it was a week ago.

T A J

- 9 a.m. Pit much the same. Crack and fume in SE bench as a week ago. Streaming from SE wall. Then across the SE center northward. SW source is sending a wide current to
- 9:20 a.m. Black ledge 20 feet high. Island 20 feet high. Bright edge. Outward streaming from the SE bubblings, swarm of fountains against SW wall, a fountaining patch W wall. Total about 8 fountains.
- 9:25 a.m. Only two wall fountains W and SW. Streaming is straight away from all the E walls. Lake rising, bright edge gone. Two fountaining patches.
- 9:35 a.m. W and SW wall fountains, two new fountaining patches NW and SW of island. These become tumultuous and funny. Four fountaining patches.
- 9:40 a.m. Patch NW of island migrated S and all the SW fountains joined in a big display against wall. New fountains SE and NW of island. Bubbling and outward streaming continuous at SE. Total fountains 5.
- 9:43 a.m. The merging of SW fountains against wall again accomplished by hundreds of bubblings on a large scale. Place where central fountaining begins is W of the old SW well. Total fountains 5.
- 9:47 a.m. New group of five or six central fountains in SW part of pit in line trending SW, progressively bigger from NE to SW. These in five minutes settle into large tumultuous patch migrating to SW wall fountains. Two new patches against S wall of pit. Total fountains 9 decreasing to 4.
- 9:53 a.m. New SW central fountaining increasing.
- 10:05 a.m. SW fountaining patch formed a line of fountains with brown fume and flame showing, and making a blowing sound. The line headed W and moved to WSW wall. Now there is a new fountaining patch at SW center 200 feet behind the first and migrating in same direction. Direction entirely different from previous migrating. Two fountains against SE wall. Total fountains 7 to 8.
- This originating of the migratory fountains just W of SW well looks as though that well were feeding gas as well as the SE well.
- 10:12 a.m. Big fountaining patch S of island. Others migrating to SW wall. Total 5.
- During all this the N and NE wall free from any big fountains, crusts creeping against wall and slabbing.
- 10:15 a.m. General multiple fountaining SW wall. One patch W wall. Total 3

At this time the streaming from SE to W was met by a

streaming E from SW well region. There appears to be a radial outwelling from SW well. This forces the SE current northward. SW source is sending a wide current to N on W side of pit.

10:20 a.m. SW wall fountains cease. New fountain W of SW source. Total fountains 2.

10:26 a.m. SW center has developed two big fountaining patches migrating to SW chasm. Fountain against W wall is a constant. Total 3.

10:30 a.m. These two merged and a new one formed at SW center and migrated after them. Total 3 or 4.

Rapid rush of currents from the island region to the big fountaining patch.

10:35 a.m. The big patch expending itself against wall just N of SW chasm. New patch starts at SW center. Total 2.

Black ledge all this time remains about 15 feet high and no marked rising or falling of lava is noticeable.

10:42 a.m. SW patch is four fountains in E-W line, and there is one at W wall. Total 5.

10:45 a.m. Big fountaining patch against S wall. SW patch merged. Total 4.

In all these counts only definite patches are counted, not the continuous bubble fountaining SE nor small bubblings elsewhere.

10:47 a.m. Total fountains 5.

10:50 a.m. S patch migrates W along wall and the SW center fountains migrate to SW wall and merge. Total 3.

10:55 a.m. Total fountains 4.

11:00 a.m. Total fountains 5.

11:02 a.m. Merging of four fountains SW wall with great vehemence. Total 3.

Back current of surface from SW well no longer seen.

11:05 a.m. Total fountains 2.

11:07 a.m. New SW center fountain. Total 3.

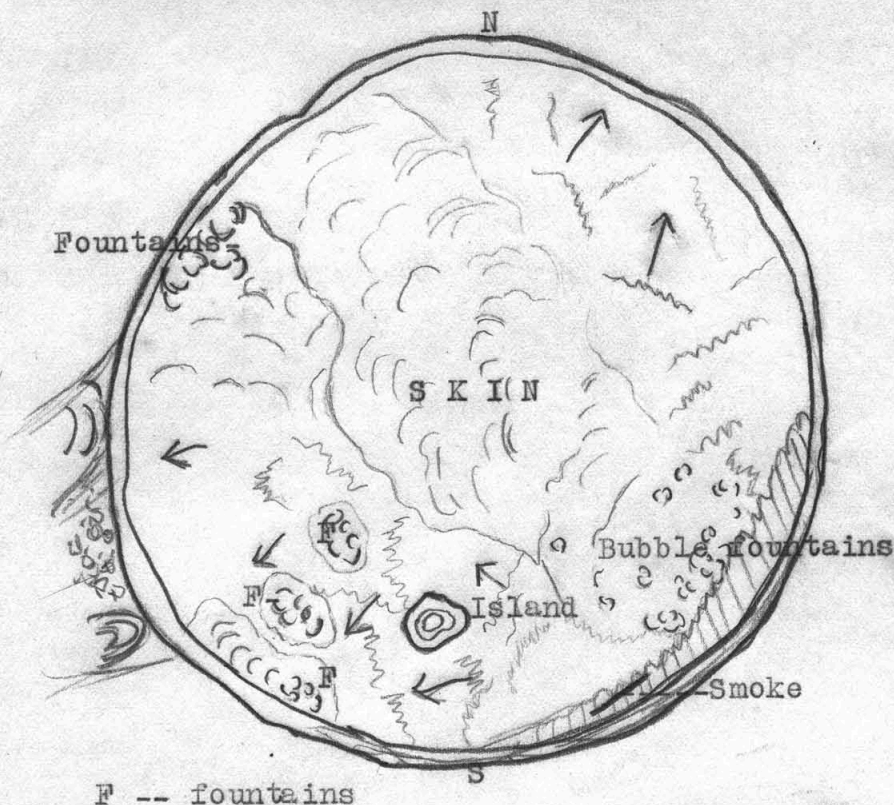
Watch 6 minutes slow by seismograph clock. Fountaining studied for comparison with harmonic tremor.

(Sketch Halemaunau floor next page)

- 3 - Day Sunday
MondayDate June 3, 1923
" 4, "

June 3

11:20 a.m. Sketch Halemaumau floor:-



June 4

9:30 a.m. Lava down, lake showing bright edge. Black ledge 40 feet high. Island has gone down and is only 2 feet high. Big fountain continuous on downstream side (W) of island. Tumultuous swarm of shifting fountains in SW corner. No steady fountain at W wall. A temporary fountain formed there. Two or three fountaining patches. Bubbling SE and outward streaming as before. Alignment of SW fountains from SW well as before.

Island remnant covered with slabs on upstream side and spatter on downstream side. Perhaps the overturn of the island has been due to pressure and erosion from the E, and the fountain on downstream side is due to eddy release of pressure there. Current increased there by the suck towards SW boiling. This SW boiling over the place where the new SW wall vent was: perhaps there is a sinkhole along fissure between that vent and the SW well.

No marked changes during 30 minutes. At 9:50 a.m. a backward current from SW, like yesterday. The island fountain ceased action.

T A J

9:30 a.m. Island about 4 feet high. Streaming across pit more rapid. Black ledge perhaps 5 feet higher. It has caved away extensively in places.

Great variability in fountaining. From 1 to 8 fountains, including border fountains N, W and S sometimes. Travelling fountains sometimes start at SE source. Island fountain not constant. Zone of wrinkled thin skins across center, bright-line polyhedra NE and SW.

Lines of fountains SW to chasm. Travelling fountains migrated from SE source to SW line of fountains; a distance of 1200 feet migration. Immense turbulent fountains in NE central area suddenly break out. Gradual subsidence appears to be in progress; bright margin shows. The NE fountains migrated toward N wall. Island shows overhang with the lowering of the liquid. One central fountain seen to die away sluggishly in the N middle region; another became a wall fountain.

A renewal of upwelling at the source means more lava and less bubbles. Restraint of gas release all over pool. Less gas heating and higher viscosity. This makes increased molecular pressure and less gas escapes from solution. Hence a quiet lake and thickening crusts during rise.

A decreased upwelling at the source means lowered pressure throughout the lake. This produces gas release and gas reactions, bubbles and heat. The crustal layers are expanded and ruptured. This starts centers of fountaining and more gas release followed by spasmodic lowering.

Last night alternations from very bright pit to very dull; the last with fountain light only at SE source. (As seen from a distance)

9 p.m. About nine fountains, mostly around edge of lake. Island small and low. Many blobs of bright flaming spume thrown up by the fountains against wall. The blobs would lodge on the bank and burn with a yellow flame for a minute or two like a piece of waste soaked in oil. Other flames of violet color seen over border fountains. The burning blobs were seen repeatedly.

Fountaining was very variable; sometimes only one fountaining patch, then the only light over pit would be at SE. Black skins at SE source in dispersion pattern of bright lines.

SURVEY RECORD

Day Tuesday Date June 5, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9:30 a.m.	NE	S						
	NNW	S (fume irrespirable at NNW station)						
		(16 ft. from NNW in S station line: 1 foot lower)						
	NE	Black ledge SE	L	3 19-11 02	+02	728	-143	
	NNW	same	L	5 20- 5 21	+03	1503	-144	
	NE	Lake SE	L	3 05-13 32	+02	726	-176	
	NNW	same	L	5 20- 6 33	+03	1500	-175	
	NE	Black ledge SW pima- cle	R	29 40- 4 57	+07	1679	-152	
	NNW	same	R	39 04- 5 40	+02	1497	-151	
	NE	Lake SW	R	30 20- 6 03	+07	1662	-182	
	NNW	same	R	39 04- 6 49	+02	1470	-178	
	NE	Island, lake level	R	24 30- 8 50	+08	1089	-172	
	NNW	same	R	15 31- 7 37	+03	1276	-172	
		Below NE station (3716'): Mean lake level 178 feet " black ledge 148						
		Maximum height of ledge 32 feet Mean " " " 28						

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date June 6, 1923

Thursday " 7, "

Friday " 8, "

June 6
3 p.m.

Island small and 2 feet high. Black ledge 40 feet high. Fountains variable, from 2 to 5. Bright blue fume over pit. Fountains migratory but fewer than before. Small bubblings along bright-line cracks in skin. Wall red with iron oxides where bench has fallen away.

T A J

June 7

11:30 a.m. No change in level. Few fountains; sometimes none, sometimes three or four. Back current from SW to meet current from SE source. A nodal crust to which the currents converge from all sides E of center of pit.

A talus of reddish debris lying at lake edge SE where black ledge has fallen.

Some very turbulent fountaining developed against S wall, with rush of currents and many hot bubblings and five or six large fountains. Island had been a mere crust flush with surface of lake but this fountaining lowered the lake all around it so that it stood 2 feet high.

T A J

June 8

9:30 a.m. Lake lower and black ledge about 45 feet high. Outwelling as before with radial glowing lines in crust from the SE. Four fountains in action, two of them at arched grottoes SW and W. The SW grotto is a splendid semi-circular arch, 25 feet high, of rounded spatter, with a continuous big fountain inside; and there is steady inrush to the fountain as though it represented a cascade below that pours into a sinkhole. Location is identical with site of the SW wall vent of a month or more ago, just E of SW pinnacles.

Three border grottoes, this one and two against W wall, keep up a steady action when all other fountains, except SE source bubbling, die out. Small central fountains play about the SW well locality.

No island. Pit seems to be in subsidence phase with gradual adoption of sinkholes W and upwelling SE, and the bench magma going down as indicated by island.

Black ledge has fallen away notably NW and SE.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Saturday	Date	June 9,	1923
	Sunday		" 10,	"
	Monday		" 11,	"
	Wednesday		" 13,	"
	Thursday		" 14,	"

June 9

8:30 a.m. Light over pit last night indicated that at most only two or three fountains were in action. Now the lake surface is almost free from fountains. There is one against S wall. Large SW grotto has fallen in and same was true last evening. Black ledge slightly higher (50+ feet) and more has fallen away leaving red walls.

Usual outward streaming from SE well. Streaming away from E walls of pit. Fume continues thin, and is less over pit because of fewer fountains.

A few new stones fallen on SW chasm floor. Three small earthquakes yesterday. Slow subsidence continues.

T A J

June 10,
11 a.m.

No evident change in lake level. One or two border fountains; position of fountains had changed somewhat. Rock tumble on black ledge SE and NW. Both of these parts of ledge protrude a little from the wall. Usual outward streaming from SE.

At night the pit appeared darker than of late, only one or two fountains in action.

T A J

June 11. Pit dull.

June 13
8 p.m.

Streaming very slowly in all directions from under a crust over SE vent. One fountain in SW part of lake and two border fountaining patches, one NE and one NW. Apparently but little or no change in level of liquid.

R H F

June 14
4 p.m.

Lava appears to rising slightly. One fountain of short duration in SW part of lake and one border fountaining patch along NW wall. Streaming toward SE vent from NE and away from SE vent to the W.

R H F

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Friday	Date	June 15, 1923
	Saturday	"	16, "
	Monday	"	18, "
	Tuesday	"	19, "
	Wednesday	"	20, "

June 15

10 p.m. Lava about 25 feet below black ledge. Streaming out from SE and E wall of pit, with some nodal skins surrounded by bright lines; centrifugal streaming. Bubbling along the bright lines in skins and flames seen coming from small blisters. Only one or two fountains, sometimes SW of center, sometimes at NE wall, and sometimes at S wall. Condition like a week ago but the gas pressure seems less.

T A J

June 16

9:30 a.m. Much the same. Notably weak fountaining and very little bubbling SE. Surface of lake higher than a week ago. Black ledge 20 to 30 feet high.

3 p.m. Same level. Notably little activity at first. Slight border fountaining W and central fountaining SW. Later some increase in central fountains with violent spraying action. Pit rather dark in evening showing decrease in fountaining activity to almost zero at times.

T A J

June 18

9:20 a.m. Lava level unchanged or perhaps slightly higher as it appears about 15 or 20 feet below black ledge. Line of fountains from SW central region westward, one of them large and tumultuous. Steady streaming out from SE margin of lake with small bubblings in lava. Rest of lake covered with skin and crust migrating to banks and cracking and foundering there. Blue fume over fountains and some whiter fume rising from bench SE. General condition stationary.

T A J

June 19

9:45 a.m. Hot streaming toward fountains SW, three to five in number. Piles of broken crusts along lake edge NE. Moiré pattern on surface of lake with crusts broken up by bright lines into polyhedral shapes. Small border fountains SW. Black ledge near SW chasm has slumped and heavy fall of rocks rests on it in the chasm. Elsewhere ledge appears 12 to 15 feet high. At SW chasm it is about 10 feet high where the slump has occurred.

T A J

June 20

8:30 a.m. A line of three or four big fountains extends W from SW center. Level same as yesterday. Narrow ledge shoreline around SE and E edge. Bright-line streaming from nodal skins SE and usual outward streaming from E bank. Small border fountain S. Five fountains the maximum counted at one time. Pattern as before. Steamy fume from E and S ledge, blue fume from fountains. Pit very clear. Crusts thin and heat strong.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Tuesday Date June 19, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9:45	NE	S		0				
a.m.	NNW	S		0				
	NE	Lake edge SW	R 22	54- 6 16	+04	1521	-171	
	NNW	same	R 30	13- 6 02	+02	1522	-163	
	NE	Top black ledge S	R 10	10- 7 16	+02	1108	-142	
	NNW	same	R 11	07- 5 26	+05	1512	-148	
	NE	Lake edge SE	L 4	28-14 02	+02	654	-165	
	NNW	same	L 8	14- 6 12	+03	1474	-163	

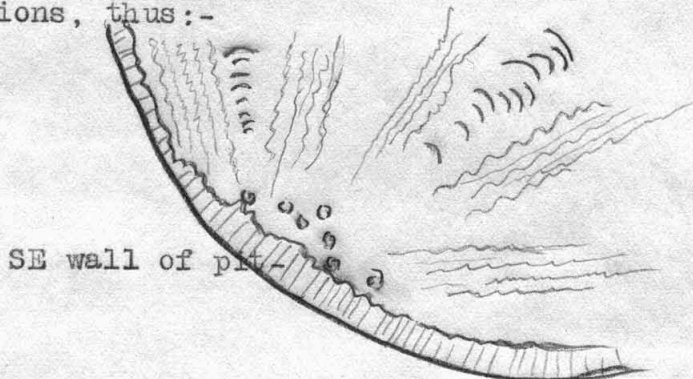
Below NE station (3716'):-
 Mean lake level 166 feet
 " black ledge 148

T A J

9 a.m. Lava higher, but crust thicker and heat on rim less. Black ledge 10 feet high NE, 6 feet high S, and WSW 1 foot high where bench has slumped. Seven fountains in line SW center and a grotto SW wall E of pinnacle.

Fountains all died away with a concentration of bubbling at SW bank as the final phase. Then a rising spell began and the liquid became flush with WSW ledge. After five minutes a small fountain began over SW well (SW center) and this started 15 minutes of travelling fountains in line until there were three fountaining patches. Over the fountains there was seen puffs of brown sulphur gas and flame condensing to blue fume above. This blue fume different from the white steamy vapor rising at SE black ledge.

Note tendency at SE source to form five or six radial carpets with bands of lined skin extending out in five or six directions, thus:-



These lines correspond to the curtains of a festooned flow.

During the rising spell though the crust was thick, large surfaces of it were arched up, as shown by the sunlight on them, by gas pressure from below.

New sets of travelling fountains start about every 10 or 12 minutes. In general the lake is rising, but the fountains relieve pressure and bring about incessant pulsations of subsidence of the surface. The bubblings SE larger than yesterday. Noise of crunching of crusts is continuous.

Went along W side of pit from the N and found the transparent gas insupportable. Cracking noises and straight cracks across large crust areas during rising spell. Watched migration of these areas against each other toward wall NW. The mechanism is illuminating in those cases where faulting of two edges of large slabs occurs, in contrast to the over-riding or underthrusting in other places; suggests on small scale what may happen in California rift faulting. The next page shows diagram of a slab which was noticed.



F -- horizontal faulting

B -- block that moved

M -- melt welling up

N -- nodal point where S, the oncoming slabs, pushed against B; here B rotated, sliding over S₁ and sliding under S.

At F the motion was horizontal like the San Andreas fault at Bolinas Bay. Compare this movement of blocks to the under drift of the substratum of crust of earth, and its effect as per Joly or von Wegener.

Two boys of "Advertiser" party overcome by gas on lee side of pit, had to be carried away.

T A J

9:30 to 10:30 a.m.

At first the lake was 1 foot below SW floor; black ledge averages only 4 or 5 feet above lake. New slab bench under black ledge NE.

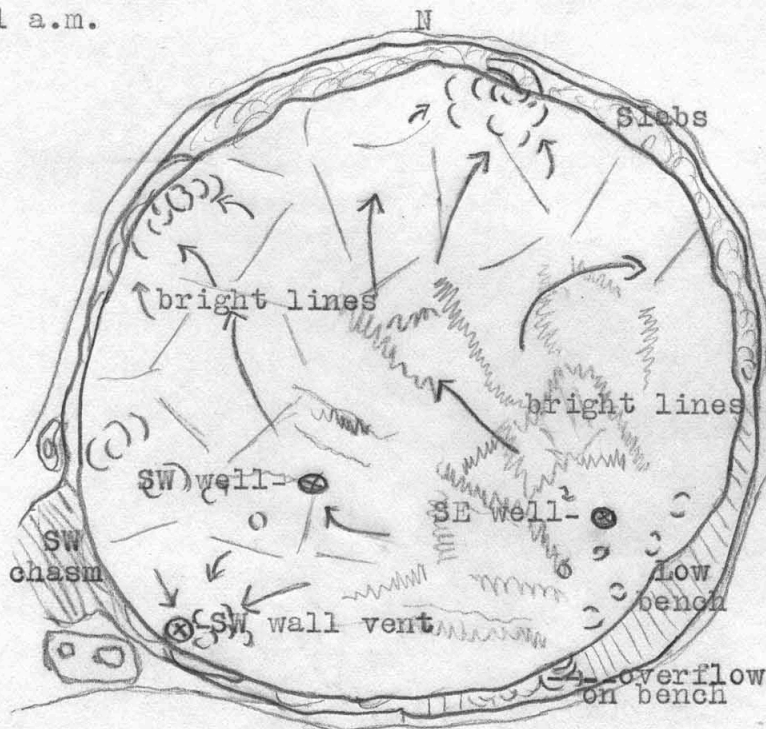
At first there were three or four fountains SW center and SW grotto. Later this increased until twelve fountains were in action, including large fountains bombarding wall NNE, NW and SW. For an hour there were seven to thirteen fountains: this loss of gas lowered level of lake 3 feet.

The bubbling SE, the speed of current, the heat and the thinness of skins all increased since yesterday. Eleven fountains were counted last night and pit was brighter than before.

There is a small border shelf all around lake 3 to 20 feet wide, widest at SE source bubbling, and standing 1 to 4 feet above lake. It is wide and low at source SE; narrow and lumpy with spatter S, SW, W and NW; wider and covered with piled slabs N, NE and ENE.

There is a general set to current that makes a curve SE to SW, SW to N and NE, like the former west river of two months ago: hence the slab heaping is at the end of the course. Probably the SW wells are feeding the lake as well as the SE well.

11 a.m.



The slab heaping process on the bank is a sign of rising. Each slab makes the heap higher than before and the lake must overtop its previous level before it can slide a new slab on top of the last layer of slabs.

At 11:30 a.m. the old black ledge of May 20 was 3 to 4 feet above the lake; the slab rampart NE was almost level with bench of May 20. Lake 155 feet down.

White fume SE has lessened.

8 p.m.

In the evening the situation was the same. There were seven to eleven fountains, radiation zigzag lines from SE source in crust and border fountains W and N increasing. Pit bright.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Saturday Date June 23, 1923

Sunday " 24, "

June 23 Halemaumau during day shows more blue fume of fountains in NW region. Harmonic vibration is increasing.

Spent afternoon in desert SW of Kilauea crater.

8 p.m. Activity of same kind and lava appears higher: bench S building up by overspatter and could not detect the slab bench NE in night light. Seven to eleven fountains and every appearance of higher gas pressure at source, small bubblings in center of lake, big line of wall fountains NE making banners of flame, and other wall fountains kept changing positions in the S, SW, W and NW. Occasional central fountains formed in single patches which migrated to the wall.

Streaming radiates from the SE well to S, SW, W, NW and NE with radial bright lines in first outward circle, then a darker area of polyhedra. Bright lines in inner circle very jagged, in outer zone straighter. (See map June 22).

An occasional small fountain over SW well but not any lines of big fountains there. The change from central fountaining to wall fountaining is noticeable and the line of big fountains along NE wall accounts for the northern blue fume that has been dominant all day at pit. This is the place that was the scene of slab piling yesterday.

There is an increase of gas pressure with the solstice without question. Will it produce a marked rise as in 1912?

T A J

June 24

3 to 4 p.m. Lake has built a rampart of slabs athwart opening between W buttress and SW pinnacles leading into SW chasm. This rampart is at least 5 feet above SW chasm former floor. There is hardly any of old black ledge anywhere. Lake appears 140 feet down.

Same mechanism as last night at intervals, but N grotto is dead and a line of big wall fountains has developed under NNW station. Much small bubbling along entire S, W and N edge of lake, and long spells without big fountains. Probably a flow is pouring into SW chasm depression. Overflow folds of skin on E ledges at edge of lake and spatter ledges had formed N and NW.

From one to seven fountains were seen between 3 and 3:30 p.m. These were mostly big border fountains W. At 3:40 p.m. a violent fountaining developed NNW, about four wall fountain patches close together, and these showed shoots of red flame and brown fume, through the splashes which were violent and very flame-like as seen backed by the afternoon sun. The fume curdled above to blue smoke. In another set of fountains in shadow against W wall the flame banners were magenta or violet. The appearance of large purple flames was notable.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date June 25, 1923

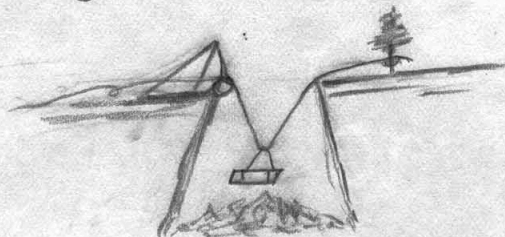
Thursday " 26, "

Friday " 27, "

June 25 A successful descent into "Devil's Throat" was made this afternoon. The arrangements were engineered by C. W. Scribner of Lihue, Kauai, and the descent and exploration of the bottom made by W. T. Sinclair of Honolulu.

Bottom of hole is covered with broken rock, highest part in the middle and sloping away in all directions. The longest diameter at the bottom was found to be over 200 feet and parallel with the lava tube over which the Devil's Throat is located. A lava tube some 5 feet high was found on the NW side. It was clear for about 20 feet. No smooth floor was found. The temperature at the bottom was a little above air temperature.

An "A" frame secured to trees was erected on one side and two pulleys arranged as in sketch.



R H F

June 26

3 p.m.

Lava rising. A rampart of broken skin about 4 or 5 feet above black ledge on wall surrounds the lake. Two central fountains playing and two large border fountain patches along N wall. Streaming out from SE quite perceptible.

R H F

June 27

4 p.m.

Lava still rising. Lake overflowing its rampart on to black ledge at S side. Other places the rampart is 5 or 6 feet above ledge. One border fountain at N and one along rampart at entrance to SW chasm.

R H F

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday Date June 29, 1923

Saturday " 30, "

June 29

5:30 p.m. Pit quiet with rising tendency still in evidence. Four border fountaining patches along NW and W sides. Some lava has poured over SW embankment on to recently formed floor. No fountains in center. Streaming radially from SE.

R H F

June 30

10:40 a.m. Lake has gained slowly but is now stationary, building spatter and slab ramparts and oven grottoes. About seven high ovens have formed W and NW, with their activity shifting. Four to six fountaining patches, sometimes some central ones. Usual outward streaming from SE source. A broad crescent shaped bench has formed there. Other wide benches NE, N and at SW chasm. W buttress or pinnacle only 20 feet above lake. Some of the grotto ovens were 20 feet high but general height of spatter ledge was about 4 feet.

There has been overflowing into the SW chasm but the rise since first of week has been very slow. An occasional fountain bursts over SW well. The slab ramparts are mostly N and E. Noises are of splashing and crunching. Fume chiefly over fountains.

TVA J

SURVEY RECORD

t	sta	pt	hor	vert	lev	dist	elev	h. i.	
10:40									
a.m.	NNW	S		0					
	NE	S		0					
	NE	W grotto (lake)	R 49	37	- 4	20	+02	1675	-128
	NNW	same	R 56	38	- 7	00	+04	1037	-128
	NE	S rampart(lake)	R 9	59	- 6	46	+04	1095	-130
	NNW	same	R 10	18	- 4	45	+08	1510	-129
	NE	N point (lake)	R104	48	-10	22	+03	701	-128
	NNW	same	L 52	42	-10	43	+07	655	-126

Mean lake level 129 feet below NE station.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
 Hawaiian Volcano Observatory

Day Saturday Date June 30, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
11 a.m.	NE	N wall	1	W P	K2	f/16	1	6½x8½
	"	W bench	2	"	"	"	"	"
	N	SE wall	3	"	"	"	"	"
	NNW	W wall	4	"	"	"	"	"

T A J

1923, June 30



1. North wall of Halemaumau, from N.E.

June 30, 1923

2. Looking toward west bench from N.E.



1923, June 30



3. Southeast wall of Halemaunau from N.

June 30, 1923



4. West wall of Halemaumau from N.N.W.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Sunday Date July 1, 1923
 Monday " 2, "

July 1

8:30 a.m. Lava down 2 or 3 feet lower than on June 30. Three border fountains NW and W. No central fountains. Streaming outward from SE unchanged.

R H F

July 2

In the morning from a distance brown fume and cumulus conspicuous over Halemaumau. Afterwards pit very clear.

8:45 a.m. Three to eight fountains including large central ones SW of center. Skins thin and heat strong. Benches SE and SW low (2 to 3 feet high), whereas black ledge S and N is 6 or 8 feet high and the spatter grottoes W are 15 to 25 feet high. In general lake lower and ledge higher and more built up with spatter.

Island has reappeared in SSW region, about 4 feet high with slabs and spatter on sides; elongate N and S.

Fountains frequently shift position. Bubbling SE and outward streaming from SE. High slab rampart NE, but N slab rampart is covered with spatter.

Large migratory fountains SW moving westward and reforming over SW well or that vicinity. Blue fume from fountains, whiter fume from bench and crack in SE wall. Bench wide and flat SE and notably higher S than SE with reference to lake. This bench has been added to by overflow, and its edge is higher than the portions back of edge. Latter portions have collapsed.

Noise chiefly splash of fountains. Streaming lines fan out from SE corner. There is low ground back of the big grottoes W and SW, the plan of shoreline tending to keep circular. SE area over source very hot and bubbling generally.

Last night the pit was bright.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Monday Date July 2, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
8:45								
a.m.	NE	S station		0				
	NNW	S "		0				
	NE	N point of island (lake level)	R 22	33- 6 56	+04	1092	-124	
	NNW	same	R 15	01- 5 47	+06	1300	-137	
	NE	Top S black ledge	R 15	07- 5 22	+04	1318	-126	
	NNW	same	R 19	29- 4 37	+05	1555	-126	
	NE	Lake at SW chasm ram- part	R 32	12- 4 36	+03	1702	-139	
	NNW	same	R 43	04- 5 36*	+03	1471	-142	
	NE	Lake at SE source	L 2	36-11 49	+04	635	-132	
	NNW	same	L 8	42- 5 13	+02			
	NE	Top SE bench	L 6	36-11 52	+04	572	-118	
	NNW	same	L 11	42- 4 53	+03	1442	-122	
		Mean lake below NE station 136 feet. *doubtful						
		Location of new N station (edge of pit, W side of N niche of 1920) Located to avoid fume of NNW station.						
	NNW	S station		0				4.5 ft
	NE	S "		0				
	S	NE "		0				
		(S sta. means 3 ft. S of S sta. in line with NNW station)						
	NNW	N station, ground level	L 70	05 -3 00	+03			
	NE	same	R 92	34 -0 22	+04			
	S	same	L 51	08 -0 26	+05			

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Tuesday Date July 3, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9 to 11:30 a.m.	NE	S station	0	+06	+07			
	N	same	0	+10	+02			
	NE	Top of island	R 21 47-	6 11	+30	1085	-127	
	N	same	R 15 40-	5 20	00	1350	-126	
	NE	Lake by SW chasm	R 32 25-	4 00	+40	1685	-132	
	N	same	R 41 32-	5 07	-05	1503	-133	
	NE	Lake at W grotto	R 57 45-	4 46	+06	1627	-138	
	N	same	R 64 30-	8 03	-07	950	-133	

Mean lake level below NE station (3716') 133 feet

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Tuesday Date July 3, 1923
 Wednesday " 4, "
 Thursday " 5, "

July 3

9 to 11:30 a.m. Intensity and number of fountains variable. Three to nine fountains, chiefly under SW, W and NW banks; the migratory ones occur at times in the SW part of the lake.

Island in southern part of lake has risen several feet since yesterday; is still covered with broken crusts.

Fume extremely thin, mainly from fountains and grottoes, which is quite blue, and a little from island and SE bench, which is much whiter.

Lava wells up on SE side, surface marked by very thin crust, with some bubbling and much heat. From here lava streams in all directions; fastest current goes along S bank toward fountains. Along N bank there is some breaking up and sinking of crust, but hardly any fountaining. In N and NW part of lake, away from shore, lake very quiet, heavily crusted, hardly any streaming. As a whole, lake seems quieter with thicker crust than yesterday.

Sounds mostly of fountaining, some hissing in NE part of pit.

Hardly any change in the benches and ramparts along edge of pool, except that bench along NE and N side appears tilted even more than yesterday. Other benches not tilted.

O H E

July 4

9 to 11 a.m. Fountain activity along W bank, this has worked farther N since yesterday. Occasional active fountain under NNE bank. Number of fountains variable, from 3 to 9. Those in SW part seem much weaker than previously.

Direction of streaming same as before, perhaps faster.

Fume thin, though a trifle thicker than yesterday.

Crusts thin, heat on rim of pit stronger, almost unbearable at N and NE stations. Lake high at 9 a.m. Threatened to overflow NE bench in several places. Sank a little during morning. Island still rising; a little bigger.

O H E

July 5

9 to 11 a.m. Fountains moderately active; four to five border patches; in S part of lake there are sometimes one or two fountains. Fountain activity along W bank farther S today.

Fume from island and SE bank thicker than past few days; that from lake generally continues quite thin.

Source of streaming, under SE bank, seems farther S and a stronger current flows along bank toward N.

Crusts thin, with much radiation. Practically the only sounds are those of fountaining.

No material change in appearance of benches and ramparts.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date July 4, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.	
9 to 11 a.m.	NE	S station	1 00	+06	+06				
	N	same	00	+10	+06				
	NE	Yellow rock on top is- land (doubtful)	R 21 29-	6 25	+08	1072	-123		
	N	same	R 15 09-	5 12	+03	1302	-121		
	NE	Lake level, W of SW chasm	R 42 25-	4 10	+10	1692	-127		
	N	same	R 50 05-	5 32	+03	1296	-126		
	NE	Lake under NW wall	R 64 09-	4 30	+09	1574	-128		
	N	same	70 31-	9 04	+01	795	-127		
Mean lake level below NE station(3716')							128 feet.		

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Friday	Date	July 6, 1923
	Saturday	"	7, "
	Sunday	"	8, "
	Monday	"	9, "

July 6
10 a.m.

Fume a little thicker, mostly from fountains; some from SE bench; between bench and wall of pit.

Fountains variable, at times strong, especially along W wall. As many as seven fountains in southern part of lake, away from wall. Island vanished. Streaming as it was yesterday. Crusts on lake thicker, heat radiation not so intense.

No marked change in benches.

O H E

July 7

10:30 a.m. to 12 m. Marked sinking of lake with collapse of embankments on W and SW side. Small avalanche on W side of pit at 10:30 a.m.

Only one active border fountain on W side, which was very constant, and a few occasional ones in southern part of lake. Main streaming seems to be due W from source under SE bench. Some bubbling at source. Crusts fairly thick; heat radiation from lake only moderate.

Main sources of fume are W fountain and SE bench, but many minor ones give lake a hazy appearance. Fume as a whole somewhat thicker than before.

No sounds audible because of high wind.

O H E

July 8
3 p.m.

Lake fallen considerably since yesterday, with some collapse of benches all around. Fume much thicker.

Fountaining transferred from W and SW side to center of lake where there were a half dozen quite active fountains. One rather weak fountain patch just N of SW chasm, the only marginal patch.

Crusts over lake fairly thick; heat radiation not so strong. Source of streaming behaving as previously; main current today flows toward S parallel with lake shore.

O H E

July 9

10 to 11:30 a.m. Height of lake not much different from yesterday and no further apparent collapse of benches and ramparts.

No active marginal fountains; three central ones in southern part of lake, not far from site of island, and a few intermittent weaker ones in N part. Whole SW, W and N parts of lake extremely quiet with very little fume. Source of streaming has moved somewhat to N; main stream toward S, very slow. Crusts moderately thick, radiation moderate.

Southern group of fountains and several places along NE, E and SE margin giving off fume, blue from fountains, yellowish blue from margin.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday

Date July 6, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
10a.m.	NE	S station		0	-11			
	NE	N "	92	33	-03		+15	
	NE	Lake off promontory under southernmost smoke, SE bank, white spot on edge of lake	R 0	31	- 9 50		-04	
	NE	Lake under notch in rampart W of SW chasm	R42	23	- 4 30	00	1663	-131
	N	same	R50	08	- 5 35	00	1264	-124
	NE	NW bank, N of fountain	R76	48	- 5 12	+04	1428	-132
	N	same	84	10	-16 42	00	438	-132
Mean lake level below NE station (3716')							130 feet	

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Saturday Date July 7, 1923
 Sunday " 9 "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
July 7								
10:30								
a.m. to								
12 m	NE	S station		0				
	N	same		0				
	NE	Top of ledge just W of SW chasm	R 36 27	- 3 59	+15	1655	-122	
	N	same	R 44 23	- 5 13	-18	1393	-122	
	NE	Lake below ledge	R 36 27	- 4 30	+15	1655	-138	
	N	same	R 44 23	- 5 48	-18	1393	-135	
	NE	Lake W	R 61 15	- 4 45	+11	1572	-136	
	N	same	R 66 50	- 9 25	-25	834	-133?	
Mean lake level below NE station (3716') 136 feet								

O H E

July 9								
10 to								
11:30								
a. m.	NE	S station		0				
	N	same		0				
	NE	Lake near SW chasm	R 45 48	- 5 10	00	1656	-150	
	N	same	R 53 04	- 7 10	-10	1204	-148	
	NE	Lake at W bank	R 68 24	- 5 43	-02	1524	-151	
	N	same	R 74 36	-12 40	-10	658	-146?	
Mean lake level below NE station 150 feet								

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Tuesday Date July 10, 1923

Wednesday " 11, "

July 10

8:30 to 10:30 a.m. No apparent change in depression of lake or conditions of benches or ramparts.

Fountains migratory, start in center and move up to N bank when they promptly die. Number varies, up to four; some are quite active. Crusts moderately thin; heat radiation quite strong. Streaming very sluggish. Fairly rapid local currents about fountains with breaking up of crust.

Fume from margin much thinner, occasionally thick from fountains.

O H E

July 11

9:30 to 10:45 a.m. No noticeable collapse in benches. One to four fountains in center, of which one is stationary and the others migrate to NW bank. Crust of lake medium stiff, heat radiation moderately strong. Streaming from SE bubbling locality which has thin skin. Strongest current NW toward fountain. Along N, NE and E strong local current toward bank, with breaking up of crusts and piling up of slab rampart.

Fume thinner; fume orifice under NE station practically stopped and others along E and SE bench much diminished. Most of the fume is from fountains. Sounds mainly splash of fountains with hissing along NE bank.

O H E

10 a.m. Large central fountain patch with migratory tendency NW away from SE source. Latter bubbling and making blistered skins and bright lines. Skins thin and wrinkled along SE-NW streaming zone. About four to five fountains in line of migration ending with spatter fountain on NW bank.

Two other border fountains E and SW at times. Total of six patches fountaining counted at one time. Crusts SW and NE of streaming zone are stiffer and break along angular lines, pulling apart and making a fibrous pattern.

Crusts NE move to bank very slowly, N and SW to bank more rapidly; S the current is rather along the bank westward.

Black ledge appears 30 feet high NNE, 20 feet high SE and only 5 feet high SW. Notable rise in height of ledge relative to lake level from SW chasm northward along base of W wall. Large portions of bench fallen away SE, SSE, NE and W.

Moss-like coating of Pele's hair on N cliff. Black ledge is lumpy with spatter W and N, straight-topped S and E. Bench is remarkably low around SW pinnacle.

Blue fume over big fountains, whitish vapor over SE black ledge.

Piling of slabs NE is still notable.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Tuesday Date July 10, 1923
 Wednesday " 11, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
July 10								
8:30								
a.m.	NE	S station						
	N	same						
	NE	SSW part of lake	R 19	51- 5 52	+03	1439	-149	
	N	same	R 25	48- 5 28	-10	1553	-144	
	NE	W side lake	R 63	48- 5 20	+09	1617	-155	
	N	same	R 72	30-11 25	-30	817	-157	
		Mean lake level below NE station		152 feet				O H E

July 11								
9:30								
a.m.	NE	S station						
	N	same						
	NE	Top black ledge S	R 2	17- 7 39	+03	913	-123	
	N	same	R 2	10- 4 38	+01	1481	-121	
	NE	Lake below ledge S	R 2	17- 9 77	+04	913	-150	
	N	same	R 2	10- 5 28	+01	1481	-143	
	NE	Lake level SW	R 24	15- 5 13	+05	1557	-144	
	N	same	R 32	05- 5 07	+01	1560	-141	
		Mean lake level below NE station		147 feet				O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday

Date July 13, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
	N	Looking S in pit	1	panch film	W A	f/16	$\frac{1}{2}$	4x5
	"	" SW " "	2	"	"	"	"	"
	"	" W " "	3	"	"	"	"	"
	"	" E " "	4	"	"	"	"	"

Kodak Anast lens

O H E



4. From N station looking E.



1. From N. station looking S.



2. From N. station looking S.W.



3. From N. station looking W.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Friday	Date	July 13, 1923
	Saturday	"	14, "
	Sunday	"	15, "
	Monday	"	16, "

July 13 Two to nine fountains; one about 100 yards from N bank strong and constant and occasional ones, at times quite strong, along SW margin and in SW part of lake. Rather strong current from source toward N, with breaking up of crusts against NE and N banks.

Heat not excessive, fume thin. No change noticed in benches.

O H E

July 14

10-11 a.m. Seven to ten fountains. Lines of travelling fountains from center to NW. Five or more border fountains W, one of them with a smooth niche or grotto of spatter. Streaming from a ragged edge of crust S side of lake straight N across the bubbling of SE source. SW source shows small bubbling fountain and occasional larger bursts.

Grotto building shows stationary condition and level is same -- 5-foot ledge SW and 15-foot ledge SE and 25-foot N.

T A J

July 15

5 p.m. Liquid lava appears 5 to 10 feet higher. Ten to twelve fountains in action. Streaming from S of SE source outward from a border skin under S wall part of the time; at other times from a nodal skin SE of center, while over the SE source there is blistering and bubbling.

Perpetual lines of fountains NW of center trending NW but holding position. Other lines migrating in groups of three or four fountains from SW source to SW chasm. Border fountains few. Thin skins. Violet flame and high spray from fountains. Lake surface hotter and higher.

T A J

July 16

10:30 to 11:45 a.m. Fountain activity greater; one to three at SW rampart, seven central fountains in W part of lake, one particularly active group about 75 yards from NNW station. Roar from these loud with hissing NE bank.

Fume rather thin considering activity of fountains. A little still comes from NE bench. Along SW and W bank grottoes have been built, otherwise benches and ramparts not changed. Crust NE and SE thin, with strong heat radiation, but in central and W part of lake crust thicker. Much heat from fountains.

Active streaming from source toward N with overthrusting of slabs and jamming against bank. Also strong general drift W in western part of lake, with rapid local currents about the fountains.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

Day ~~Friday~~
Monday

Date July 13, 1923
" 16, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.	
July 13									
	NE	S station		0					
	N	same		0					
	NE	Top S bench	R 2	11- 7 27	+20	920	-125		
	N	same	R 2	11- 4 37	+05	1485	-123		
	NE	Lake S	R 2	11- 8 52	+20	920	-143		
	N	same	R 2	11- 5 31	+05	1495	-146		
	NE	Lake SW	R 34	52- 4 52	+13	1675	-149		
	E	same	R 43	17- 5 42	+03	1435	-146		
	Mean lake level below NE station (3716') 146 feet								O H E
July 16									
10:30									
a.m.	NE	S station		0	-	05	-02	5'	
	N	same		0	+	06	-03	4½'	
	NE	Lake below knob W of SW chasm	R 34	37- 5 10	-10	1672	-146		
	N	same	R 43	16- 5 33	+02	1446	-145		
	NE	Lake below W cavern	R 58	32- 5 25	-14	1623	-147		
	N	same	R 65	43- 8 35	+04	926	-145		
	NE	Top W cavern	R 58	32- 4 45	-14	1623	-128		
	Mean lake level below NE station 146 feet								O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Monday

Date July 16, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
11:30 a. m.	N	Fountains	1	panc film	W A	f/16	1/25	4x5
		From 2/3 way from N to NE to SE and S part lake	2	"	"	"	1/2	"
								O H E



1. Fountains in Halemaunau, from N.



2. Southeast and south part of lake
from N.N.E.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Tuesday~~ Wednesday Date July 17, 1923
" 18, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
July 17								
9:30 -								
10:30								
a. m.	NE	S station						
	N	same						
	NE	Lake below knob W of						
		SW chasm	R 34 39-	4 57	+03	1672	-146	
	N	same	R 43 17-	5 35	-03	1446	-145	
	NE	Small black mass in						
		W grotto	R 58 24-	4 58	+13	1618	-146	
	N	same	R 65 89-	8 44	-04	925	-145	
		Mean lake level below NE station						0 H E
		146 feet						
July 18								
9:15								
a.m.	NE	S station						
	N	same						
	NE	Lake below knob near						
		SW chasm	R 34 38-	4 59	+01	1672	-146	
	N	same	R 43 14-	5 42	-07	1490	-145	
	NE	Lake NW	R 76 23-	5 45	+01	1429	-144	
	N	same	R 81 53-	17 07	-05	451	-138?	
		Mean lake level below NE station						0 H E
		145 feet						

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Tuesday	Date	July 17, 1923
	Wednesday	"	18, "
	Thursday	"	19, "
	Friday	"	20, "

July 17

9:30 to 10:30 a.m. One to three fountaining patches at lake margin SW and five to seven central ones mostly in northern part of lake. Crusts fairly thin; blistered in eastern part of lake. Heat radiation strong. Speed and direction of streaming little changed from yesterday.

Piling up of slabs against N, NE and E ramparts continues, but lake not high enough to build slab rampart. No noticeable change in benches or ramparts.

Fume thin. Sounds those of fountains and hissing NE.

O H E

July 18

9:15 a.m. One strong and constant fountain at margin of lake E of SW chasm. It has built up a grotto 20 feet high. Central fountains vary from none to four strong ones about 100 yards from above, and four more in N part of lake. Except for new grotto, no change in bench.

Moderate streaming from SE source along N bank, with sluggish jamming of slabs against margin. Strong streaming toward fountains and moderate toward W bank. Crusts thin, heat radiation strong. Crusts along E bank much wrinkled.

Fountains noisy; hissing NE.

O H E

July 19

9 a.m. Height practically unchanged. Intermittent marginal fountains (up to four) building spatter ramparts along SW, W and NW. Group of fountains N continues quite constant and in same place as previously. Other fountains in SW and NE part of lake. Altogether as many as ten central fountains.

Fairly rapid radial drift away from SE source with many local currents, especially about fountains. Piling up of crusts against E, NE and N banks continues. Crust on lake moderately thin, heat radiation fairly strong.

Fume thin, mostly from fountains and SE bench; a little oozes through crust near N fountains.

O H E

July 20

9:30 a.m. Only two groups of fountains, both in NW part of lake, totalling three to six large fountains, and a few very small ones. Lake seems a little higher. Streaming from SE with rapid current toward fountains and bank. Pilling of slabs against bank all around E, N, W and SW. Crusts thin and wrinkled, sometimes overthrust. Heat moderate. Fume thin.

Sounds mostly from fountains; a little hissing NE.

4:15 p.m. Marked rise since morning; extensive formation of slab rampart E, NE and even N. Source of streaming SE moved farther into lake. N fountains weaker; strong fountains near W bank and one in SW part of lake.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday Date July 20, 1923
Saturday " 21, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
July 20 4:15 p.m.	NE NE	S station Knob under SW chasm	0 34 39-	4 45	0	16722	-139	
July 21 10 a.m.	NE N NE N NE N NE N	S station same Lake SSW same Lake below SSW knob same Lake by W grotto same	0 0 R 22 00- R 29 00- R 34 40- R 43 15- R 58 29- R 65 36-	5 18 4 48 4 40 5 15 4 50 8 15	+01 +05 +05 +07 +05 +10	1512 1575 1683 1454 1639 945	-141 -139 -140 -140 -141 -144?	
Mean lake level below NE station 141 feet								
								O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Saturday	Date	July 21,	1923
	Sunday	"	22,	"
	Monday	"	23,	"
	Tuesday	"	24,	"

July 21

10 a.m. Fountains in N part of lake continue but are small and weak. In SW they are variable, up to four big ones.

Strong current from SE source toward SW fountains, more moderate along NE bank, where crushing of slabs against it progresses slowly. Lake has been overflowing its bank below viewpoint near auto parking place. Appears to have been some local collapse of benches along S and N sides of lake in spite of rising lava. Saw two small avalanches from N bank this morning.

Crusts as before. Fume thin. Fume from SE bank thinner and notably whiter than before.

O H E

July 22 Fountaining somewhat variable. Most active fountains in NW half of lake. Eighteen counted at one time, of which only four were marginal. Marked building of grottoes along SW and W bank. Lake fallen several feet since yesterday.

Streaming away from SE source, with strong current toward fountains and along NE bank where crushing of slabs against bank continues. Crusts thin, heat strong.

Fume thin considering the number of fountains.

O H E

July 23

10 a.m. Very little change. Large number of rather constant fountains, as many as eighteen at a time, most of which are small. About six marginal ones which are rapidly building up grottoes. The greater number are in W central part of lake. Liquid a little lower than yesterday and fume thicker. Strong currents from SE source to fountains and NE bank.

O H E

July 24

8:30 a.m. Height of lake about the same. Some caverns along W bank have collapsed. Number of fountains much less. One group of three or four rather weak though constant fountains about 125 yards S of N station. Another group of four much stronger ones in SW part of lake. One marginal grotto by SW chasm.

Fume thin, most of it comes from SW fountains and SE ledge; a little from N fountains and SW ledge.

Streaming away from SE source rather sluggish, with slow jamming of slabs against NE bank. Rapid local currents toward fountains. Nature of crusts the same as before.

Much noisy escape of gas NE with breaking up of crust at bank.

O H E



1. Southwest chasm from ledges on S.S.W. edge.



2. South bank from E.N.E.

July 22, 1923



3. East bank from N.N.E. rim.



4. Northeast bank from N. rim.



1. West bench Halemaumau from N.



2. Southwest bench from N.W. part of rim.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Monday~~ Date ~~July 23, 1923~~
 Wednesday " 25, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
July 23								
10a.m.	NE	S station						
	N	same						
	NE	Lake, S bank	R 21	08- 5 17	+25	1470	-147	
	N	same		27 19- 5 14	00	1561	-147	
	NE	Top high SW cavern	R 45	30- 4 10	-03	1655	-119	
	N	same	R 52	46- 5 20	-02	1220	-117	
	NE	Lake below same	R 45	30- 5 03	-03	1655	-145	
	N	same		52 46- 6 35	-02	1220	-144	
Mean lake level below NE station(37'16') 146 feet								O H E
July 25								
9:15								
a.m.	NE	S station						
	N	same						
	NE	S margin lake	R 21	00- 5 45	-03	1456	-145	
	N	same	R 27	11- 5 12	+02	1553	-146	
	NE	Lake under W black ledge	R 59	35- 5 20	-01	1600	-149	
	N	same	R 65	50- 8 49	-03	896	-142?	
Mean lake level below NE station 147 feet								O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcanic Observatory

Day	Wednesday	Date	July 25, 1923
	Thursday	"	26, "
	Friday	"	27, "
	Saturday	"	28, "

July 25

10 a.m.

Three large and constant fountains building grottoes on W bank. Two or three large central fountains SW. N group stopped. One in NE part of lake spurting rhythmically about every 2 seconds. Streaming from SE source along S margin to fountains strong, along NE margin sluggish. Little breaking up of crust E bank. Outside of growth of grottoes and spatter benches SW, no material change in benches.

Fume thin, comes from fountains and SE bench; a little from crust N part of lake. Crusts moderately thick, heat not excessive.

O H E

July 26

9:30 a.m.

Marked subsidence of lake with a little collapse of benches all around lake. Six large fountains SW, two or three of which are marginal; about six in N part, small but constant. Spasmodic fountain 100 yards SE of N a little bigger than yesterday.

Streaming from SE source toward SW fountains fairly strong; current along NE bank sluggish; otherwise no current noticeable. Breaking up and sinking of crusts along NE margin continues. Heat radiation rather mild. Fume thin, though thicker from SE bench.

O H E

July 27

9:15 a.m.

Lake not much changed in height. Some local but no general collapse of benches since yesterday. Fountaining in SW varies; sometimes five strong fountains start in SW center of lake and move to bench. Current from E toward fountains strong. N fountains constant but weak. Spasmodic fountain near N still active but smaller, and spasms longer apart than yesterday.

Sluggish drift from SE along N bank, with local currents to bank. Fume thin; crusts as before; heat radiation moderate. Between 10 and 11 some collapses of benches WSW, E, S and NNE.

O H E

July 28

9 a.m.

Height of lake practically unchanged. Fresh reddish scars indicate further breaking down of benches, but no general collapse.

Main fountains in SW part of lake; three to five large ones, which migrate slowly toward bench. Strong streaming toward them, especially from NW. Spasmodic fountain the only one in N part of lake; more active than yesterday. Streaming away from SE source very sluggish.

Crusts as usual. Heat radiation moderate; fume thin. Sounds are splash of fountains SW and roar like distant surf from NE bank.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Thursday~~ ^{Friday} Date ~~July 26,~~ ^{July 27,} 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
July 26								
9:30								
a.m.	NE	S station		0				
	N	same		0				
	NE	S edge lake	R 19	14- 6 28	+02	1412	-160	
	N	same	R 24	46- 5 30	+12	1554	-159	
	NE	S edge of red patch, SW margin lake	R 42	40- 5 27	+02	1685	-161	
	N	same	R 50	30- 7 00	-02	1300	-162	
	NE	W margin, under red patch(S edge of patch)	R 67	26- 5 54	+06	1555	-163	
	N	same	R 74	02-12 43	+03	713	-165	
		Mean lake level below NE station (3716')				162 feet.		O H E
July 27								
9:15								
a.m.	NE	SW red spot (lake)	R 42	30- 5 30	00	1685	-162	
	N	same		50 30- 7 00	+03	1300	-164	
	NE	Lake by W red spot	R 67	12- 6 02	+04	1555	-166	
	N	same		74 04-12 50	00	713	-166	
		Mean lake level below NE station				164 feet		O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday

Date July 27, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
9-11 a.m.	W	SW grotto	1	panch film	A	f/16	$\frac{1}{8}$	4x5
	100 yd E of N	N bank	2	"	"	"	"	"
	N of N	S bank	3	"	"	"	"	"
	N	NNE bank	4	"	"	"	"	"
	N	SE bank	5	"	"	"	"	"

O H E



1. Toward southwest grotto and west bank.



3. South bank from N. of N. station.

July 27, 1923



5. Southeast bank from N. station.



2. North bank, from point 100 yards E. of N. station.



4. North-northeast bank from N. station.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Sunday Date July 29, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
10a.m.	NE	S station						
	N	same						
	NE	Lake edge S	R 10 40	- 8 32	+01	1102	-166	
	N	same	R 11 29	- 6 10	-04	1485	-163	
	NE	Lake SW	R 43 33	- 5 35	+02	1673	-164	
	N	same	R 51 04	- 7 20	-05	1266	-165	
	NE	Lake W	R 63 47	- 5 58	+06	1579	-167	
	N	same	R 70 20	-11 38	-03	796	-169	

Mean lake level below NE station (3716') 166 feet

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Sunday	Date	July 29, 1923
	Monday	"	30, "
	Tuesday	"	31, "

July 29
10 a.m.

Considerable further collapse of benches, notably along E side where a delta shaped bench seems to have been formed only about a foot above level of lake. About six fountains near SW grotto, all of which are central and quite strong. All more or less migratory. Four fairly active ones in NNW part of lake. Spasmodic fountain NE more active than previously and now consists of two fountains about 10 yards apart.

Strong streaming from SE source toward toward SW fountains and moderate along NE bank. Slow driving of slabs against NE bank with overthrusting of crusts. Hissing NE. Fume thin, mostly from SE bench and SW fountains. Heat fairly strong.

O H E

July 30

7:50 a.m. Height of lake not much changed. Fountains variable, four marginal and five central, mostly in SW part of lake. One strong one appears at times S. Spasmodic fountain NE still active.

Currents generally sluggish, though there is strong current at times from margin near SW chasm to a group of central fountains 100 yards off shore. Slow streaming away from SE source. Fume fairly thick and from same sources.

No material change in benches. New bench under E bank seems to be partly covered with aa. Mass of black crust along margin at E bank undisturbed by thin crusted north moving stream from SE source. Sounds of fountains with subf-like sound at NE bank.

O H E

July 31

4 p.m.

Pit appears stagnant. Streaming slow. Four or five fountains at most. Principal fountains in SW region, continuous or slightly migratory. N half of lake covered with heavy skin moving scarcely at all. Isolated fountains in N central region but no border fountains seen and no bright edge to indicate subsidence.

Black ledge appears 50 or 60 feet high N and lake about 170 feet below rim.

SE source hot and bubbling as usual.

Pit at night as seen from a distance moderately bright.

T A J

Day Wednesday Date August 1, 1923

Thursday " 2, "

Friday " 3, "

August 1

5 p.m.

Streaming and fountaining much more lively and lake appears lower, perhaps 180 feet down. Bright edge around lake borders. Bubbling in thirty or more spots and bright lines SE. Lower ledge 10 feet above lake level SE.

Outward streaming from a crust along whole E bank of lake. Main current W along S half of lake. Outward fanning from SE to center. Slow creep of skins N. Stagnant condition NE.

Fountains in turbulent groups and lines SW. Some of these expend themselves on the bank. Their puffing, spraying and flaming is strong. Blue fume above them. Much whiter fume from SE bench. SW fountains continuous, but always changing number and pattern. From four to nine counted here, and three or four others in N central region. These latter are quieter dome fountains.

The bench or black ledge has fallen under W fault block and made a small cape of debris.

In evening there were occasions when the pit, as seen from a distance, was dull and no fountain fume whatever was in evidence. Apparently fountaining ceased at times. Later in the night the fountain light and fume jet reappeared.

T A J

August 2

1:30 p.m. A red avalanche cloud seen rising from N side of pit.

3:00 p.m. As seen from rim of pit lake appears still lower and with bright edge indicating continued subsidence. SW black ledge looks higher and W cape of debris is bigger. SE lower bench is 12 feet high. N black ledge has scaled off more.

Four to twelve fountains. SW fountains small. Seen on bank on one occasion. SE streaming is from bank itself. Skins rather thin.

7 p.m.

The look of the lake surface was peculiar with a suggestion of clinkery aa quality in glowing dots. Bright edge all around. Black ledge higher. Lake appears 190 feet below rim of pit. Bright glowing and perhaps flaming hole or cleft in face of black ledge WSW.

As many as twenty-two fountains in W half of pit at times. Very hot. One fall of bench N making avalanche cloud.

T A J

August 3

3 p.m.

Skins thin and lake very hot. Lake lower, 200+ feet down. More fountains, mostly in groups W of center and SW wall. Streaming from bank SE. Blistered skins.

A pronounced sinking movement with perhaps increases about noon or afternoon (?) Twenty-two earthquakes in daytime today ceasing toward evening. Numerous felt quakes.

Glow at night from fountains as before.

T A J

Day	Saturday	Date	August 4,	1923
	Sunday		" 5,	"
	Thursday		" 9,	"

August 4. Two or three felt earthquakes in forenoon. No avalanche clouds seen. Fume very thin. Lake reported lowering slowly.

T A J

August 5
10 a.m.

Lake much lower. Upper black ledge much fallen away, best preserved SW. Steam from cracks in wall at top of ledge S and SE. Protruding capes of ledge W and SE.

Six to eight fountains. Skins quiet with sweeping lines, somewhat blistered. A somewhat rhythmic patch of fountaining N of center. One small W grotto. Hissing heard. Most of the fountains extend across pit from N to S in a line W of center.

Outward streaming from lake edge SSE, but some inward streaming to wall E. Remainder of streaming as usual SE to SW, SW to N.

One felt earthquake last evening.

10 p.m.

Watched the lake for three hours. Fountains fluctuated in number, the northern rhythmic fountain breaking out rather regularly and leaving a healing-scar on the crusts broken through, which gradually cooled and hardened. This scar would migrate W with the crusts and the fountain recurrence would break a new place. Sometimes three scars were visible at one time.

Bright margin of subsidence in evidence most of the time. Some small falls of black ledge.

T A J

August 9
3:30 p.m.

Black ledge S is as high as the wall shown above it, but NE the wall band above is higher than the ledge is. Lake hence 215+ feet down. Wide ledge SE seen caving. W cape slowly growing as a buttress. Black ledge still intact near SW chasm. Most completely gone SE and NW.

Five to seven W central fountains. Nothing seen of the fountain NE of center. Bright edge around lake. Streaming general slow northwestward current. Glow spot no longer seen in W bench. No increase of fume.

T A J

SURVEY RECORD

Day Sunday Date August 5, 1923
Thursday " " " " " "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
August 5								
10a.m.	NE	S station						
	N	same						
	NE	W cape (lake edge)	R 44	44- 7 21	+05	1602	-212	
	N	same	R 49	59- 9 46	0	1192	-206	
	NE	S edge lake (SSE)	L 4	09-16 33	+02	699	-209	
	N	same	L 6	53- 8 12	0	1425	-207	
		Below NE station:						T A J
		W cape (lake edge)		211 feet				
		S edge lake		210 "				
August 9								
3:30 p.m.	NE	S station						
	N	same						
	NE	SE edge lake	L 1	42-15 44	+01	753	-213	
	N	same	L 4	20- 8 23	00	1431	-212	
	NE	SW edge lake	R 26	33- 7 48	+04	1554	-216	
	N	same	R 33	40- 8 00	00	1514	-214	
		Below NE station:-						
		SE edge lake		214 feet				
		SW " " "		217 "				T A J

Day	Date
Friday	August 10, 1923
Saturday	" 11, "
Sunday	" 12, "
Monday	" 13, "

August 10
9 a.m.

Lack of earthquakes indicate improbability of subsidence, though there may have been slight rise of lava in Halemau-mau. Fountains variable in number and intensity, up to half dozen in W central part of lake; at times they are strong. Bubbling at SE source very slight. Currents seem very sluggish. SE source of streaming seems to have moved further N and away from the bank. Very little breaking up and sinking of crusts.

Fume thin, comes from fountains and cracks in SE wall, high above lake. Heat radiation moderately strong.
10:05 a.m. Unusually strong fountain in SW part of lake, with strong local currents toward it.

O H E

August 11
11 a.m.

Fountains variable in number and strength, up to ten, some of which are at times strong. All are in NW part of lake. Strong local currents towards stronger fountains. Outside of tendency of fountains to be in NW, conditions are the same as yesterday.

O H E

August 12
11 a.m.

Height of lake little changed. An active group of fountains in W part of lake not far from bank, including from two to six fountains, which are fairly strong at times, with local currents toward them. Crust of lake somewhat thin, heat radiation moderately strong. Currents in lake very sluggish, in general. SE source quiet, with little bubbling. Fume thin, only sources being fountains and cracks in E wall.

O H E

August 13
9:30 a.m.

Fountains variable in number and intensity from hardly any to half dozen large ones. Individual fountains appear and function a while, and then die out, without migrating much. All fountains are in SW part of lake. Moderately strong currents from SE source to W and SW, with strong local currents to fountains. Slight bubbling at SE source. No fountains of any consequence along margins, but breaking up and sinking of crusts goes on at times. Crusts seem thinner and heat radiation milder than yesterday. Fume continues thin. No noticeable change in walls of pit.

O H E

5:30 p.m.

Seven to ten fountains in W region; some along N margin. Glowing line around edge of lake. Moderate heat and thickness of skins. Outward streaming from SE. Low roar of fountains and crunching of crusts. Fresh spatter corrugations in horizontal bands. Lake steadily and slowly lowers.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Saturday Date August 11, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
11a.m.	S	SW ledge	1	panc film	W A filter	f/16	$\frac{1}{2}$	4x5 Kodak
	N	W side pit	2	"	"	"	1	"
	N	E " "	3	"	"	"	1	"
	NE	S " "	4	"	"	"	1	"

O H E



3. East side of Halemaumau, from N. station.



2. West side of Halemaumau, from N. station.

Aug. 11, 1923



1. Southwest ledge from S. side of pit.



4. South side from N.E. edge of pit.

Day	Tuesday	Date	August 14,	1923
	Wednesday	"	15,	"
	Thursday	"	16,	"
	Friday	"	17,	"
	Saturday	"	18,	"

August 14

10 a.m.

Height of lake little changed, 220 feet below rim, more or less. Fountains variable, up to eight, mostly in S and SW; those in S being at times noisy and strong. Currents generally sluggish, though strong near the larger fountains. SE source bubbling slightly, with thin skins. Crusts generally appear moderately thin, with somewhat active breaking up at E; but hardly any breaking up elsewhere. Fume thin, almost all comes from fountains and SE bench.

O H E

August 15

9:15 a.m.

Lake risen about 3 feet since yesterday. Fountains variable, up to four strong ones in central part of lake. One about 150 yards from S edge most constant of all. Crusts on lake thin, and along E and NE banks are blistered. Little breaking up and sinking of crusts, some going on sluggishly along N margin. Streaming very slow, scarcely perceptible. Fume thin, only very thin wisp coming from crack in wall E. Fume from fountains moderate, and practically none coming from any other place.

10 a.m.

Bright edge around lake.

O H E

August 16

8:40 a.m.

Lake 2 feet lower than yesterday. Fountains variable, three to ten, at times strong. Mostly in SW and W part of lake. Streaming slow, from SE source toward fountains. Slightly increased bubbling at SE source. Crusts thin, heat radiation moderately strong. Some breaking up of crusts along SE and N margins. Fume even thinner than yesterday.

O H E

August 17

8:20 a.m.

Height of lake unchanged. Fountains variable, up to eight, all in W part of lake. Are at times strong. The fountain in the S part of the lake, which was active yesterday and the day before, not active now. At times moderately strong currents from S toward fountains, and also less rapid drift from E. SE source bubbling with thin crusts. Crusts in general moderately thin. Fume from SE bench practically stopped.

O H E

August 18

2:45 p.m.

Height of lake unchanged. About six fountains in WSW part of lake, strong. Crusts thin, radiation of heat strong. Very little breaking up of crusts, however, and what little there is is along margins, in patches. Currents in lake slow. Fume apparently thin, but hard to tell from steam due to rain.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date August 15, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9:15 a.m.	NE	S station	0					
	N	same	0					
	(10' E of	N)						
	NE	Lake S	R 21	14- 8 35	+05	1445	-220	
	N	same	R 26	58- 7 57	-03	1553	-217	
	NE	Lake W	R 76	33- 8 40	+03	1429	-219	
	N	same	R 82	58-24 50	-07	454	-214?	
	Lake level below NE station (3716'): South 218 feet West 216 "							
	O H E							

Day	Date
Sunday	August 19, 1923
Monday	" 20, "
Tuesday	" 21, "
Wednesday	" 22, "

August 19

10:25 a.m. Height of lake unchanged. Fountains variable, up to ten, mostly on W and N sides, near margins. At times strong, though usually somewhat weak. Streaming scarcely perceptible except near fountains. Crusts thicker than for some days previously, heat radiation mild. Breaking up of crusts along margins same as before, sluggish. Fume thin, only from fountains, none from bench.

O H E

August 20

9:30 a.m. Lake little changed since yesterday. Fountains at times stronger than yesterday, and currents toward them stronger. Up to seven fountains, of which one is in S part of lake, and rest are in N. All central. Crusts thick, same as yesterday. Over SE source they seem very thick, and streaming there not active.

O H E

August 21

9:30 a.m. Lake risen perceptibly since yesterday, but little change. Fountains vary in number and position and strength; up to seven, mostly in W part of lake. One in SW, at times constant. One in NE, with spasms every 10 to 15 seconds. Very slow drift from east toward W fountains, with faster local currents. Crusts same as before, fume thicker.

O H E

August 22

9:25 a.m. Benches around lake give an appearance of a 5+ feet drop in liquid lava since yesterday. Fountains more active, about nine. Six along NW side near margin, one in center, one S center, one marginal patch near SE active at times.

Fume from fountains distinctly thicker. Appearance of crust and streaming unchanged.

O H E

Day Thursday Date August 23, 1923
 Friday " 24, "

August 23

9 a.m.

Fountains variable, up to six; a few strong ones rather than many weak ones. Fountains in two groups, S center and near N margin. Local currents toward fountains moderately strong, though no general currents noticeable. SE source crusted and quiet. Breaking up of crusts more active, especially along NE margin. Heat at NE rim of pit and at N strong. Fume from fountains thicker. Lake showed bright edge most of time of observation.

O H E

August 24

9:15 a.m.

Was at pit last night, 8:30 to 9:15, and saw no drop. This morning lake showed marked fall. Fountains quieter and smaller than yesterday, up to half dozen, mostly in southern part of lake. Currents slow, lake generally sluggish. Fume moderate. Occasional rock falls all morning.

O H E

4:30 p.m.

Lava low, with thin black ledge layer all around, horizontally corrugated. Ledge thicker at SE side and shows a fault block near bottom. SE ledge steaming.

Lake has thin and blistered skins. Very little bubbling SE. Streaming slow from SE source. About ten fountains; four N of center, a large one and one or two others SW of center, and several in NW region. No marginal fountains. Some cracking and foundering crust near walls. Lake appears 250 feet below rim of pit.

Much Pele's hair flying, gleams in sunlight.

Ledge on both sides of SW chasm intact for 250 feet on each side and slight cape at lake level W. Top of this SW ledge continuous with floor of SW chasm. Rock fall heard SE. Quakes registered today.

T A J



2. Southwest chasm from S.S.W. rim of pit.



3. South side of pit from rim near auto terminus.



2. Southwest chasm from S.S.W. rim of pit.



3. South side of pit from rim near auto terminus.

Aug. 24, 1923



1. West bank of lake from N. station.



4. North side of pit from rim near auto terminus.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Friday~~ Saturday Date August 24, 1923
" " " 25, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
August 24								
9:15 a.m.	NE	S station						
	N	same						
	NE	Lake S	R 8	35-11 50	-03	1045	-218	
	N	same	R 8	48- 8 10	00	1470	-217	
	NE	Lake SW	R 47	03- 7 52	+04	1570	-220	
	N	same	R 51	20-10 58	-02	1122	-221	
	NE	Lake W	R 66	29- 7 58	+07	1545	-219	
	N	same	R 73	21-16 35	-03	721	-218	

O H E

August 25
9:15 a.m.

NE	N station							
N	NE "							
	(S station has gone)							
NE	Lake SW		L 54	15-12 33	+07	1497	-337	
N	same		R 77	08-15 00	+10	1252	-342	
NE	Lake S		L 68	29-13 10	+07	1422	-340	
N	same		R 64	36-12 55	+07	1467	-343	

O H E

9:15 to 10:30 a.m.

Fall continues slowly, with glowing edges to lake and frequent avalanches. Two active fountain groups, one near NNE bank and other in S center. Fountains strong and contiguous, though change position and number by joining or by splitting in several parts. Streaming slow. SE source quiet. Crusts medium thick; much more active breaking up of them, in part due to avalanches. Fume from bench and fountains thicker, but from lake as a whole is rather thin.

3 p.m.

Lake had fallen 50+ feet since morning, and there appeared about twelve islands of various sizes. About twenty fountains, mostly small; though a spasmodic fountain in NE strong and spattering over an island adjacent to it. No general currents noticeable, though there are local ones near fountains. Decided increase in amount of fume, especially from islands, and from biggest island in particular.

3:30 p.m. Counted 15 islands.

8:45 p.m. Lake appeared a mass of glowing lines, with some lava streaming out from islands SE. No fountains, but a crack in NE part of floor shot spray occasionally to a height of 100+ feet, with a report like a high powered rifle. Impossible to judge height of lake, or number of islands.

All evening the glow as seen from the Observatory was very slight.

O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Saturday Date August 25, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
10a.m.	N	Lake W	1	panc film	W A	f/16	$\frac{1}{2}$	4x5
	W	SW ledge	2	"	"	"	"	"
2:26p	NE	S side	3	"	"	"	1	"
2:37p	NE	SW chasm, showing some islands	4	"	"	"	$\frac{1}{2}$	"
2:47p	W	SW side	5	"	"	"	1.5	"
2:55p	NW	SE "	6	"	"	f/11	1	"
							O H E	



2. 10 a.m. Southwest ledge from W side of pit.



5. 2:47 p.m. Southwest side from W side of pit.

Aug. 25, 1923



1. West side of pit from N. station.



4. Southwest chasm from N.E. rim.



3. South side from N.E. station.



6. Southeast side from N.W. rim.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Sunday

Date August 26, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
10a.m.	NE	N station		0				
	N	NE "		0				
	NE	Yellow rock NE center	L 31	50-40 20	-02	648	-548	
	N	same	R 29	50-38 43	-03	688	-554	
	NE	Trinagular rock SW center	L 43	16-27 03	+02	927	-475	
	N	same	R 53	12-30 52	-02	796	-478	

O H E



— Post card. 1923. Unofficial. Location: Chain of craters, near Makaopuhi.

Day Sunday Date August 26, 1923
 Monday " 27, "

August 26.

10-11 a.m. Halemauau. Bottom of pit full of enormous cracked and jagged blocks, tilted at all angles. Hardly any fire visible except at SE source where lava was actively streaming out of a crack, carrying down blocks of rock, like a small aa flow. At 10:50 a.m. this had stopped, and all the fire visible was the glowing in a few cracks.

Main source of fume: cracks in SE wall, 125 to 150 feet below rim and a place among the blocks on S side of floor. Besides these, there are a few minor sources. Occasional rock falls from S wall consisting of pieces of the old ramparts.

On SE side of floor is what looks like large mass of aa.

1:30 p.m. Two chauffeurs claimed to have seen smoke toward Puna this morning. I went to Uwekahuna and could see nothing.

4:15 p.m. Halemauau. Conditions unchanged since morning except that cracks in NE part of pit are pouring out more smoke than they were. SE source still spitting in a small way. Rock falls continue.

O H E

August 27. Saw Alec who said that he saw smoke by Makaopuhi on Saturday, August 25, at 1:30 a.m. from hill by Devil's Throat.

Makaopuhi Trip. At 10:15 a.m. reached Puu Huluhulu; dense white fume rising from zone W of Makaopuhi. No fire visible. View into Puna cone country good, no activity visible. Some steam rising near Aloe crater, no more than usual, according to Beers.

Cut across country toward Kane Nui o Hamo, saw no new cracks between Puu Huluhulu and immediate vicinity of activity. Tried to go up Kane Nui o Hamo but could not. Ate lunch there, returned to activity.

Reached steam about noon, no fire visible. Fume very thick and strong. Could not determine extent of lava discharge on account of fume, but apparently small. Saw no flowing lava, and saw several parties, none of whom had seen any. Small new cracks plentiful, and some large ones (10 feet wide) were reported, but I did not see any.

About 2:30 p.m. met a party that had been to Makaopuhi crater; no activity there. Returned home by skirting around W side of fume, and saw that there were several sources of fume to lee of northernmost source, one of them being very dense. I could not smell anything in the fume there except SO₂, and of that there was plenty. Color of fume mostly white, some bluish white.

At E end of Alea Crater saw some new cracks 1.5 to 3 inches wide; near edge of crater. Probably due to recent quake rather than lava flow.

O H E



1. Steam from vicinity of Makaopuhi as seen from Puu Huluhulu.



2. Northernmost source of outflow, showing lava discharged.

Aug. 27, 1923



3. Another view of northernmost source of lava outflow near Makaopuhi.



Upper lava patch near Makaopuhi, looking S.



Upper lava patch near Makaopuhi, looking S.

Halemaumau

10 a.m. Lava, at 560+ feet down, a tumbled mass of large bench magma blocks much like January. Black ledge largely intact NW, W and SW, and very humpy with overhang at different levels; 25 feet wide on the W in at least two steps. Glow reported in black ledge W, in hole on top of ledge. Some avalanches.

At night glow visible in tumble of bottom, in spots yellow and fuming as seen in daylight. Low places N, SE and SW, the mass of matter rather level as seen from the W, like Asama bottom in 1909; but from SE appearing to have lowest part in eastern region. Some dark holes among the tumbled crags in places; much "patchy scum" pattern on surfaces left, polyhedra of pahoehoe with dull zones between, and much aa among the fragments. Little talus, and hardly any wall-rock talus. The talus remnants of January are still concealed.

Fume from the pit as a whole thicker than before the subsidence, but seeing is perfect. No disagreeable odor to leeward.

8 p.m. About thirty glowing places visible in bottom between the crags, some of these bright and probably flaming. Heavy avalanche heard from N black ledge.

Eruption Makaopuhi Flat

Noon. Left car at Kalapana trail and walked past Alea crater by National Park trail to lava-tree district just E of Kane-nui-o-hamo, this place lying on windward edge of new eruption. Eruption a development of N-S cracks W of Makaopuhi crater. A region freshly cracked, with many fissures one half to 2 feet wide. This region about 500 feet wide by 2000 feet long. Some fissures on edge of belt without gas, those inside increasingly steaming to center of belt, where dense white cauliflowers rise from one major vent which it was impossible to reach on account of acid fumes.

The new lava was a patch of one or two acres on N end of belt. Fumes steamy and biting, probably SO_2 . Sulphur around live solfataras in lava patch. Lava a shelly pahoehoe with some aa. There was much spatter and blobs and filaments on vegetation and on ground and on lava field. There were round holes and small cones along the cracks underlying the lava field. Cracked ground begins 100 yards from lava field.

Crossed lava field and went to edge of Makaopuhi which shows no activity; the usual steam cracks on W edge and at top of inner talus N; lava of 1922 exactly as left in May of that year.

Ferns browned all around the live area and burned in places. No sign of extensive brush fire.

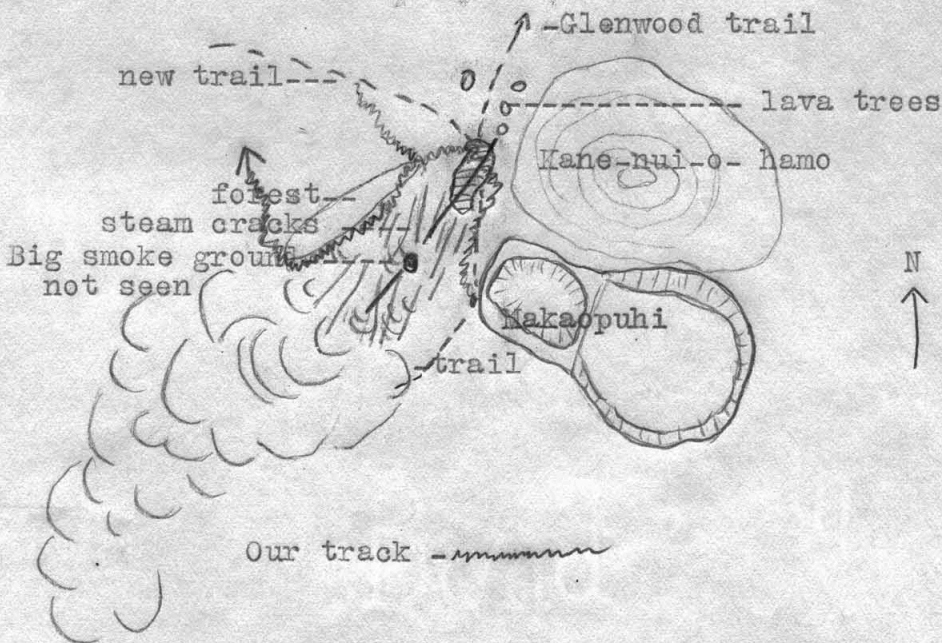
Returned to W side of active area, saw S end of lava patch, and followed W side from N to S through open forest ridge. No view of ground at big smoke hole. The smoke is brown in transmitted light, and more bluish and sulphury at N end of live area than at S end. Found old deep cracks 4 feet wide and some showing renewed motion. The inner

cracks emitting asphyxiating steam made it impossible to approach the center. No sign of lava at S end of patch.

Climbed Puu Huluhulu and view showed line of Puna cones beyond Kane-nui-o-Hamo and bushy ground S of new eruption, the last free from any lava flow. Dense fumes blowing SW, but could not see lava area. Aloii steaming, and also old broken ground S of it.

It should be noted that Mrs. J. Judd in July reported extra hot cracks W of Makaopuhi.

Sketch map of new eruption:-



T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Tuesday Date August 28, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
<u>Halemaumau</u>								
10-11 a.m.	S	SW chasm	1	panc film	A	f/16	$\frac{1}{2}$	4x5
	SW	chasm N	2	"	"	"	"	"
	"	" E	3	"	"	"	"	"
	E	SW	4	"	"	"	"	"
	NE	SW	5	"	"	"	"	"
	E	W	6	"	"	"	"	"
	N	S	7	"	"	"	"	"

O H E



1. Southwest chasm from S. rim.



4. Looking S.W. from E. rim.



3. Looking E. from S.W. chasm.



7. Looking S. from N. rim.

Aug. 28, 1923

5. Looking southwest from N.E. rim.



2. Looking north from S.W. chasm.



6. West side of pit from E. rim.



JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date August 29, 1923 3
 Thursday " 30, "
 Friday " 31, "

August 29
 9 a.m.

Conditions of lake unchanged. T A J saw fire in cracks in twenty or thirty places last night, but no fire visible in daytime. Occasional avalanches.

O H E

August 30
 9:30 a.m.
 to noon

Pit much the same. Some sliding, one avalanche sending up dust. Bright red old wall E where black ledge has fallen. Pit greatly resembles January, 1923. Notable long slope W, of bench magma fragments, over the big talus of 1922, which does not show, but determines the grade. Scorings on the slope. Steady hissing at a northern vent.

Went out to Kau Desert rift of 1920. No new fume or other activity along the Kau Desert.

T A J

10 a.m.

Fume from pit considerably thinner. NE fume place practically stopped. Rock falls continue, though smaller and less frequent.

O H E

August 31
 10 a.m.

Conditions at pit unchanged. Occasional rock falls and avalanches; one at 10:25 making earth shake slightly. Talus accumulating in patches along SE, E, NE and W sides of pit.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date August 29, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. l.
9 a.m.	NE	N station			0			
	N	NE "			0			
	NE	Red rock NE	L 31	05-40 37	-07	660	-564	
	N	same	R 30	45-39 05	+05	683	-560	
	NE	Triangular rock in center	L 45	31-27 23	00	920	-478	
	N	same	R 53	05-30 55	+2 02	793	-478	
	NE	Red rock S (new)	L 68	19-19 52	+03	1200	-435	
	N	same	R 57	24-18 10	+04	1325	-430	

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Thursday~~ Friday Date August 30, 1923
31

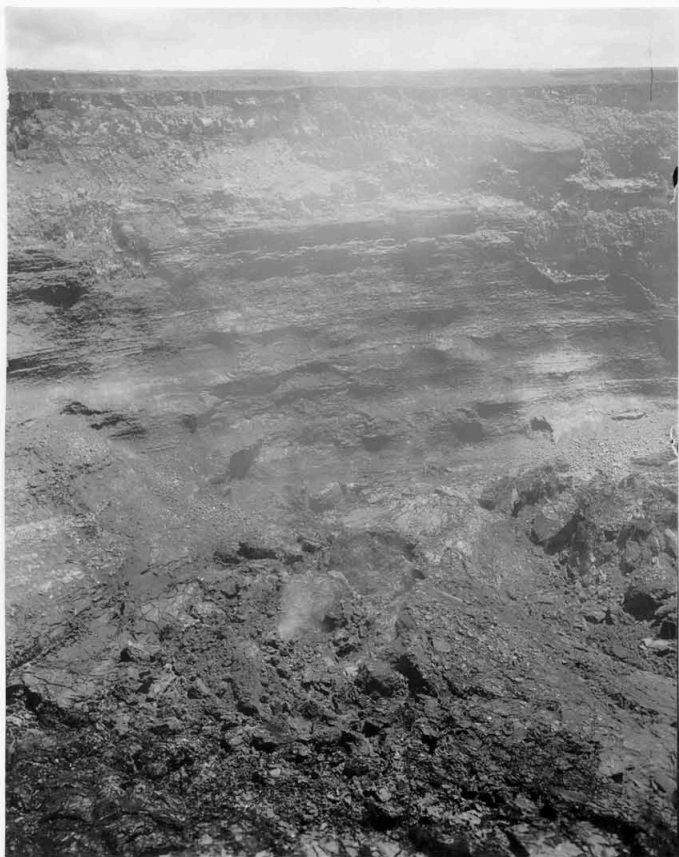
t	sta	pt	hor	vert	lev	dist	elev	h. i.
August 30 10a.m.	NE	Red rock N		-40 32	00	660	-565	
	NE	Triangular rock SW center		-27 20	00	920	-476	
	NE	Red rock S		-20 08	+02	1200	-440	
August 31 10a.m.	NE	Reddish brown rock NE		-40 34	-03	660	-565	
	NE	Triangular rock SW center		-27 29	-01	920	-478	
	NE	Red rock S		-20 10	00	1200	-440	

O H E

PHOTOGRAPH RECORD

t	sta	subject	no	pl	scr	stop	ex	cam
		Bright sun						
10a.m.	Near SW chasm	W and NW sides of pit	1	panch film	A	f/16	$\frac{1}{2}$	4x5
	"	Looking toward E wall	2	"	"	"	"	"
	SW chasm	" " SE source	3	"	"	"	"	"
	W	Looking toward S bench	4	"	"	"	"	"

O H E



2. East side of pit from near S.W.



3. Southeast side from near S.W.



1. W. and N.W. sides of pit from near S.W.



4. South side of pit from W. rim.

1923

Sept. 1
Oct. 25

312

Pictures

Dec. 3
Dec. 12

245
242

Dec. 31

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Saturday	Date	September 1, 1923
	Sunday	"	2, "
	Monday	"	3, "
	Tuesday	"	4, "

September 1
9:30 a.m. Fume thin, otherwise no change in pit. No rock falls seen.

O H E

September 2
4 p.m. Pit quiet. Fume thin. No observable changes. Three or four yellow fuming cracks in bottom, but not in SE well. Little motion. Much Pele's hair to leeward. At least four benches of bench-magma W corresponding to slope of submerged talus of 1922.

T A J

September 3
Southern fume crack stopped. N one active and pouring out dense white fume. Pit hazy. Occasional small rock falls.

O H E

11 a.m. At Puu Huluhulu. Fume at new eruption greatly dwindled. Three puffing places, middle one makes most white vapor. Blue gas over all three.

2:30 p.m. Big avalanche cloud from Halemaumau. Fume today thicker than yesterday.
Persons at pit said avalanche was from N wall, first below, then towards the top. Fume from N inner vent denser.

T A J

September 4 Returned from Hilo in evening and at 9:30 p.m. noticed dull intermittent glow over pit. Fume from pit during day reported to have become denser. During night glow is said to have become more constant, but not appreciably more brilliant. Outbreak took place between 9 and 9:30 p.m.

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Wednesday	Date	September 5,	1923
	Thursday		" 6,	"
	Friday		" 7,	"
	Saturday		" 8,	"

September 5

10 a.m.

Moderately strong spasmodic fountain at SE source, overflowing into pit with a regular stream of pahoehoe. Stream was some 75 yards long and 30 wide, growing rapidly. Fume in pit dense, making transit measurements impossible. SSW, W and NE fumaroles pouring abundant whitish fume.

5 p.m.

Pool extended almost to red rock N, some 250 yards from SE source. Fume dense, so that one can hardly see across bottom of pit. In going to leeward fume found to have almost no odor of SO₂. Hot cracks on SSW side of pit, which were quite cool (100° C, more or less) during subsidence, now much hotter, but not hot enough to set fire to paper.

Some avalanching all around pit.

O H E

September 6

9:40 a.m.

Tried to make survey but fume too dense. Got one angle.

Flow progressed and covered red rock N, but now going very sluggishly. SE fountain has less energy than yesterday, but is still noisy. Fume thick, though thinner than yesterday, and coming from same sources.

5 p.m.

A visitor at pit reported seeing a new flow break out from crack in SW center of pit, a little SSE of triangular rock in SW center. Lava poured quietly and noiselessly out of crack.

O H E

September 7

9:30 a.m.

Fume in pit so dense as to prevent use of transit, S fuming place in particular pouring out dense fume. Flowing from SE source increased, with a double spasmodic fountain. Pool heavily crusted, but in several places lava is pouring out from under crusts in steady streams. Size of pool somewhat increased. Small flow yesterday 5 p.m. in SW center now showing no signs of life.

4:10 p.m.

Saw big avalanche fall into pit, sent up big dust cloud, and splashed lava in pool over neighboring rocks. Fume notably thinner, N fuming place practically stopped. Lava scarcely flowing at all, hardly any fire visible.

Old ramparts seem to be peeling off still. One large piece on N wall almost ready to go.

O H E

September 8

10 a.m. to 12 m.

Pool crusted and lava flowing out from under crust in several places, with moderate speed, a little faster than before. No fountain this morning. Fume notably thinner, even than yesterday afternoon. NE fume source practically stopped. Frequent avalanches, some quite large, especially from NE wall, and at times from S and N.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

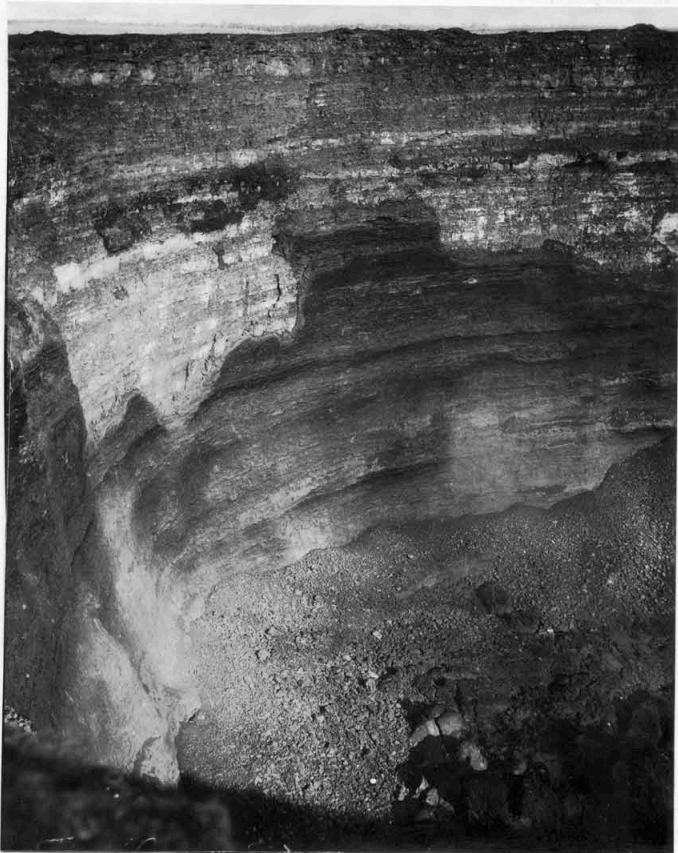
Hawaiian Volcano Observatory

Day Thursday Date September 6, 1923
 Saturday " " 8 "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
September 6 9:40 a.m.	NE	Triangular rock S center of pit		-27 25	-03	920	-475	
		(Fume too dense for more)						
September 8 10:30 a.m.	NE	Transit 6 feet from NE station:						
	N	N		0				
	N	NE		0				
	NE	Trinagular rock SW center	L 43 40	-27 27	-05		-475	
	N	same	R 53 10	-31 08	-07			
	NE	Point of lake near W stream	L 72 33	-46 45	-02	475	-505	
	N	same	R 24 15	-24 48	-03	1004	-525	
	NE	Point on lake near E stream	L 79 02	-41 48	-02			
								O H E

N
~~NE~~ transit

1923, Sept. 7



North wall from W. rim.

1923, Sept. 8



1. Pool, from N.W. rim of pit.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Sunday	Date	September 9, 1923
	Monday	"	10, "
	Tuesday	"	11, "
	Wednesday	"	12, "

September 9

10:30 a.m. Pool crusted, lava flowing out quietly under crust in several places. No fountaining. Pit smoky.

9:00 p.m. Pit considerably more active, small fountain occasionally at SE source, with streaming toward it. Small stream of lava oozed out of crack in SW center, near where Thursday's flow took place. Strong hissing in SW part of pit.

O H E

September 10

10 a.m. Strong hissing in SW continues. Lava not flowing actively, only a few glowing places. Last night's flow from SW center crack now dead. Fume mostly from SW source, which, though it is not pouring out any dense column, is giving pit hazy appearance.

O H E

September 11

10 a.m. to 12 m. Lava from SE source oozing out from crusts, somewhat more rapidly than before. Area covered by fresh lava now about 1/6 of pit. S fume place now giving off little fume; small lava flow coming from it. Fume in pit thin. Strong hissing in SW continues same as yesterday, perhaps stronger.

O H E

September 12

2:45-4 p.m. Flow from S source now much more rapid, pouring into main pool after running over 20-foot pali (cliff). SW crack, which had been so noisy, now discharging some lava, though stream crusted over. Puffing still, though not so noisily. SE well a miniature lake, some 20 by 15 yards, usually crusted but at times crusts break up with active fountain and currents. At 3:50 this happened and lake dropped 10 to 15 feet. Fountaining lasted only two or three minutes. Well now building itself up into a mound, like Halemaumau in Kilauea crater in miniature.

Lava in pool broke up crust about 3:40, like real lake, with some small fountaining. Crusts broke with noise like wagon with iron tires running on cement.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Tuesday Date September 11, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit 6 feet from NE, as before, and 4 feet lower than usual						
10a.m.	NE	N station		0				
	N	NE "		0				
	NE	High rock near W end of flow	L 16	47-37	50	-05	566	-438
	N	same	R 15	03-35	48	-02	622	-440
	NE	Triangular rock SW of center	L 43	42-27	27	-03	923	-478
	N	same	R 53	04-31	03	-05	800	-480
	NE	Grotto, S source new flow	L 64	00-23	30	+01	1095	-476
	N	same	R 55	45-21	47	-05	1193	-476
	NE	White rock, SE end of flow	R 80	00-34	07	00	750	-507
	N	same	L 35	55-22	05	00	1260	-510

O H E



1. Southeast side of pit from near S.W.



2. Northwest side from same position.

1923, Sept. 13



1. Northwest side of pit from S.W.



2. Southeast side of pit from S.W.



1. Northeast side of pit from W. rim.



2. Southwest side of lake from W. rim.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Thursday	Date	September 13, 1923
	Friday	"	14, "
	Saturday	"	15, "
	Sunday	"	16, "
	Monday	"	17, "

September 13

10 a.m. Pool risen considerably. S source now crusted and no fire visible there, but crack is puffing somewhat noisily. SE source behaving as yesterday. Fume thin.

O H E

September 14

11 a.m. S and SW sources not running out lava, though S source puffing strongly and SW smoking somewhat. SE source pouring out much lava from under crusts. Total area covered with fresh lava about half of floor of pit. Pool breaking up crusts, showing more activity in that way. Fume thin.

O H E

September 15. Conditions much like yesterday, except that S source pouring out lava, and still puffing. Pool extended almost to SW source. SW source smoking, but showing much heat in cracks. Much lava pouring out of SE source, though occasional fountaining spells take place there and lava in well sinks. Fountain at times strong, though does not last more than a minute or two. SE well still building itself up as a dome. Lake risen to level of triangular rock in SW center, about 480 feet below rim NE.

Late in afternoon strong puffing place developed near SE source, which at times exploded with dull roar.

O H E

September 16. At pit both morning and afternoon, SE source was seen pouring out lava abundantly with occasional spells of fountaining and subsidence, lasting up to five minutes, with rapid recovery. S source also pouring out lava, now on level with lake. Lake has buried triangular rock SW center and is rapidly extending. SW source a tall chimney, smoking and showing heat through cracks.

During afternoon a very noisy crack developed near SE source, exploding frequently with a dull roar, as though a gas channel was choked with viscous lava. The fume was very thin.

O H E

September 17.

3:15 p.m. Pool risen markedly since yesterday so that it is no longer being fed by SE source, which is filling up low land between it and pool, and to SE of pool. Pool has built ramps ^{around} itself, so that there is low ground 25+ ft. below mean level of the pool under NNE station. SE and SW sources are pouring out abundant streams. SW cone has split on SE side and from it a stream of orange yellow lava gushes like water out of an artesian well. Nearly 2/3 of the floor of pit is covered with lava. Heat felt at auto stand is strong. Many small places among the slabs are giving off fume, and when the SE well broke up with fountaining much bluish fume escaped.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday Date September 14, 1923
Saturday " " 15, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>September 14</u> Location of new stations								
11a.m.	NE	N station	R 75 55	30	- 0 33	- 0 03		5 ft
	SSW	same	R 87 14	+ 0 15	- 0 01			"
	SW	same	0 00	- 0 18	0 00			"
	N	NE station	0 00	- 0 02	- 0 02			"
	SSW	same	R 132 59	+ 0 28	- 0 02			
	SW	same	R 36 51	- 0 10	+ 0 02			
	N	SSW station	R 58 18	- 0 36	+ 0 01			
	NE	same	0 00	- 0 57	- 0 05			
	SW	same	R 68 30	30	- 1 45	- 0 02		
	N	SW station	R 82 33	- 0 01	+ 0 01			
	NE	same	R 15 18	- 0 14	- 0 04			
	SSW	same	0 00	+ 0 52	- 0 05			
O H E								
<u>September 15</u> Survey of Halemauau								
	NE	N station	0		(elevation NE 3716')			
	SSW	same	0		(" SSW 3700')			
	SW	same	0		(" SW 3716')			
	N	NE station	0		(" N 3712')			
	NE	SE (Information sign L near auto terminus)	L 105 54	- 2 17	-02 485	3702'		above sea
	N	same	R 19 55	- 0 41	-04 1376	3703'		"
	SSW	same	R 60 16	- 0 13	-07 985	3704'		"
	SW	same	R 49 23	- 0 42	-05 1375	3703'		"
	NE	S end of SW shelf (Lake in June)	L 61 09	- 4 50	-04 1425	-118		
	N	same	R 69 20	- 4 47	-04 1337	-114		
	NE	NW corner of same	L 42 19	- 4 19	-06 1628	-120		
	N	same	R 95 11	- 6 03	-03 1141	-124		
	NE	Top of big talus S	L 77 57	-21 36	-03 1103	-435		
	N	same	R 49 17	-16 54	-03 1436	-437		
	NE	Little talus S	L 73 45	-19 11	-03 1242	-431		
	N	same	R 55 50	-16 32	-04 1448	-433		
	NE	S source on small cone	L 63 16	-22 33	-04 1098	-478		
	N	same	R 55 57	-21 55	-04 1180	-476		
	SSW	same	R 6 43	-50 13	-07 385	-474		
	NE	Top SW cone	L 45 16	-22 37	+02 1042	-435		
	N	same	R 60 00	-27 11	-04 851	-439		
	SSW	same	L 1 39	-30 34	-08 712	-434		
	NE	Triang. rock SW cent.	L 43 29	-27 48	-06 922	-485		
	N	same	R 53 14	-31 26	-03 793	-487		
	NE	NNE ahu	R 31 40	- 0 48	-05 470	3716'		above sea
	N	same	L 17 49	- 0 06	-03 800	3715'		"
	SSW	same	R 29 26	+ 0 21	-03 1578	3716'		"
	SW	same	R 23 17	- 0 13	-03 1990	3717"		"
O H E								

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

Day Sunday Date September 16, 1923
Tuesday " " " " " "

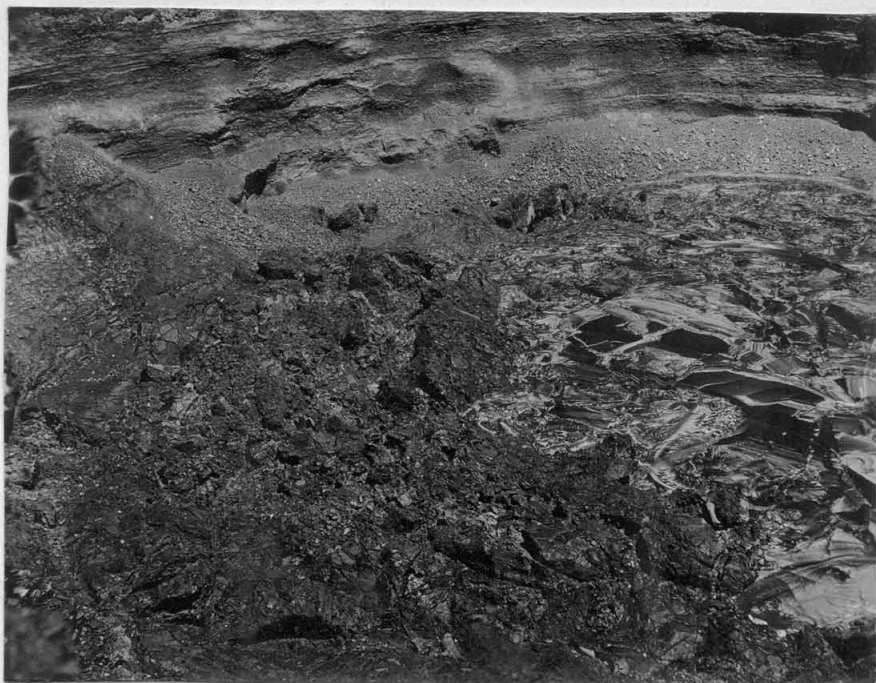
t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>September 16</u>								
	NE	Edge of lake by late triangular rock	L 41	29-26 24	-01	967	-480	
	NNE	same	L 52	05-26 55	-07		-473	
	NE	Small bay NW (lake)	L 22	01-30 56	-02	820	-490	
	N	same	R 38	05-43 40	-01	506	-488	
	NNE	same	L 39	07-36 35	-07	663	-492	
	N	Glowing cone SE near SE source	R 25	48-19 47	-02	1252	-454	
	NNE	same	L 97	00-27 35	-06	870	-453	
	N	Extreme SE end of lava	R 24	26-19 20	-02	1298	-456	
	NNE	same	L 100	11-26 58	-05	888	-450	
								O H E

September 18

	NNE	N (NNE 3715 above sea)	0					
	SW	N (SW 3716 " ")	0					
	N	NE(N 3712 " ")	0					
	NNE	NW station	L 8	42- 0 18	-03	520	3718	above sea
	N	same	R 131	18- 0 42	-03	325	3714	" "
	SW	same	L 9	19- 0 17	-03	1485	3715	" "
	NNE	W station*	L 32	22- 0 54	-11	940	3708	" "
	N	same	R 102	40- 1 11	-03	675	3703	" "
	SW	same	L 21	53- 1 30	-04	858	3700	" "
	NNE	Knob in lower rim of pit NE (lake)	L 101	28-37 22	-06			
	N	same	R 15	05-22 51	-05			
	SW	same	R 39	44-16 06	-05			

*Point uncertain as to elevation, not definite to shoot on.

O H E



1. Northwest side of lake from fault block
by S.W. chasm.



2. Southeast side of lake from same position.

Sept. 18, 1923.



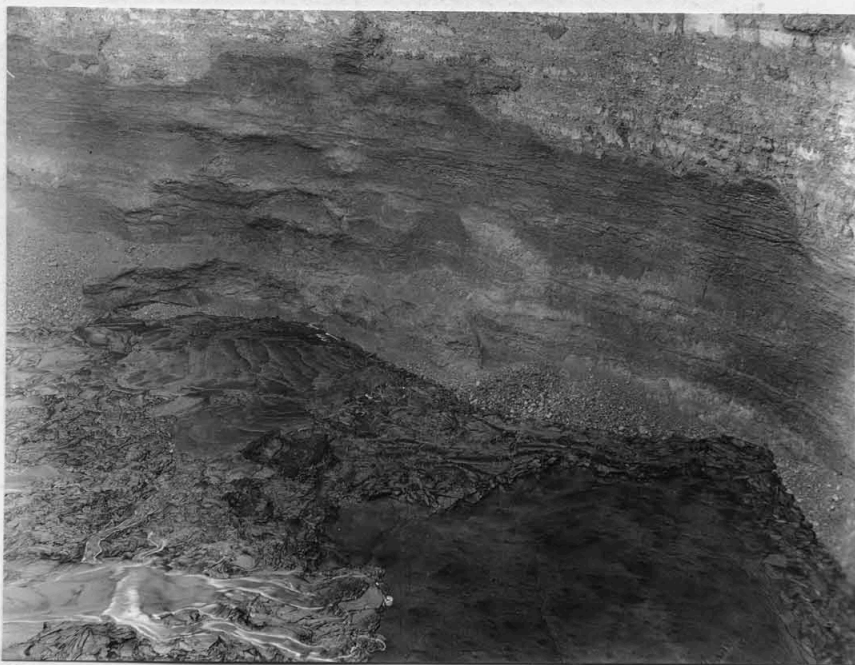
3. East side of lake and southeast well from
N.N.W. rim of pit.



2. Southeast side of lake from
S.W. rim of pit.



1. Northwest side of lake from
S.W. rim of pit.



5. Northeast side of pit from near S.E. station.

Sept. 20, 1923



3. Southwest side of lake from near S.E. station.



4. West side of lake from near S.E. station.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Tuesday	Date	September 18,	1923
	Wednesday		"	19, 1923
	Thursday		"	20, "
	Friday		"	21, "
	Saturday		"	22, "

September 18. Was at pit late in morning and most of the afternoon. Lake risen markedly, with all three sources active. Notably rapid stream from SE source to low area under NNE station. Lake rising faster than SE dome is building itself up, and latter is being more and more engulfed. Fume continues thin. SE source occasionally breaks up with very active fountains.

O H E

September 19. At pit all day making survey for map. Lava extended northward, covering fully 8/10 of floor of pit. New source fountain broken out under N station, responsible for flooding adjacent area. SW cone active with bubbling lava. S and SE sources apparently quiet, though probably streaming under crusts. SE dome wholly submerged by rising lake.

Breaking up of crusts active, heat radiation strong considering depth of lake. Fume generally thin, main source is SW cone, with many minor ones, particularly around SE source.

O H E

September 20.
Noon

Lake rising and expanding, now covering 9/10 floor of pit. All four sources are active now, N and S ones are fountains in lake, and SE and SW are cones belching out lava. There are islands in lake. Much flowing red hot lava visible. The ramparts are not wholly broken down so there is much relief in lava covered area.

Near SE source are a number of small islands which look like mud islands eroded by running water, the channels being some 3 to 6 feet deep. Fume thin. Heat strong, on account of large area of fresh lava exposed.

September 21.
2 to 4 p.m.

Lake risen to cover practically entire floor, with exception of a half dozen islands. All four sources tending to build themselves up as cones, though tendency is least with S source. Apparently distinct streaming from SW and N sources around lake in clockwise direction. All sources pouring out lava.

Not much noise or throwing of lava. S source acting as moderately active fountain. Fume continues thin.

O H E

September 22.
Noon

Lake rising, all four sources active and tending to build domes. Gas pressure at the time not very great, fountains rather small, not very much hissing. Fume very thin.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date September 19, 1923
Thursday " " 20, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>September 19</u>								
	NNE (3715)	New fountain N side	L 30	33-30 35	-04	773	-456	
	N (3712)	same	R 52	53-47 47	-04	430	-475	
	SW (3716)	same	R 8	37-18 55	-04	1325	-438	
	NNE	Knob in edge NNW(lake)	L 22	00-30 12	-03	795	-463	
	N	same	R 59	52-57 10	-03			
	(SSW 3700)	Ahu at N end fault scarp	L 71	48- 1 04	-05	668	3694	above sea
	SW	same	L 6	18- 9 20	-04	183	3686	" "
	(SE 3703)	same	L 62	25- 0 32	-04	1515	3695	" "
	SSW	Ahu at N end fault scarp	L 41	58- 0 50	-05	1215	3790	" "
	SW	same	L 32	14- 2 13	-05	880		
							O H E	
<u>September 20</u>								
10a.m.								
to	SE	New fountain	L 12	03-22 32	-04			
12 m.	NE	same	L 20	23-24 53	-02			
	N	same	R 53	52-46 55	-04			
	SE	Crack in SW wall	L 38	17				
	NE	same	L 38	40				
	N	same	R 86	04				
	N	Depression from N to flow from SSW cone		-27 05	-05	860	-440	
	SE	Lake edge W	L 24	52-19 00	-04			
	NE	same	L 26	20-19 35	-01			
	N	same	R 91	37-38 00	-05			
							O H E	

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Friday~~ Saturday Date September 21, 1923
" " " " 22, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
September 21								
2-4 p.	SE	N station	0					
	NE	" "	0					
	SSW	" "	0					
	SE	NW end NE talus	R 17	25-25 48	-06	932	-461	
	NE	same	R 8	43-37 13	+01	615	-468	
	SSW	same	R 20	57-17 04	-06	1447	-456	
	SE	Promontory in lake NW	L 12	29-19 33	-06	1225	-445	
	NE	same	L 16	23-21 37	+02	130	-448	
	SSW	same	L 4	44-18 41	-07	1260	-440	
	SE	Crack in rock, lake edge W	L 25	16-17 39	-05	1355	-441	
	NE	same	L 26	04-18 01	+02	1350	-440	
	SSW	same	L 18	20-20 22	-07	1145	-439	

O H E

September 22

11a.m.	SE	N station	0					
	SSW	" "	0					
	SE	S rim N cone (lake edge)	L 13	50-21 55	-05	1062	-439	
	SSW	same	R 0	44-20 30	-04	1143	-441	
	SE	S rim SW cone (end of pahoehoe toe)	L 38	21-24 47	-04	915	-433	
	SSW	same	L 1	59-30 45	-03	715	-440	
	SE	S rim S cone	L 59	20-26 22	-05	844	-431	
	SSW	same	R 2	24-47 45	-03	381	-434	

O H E

PHOTOGRAPH RECORD

Day Saturday Date September 22, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
12 m	SE	Bright sun SW side Halemaunau	1	panch film	G	f/22	$\frac{1}{2}$	4x5
	"	NE " "	2	"	"	"	"	"
		NNE SE source	3	"	"	"	"	"

O H E



1. Southwest side of Halemaumau from S.E.



2. Northeast side of Halemaumau from S.E.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Sunday	Date	September 23, 1923
	Monday		" 24, "

September 23
2 to 3 p.m.

Tendency for lake to form two pools very apparent. The SE source pool is about 250 to 300 feet long and 200 wide. Main pool occupies SW part of pit, and occupies 1/4 to 1/3 of the floor, including S and SW, but not N sources. These pools are building ramparts about themselves, which, however, they are overflowing almost continuously, flooding the lower areas with large streams of lava.

SE pool occasionally breaks up with active fountaining and strong streaming and subsidence. No streaming is visible in the main pool except near the breaks in the ramparts through which it is overflowing. SW cone has broken down on one side and a vigorous fountain is playing there. The S cone has vanished and only a weak fountain marks where it was. N cone inactive except for some hissing.

Sounds mostly moderate puffing, with splash of SW fountain. Fume very thin.

5:30 p.m.

There was a peculiar shaped cloud over southern end of Mokuaweoweo.

8:00 p.m.

Night brilliantly clear, with almost full moon. Mauna Loa and Mauna Kea both visible, and neither glow nor fume to be seen over Mokuaweoweo.

O H E

September 24
2 to 3 p.m.

SE source crusted and quiet, and sunk in its cup. N source also inactive; S source weakly active. S source is on the edge of main pool, where it is building a small cavern. SW fountain very active and constant, with streaming away from it. Main pool about 750 feet long by 350 wide, more walled in than yesterday. Rapid and voluminous stream pouring from it toward NE, bright red as it pours down rampart.

Skins on main pool medium thick, though thin and blistered near SW fountain. Fume very thin, with almost no sulphur.

Heat strong, on account of bright flow.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

Day ~~Sunday~~ Monday Date September 23, 1923
" " 24, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
September 23								
2-3 p.	NNE	N station		0				
	N	NE "		0				
	NNE	Top of N cone	L	30 38-28 26	-03	785	-424	
	N	same	R	54 45-45 30	-04	419	-428	
	NNE	N edge SW cone (lake)	L	53 41-21 47	-03	1042	-418	
	N	same	R	59 48-25 43	-05	859	-416	
	NNE	Top fo SE cone	L	96 22-26 14	-04	864	-425	
	N	same	R	25 55-18 52	-04	1240	-426	
		NNE station 3715' above sea						
	N	" " 3712 " "						O H E
September 24								
2-3 p.	SE	N station		0				
	SW	" "		0				
	SSW	" "		0				
	SE	Edge of pit NE	R	27 11-26 11	-05	878	-443	
	SSW	same	R	26 56-15 44	-05	1511	-440	
	SE	Edge of promontory by	L	17 59-30 01	-03	704	-419	
		E end main pool						
	SSW	same	R	17 00-23 30	-05	918	-413	
		SE station 3703' above sea						
	SSW	" " 3700 " "						O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

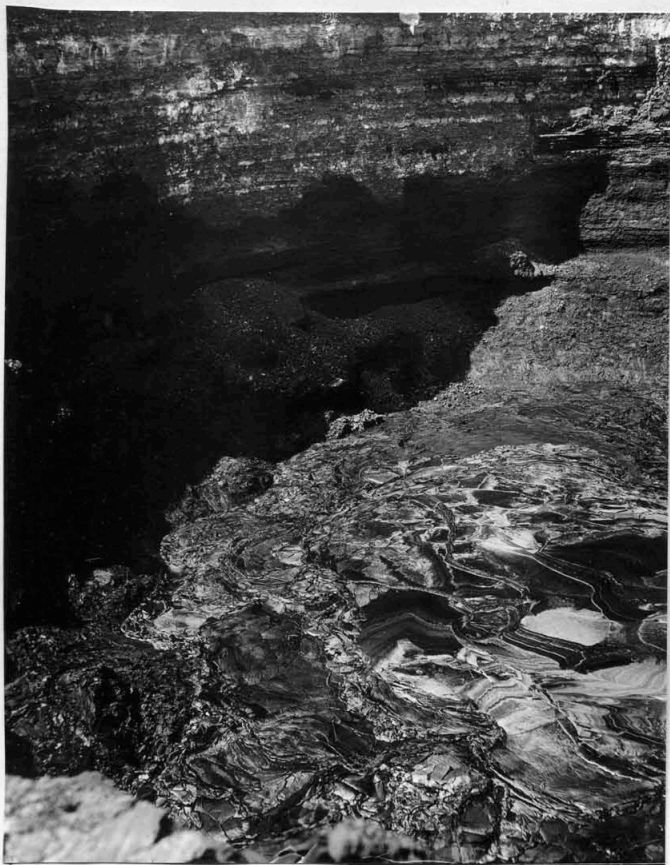
Hawaiian Volcano Observatory

Day Monday

Date September 24, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
2 p.m.	SSW	SW side of SW pool	1	panch film	A	f/16	$\frac{1}{2}$	4x5
"	NE	" " pool	2	"	"	"	"	"
"	SE	" " pit (1, 2 and 3 bright sun)	3	"	"	"	"	"
	NE	Toward SW (Light clouds)	4	"	"	"	1	"

O H E



1. Southwest side of southwest pool
from S.S.W. station.



2. Northeast side of pool from
S.S.W. station.

Sept. 24, 1923



3. Southeast side of pit from S.S.W. station.



4. Looking southwest from N.E. station.

Day Tuesday Date September 25, 1923
 Wednesday " 26, "

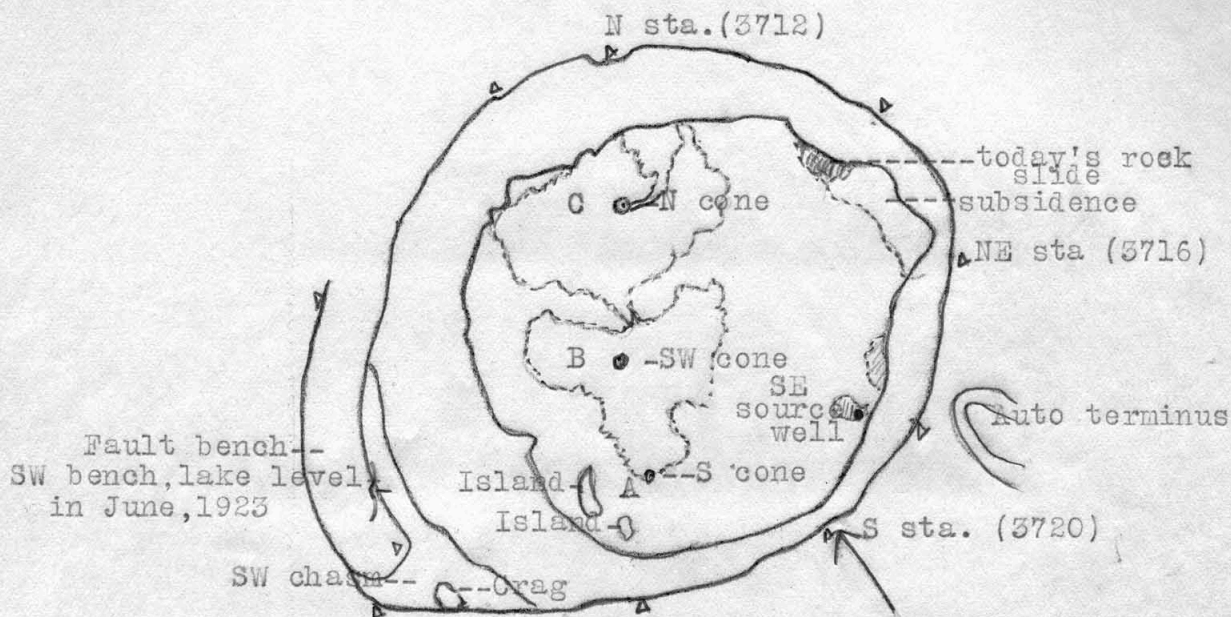
- 1 -

September 25
 11 a.m.

Lake much less active than yesterday; crusted; only moderate fountains at N, SW and S sources, and a new one in NE part of SW pool, almost in geometrical center of pit. A cone in SE source region at times belches lava. Neither pool is overflowing to any extent, though both are full to the brim. Fume continues extremely thin.

O H E

September 26. Map from survey of Sept. 22.



The SE well which was filled in yesterday morning by a flow from the source B, today again became a place of slight activity followed by subsidence which late in the afternoon gave the sump the contour of an oyster shell as shown on sketch. A small hissing cone appeared as shown by the dot on the S side of sump from which small explosive jets of very hot and fast flowing lava were at long intervals -- one and one quarter hours -- emitted and flowed toward and into the sump. The sump was 15 or more feet below the surrounding crust. Its surface at about the same intervals engulfed itself in overrolling folds of welling lava producing a fiery effect of activity.

In comparison, however, the activity of this SE sump and environment was far less spectacular than the activity of the three other main sources marked A, B and C which have caused the rise in the bed of the crater. Yesterday source A was almost submerged by flows from source B, its activity being confined to a glowing "eye". Today source A became moderately active, its flows reaching an area toward the SE sump.

SURVEY RECORD

Day Tuesday Date September 25, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
11a.m.	NNE	N station		0				
	N	NE "		0				
	NNE	N fountain, SE edge	L 31	00-28 25	-04	775	-419	
	N	same	R 53	21-44 42	-05	424	-422	
	NNE	Main pool, NE edge	L 52	43-25 26	-03	856	-407	
	N	same	R 49	38-28 45	+01	740	-410	
	NNE	SE source cone	L 96	55-25 42	-03	858	-413	
	N	same	R 25	27-18 12	-06	1242	-409	

O H E

Source B though more sluggishly active than yesterday, is yet a prolific source of lava which has sought its level in the area toward and including source C shown on sketch. Source C has been intermittently active during the day and has overflowed the area to the N as shown on sketch. Hence there were today three sources of supply, A, B and C.

The feature of the day was a heavy rock slide on the NE wall about $2/5$ way down from top and the disclosure there of a fairly wide crack opening. After a small preliminary slide this opening was disclosed emitting smoke and this was followed by a heavy rock slide of veneer lava from that locality.

The most interesting development shown was that of the encrusted embankment of an area as shown on the sketch surrounding sources A and B thus indicating that an inner pit of activity, such as 1913, may be formed around this area.

There were indications of subsidence on the NE section.

E. A. Mott-Smith

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Thursday Date September 27, 1925
Friday " 28, "

September 27

10:45 a.m. to 12 m. Conditions very little changed. SW fountain constant and vigorous, with no streaming to it. S source quiet with occasional feeble outbreaks of short duration. N cone hissing but not showing much lava. SE well shaped like pear, crusted, sunken and wholly inactive. Main pool shrinking in size? Small pool between N cone and edge of pit exhibited breaking up and sinking of crusts. Has never been very active, and has only weakly developed crusts around it. Pool about 350 feet diameter.

At 10:50 a.m. main pool broke up with active fountaining and rapid streaming to SE corner. Had slight temporary subsidence. Main pool overflowing to SW with moderate rapidity.

An old area of flat pahoehoe in NE part of pit broke up yesterday forming some ridges of broken pahoehoe slab and aa. Photographed area.

Fume continues extremely thin, with a number of minor sources. Some white solfataric deposits about cracks in E part of pit.

O H E

September 28

11 a.m. to 12 m. Main pool sunk a trifle, so that its edges show plainly. SW fountain constant and active, and at times other weak ones appear, usually in S cove of main pool. They last but a few minutes, accompanied by breaking up of crusts, rapid streaming and subsidence.

SE pool quiet and crusted, but cone to E of it is puffing loudly and emitting small amounts of lava. N cone a grotto, moderately active. N pool quiet and crusted, brimfull, so that its edge is not plain.

Most of fume comes from cracks in the bench not far from NE end of main pool, where there are two main sources. These are pouring out more fume than yesterday, but still it is notably thin.

O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Thursday~~ Date ~~September 27, 1923~~
 Friday " " 28, "

t	sta	subject	no	pl	scr	stop	ex	cam
<u>September 27</u>								
11:30 a.m.	SE	NE sunken region in Halemaumau (Bright sun)		panch film	A	f/16	$\frac{1}{2}$	4x5 O H E
<u>September 28</u>								
11:30 a. m.	N	Main pool	1	panch film	A	f/16	$\frac{1}{2}$	4x5
	N	SE pool	2	"	"	"	"	" O H E



Sunken region N.E., from S.E. station.



1. Main pool from near N. station.



2. Southeast pool from near N. station.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
 Hawaiian Volcano Observatory

Day Saturday Date September 29, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Survey for map of pool						
10:30	SE	N station		0				
a. m.	NE	same		0				
to	NNE	same		0				
12 m.	SE	NE end of main pool	L 15	30				
	NE	same	L 42	28				
	SE	SW side of W cove	L 42	13-20	55	-02	1010	-398
	NE	same	L 46	38				
	SE	W bank S cove	L 48	17-24	45	-02	834	-396
	NE	same	L 55	06-20	48	-05	1052	-398
	NNE	Tip of promontory on E side pool	L 68	00				
	SE	same	L 50	14				
	NE	same	L 60	08				
	NNE	Point on N bank E cone	L 53	56				
	NE	same	L 37	42				
	NNE	Center W cusp	L 44	35				
	NE	same	L 39	07				

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Saturday Date September 29, 1923
 Sunday " 30, "

September 29

10:30 a.m. to 12 m. Main pool sunken and crusted, with constant fountaining on small scale at S grotto and occasional other fountains. SW fountain inactive. SE cone flowing out a small amount of lava. SE pool filled up and boundaries are indefinite. N cone pouring out two strong streams, one flowing east, the other west. Limits of N pool, if such exists, are extremely vague.

Fume very thin, main source being SE cone. NE cracks, which were the source yesterday, now dead.

4:00 p.m.

Main pool risen and overflowing bank with vigor along SE side. SW fountain very strongly active, throwing large gobs of lava to height of 30 to 40 feet. SE pool active for short time, with break up of crusts. N cone not pouring out as much lava as it did this morning.

O H E

September 30

2:30 p.m.

Main pool overflowing SW and S sides somewhat sluggishly. Has been building high ramparts along E side. SW fountain active, S grotto scarcely so. SE cone hissing and pouring out small flow. N cone appears quiet.

Two zones appearing, one just S of W end of main pool and other by N bank, both covered with broken slabs. Islands of bench appearing through recent overflows?

3:20 p.m.

There was breaking up of crusts in W part of main pool with vigorous fountaining and rapid streaming, lasting about 3 minutes, but without noticeable subsidence.

O H E

PHOTOGRAPH RECORD

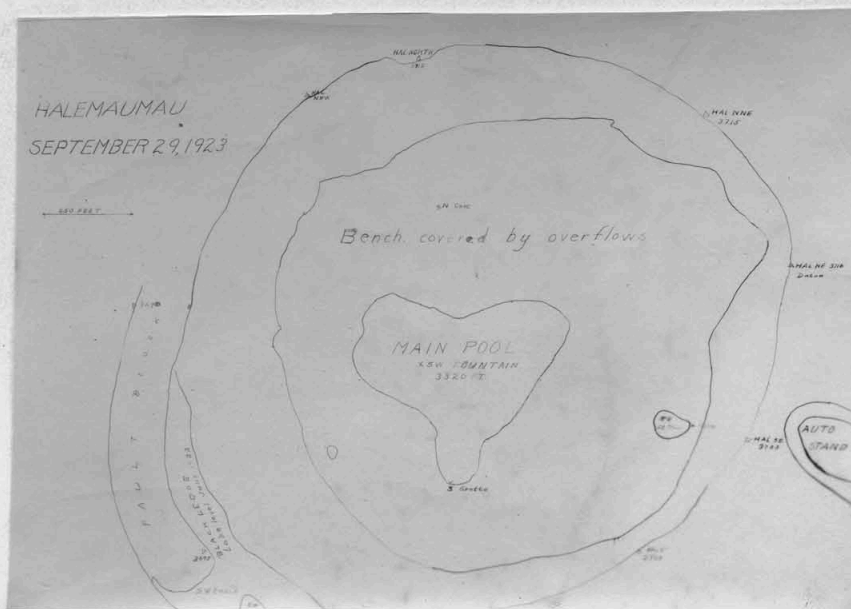
Day Sunday

Date September 30, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
2:30 p.m.	NE	Main pool Halemaumau (bright sun)		panch film	A	f/16	$\frac{1}{2}$	4x5 O H E



Main pool from N.E. station.



Map of Halemaumau from survey of Sept. 29.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Monday	Date	October 1,	1923
	Tuesday		"	2, "
	Wednesday		"	3, "

October 1
11 a.m.

Main pool active, pouring out rapid stream to NE, flooding aa patch. SW fountain vigorous. S grotto moderately active. Breaking up of crusts was frequent. Ramparts very well marked, in places fully 10 feet high. SE and N pools crusted and quiet, the former sunk in its cup, the latter full. Latter 300 by 200 feet, main axis NNE. Boundaries of N pool better than ever before. Fume continues extremely thin.

O H E

October 2
11 a.m.

At first the main pool was sunk in its cup a little, but it later rose and overflowed the bank in five places. SW fountain constant and vigorous. S grotto weakly active. Latter has been building up a high cone. Occasionally other fountains play; these are sometimes strong. SE pool quiet, but cone near it has lately poured out considerable flow to the N and has built itself up fully 10 to 15 feet. It is smoking somewhat now. N lake much more indefinite in boundaries than it was yesterday. Looks as though it might extend 400 or 500 feet to westward. N cone moderately active.

O H E

October 3
11 a.m. to 12 m.

Main pool somewhat sunk, so that it is not overflowing. SW fountain quiet most of the time. S grotto more active than before and is source of streaming into main pool. At times as many as five fountains in action in main pool, of which several are very vigorous. N cone markedly more active. It is source of pool of indefinite limits, but apparently as big as main pool. In it several areas look like islands, being covered with broken slabs and several are fuming somewhat. SE cone has built itself up fully 20 feet high, and is more active than for some time previously. Is also fuming a little. SE pool full and more active in fountaining and breaking up of crusts. Fume thicker than for some time but is still thin. Heat strong. Continued tilting, as though Halemaumau were being lifted, has thrown the needle on E-W seismograph far to one side. Adjusted at 1:53 p.m.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Monday~~ Tuesday Date ~~October 1,~~ ^{October 1,} 1923

~~Wednesday~~ " " " " " "

t	sta	pt	hor	vert	lev	dist	elev'	h. i.
<u>October 1</u>								
11a.m.	N	NE station		0				
	NNE	N "		0				
	NNE	E pond	L 94	43-26	10	-04	811	-398
	N	same	R 25	02-18	35	-05	1186	-401
	NNE	Main pool by S grotto	L 67	06-17	40	-04	1221	-387
	N	same	R 55	51-18	17	-05	1171	-389
	NNE	N pool	L 29	41-27	57	-04	743	-394
	N	same	R 48	44-44	47	-04	400	-400
								O H E
<u>October 2</u>								
11 a.m.	NNE	N corner N cone	L 29	40-26	39	-02	775	-390
	N	same	R 53	27-43	51	-04	405	-392
	NNE	W wall	L 25	27-18	00	-02	1205	-392
	N	same	R 100	58-33	30	-05	593	-395
	NNE	Main pool at SW grot-						
		to	L 66	57-17	26	-01	1227	-386
	N	same	R 56	09-18	10	-05	1175	-387
	NNE	E pool	L 90	52-25	29	-02	827	-394
	N	same	R 27	30-18	43	-04	1160	-395
								O H E
<u>October 3</u>								
11a.m.	NNE	N station		0				
	N	NE "		0				
	NNE	N cone, N pool	L 31	19-26	27	-01	761	-379
	N	same	R 51	17-41	46	-06	425	-382
	NNE	S cone, main pool	L 67	18-17	18	-04	1225	-381
	N	same	R 55	44-17	56	-06	1178	-382
	NNE	SE pool	L 96	39-24	49	-05	832	-384
	N	same	R 24	41-17	23	-05	1220	-384
								O H E



1. Southeast pool from N. of N.E. station.

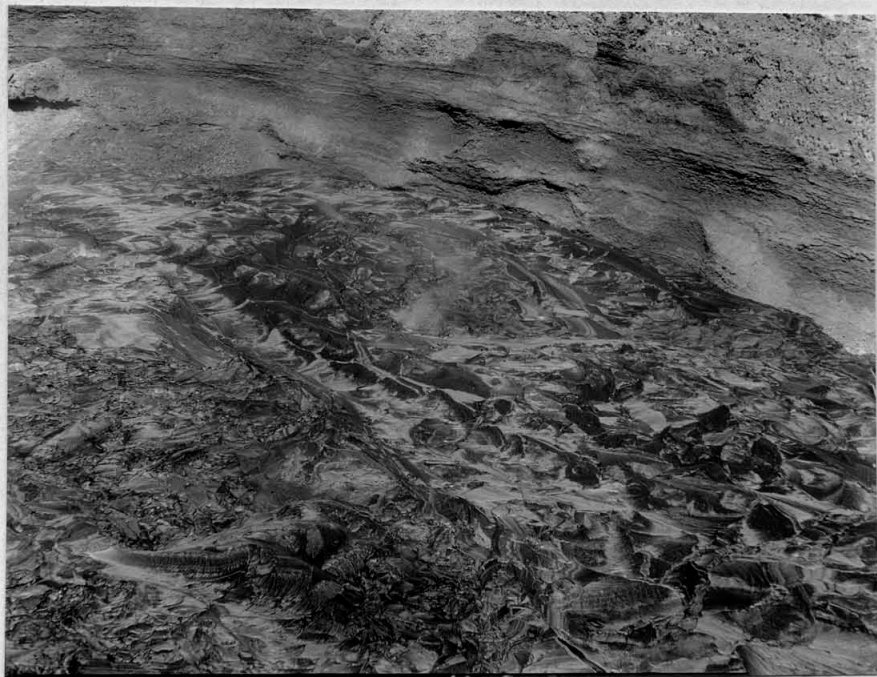
Oct. 2, 1923



2. Main pool from N.E. station.



3. North section of pit from N.E.



1. North part of pit from S.E.



2. South part of pit from S.E.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Thursday	Date	October 4,	1923
	Friday		" 5,	"
	Saturday		" 6,	"

October 4

11 a.m. to 12 m. All pools full. Main pool overflowing in four places. Margins are vague except E rampart of main pool. SW fountain quiet. S and N grottoes very active and constant. Both are sources of streaming. SE cone quiet. Main pool and N pool at times break up with rapid streaming and very vigorous fountaining. Fume thicker, five distinct sources in N part and a few smaller ones in S, but as a whole the pit was clear. Heat strong.

O H E

October 5

8:30 a.m. The various pools appear to be uniting. Main pool overflowing into SE pool. A large section of rampart near S grotto has collapsed, making latter an island. S grotto powerfully active and constant, throwing large gobs of lava to height of 20 to 30 feet and smaller particles fully 50 feet. Occasional short lived but vigorous fountains in other parts of the lake. SW fountain quiet. N grotto quieter than it has been. SE fountain inactive. Fume thin, heat radiation strong.

O H E

October 6

2:45 p.m. Arrived at the pit and found all the pools sunk in their cups, crusted and quiet. Lava was streaming slowly into main pool from a new pool NE of main pool. At 3 p.m. main pool started to rise, with breaking up of crusts near S grotto, and very powerful fountaining and streaming away from fountains. Soon after fountains died down to moderate activity. N pool was revealed, apparently 300 feet long by 200 wide, and parallel to margin of pit. New pool NE of main pool about 500 feet long, and fed by main pool. SE pool somewhat enlarged and nearly round.

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Sunday	Date	October 7, 1923
	Monday	"	8, "
	Tuesday	"	9, "

October 7

11 a.m. to 12 m. Main and N pools full. Edges of former are ill defined along S and E sides. Appears to be enlarging greatly to southward.

SE pool enlarging, with faulting and sinking of blocks around the rim. It is usually quiet but occasionally has breaking up of crust.

In main pool, S and SW fountains are active, with fountaining in other places at times; up to seven fountains. N grotto somewhat feebly active.

Two main fuming sources, both near E end of main pool, but fume as a whole continues very thin. Heat moderately strong.

O H E

October 8

11:30 a.m. Main pool and SE pool are somewhat sunken in their cups, N pool full. Fountaining not very active. N and SE cones puffing, and S and SW fountains only moderately active. Occasional other fountains accompany break up of crusts.

In main pool, S and SW benches are only 4 feet high, while those at the NE are about 10 feet, suggesting tilting of floor of pit. Some large cracks forming in bench near E end of main pool. Main pool has extended itself fully 100 to 150 feet along SE side.

Several places along E end of main pool, on rampart, giving off dense white fume, making whole pit hazier than it has been since the rise got well under way.

Not much exposed lava, and heat radiation mild.

O H E

October 9

9 to 10 a.m. Main pool now occupies whole southern half of pit, where it extends to main wall of Halemaumau. Fairly definite rampart extends across lake over which lava is pouring in four active streams. Has filled up SE pool, so that as a separate entity has ceased to exist. N pool full and overflowing on to surrounding area.

Very powerful and constant fountaining in S source area, and at times elsewhere. As many as eight, of which only S fountain is at all constant. Only occasional fountaining over SW well. N and SE cones moderately active and pouring out some lava.

At times N pool breaks up with active fountaining, strong streaming and subsidence.

Fume thin, very much thinner than yesterday. Crusts thin and heat radiation very strong, almost unbearable. on rim.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Sunday~~ ~~Monday~~ ~~Tuesday~~ Date ~~October 7,~~ ~~8,~~ ~~9,~~ 1925

t	sta	pt	hor	vert	lev	dist	elev'	h. i.
<u>October 7</u>								
10:30								
a. m.	NNE	N station						
	N	NE "						
	NNE	N cone (N pool)	L 30	15-25	27	-03	770	-366
	N	same	R 52	48-41	35	-04	413	-470
	NNE	Edge of main pool	L 69	32-21	14	-04	943	-366
	N	same	R 43	52-19	57	-04	1002	-367
	NNE	E pool	L 95	22-24	27	-03	758	
	N	same	R 25	18-17	10	-04	1107	-357
								O H E
<u>October 8</u>								
10:45								
a. m.	NNE	N station						
	N	NE "						
	NNE	N pool	L 30	02-25	09	-04	774	-363
	N	same	R 53	10-41	30	-04	412	-466
	NNE	Main pool	L 69	10-21	00	-04	950	-364
	N	same	R 44	26-19	54	-02	1004	-366
								O H E
<u>October 9</u>								
9:45								
a.m.	NNE	N station						
	N	NE "						
	NNE	N grotto	L 31	00-25	00	-05	760	-354
	N	same	R 51	15-40	04	-04	420	-356
	NNE	Main pool, NE edge	L 81	34-27	54	-05	671	-355
	N	same	R 25	45-20	02	-02	958	-353
								O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Sunday

Date October 7, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
11:30 a. m.		Bright sun						
	NNE	NW side of Halemaumau	1	panch film	A	f/16	$\frac{1}{2}$	4x5
	NNE	S " " "	2	"	"	"	"	"
	NNE	E " " "	3	"	"	"	"	"
	SE	NE part " "	4	"	"	"	"	"

O H E



3. East side of pit from N.N.E.



2. South side of pit from N.N.E.

Oct. 7, 1923



1. Northwest side of pit from N.N.E.



4. Northeast part of pit from S.E.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Wednesday	Date	October 10, 1923
	Thursday	"	11, "
	Friday	"	12, "

October 10

11 a.m. to 12 m. Main and SE pools joined, sunk in their cups and are smaller than they appeared yesterday. They are surrounded by a very definite rim of crags that range up to 10 feet in height.

N pool only slightly active, with occasional breaking up of crusts. N grotto moderately active.

Fountaining in general moderate, not nearly so strong as yesterday. S and SW fountains active in main pool. Action in SE cone moderate.

Fume continues thin, heat radiation very much milder than yesterday.

O H E

October 11

2 to 4 p.m. Main pool little changed, bounded on E and SE by walls of crags ranging up to 15 feet high. S and SW fountains constant and active, though not strongly so. New SE gulf is a region of sinking, with a steady and at times rapid stream flowing into it. However, SE cone is pouring out small volume of lava that is pooling to E of gulf, and is flowing into gulf at times over cascade.

N cone hissing strongly and grotto little changed. N pool full, its limits very indefinite.

Large sunken area to E of N pool apparently dead and cold. Reason for its having sunk not apparent.

W wall of SE gulf made of aa, glowing like bed of coals at 2 p.m., but later cooled.

Fume thin; chief sources being three places along bench on E margin of main pool and one place between N pool and sunken area.

O H E

October 12

12 m.

Situation very much like yesterday except that a ledge has risen, severing the main pool from the east gulf at the "golden gate". Main and SE pools are sunk in their cups, while N pool is full and overflowing. Benches appear to have risen higher than they were yesterday.

N cone very noisy. SE cone still pouring out lava which is cascading into the new SE pool. Fountains in main pool are somewhat weak.

Fume comes from same sources and is about as dense as it was yesterday.

O H E

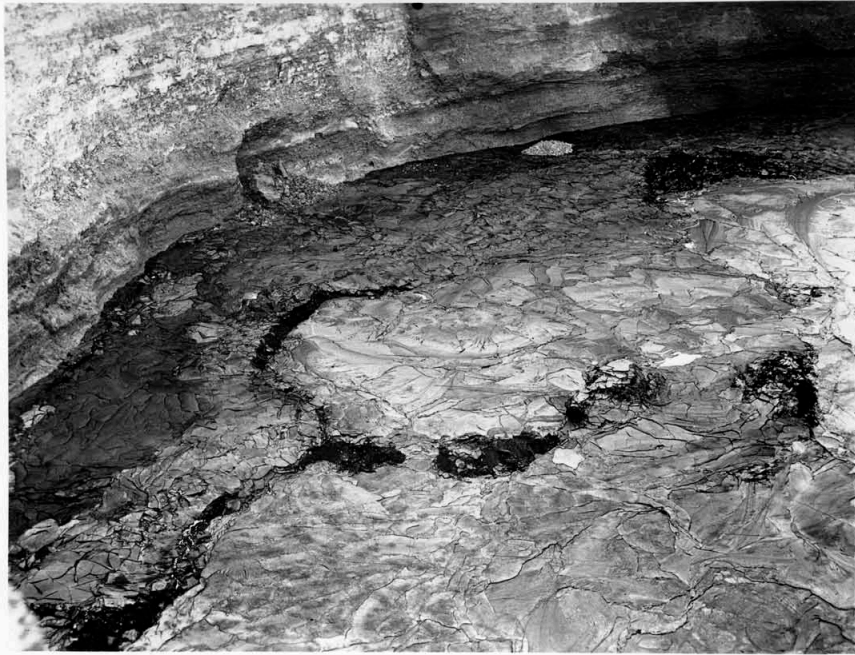
SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date October 10, 1923
Thursday " 11 "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
October 10								
11 a.m.	NNE	N station						
	N	NNE "						
	NNE	N cone N pool	L	29 38-24 45	-05	768	-354	
	N	same	R	70 28-41 15	-02	406	-359	
	NNE	Main pool	L	69 13-26 50	-04	720	-364	
	N	same	R	50 57-22 40	-04	867	-365	
							O H E	
October 11								
2 p.m.	SE	N station						
	NE	same						
	NNE	same						
	N	NNE station						
	SE	E lobe main pool	L	14 46				
	NE	same	L	41 07				
	NNE	same	L	65 14				
	SE	N promontory	L	29 41				
	NE	same	L	40 49				
	NNE	same	L	52 05				
	SE	W end main pool	L	30 13				
	NE	same	L	34 57				
	NNE	same	L	40 45				
	SE	W indenture	L	43 17				
	NE	same	L	46 29				
	NNE	same	L	50 08				
	SE	Promontory S side	L	49 02				
	NE	same	L	54 45				
	NNE	same	L	60 31				
	SE	S bay, by straight coast	L	63 20				
	NE	same	L	64 35				
	SE	E end of straight coast	L	65 39				
	NE	same	L	72 19				
	SE	W side "golden gate"	L	47 32				
	NE	same	L	66 38				
	NE	Tip of peninsula	L	42 12				
	NE	same	L	57 50				
	NNE	same	L	69 20				
	N	E end gulf	R	40 00				
	NNE	same	L	97 45				
	N	S end sunk area	R	37 08				
	NNE	same	L	94 35				
4 p.m.	N	NNE station						
	NNE	N "						
	NNE	N grotto	L	30 14-24 48	-08	755	-347	
	N	same	R	68 42-40 25	-05	410	-350	
	NNE	E side SE gulf	L	93 53-22 30	-05	858	-355	
	N	same	R	44 58-16 12	-02	1215	-356	
							O H E	



1. Southeast side of pit from N.N.E.



2. Main pool from N.N.E.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

Day ~~Friday~~ ^{Saturday} Date ~~October 12,~~ ^{13,} 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>October 12</u>								
11a.m.	NNE	N station						
	N	NNE "						
	NNE	N cone	L 30	05-24 18	-06	770	-347	
	N	same	R 70	47-40 15	-05	408	-348	
	NNE	Lake by small W promontory	L 47	05-17 02	-04	1145	-350	
	N	same	R 88	36-22 42	-04	839	-353	
	NNE	Top of promontory	L 69	51-19 30	-04	948	-335	
	N	same	R 62	03-18 20	-05	1012	-338	
	NNE	E pool (yesterday's gulf)	L 92	31-22 13	-04	870	-355	
	N	same	R 46	02-16 25	-06	1209	-357	

O H E

October 13

10-11 a. m.	NNE	N station						
	N	NE "						
	NNE	N grotto "N pool"	L 30	05-24 11	-05	773	-346	
	N	same	R 53	18-40 06	-05	410	-348	
	NNE	W end rampart, main pool	L 41	22-17 25	-06	1086	-340	
	N	same	R 73	15-25 09	-06	720	-340	

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Saturday	Date	October 13,	1923
	Sunday		"	14, "
	Monday		"	15, "

October 13

10 to 11:30 a.m. Lake risen and drowned almost the entire bench, except for a few islands in W part of pit and E part. All pools united.

Only two places where there is rapid streaming. One is at W end of former main pool where remnants of the old walls constrict the current. And the other is on edge of N pool where lava from the high main pool is pouring into it over the partly drowned rampart.

Fountaining variable, up to eight, at times vigorous. Two constant fountains over SE source. S grotto active, N one feebly so. No activity visible over SW source.

Fume thin, coming from island near main pool. Crusts thin and heat radiation strong.

Glow over pit last night brilliant.

O H E

October 14

10 to 11 a.m. Main pool taken on definite shape, occupies entire E half of pit, including former main pool, SE pool, E sunken area. Extends almost to the wall of Halemaumau in several places, but usually there is margin of bench up to 75 feet wide.

Fountaining at times powerful. Strongest fountain appearing intermittently on W end of main pool. Moderately powerful and constant fountains over S source, and over site of SE cone, which has disappeared. N cone also constant and strongly active.

N pool full, margins very indefinite. Main pool somewhat sunk in cup, so margins are sharper.

Fume thin, but more SO₂. One at times gets unpleasant whiffs at Halemaumau on SE. Alec went to the SW and said there was no SO₂ there.

O H E

October 15

9:45 to 11 a.m. Shape of main and N pools very much like yesterday. Main pool somewhat more sunk in its cup. No fountaining over SE and S sources, but many fountains in lake, up to twenty, varying greatly in strength. At times fountaining powerful, accompanied by rapid streaming and evolution of much SO₂. Strongest streaming was to a group of fountains in central part of main pit, but lasted only a short time.

N cone constantly and moderately active, only cone left in the pit. An island is forming a little W of N cone.

During the morning the main pool sank somewhat in its cup.

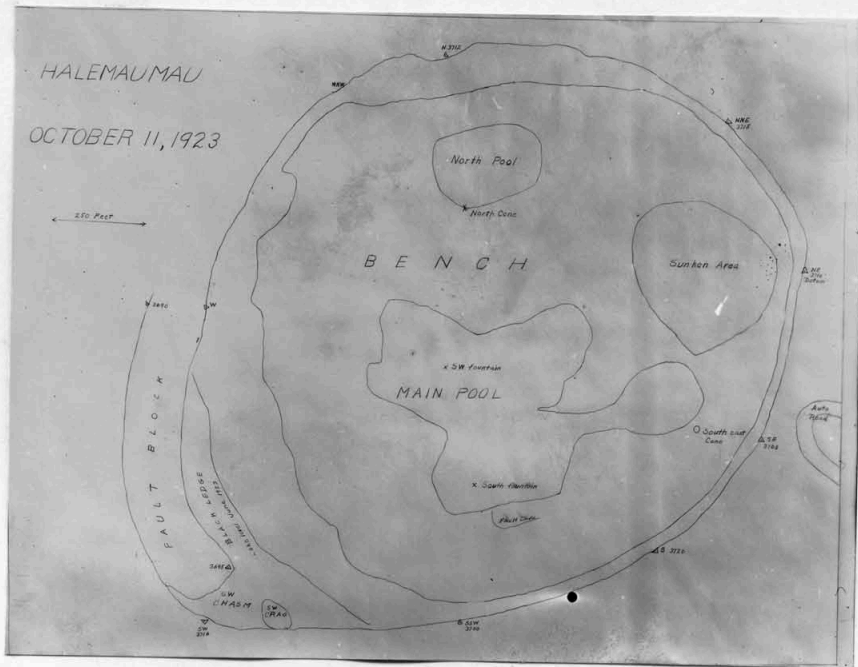
O H E



1. West side of pit from N.N.E.



2. South side of pit from N.N.E.





1. North pool from near N.N.E.



2. Fountaining in main pool, from near N.N.W.

1923, Oct. 15



5. Northeast end of main pool, from
near N.N.W.



3. South end of main pool, from near N.N.W.



4. Center of main pool, from near N.N.W.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Tuesday	Date	October 16,	1923
	Wednesday		"	17, "
	Thursday		"	18, "

October 16
9 a.m.

Three islands appearing in center of main pool. One large one 75 yards long. Other two small. Highest stands about 15 feet above lake.

Both pools sunk in their cups. N and SE fountains entirely quiet, S fountain at times weakly active, and SW fountain moderately and constantly active.

No currents visible. Heat radiation moderately strong. Fume extremely thin.

O H E

October 17

10 a.m. to 12 m. What was the big island yesterday is now joined to SE side and topography is identical with peninsula after closing of the "golden gate" a few days ago. W side of peninsula identical with that of October 12, even to location of shoreline and cracks.

Both pools sunk, particularly N one. Main pool smaller on account of rising of previously drowned bench. A new island has appeared in the main bay of main pool.

Fume continues very thin, some coming from newly risen peninsula just as it had before that piece of bench was drowned.

Fountaining very weak.

O H E

October 18

9:30 a.m. to 12 m. Both pools risen considerably in their cups since yesterday. Main pool much shrunk. SE pool area and sunken zone to NE apparently cold and shrunken zone appears just the way it did before being submerged on Saturday the 13th. Very hard to say whether pool is entirely cold or just heavily crusted.

A new cone has formed over SE source and is at times pouring out small flows. Generally feebly active.

N grotto also feebly active; also S fountain. SW fountain moderately and constantly in action.

Bench around lakes much cracked in places, indicating differential uplift. The two islands, which appeared in the main SW bay yesterday, have risen considerably and are larger.

Fume is very thin and comes from E side of the N bay -- the newly risen part of the bench.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

Day Wednesday Date October 17, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
11a.m.	NE	W end island	L 50 44	-17 36	-03	1080	-340	
	N	same	R 59 50	-19 15	-08	958	-335	
	NE	SE promontory	L 58 22					
	N	same	R 45 12	-18 20	-06	1015	-338	
	NE	N pool by grotto	L 19 54	-20 00	-03	958	-348	
	N	same	R 51 08	-39 44	-08	410	-344	
	NE	Top of grotto		-18 32	-03		-320	
	SE	W end NE talus, by furthest W rock	R 29 48					
	NE	same	R 24 14					
	SE	Small scar W	L 15 13					
	NE	same	L 14 25					
	SE	S end big talus W	L 30 28					
	NE	same	L 29 06					
	SE	Promontory on SW side, by black spot and wrin- kled crusts S side of promontory	L 57 05					
	NE	same	L 54 44					
	SE	Dent SSW, near turn	L 73 20					
	NE	same	L 69 01					
	SE	S side main pool near black spot	L 64 40					
	NE	same	L 63 27					
	SE	SSW side main pool, S edge smooth	L 46 43					
	NE	same	L 47 09					
	SE	SW bay	L 30 24					
	NE	same	L 33 48					
	SE	W promontory	L 28 58					
	NE	same	L 40 33					
	SE	W end N pool	L 15 07					
	NE	same	L 20 10					
	SE	E end N pool	R 0 28					
	NE	same	L 7 08					
	NE	E promontory, main pool	L 43 35					
	N	same	R 30 00	-21 56	-05			

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday Date October 19, 1923
Saturday " 20, "October 19
12 noon

Both pools full and overflowing the bench. They are joined together. Together they occupy an area on the map of October 15 including the main and N pools and the bench between, and the sunken region to the NE, bounded by the cliff. Most of the bench outside that cliff has been flooded?

Constant and active fountaining over N, S and SE sources, the one over N being the strongest. It is a powerful fountain. S fountain is a multiple one, made up of many small ones close together. Occasional fountaining elsewhere, at times stronger than N fountains.

N fountain is source of a very rapid stream, but no perceptible currents from SE or S. Temporary powerful fountains are sinkwells.

Fume thin, part coming from subsidence fountains, part from cracks in bench. Crusts over pools thin, heat strong.

O H E

October 20
11:30 a.m.

Both pools sunk again in their cups, main pool having sunk much the more. General topography same as on October 17, last map, though N pool somewhat changed and minor features altered. Extent to which NE and SE bays are live lava uncertain; both are very shallow, and when lava in main pool recedes, they are left pretty well dry. No aa along their bottoms, apparently pahoehoe does not occupy them long enough to form much aa. Neighboring bench seems to be quite largely aa, however.

Fountaining very weak, only N, SE and S sources active at all. No streaming visible. Fume very thin. Occasional break up and sinking of crusts. Heat only moderate, crusts inclined to be thick.

At least four islands in main bay of main lake, of which those two present on October 17 are by far the largest.

O H E

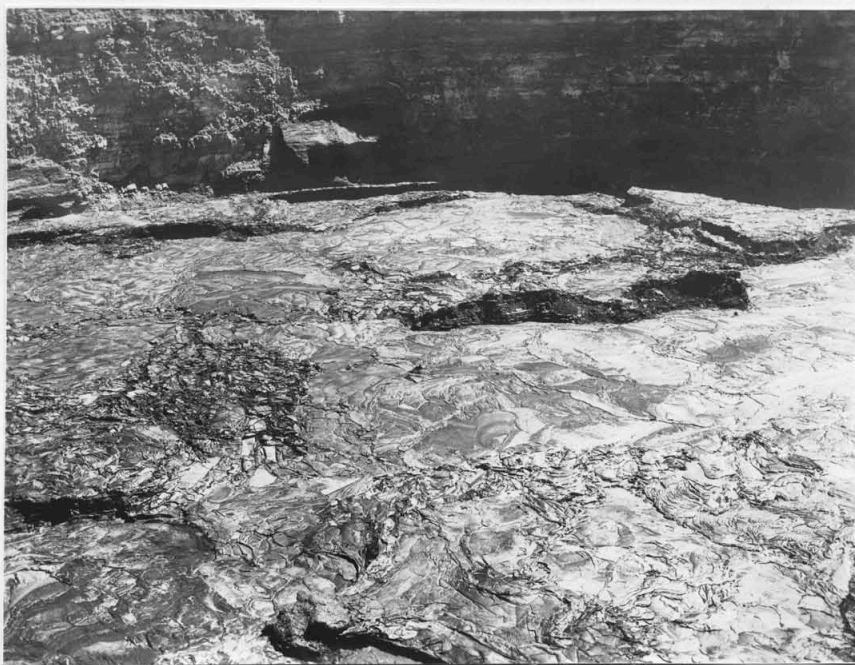
PHOTOGRAPH RECORD

t	sta	subject	no	pl	scr	stop	ex	cam
		Bright sun						
Moon		S side of main pool	1	panch film	A	f/16	$\frac{1}{2}$	4x5
	20 yd. S of NNW	} Central part of main pool	2	"	"	f/16	$\frac{1}{2}$	"
	75 yd. S of NNW	} NE part of main pool	3	"	"	"	"	"

O H E



1. South side of main pool, from near N.N.W.



2. Central part of main pool, from near N.N.W.

Oct. 20, 1923



3. Northeast part of main pool, and N pool from
point S. of N.N.W.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Sunday Date October 21, 1923
Monday " 22, "

October 21

2:30 to 3:15 p.m. Main pool much shrunk, extending as far NE as a line between N and SE grottoes. N, SE and S fountains active, usually feebly, though for a few minutes the S fountain was powerfully active, with rapid streaming away from it. Except for those few minutes, no visible streaming. Islands scarcely changed, there being four distinct ones.

The NE sunken area is now cold, and the thin veneer of pahoehoe is much cracked, with aa below. Appearance suggests portions of the floor of Mokuaweoweo. One area in particular, between the SE pool area and the main pool, is extremely rough.

Crusts on the pools of moderate thickness, heat radiation slight. Occasional break up of crusts. Fume thin.

O H E

October 22

10 a.m. to 12 m. Appearance of pit almost unchanged. N and SE cones at times weakly active. For a few minutes at 12:20 p.m. N cone was vigorously active. Several small fountains over S source, constantly and moderately active. Sluggish streaming from SE cone, with a few bright toes from under crusts.

No streaming visible in main pool. S island now connected to bank by a low bench which the pool is flooding sluggishly.

Fume thin, coming from three sources of which two are at the E end of main pool, and third at E end of N pool.

NE sunken area is now being separated from main pool by a rising block of much shattered bench, which stands about 4 feet above the sunken area and a little higher above main pool.

Fume thin, almost no heat radiation. Little fire visible.

Glow over pit for past two nights dull.

O H E

PHOTOGRAPH RECORD

t	sta	subject	no	pl	scr	stop	ex	cam
Noon	Fault block	Bright sun						
	SW	E side of pit	1	panch film	A	f/16	1/2	4x5
	"	N " " "	2	"	"	"	"	"
	"	W " " "	3	"	"	"	"	"
							O H E	



2. North side of pit, from S.W.



3. West side of pit, from S.W.

Oct. 23, 1923



1. East side of pit, from S.W.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Tuesday	Date	October 23,	1923
	Wednesday		" 24,	"
	Thursday		" 25,	"

October 23

10:30 a.m. to noon. Last night the glow was slightly brighter than it had been since the 20th. Flowing from SE source somewhat more active than during past few days. S, SW and N fountains active, at times moderately strong.

At 10:30 a.m. the N pool was sunk in its cup, but shortly after it started to rise rapidly, with vigorous fountaining at N grotto, and it overflowed the surrounding bench to a small extent.

Size of the main pool materially reduced by the formation of an inner bench, and its shape is becoming very irregular. S fountain most active fountain in it, and it is a multiple fountain, consisting of many small ones which are very close together.

Fume medium, comes from two sources, one at E end of main pool, the other at E end of N pool.

Crusts on N pool thin and heat radiation from it strong. Crusts on main pool thicker. No streaming visible in main pool.

O H E

October 24

10-11 a.m. Appearance of pools like yesterday, with inner bench of main pool becoming more pronounced.

S, SE and N fountains active, the S one moderately, and the others slightly. SE cone pouring out more lava than it had done for a long time. There is a slight current in the main pool away from the S source.

The bench around the main pool is rising differentially, a promontory on the E side and one on the W are both nearly as high above the lake as the island.

The SE pool is taking on a definite shape, and is about as large as the N pool.

O H E

October 25

11 to 12 m. Extent to which SE pool is overflowing has notably increased, by far the most vigorous flow from that source since middle of September. Cone at E end of pool belching out some lava, moderately active.

N and main pools moderately active with occasional break up of crusts. Crusts medium thick, heat radiation moderate. N and S fountains constantly active, S at times moderately strongly. SW not active at all. No perceptible streaming in main pool. Growth of inner bench there continues.

Bench rising and cracks in E part are becoming larger. Fume thin, coming from cracks in the bench near E end of main pool.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Tuesday~~ ^{Wednesday} Date ~~October 23,~~ ^{October 24,} 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>October 23</u>								
10:30	NNE	N station		0				
a. m.	N	NNE "		0				
	NNE	N pool	L 29	28-22	50	-04	770	-324
	N	same	R 71	28-38	51	-01	402	-327
	NNE	SW end main island	L 58	50-16	10	-05	1131	-327
	N	same	R 77	24-18	12	-01	994	-330
	NNE	Top of island	L 60	58-15	12	-05	1091	-296
	N	same	R 74	15-16	31	-01	995	-298
	NNE	SE pool	L 96	27-20	53	-04	855	-326
	N	same	R 43	28-14	42	-02	1235	-326
O H E								
<u>October 24</u>								
10:30	NNE	N station		0				
a. m.	N	NNE "		0				
	NNE	N pool (lake sank between readings)	L 29	07-22	02	-03	770	-312
	N	same	R 31	33-38	25	-03	398	-319
	NNE	W end island, lake	L 58	34-16	00	-03	1133	-325
	N	same	R 77	47-18	02	-03	991	-326
	NNE	Top of island	L 60	46-15	02	-03	1095	-294
	N	same	R 74	28-16	27	-03	996	-297
	NNE	SE pool	L 96	07-20	30	-04	840	-314
	N	same	R 43	16-14	32	-03	1222	-319
O H E								
<u>October 25</u>								
11 a.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	N pool	L 29	40-22	41	-03	745	-311
	N	same	R 67	46-38	00	-12	401	-315
	NNE	N crag	L 49	52-18	09	-04	902	-295
	N	same	R 72	40-22	14	-02	722	-298
	NNE	W end island	L 58	18-15	52	-03	1133	-321
	N	same	R 78	19-17	55	-02	991	-323
	NNE	Top of island	L 60	49-14	51	-03	1095	-391
	N	same	R 74	30-16	12	-02	996	-393
	NNE	E crag (near NE end of bay, not sharp ridge like promontory)	L 69	23-20	17	-03		
	NNE	SE pool	L 96	08-20	22	-03	840	-312
	N	same	R 43	30-14	22	-02	1222	-315
O H E								

SURVEY RECORD

Day Friday Date October 26, 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
10:45	NNE	N station		0				
a. m.	N	NNE "		0				
	NNE	N pool	L 29	16-22	02	-03	762	-308
	N	same	R 70	01-37	48	-02	397	-311
	NNE	W end island, main pool	L 58	24-15	45	-04	1143	-320
	N	same	R 78	23-17	46	-02	996	-321
	NNE	Top of island	L 61	14-14	38	-04	1094	-285
	NE	same	R 74	09-15	43	-02	998	-284
	NNE	High bench NE end main pool	L 69	17-21	53	-05	724	-291
	N	same	R 52	27-18	29	-02	867	-291
	NNE	SE pool	L 95	45-19	53	-04	860	-310
	N	same	R 44	06-14	05	-01	1234	-312
2-4p.m.	SE(new)	E end N pool	L 1	10				
	SSW	same	R 10	09				
	SE	W end N pool	L 13	58				
	SSW	same	L 1	42				
	SE	Top of N bench above main pool	L 27	58-17	34	-03	890	-294
	SSW	same	R 2	52				
	SE	Middle of new island	L 34	40				
	SSW	same	R 11	05				
	SE	Top of E end of main pool(?)	L 42	29-25	02	-02	615	-296
	SW	same	R 35	05-14	49	-03	1095	-290
	SE	N end SW hog back	L 46	17-16	30	-02	993	-307
	SSW	same	L 12	24-26	15	-06	600	-310
	SE	Top of high bluff above old "golden gate"	L 57	37				
	SSW	same	R 35	25				
	SE	E end main pool	L 15	38				
	SSW	same	R 24	46				
	SE	E promontory	L 50	56				
	SSW	same	R 14	30				
	SE	N pt. main island	L 44	29				
	SSW	same	R 7	10				
	SE	E pt. main island	L 49	25				
	SSW	same	R 9	39				
	SE	S pt. main island	L 52	03				
	SSW	same	R 4	05				
	SE	S pt. SW peninsula	L 50	22				
	SSW	same	L 14	44				
	SSW	Small peninsula S	R 8	54				
	SW	same	R 56	59				
	SSW	Small peninsula SW	L 23	25				
	SW	same	R 32	29				
	NE	New SE station	L 105	54				
	SSW	same	R 59	34				
	SW	same	R 48	53				

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday Date October 26, 1923
 Saturday " 27, "

October 26
 11 a.m. to 12 m.

New island in NE part of main pool, otherwise little change. All three pools slightly sunk in cups. Tilting of shoreline of main pool continues, so that but little rise would cause overflow to SW, while benches to NE stand 15 to 25 feet above lake.

Fountaining weak to moderate. Only N, SE and S fountains active, though they are constant. About noon S fountain became very powerfully active, with streaming away from it. Fume moderate, almost wholly from cracks in bench. No perceptible SO₂.

O H E

October 27
 11 a.m. to 12 m.

All three pools full, overflowing vigorously. Main pool to SW, SE pool to NW, and N pool chiefly to S. Occasionally SE and N pools break up with short bursts of fountaining and subsidence; rapid recovery and resumed overflow. N pool built high ramparts, chiefly on N side, so that it stands out on top of a steep and very pronounced hill.

SE fountain built up a chimney, of which roof has collapsed, showing orange yellow inside.

Vigorous fountains at S and N sources, and a weak one near SW. SE chimney spits strongly at times. Occasional fountaining elsewhere. At times of subsidence there were two groups of fountains in N pool, one at E end and the other at W end. Fountains strong but not unusually so. Fume moderate.

Afternoon. Visited pit to sketch map. All three pools were full, and NE and SE overflowing vigorously, main pool sluggishly. A very fast stream poured as a cascade down a 15-foot embankment from the N pool to the N, and then flowed under the N wall of Halemaumau and poured over a small pali into the NE sunken area. The pool had filled up the low area around it and was overflowing over the saddle into the main pool, but not rapidly.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Saturday Date October 27, 1923
Sunday " 28 "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>October 27</u>								
11a.m.	NNE	N station		0				
to	NNE	N pool (N cone)	L 29	05-21	43	-08	754	-300
12 m.	N	same	R 68	50-36	45	-05	394	-298
	N	NNE station		0				
	NNE	W end island	L 58	47-15	10	-06	1149	-310
	N	same	R 78	10-17	10	-05	1006	-313
	NNE	SE pool	L 96	17-19	45	-05	850	-305
	N	same	R 43	29-13	47	-05	1231	-304
	NNE	Top of island	L 61	34-14	26	-05	1114	-286
	N	same	R 74	40-15	36	-04	1015	-286
								O H E
<u>October 28</u>								
11a.m.	NNE	N station		0				
to	N	NNE "		0				
12 m.	NNE	N pool	L 29	37-21	20	-04	760	-296
	N	same	R 69	55-37	37	-03	403	-314
	NNE	Top of N crag	L 49	30-17	37	-04	902	-286
	N	same	R 72	42-21	36	-03	720	-288
	NNE	W pt. of island	L 58	40-14	54	-03	1155	-307
	N	same	R 78	40-16	57	-03	1008	-310
	NNE	Top of island	L 61	41-14	08	-03	1120	-282
	N	same	R 74	50-15	19	-05	1020	-282
	N	SE pool	R 43	40-13	43	-01	1230	-304
								O H E

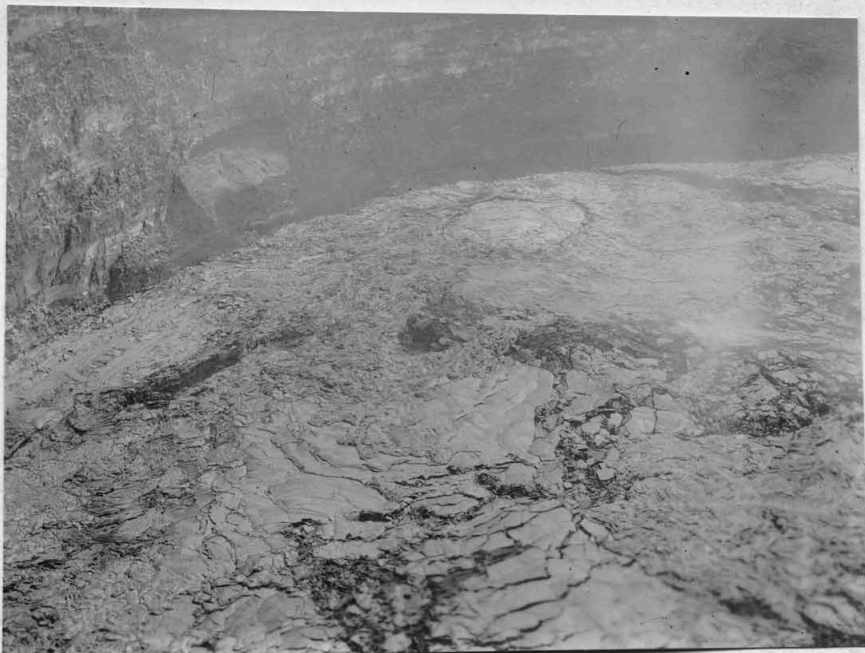


2. Northwest side pool, from S.W.



1. East side pool, from S.W.

Oct. 28, 1923



3. Southeast pool, from rim of pit N. of N.N.E.



4. North pool, from point S. of N.E.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Sunday	Date	October 28,	1923
	Monday		" 29,	"
	Wednesday		" 31,	"

October 28

10:40 a.m. to 12 m. All three pools were slightly sunk in their cups. Fountaining at N and S sources moderate and constant, though for short periods it was strong. Occasionally short spasms elsewhere. Once there was a break up in the main pool, with strong currents to W cove, with many small fountains travelling with the current. A minute later there was a slight repetition in the N cove, with some subsidence.

The overflow from the N pool covered a considerable area in the NE sunken region.

Fume medium, coming from various places in the bench.

11:20 a.m. Large avalanche in SW chasm.

O H E

October 29

2 p.m.

All three pools slightly sunk in their cups and moderately crusted. About six small fountains playing over S well, and one weak one over SW. N and SE cones moderately active. Occasional break up of crusts. Slow streaming away from SW source.

Fume moderate, coming from cracks in bench.

Distinct tilting of the shoreline of the main pool toward SW.

O H E

October 31

11 a.m.

All three pools crusted and sunken in their cups. Fountains weak, only N, S and SW fountains active at all. No perceptible streaming. New island appearing in main pool between E peninsula and N crag.

Fume moderate, entirely from the bench. Heat radiation barely perceptible.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
 Hawaiian Volcano Observatory

Day Monday Date October 29, 1923
Wednesday " " 31, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>October 29</u>								
2 p.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	N pool	L	29 39	-21 39	-05	763	-302
	N	same	R	70 05	-36 41	-01	405	-305
	NNE	W end island	L	59 06	-14 53	-03	1156	-307
	N	same	R	78 29	-16 45	-01	1014	-309
	NNE	Top of island	L	61 27	-13 56	-02	1122	-279
	N	same	R	74 58	-15 09	-01	1022	-279
	NNE	SE pool	L	96 05	-19 20	-03	848	-298
	N	same	R	43 28	-13 30	-01	1236	-298
								O H E
<u>October 31</u>								
11 a.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	N pool	L	29 30	-21 51	-04	765	-307
	N	same	R	70 22	-37 21	-03	402	-322?
	NNE	W end island	L	58 36	-15 12	-03	1153	-313
	N	same	R	78 22	-17 12	-04	1005	-314
	NNE	Top of islnad	L	61 10	-13 59	-04	1113	-277
	N	same	R	74 53	-15 15	-04	1062	-279
	NNE	SE pool	L	96 24	-19 29	-04	854	-302
	N	same	R	43 24	-13 45	-04	1235	-304
								O H E

Day Thursday Date November 1, 1923

Friday " 2, "

November 1

2-3 p.m.

All three pool sunk in their cups and crusted. The crusts occasionally break up. Fountaining weak; the S fountain the only one active at all, and it is only moderate to weak. New island appearing in main pool, in northern part, and some seem to be forming in N pool, but not very definite.

Fume medium dense, coming from various sources almost wholly in bench. Heat scarcely perceptible.

Visitors to the pit the evening before reported it dull. Evening of November 1 glow as seen from the Observatory was dull.

O H E

November 2

2-3 p.m.

N and SE fountains vigorously active with pools overflowing the bench heavily. N pool appears to be pouring out the larger volume of lava, and the lava is more fluid. Main pool full, but not overflowing to any extent. S fountain much less active than N and SE ones, and SW fountain not active at all.

Occasional bursts of fountaining outside of three constant sources, with rapid streaming and temporary subsidence. These short lived fountains emit bluish sulphurous fume, which the source fountains do not. When they occur, the source fountain in the pool in which they occur becomes much weaker.

Fume very thin, mostly from bench.

Streams from N and SE sources pooling in NE sunken area, and in a low place W of main pool. The crusts over these puddles frequently break up with bubbling, exposing large surfaces of live lava. The topography prevents either puddle from being over 10 feet deep and it is doubtful if they are over 5 feet deep. There were no bursts of fountaining in either puddle, so I have no reason to suppose that gas channels were formed in either bottom, and no gas channels existed before. Consequently this break up of crust would appear to be a feature in the gas release from pahoehoe, in the formation of aa.

The lava from the N pool exhibited breaking up of crusts much more frequently than that of SE pool, and appeared to be much more fluid on account of its much greater speed in flowing, while the lava from the SE pool poured slowly down some steep slopes of the bench.

O H E

PHOTOGRAPH RECORD

Day Thursday Date November 1, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
		Bright sun						
2 p.m.	SW	SE side of the pit	1	panch film	A	f/16	$\frac{1}{2}$	4x5
	SW	NW " " " "	2	"	"	"	"	"
							O H E	



2. Northwest side of pit, from S.W.

1. Southeast side of pit, from S.W.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Sunday
Monday

Date November 4, 1923
" 5, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>November 4</u>								
11 a.m.	NNE	N station		0				
to	N	NNE "		0				
12 m.	NNE	N pool	L 29	22-22	08	-03	765	-311
	N	same	R 69	54-37	58	-04	402	-318
	NNE	W end island	L 56	55-15	30	-03	1154	-319
	N	same	R 79	44-17	51	-01	983	-319
	NNE	Top of island	L 60	38-14	50	-04	1117	-296
	N	same	R 75	14-16	18	-04	1008	-297
	NNE	SE pool	L 95	47-20	07	-04	855	-313
	N	same	R 43	21-14	06	-03	1234	-313
								O H E
<u>November 5</u>								
2 p.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	N pool	L 28	48-21	53	+02	764	-308
	N	same	R 69	54-37	58	-05	394	-310
	NNE	End of island	? L 58	03-16	30	-04	1168	? -334
	N	same	R 79	30-18	10	-05	1010	-334
	NNE	Top of island	L 61	10-14	41	-04	1095	-286
	N	same	R 73	59-15	59	-05	1002	-289
	NNE	SE pool	L 95	49-20	02	-04	838	-307
	N	same	R 43	11-13	58	-04	1230	-310
								O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Saturday	Date	November 3,	1923
	Sunday		"	4, "
	Monday		"	5, "
	Tuesday		"	6, "

November 3

11 a.m.

N and SE pools sunk in their cups and crusted. Practically inactive. S and SW fountains moderately active, and main pool has frequent breaking up of crusts, with slight subsidence. S fountain distinctly spasmodic in its behavior; it is crusted between spasms. Spasms last only a few seconds.

A few islands in bottom of N pool, at E end. Fume extremely thin.

3:30 p.m.

At about 3:30 p.m. there was a large avalanche from W wall, preceded by frequent rock falls. First large avalanche for some time. Occasional rock falls elsewhere.

O H E

November 4

Noon

All four sources were mildly active and the crusts on the pools medium thick. Occasionally the crusts broke up, exhibiting moderately large patches of lava. The island is tilting to the SW very notably. Fume thin.

O H E

November 5

2 p.m.

Fountaining weak. S and SW fountains constant and moderate, SE and N at times feebly active. Crusts on SE pool thick, but thinner on N and main pools. Crusts on main pool break up moderately frequently. No streaming visible. Island in main pool has tilted to SW and a large part of the top has tumbled over. Fume thin.

O H E

November 6

2:15 p.m.

SE pool is full and overflowing a little. Other two sunk in their cups, although not much rise would be necessary for main pool to overflow to SE. SE cone very noisy. N, S and SW fountains moderately active. N and main pools generally crusted and quiet. No streaming visible.

Fume moderate, coming from E bench of main pool and W end of island. SE pool broke up at 2:15 with moderate fountaining, which emitted some SO₂.

No change in the appearance of the bench.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Tuesday Date November 6, 1923
Wednesday " " 7 " "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>November 6</u>								
2:15	NNE	N station			0			
p. m.	N	NNE "			0			
	NNE	N pool	L 28	47-22	01	-03	778	-314
	N	same	R 72	15-38	38	-04	395	-318
	NNE	Main pool	L 65	46-20	37	-02	845	-318
	N	same	R 59	22-19	24	-04	898	-318
	NNE	Top of island	L 60	58-14	43	-02	1090	-286
	N	same	R 73	54-16	02	-04	994	-288
	NNE	SE pool	L 95	01-19	30	-02	850	-301
	N	same	R 43	56-13	39	-04	1218	-298

O H E

<u>November 7</u>								
10:45	NNE	N station			0			
a. m.	N	NNE "			0			
to	NNE	N pool	L 29	22-21	30	-02	764	-301
12 m.	N	same	R 69	53-36	51	-05	402	-305
	NNE	Top of N crag	L 49	30-17	59	-07	909	-295
	N	same	R 72	45-22	01	-05	727	-296
	NNE	Main pool	L 67	29-18	12	-03	949	-312
	N	same	R 63	12-17	31	-05	984	-313
	NNE	Top of island	L 60	51-14	42	-03	1087	-285
	N	same	R 73	47-16	00	-05	992	-286
	NNE	SE pool	L 94	11-18	57	-03	840	-288
	N	same	R 44	00-13	22	-06	1205	-288

O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date November 7, 1923

t	sta	subject	no	pl	ser	stop	ex	cam
		Bright sun						
Noon	SE	Talus of recent big avalanche	1	panch film	A	f/16	$\frac{1}{8}$	4x5
	S of NNW	S side of pit	2	"	"	"	"	"
	"	E " " "	3	"	"	"	"	"
	"	NE " " "	4	"	"	"	"	"

O H E



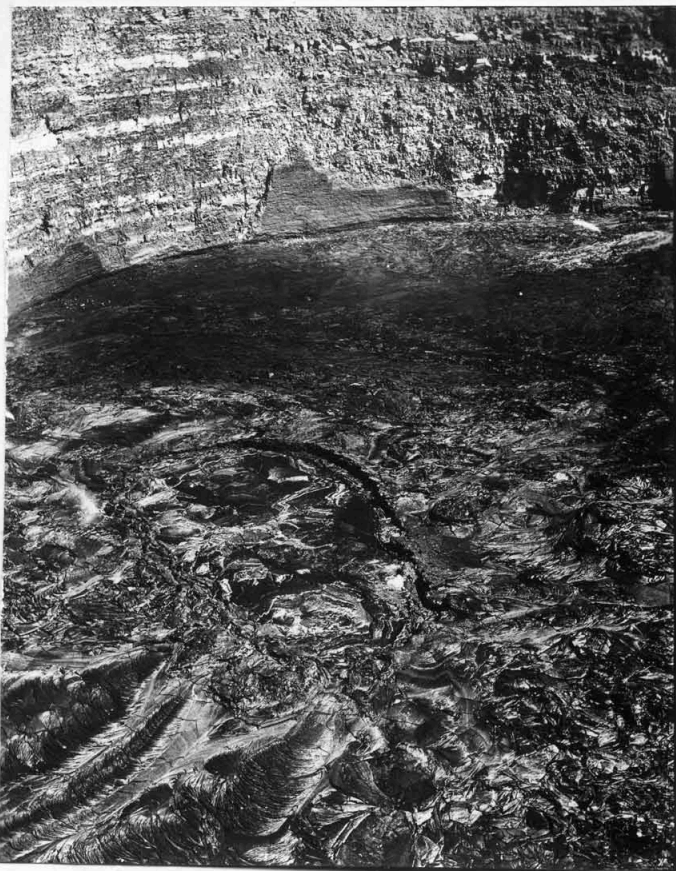
2. South side of pit, from point S. of N.N.W.



3. East side of pit, from point S. of N.N.W.



1. Talus of recent big avalanche, from S.E.



4. Northeast side of pit, from point
S. of N.N.W.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Wednesday	Date	November 7, 1923
	Thursday	"	8, "
	Friday	"	9, "
	Saturday	"	10, "
	Sunday	"	11, "

November 7

10:45 a.m. to 12 m. Appearance of pools like yesterday; N pool quiet and crusted, but higher. Main pool also appears higher. Crusts occasionally break up with rapid streaming and scores of small bubble fountains, activity lasting only two or three minutes. SE pool overflowing with moderate energy. Is building up a dome considerably higher than surrounding bench. Occasionally breaks up with vigorous fountaining and subsidence.

Constant and moderately strong fountaining over SW and S source wells. SE cone occasionally hisses and belches strongly, and N source constant and mildly active.

November 8

11 a.m. Pools somewhat sunk in their cups, moderately crusted, heat slight. All four sources constant; S and SW moderately active, N slightly. SE cone belching noisily at times, throwing spatter 20 to 30 feet high. SE pool much shrunk, now only about 50 feet in diameter. No streaming visible in pools. Occasional partial break-ups with moderate fountaining and slight subsidence. Fume thin.

November 9

10 to 11 a.m. N and SE pools full, N overflowing slightly, and SE strongly. Fountaining moderately strong, all four sources fountains except S being active and occasional fountains elsewhere. SE cone about 30 feet from the pool, and pool is building itself up as a dome. At 10:55 SE pool broke up with vigorous fountaining.
Fume thin. Crusts on pools moderately thick, heat mild.

November 10

3 p.m. All pools somewhat sunk in their cups, main pool being least sunk. SE pool has shrunk in size until it is now only about 15 by 25 feet. A new island is appearing in the main pool, just N of the big island. Only S and SW fountains active. Occasional break-up of crusts in main pool. Fume thin.
No material change in the appearance of the main island or the benches.

November 11

11 a.m. Pools quiet, crusted and about same distance below their margins. New island in main pool a little higher.
Three small fountains over SW source area, one over S. N fountains at times weakly active. Occasionally S fountain threw blobs to a height of about 50 feet with a dull explosion, as though lava were viscous. SE cone not active at all, just a little fume rising from it.
Fume in general thin.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Thursday Date November 8, 1923

Day Friday Date " 9 "

Day Sunday Date " 11 "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>November 8</u>								
10:45	NNE	N station		0				
a. m.	N	NNE "		0				
	NNE	N pool	L 29	20-21	37	-05	761	-302
	N	same	R 69	44-36	56	-04	402	-305
	NNE	Main pool	L 65	22-20	09	-06	842	-318
	N	same	R 59	28-19	04	-04	897	-313
	NNE	Top of island	L 60	35-14	46	-05	1070	-280
	N	same	R 73	25-16	02	-04	974	-282
	NNE	SE pool	L 94	02-19	22	-05	808	-284
	N	same	R 43	18-13	23	-04	1180	-283
<u>November 9</u>								
10:20	NNE	N station		0				
a. m.	N	NNE "		0				
	NNE	N pool	L 30	02-21	43	-04	741	-291
	N	same	R 66	47-35	25	-04	407	-292
	NNE	Top of island	L 60	26-14	49	-05	1059	-278
	N	same	R 73	00-16	08	-04	963	-281
	NNE	Main pool	L 65	12-20	02	-05	836	-304
	N	same	R 59	20-18	58	-03	883	-306
	NNE	SE pool	L 92	22-18	56	-04	797	-276
	N	same	R 43	36-13	14	-03	1156	-275
<u>November 11</u>								
11a.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	N pool	L 30	10-21	25	00	758	-298
	N	same	R 68	57-36	38	00	412	-308
	NNE	W end island	L 55	29-15	32	-02	1083	-301
	N	same	R 77	54-18	05	+02	915	-302
	NNE	Top of island	L 60	19-14	30	-02	1045	-270
	N	same	R 72	25-15	45	00	955	-273

O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Monday Date November 12, 1923

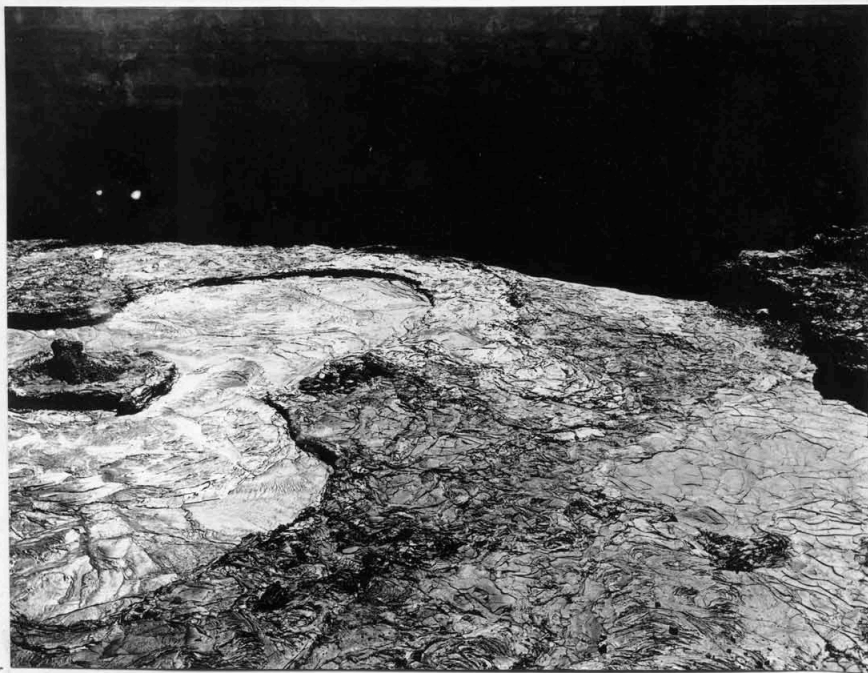
t	sta	subject	no	pl	scr	stop	ex	cam
		Bright sun						
11:30 a.m.	50 yd S of NNW	S side of pit	1	panch film	A	f/16	$\frac{1}{2}$	4x5
	"	E " " "	2	"	"	"	"	"
	"	NE " " "	3	"	"	"	"	"

O H E

11th. Photo Sec. 11-22. Fire Pit. Kilauea Volcano. 4,000 ft.
Air Service U.S.A.



11th. Photo Sec. 11-22. Fire Pit. Kilauea Volcano. 4,000ft. 11-9-23.



1. South side of pit, W. rim.



2. East side of pit, from W. rim.

Nov. 12, 1923



3. Northeast side of pit, from W. rim.

Day	Monday	Date	November 12,	1923
	Tuesday		"	13, "
	Wednesday		"	14, "
	Thursday		"	15, "

November 12

11:40 a.m.

Appearance of pit little changed. N and SW fountains constant and moderate. S fountain occasionally explodes with dull roar and sends blobs of lava to height of 50 feet or more, as it did yesterday. SE cone fuming and showing heat through cracks.

SE pool usually quiet, though at 10 a.m. it rose suddenly some 10 feet in its narrow neck, discharged a lot of gas that smelt of SO₂ strongly, and then subsided. Whole activity lasted only about five minutes.

In the main pool there was slow streaming away from SW source fountain. The new island in the pool had disappeared.

Fume generally rather thin, coming wholly from bench except at rare occasions from SE pool.

November 13

11 a.m.

SE and main pools full, former overflowing energetically. N pool slightly sunk in its cup. Fountaining moderate, five small fountains over SW source, two over S, and N grotto moderately active. SE cone quiet. No general streaming visible in main and N pools, though local currents accompany break-up of crusts. Lava from SE pool appears decidedly viscous, like somewhat thin mush. Slag heap has built itself up very noticeably since yesterday.

Fume thin. Island N of main island in main pool has reappeared.

November 14

Noon

SE slag heap built much higher, now fully 30 feet high; discharging some viscous lava from the top. Occasionally emits much sulphurous gas with fountaining. Cone is steep, slope 25° to 40°. Old cone between slag heap cone and rim occasionally belches large blobs of lava with great vigor, making dull and loud reports.

Main pool full, N pool somewhat sunk in its cup. N, S and SW fountains moderately active. Fume thin. No streaming visible in any of the pools.

At 11:30 there was a large avalanche from W wall.

November 15

1:30 p.m.

SE pool vanished, just two cones now, one puffing slightly, and both fuming a little. Main pool full with S and SW fountains moderately active. Pool is crusted, occasional foundering of crusts. New island in main pool several feet higher. N pool fuller than it has been for some time, with more active fountaining.

Fume thin.

5:30 p.m.

It was reported that the westernmost of the two SE cones suddenly became active and threw spray, it was said, over 200 feet high. Activity lasted about five minutes and ended suddenly. Later in the evening the easternmost cone poured out a small flow.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Monday Date November 12, 1923
Tuesday " " 13, "
Wednesday " " 14, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>November 12</u>								
9:50	NNE	N station			0			
a.m.	N	NNE "			0			
	NNE	N pool	L 29	37-20	14	+02	782	-290
	N	same	R 72	30-36	12	00	408	-300
	NNE	W end island, main pool	L 55	21-15	25	+02	1078	-301
	N	same	R 77	45-18	10	+02	910	-302
	NNE	Top of island	L 60	25-14	32	+03	1043	-272
	N	same	L 72	22-15	50	+02	954	-275
<u>November 13</u>								
10a.m.	NNE	N station			0			
	N	NNE "			0			
	NNE	N pool	L 29	48-20	35	+03	762	-290
	N	same	R 69	20-35	38	+02	404	-293
	NNE	Main pool	L 54	55-15	13	+02	1058	-290
	N	same	R 77	30-18	07	+03	887	-294
	NNE	Top of island	L 59	56-14	32	+03	1027	-268
	N	same	R 72	27-15	55	+04	940	-273
	NNE	SE pool	L 94	28-17	25	+05	813	-257
	N	same	R 43	09-11	58	+04	1186	-256
<u>November 14</u>								
11:15	NNE	N station			0			
a. m.	N	NNE "			0			
	NNE	Main pool	L 54	20-16	52	00	945	-286
	N	same	R 72	09-19	30	+01	809	-289
	NNE	Top of island	L 59	24-14	25	00	1033	-266
	N	same	R 72	58-15	57	+01	931	-270
	NNE	Top of SE slag heap	L 93	41-16	32	+02	798	-237
	N	same		43 14-11	26	+01	1166	-230
	NNE	N pool	L 30	00-20	34	00	758	-285
	N	same	R 69	28-35	10	+02	406	-290

O H E

Day Friday Date November 16, 1923
 Saturday " 17, "

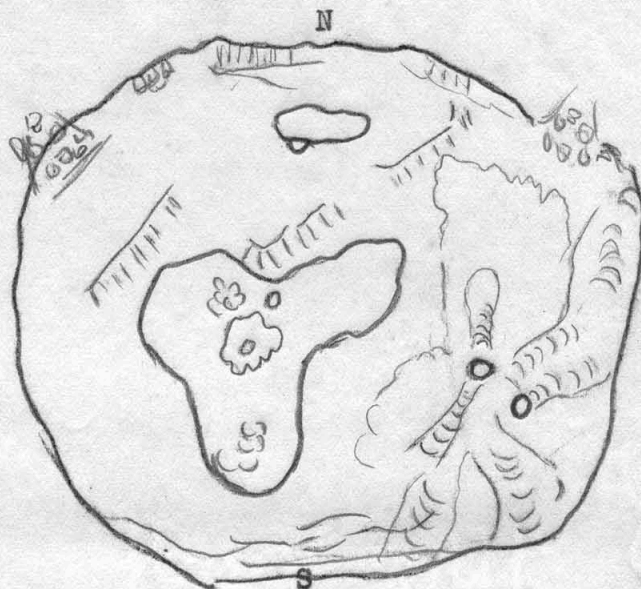
November 16
 11 a.m.

Both pools slightly more sunk in their cups. Both pools crusted, occasional partial foundering of crusts. No streaming visible. Fountaining moderate. N, S and SW fountains somewhat active. SE cones puffing a little. Large area about easternmost of the cones is covered with spatter.

O H E

November 17
 4 p.m.

Sketch of Halemaumau:-



Fume rising from edges of lakes. Two sludgy fountains in W lake. NE arm of W lake cracked up with effervescence and eastward flow.

Two big cones SE. Fresh flows glowing from both. The SE one puffing and lifting a lid. Largest flows from southeastern one along E wall of pit and to S. Spatter slope on SE side of this cone. Other bronzy flows of shell pahoehoe and older are all around the SE cones.

At times a prolonged hiss heard in northern part of pit.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday
Sunday

Date November 16, 1923
" 18, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>November 16</u>								
11a.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	Main pool	L 52	30-16 40	+02	940	-284	
	N	same	R 72	00-19 54	+01	779	-286	
	NNE	Top of island	L 59	03-14 20	+02	1064	-273	
	N	same	R 72	48-15 46	+03	960	-276	
	NNE	N pool	L 29	52-20 28	+02	765	-287	
	N	same	R 69	10-35 23	+01	405	-292	
<u>November 18</u>								
2:30	NNE	N station		0				
p.m.	N	NNE "		0				
	NNE	N pool	L 29	22-20 28	-02	760	-285	
	N	same	R 69	42-35 18	-04	398	-285	
	NNE	Main pool	L 51	41-15 10	-07	1050	-284	
	N	same	R 79	47-18 38	-05	837	-285	
	NNE	Top of island	L 57	25-14 41	-03	1010	-265	
	N	same	R 73	20-16 32	-05	887	-265	

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Sunday	Date	November 18, 1923
	Monday		" 19, "
	Tuesday		" 20, "

November 18

2:30 to 3:30 p.m. Both pools slightly sunk in their cups. Easternmost of SE cones pouring out a small flow of viscous lava. N, S and SW fountains moderately active; occasional fountaining elsewhere.

Main island in main pool tilted decidedly to S. Fume much denser than it has been for some time, coming from bench on S side of N pool, by N cone, and also along bench to E of main pool.

O H E

November 19

11 a.m.

The western of the SE cones let off a great discharge of gas, following sudden vigorous fountaining at N cone. As soon as the blast from the SE cone began the N cone became quieter. The blast from the SE cone lasted altogether about five minutes, but only the first three were vigorous. An opening about 3 by 6 feet was formed at the top of the cone, and through it gas rushed in a powerful stream, making a roar like a freight engine letting off steam. A few sparks flew up and one blob of lava must have gone up fully 100 feet. The fume from these bursts was strongly sulphurous.

A visitor at the pit reported similar conditions the night before, with a bluish flame rising above the cone and strong fume.

Noon

Both pools full, N one overflowing somewhat strongly to the N. N, S and SW fountains moderately active. No streaming visible. Small island joined to main one. Size of main pool further reduced by formation of more bench. Fume much thinner than yesterday.

O H E

November 20

4-5 p.m.

Three to six fountains in action, including N, S and SW sources. Occasional break-up of crusts, with rapid streaming and subsidence, and many small bubble fountains.

An inner bench is forming at the E end of the N pool, and the island in the main pool is tilting further to the south.

A moderately large flow had taken place from the eastern of the SE cones and had flowed along the E wall of pit. Live toes were still visible. Fume thin.

O H E

PHOTOGRAPH RECORD

Day Monday

Date November 19, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
Noon	50 yd E of NNE	SE side of pit	1	panch film	A	f/16	$\frac{1}{2}$	4x5
"	"	SW " " "	2	"	"	"	"	"
"	"	N " " "	3	"	"	"	"	"

O H E



2. Southwest side of pit, from point E. of N.N.E.



3. North side of pit, from point E. of N.N.E.



1. Southeast side of pit, from point E. of N.N.E.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Monday Date November 19, 1923
Tuesday " 20, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>November 19</u>								
11a.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	N pool	L	20 30-20 30	-05	727	-278	
	N	same	R	66 20-34 12	-04	408	-281	
	NNE	Top of island	L	57 07-14 42	-05	1006	-263	
	N	same	R	72 13-16 30	-04	882	-264	
	NNE	Main pool	L	56 15-16 25	-05	951	-279	
	N	same	R	71 05-18 27	-07	836	-280	
<u>November 20</u>								
4:10 p.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	N pool	L	29 42-20 47	-06	720	-273	
	N	same	R	66 41-34 54	-06	401	-280	
	NNE	Top of island	L	57 06-14 30	-05	1017	-262	
	N	same	R	73 45-16 23	-05	893	-265	
	NNE	W end island, main pool	L	51 03-14 51	-05	1052	-279	
	N	same	R	80 12-18 26	-05	832	-283	

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Wednesday	Date	November 21,	1923
	Thursday	"	22,	"
	Friday	"	23,	"
	Saturday	"	24,	"

November 21

3 p.m.

Both pools sunk 5 to 8 feet in their cups. Fountaining mild. S and SW fountains moderately active, and N feebly so. SE cone puffing and fuming slightly, "Vesuvius quiet" (the more western of the two cones). Fume generally thin, coming from an area at E end of N pool and from SE cones. One at E end of N pool making yellow solfatara deposit.

O H E

November 22

4-5 p.m.

Main and N pools were both slightly sunk in their cups. Only S fountain was constantly active and it was moderately vigorous. Flowing of viscous lava along NE wall continues; volume greater than yesterday. Not certain if it comes from SE cone or oozes from crack in bench. Bench evidently rising in SW part of pit; is cracked. Some lava visible in bottom of the crack.

O H E

November 23

11 a.m. to 12 m.

Both pools full. Viscous flow along NE wall continues; it cools a dull black unlike other lava in pit. Probably comes from crack in bench and not from SE cones.

Fountaining moderate. S fountain vigorous, several over SW well. N cone moderately active. SE cone puffs noisily at times and occasionally the one W of it becomes active. Fume thin. Cracks in southern part of bench widening.

O H E

November 24

Noon

Both pools full. S and N fountains vigorous. SE cones and SW fountains quiet. Flow along NE wall showing no bright toes. Ramparts about 5 feet high being built along S side of island. Fume moderately thin.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Wednesday~~ ~~Friday~~ ~~Saturday~~ Date ~~November 21,~~ ~~23,~~ ~~24,~~ 1923

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>November 21</u>								
3 p.m.	NNE	N pool	L 29	31-20	28	-05	762	-285
	N	same	R 69	58-35	20	-06	402	-288
	NNE	Main lake, W end is- land	L 50	48-15	16	-05	1045	-285
	N	same	R 80	07-18	52	-06	824	-284
	NNE	Bench by E crack on rim	L 117	12-26	19	-05	603	-298
	N	same	R 26	27-13	46	-05	1203	-296
	NNE	White object S bench near rim	L 80	31-12	35	-05		
	NNE	N end of rectangular white rock on bench W	L 39	36-12	36	-04	1263	-281
	N	same	R 102	00-18	50	-06	825	-284
<u>November 23</u>								
11:15	NNE	N station			0			
a. m.	N	NNE "			0			
	NNE	N pool	L 29	23-20	08	-04	748	-274
	N	same	R 67	57-34	33	-06	397	-276
	NNE	W end island	L 51	57-15	05	-04	1036	-279
	N	same	R 78	44-18	24	-05	833	-278
<u>November 24</u>								
11 a.m.	NNE	N station			0			
	N	NNE "			0			
	NNE	N pool	L 29	33-20	12	-04	745	-274
	N	same (Best determina- tion from NNE. Pool afterwards rose about 4 feet)	R 67	20-34	45	-05	399	-279?
	NNE	Main pool	L 55	20-14	35	-04	1055	-275
	N	same	R 77	02-17	05	-05	891	-276

O H E

Day Sunday Date November 25, 1923
Monday " 26, "

November 25

11 a.m. to 12 m. Pools almost full; they showed signs of recent overflowing. Between 11 and 11:40 a.m. the westernmost of the SE cones poured out a moderate stream of lava and then with a rush of gas threw spray up 100 feet. Flow along NE wall apparently dead but there was a loud hissing under there several times, indicating a separate source.

The island in main pool has moved S, so that the channel between it and the SE bank has become very narrow. The ramparts on SW side of island are higher than yesterday.

S fountain vigorously active, N and SW ones mildly so. There is decided streaming away from S source. Various small fountains at NE end of main pool.

At 11 a.m. SE cone was belching loudly but later became quiet. Occasional foundering of crusts in both pools.

Fume thin, coming from N cone, E end of N pool, E end of main lake and from SE cone. Solfatara action at E end of N pool continues.

O H E

November 26

2-3 p.m.

S fountain vigorous and N and SW fountains mild. At 3 p.m. the cone W of SE cone discharged a small blast of gas and at the same time there was rapid streaming to the W end of the N pool, lasting less than a minute.

Both pools were slightly sunk in their cups and a pronounced rampart was being built about main pool. Tilting of the island continues and the high top part has practically vanished. Fume thin.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Sunday Date November 25, 1923
Monday " 26, "
Tuesday " 27, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>November 25</u>								
11:15	NNE	N station		0				
a. m.	N	NNE "		0				
	NNE	N pool	L	30 00-20 20	-04	728	-270	
	N	same	R	64 55-33 42	-06	403	-272	
	NNE	W end island	L	56 23-14 04	-04	1075	-269	
	N	same	R	77 05-16 17	-06	918	-270	
<u>November 26</u>								
2:30	NNE	N station		0				
p. m.	N	NNE "		0				
	NNE	N pool	L	28 09-19 22	-05	756	-266	
	N	same	R	69 19-34 41	-05	383	-268	
	NNE	Main pool	L	56 34-13 35	-05	1091	-263	
	N	same	R	77 38-15 37	-04	934	-262	
<u>November 27</u>								
11:15	NNE	N station		0				
a. m.	N	NNE "		0				
	NNE	N pool	L	27 47-18 27	-07	800	-269	
	N	same	R	76 05-34 31	-05	386	-269	
	NNE	Main pool	L	57 33-13 29	-06	1112	-266	
	N	same	R	77 37-15 24	-05	962	-266	

O H E



1. Southeast side of pit, from N.N.E.



2. Southwest side of pit, from N.N.E.



3. North side pf pit, from N.N.E.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Date	November	27,	1923
Tuesday				
Wednesday	"		28,	"
Thursday	"		29,	"
Friday	"		30,	"

November 27

11 a.m. to Noon. Appearance of pit unchanged. S, SW and N fountains all moderately active, though S fountain is weaker than of late. Pools crusted and no fire visible except for fountains. Ramparts about main pool a little higher than yesterday.

Small flow SSW, source apparently a crack in bench.

At noon there was a small break-up of crusts in main pool with rapid streaming to W. Activity of short duration.

Fume thin, but smells of SO₂ to leeward.

O H E

November 28

10 a.m. to noon. Main pool slightly sunk in its cup; N pool full and overflowing moderately. S fountain strongly active, SW quiet, and N fountain occasionally active, sometimes strongly. At times main pool has foundering of crusts with many small fountains and rapid streaming. The island has drifted away from SE rampart.

Fume thin, comes from SE cones and E end main pool.

O H E

November 29

11 a.m. to noon. S and SW fountains active, N fountain quiet. SE cones puff a little at times. Main pool full; N pool sunk in its cup. Cracks in the bench passing through SE cone have widened and bench appears to be rising.

Fume thin.

O H E

November 30

11:30 a.m. N pool slightly sunk in its cup; main pool overflowing slightly on several sides. S and SW fountains vigorous. N source becoming a cone that is hissing strongly. Occasional foundering of crust in both pools, with rapid streaming and many small fountains.

Fume denser, coming from western of SE cones mainly.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Wednesday~~ ~~Thursday~~ ~~Friday~~ Date November 28, 1923
 " 29, "
 " 30, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>November 28</u>								
10a.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	N pool	L	29 27-18 35	-05	760	-256	
	N	same	R	69 40-32 14	-05	400	-255	
	NNE	Main pool	L	57 02-13 46	-06	1085	-265	
	N	same	R	77 00-15 50	-05	936	-268	
<u>November 29</u>								
11a.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	N pool	L	27 26-18 25	-04	788	-262	
	N	same	R	74 30-34 47	-04	377	-265	
	NNE	Top of "Vesuvius"	L	94 30-14 47	-04	802	-212	
	N	same	R	42 52-10 11	-05	1176	-214	
	NNE	Main pool	L	56 55-13 52	-05	1044	-257	
	N	same	R	75 21-15 57	-05	903	-260	
<u>November 30</u>								
11a.m.	NNE	N station		0				
	N	NNE "		0				
	NNE	N pool	L	27 41-18 12	-04	778	-256	
	N	same	R	72 58-34 00	-04	381	-260	
	NNE	Main pool	L	51 38-15 58	-05	907	-259	
	N	same	R	71 33-18 57	-04	753	-260	

O H E

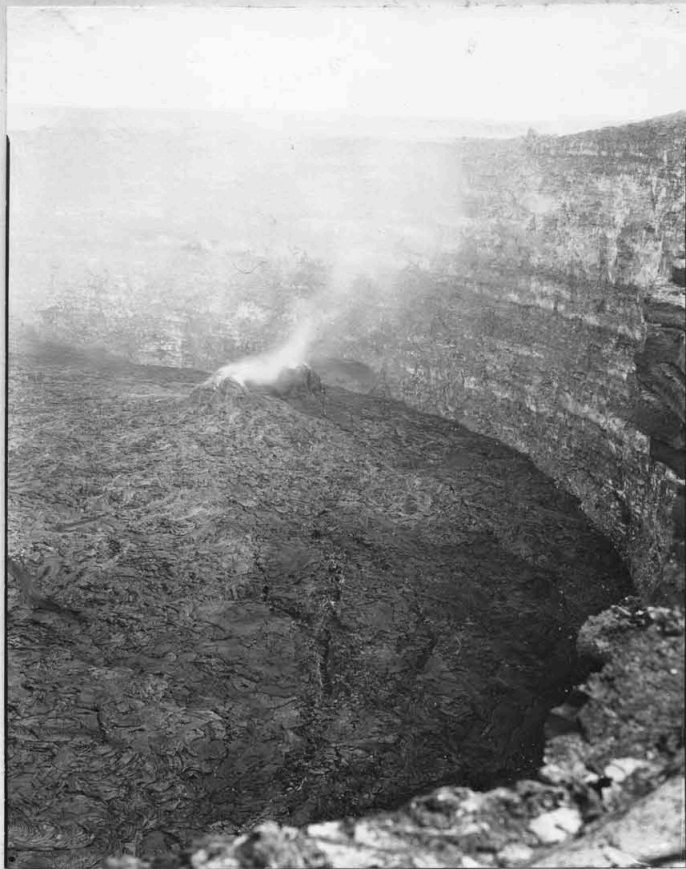
PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Saturday Date December 1, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
11a.m.	Bet.SW & SSW	Cracks in SE part of pit (Light clouds)	1	panch film	A	f/22	2	4x5
	SSW	Cracks in bench along SW wall of pit (Light clouds)	2	"	"	f/16	1.5	"
							O H E	



1. Cracks in S.E. floor of pit.



2. Cracks along S.W. wall, from
S.S.W.

Day	Saturday	Date	December	1,	1923
	Sunday		"	2,	"
	Monday		"	3,	"
	Tuesday		"	4,	"
	Wednesday		"	5,	"

December 1.

11 a.m. to 12 m. S and SW fountains active, N quiet most of the time. SE cones only fuming. Occasional foundering of crusts in both pools, with rapid streaming and many small fountains along margins. Cracks in bench parallel to walls of pit are widening and extending NE. A small sluggish flow oozing out of cracks SW showing a few bright toes. Moderate amount of fume, mainly from one of SE cones; some from E end main pool and N cone.

December 2.

2 p.m. Main pool full, N pool depressed. Fountains at S and SW sources. SE cones fuming only. Occasional foundering of crusts in both pools with rapid streaming and both marginal and central fountains. Island moved several yards to NW. Cracks in bench widening and extending NE. Fume the same.

December 3.

4-5 p.m. Pools joined and almost entire bench flooded. SE cones still stand over lake, the inner one broken down and sending out a large flood of lava, the main source of flowing. About twenty fountaining patches, some vigorous. Fume thin, heat strong.

At 5 p.m. bright lines showed along margins of pools and the tops of islands reappeared. There was a wall of chilled lava six feet high that indicated that there had been a previous subsidence after flooding before 4 p.m.

December 4.

11 a.m. Pools crusted and almost full. S and SW fountains moderately active, N fountain active at times. Inner SE cone as it was at 5 p.m. yesterday, with a pool of lava 30 feet wide in middle of it. Outer SE cone fuming slightly. Island in main pool moved further NW and has tilted more to SW. Entire bench covered with new lava. Fume thin.

December 5.

2-3:30 p.m. All three pools overflowing. S, SW and N fountains active. At 3:30 p.m. N pool broke up with vigorous fountaining and rapid streaming to E, the fountaining more vigorous than seen for weeks. A few minutes later SE pool broke up with active fountaining. Island in main pool getting drowned and is now tilting to N. Fume thin.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day ~~Saturday~~ Date December 1, 1923

~~Sunday~~

~~Monday~~

t	sta	pt	hor	lev	dist	elev	h. i.
<u>December 1.</u>							
11 a.m.	NNE	N station		0			
	N	NNE "		0			
	NNE	N pool	L	28 47-18 52	-05	762	-260
	N	same	R	70 06-33 17	-05	393	-261
	NNE	Main pool	L	56 24-14 06	-05	1022	-257
	N	same	R	74 39-16 11	-04	885	-260
<u>December 2</u>							
11 a.	NNE	N station		0			
	N	NNE "		0			
	NNE	N pool	L	29 22-19 20	-03	738	-259
	N	same	R	66 20-33 05	-05	397	-262
	NNE	Top inner SE cone	L	94 22-14 18	-03	810	-207
	N	same	R	42 56- 9 48	-04	1184	-206
	NNE	W end island main pool	L	55 40-14 15	-03	1008	-256
	N	same	R	74 10-16 27	-04	857	-256
<u>December 3</u>							
4 p.m.	NNE	N station		0			
	N	NNE "		0			
	NNE	Inner SE cone	L	106 18-25 32	-08	513	-244
	N	same	R	38 37-16 54	-03	788	-239

This was several feet above lake, so we can consider lake to have been -245 feet

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
 Hawaiian Volcano Observatory

Day ~~Tuesday~~ ~~Wednesday~~ ~~Thursday~~ Date December 4, 1923
 " 5, "
 " 6, "
 " h. i.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>December 4</u>								
10:30	NNE	N station						
a. m.	N	NNE "						
	NNE	N pool	L 30	05-18	57	-04	745	-255
	N	same	R 67	32-32	04	-05	397	-252
	NNE	Main pool	L 55	34-15	21	-12	943	-255
	N	same	R 70	54-17	12	-04	825	-258
	NNE	SE pool	L 93	19-15	54	-05	835	-236
	N	same	R 44	20-11	10	-05	1190	-237
<u>December 5</u>								
3 p.m.	NNE	N station						
	N	NNE "						
	NNE	N pool	L 28	24-17	17	-03	757	-236
	N	same	R 69	38-31	15	-03	388	-238
	NNE	Main pool, W end is- land	L 56	50-14	54	-03	948	-252
	N	same	R 70	20-16	10	-03	844	-250
	NNE	SE pool	L 92	54-15	07	-04	829	-224
	N	same	R 44	20-10	40	-04	1182	-225
<u>December 6</u>								
10:30	NNE	N station						
a. m.	N	NNE "						
	NNE	N pool	L 31	12-19	45	-04	683	-245
	N	same	R 58	40-30	26	-04	417	-248
	NNE	Main pool	L 56	40-13	52	-04	993	-244
	N	same	R 72	48-16	40	-04	870	-260x

O H E



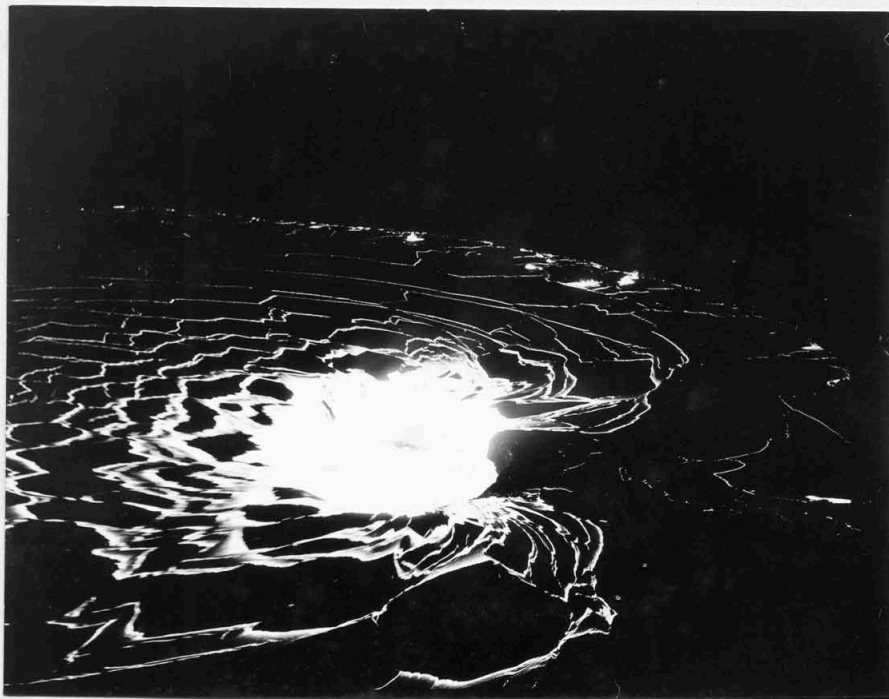
1. Southeast side of pit, from N.N.E.



2. Southwest side from N.N.E.



3. North side from N.N.E.



1. North pool sink well, from N.N.E.



3. South and southwest sources, from S.E.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Thursday Date December 6, 1923

Friday " 7, "

Saturday " 8, "

December 6

10-11 a.m. N and SE pools depressed 8 feet below their margins. Main pool almost full. S and SW fountains active; at times a third fountain played in W part of main pool. No streaming noticeable. Island in main pool moving further N. Fume very thin, mainly from SE cone.

December 7

11:45 a.m. Both pools crusted and slightly sunk in their cups. Fountaining feeble, only S and SW fountains in action. No streaming visible. Island in main pool moving further N. SE cones fuming and quiet. Fume in general thin.

8-10:30 p.m. Glow as seen from Volcano House brilliant, so went down to pit to investigate. The pools had risen and become joined, with the SE cones, S and SW wells as sources of flow. N pool was a great sink hole into which the lava cascaded. This pool must have been fully 10 feet below rest of lake and was orange yellow. Lava was flowing rapidly out of both SE cones and there was for a time an 8-foot dome fountain over the inner cone. The S source was covered by many small bubble fountains, and the SW one was similar but smaller. The fountains were giving off considerable sulphurous fume.

A chauffeur who left the pit at 5 p.m. reports the pit quiet at that time. Another chauffeur reports that at 5:30 p.m. the main pool started to overflow, but in no very spectacular way, and when he left at 6 p.m. the SE cones were inactive.

December 8

10-11 a.m. Lake showed no sign of falling. S well main source, SW well secondary source. Both marked by thin skins with radial streaming. Inner SE cone had become a sink well, with small stream pouring into it. Old SE cone crusted and quiet. There were three powerful and constant groups of fountains: one under N station, one in W central part of lake and one near W end of SW ledge of June 1923. There were three smaller groups and one marginal fountain under S station.

Heat was so strong that it was necessary to shield the face. Much fume, strong with SO₂, from fountains.

4:15 p.m. Lake continues to rise with S and SW sources as feeding wells. Fewer fountains than in morning and more variable in strength, ranging from nothing to powerful. N group more concentrated, at times fountaining powerfully, followed by quiet spells. SW group varies from weak to violent. Both SE cones were sink wells and fountained a little. Crusts thin and heat strong.

O H E

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday Date December 7, 1923
Saturday " 8, "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>December 7</u>								
11:45	NNE	N station	0					
a. m.	N	NNE "	0					
	NNE	N pool	L 26	43-17 23	-04	784	-245	
	N	same	R 74	10				
	NNE	Main pool	L 58	19-14 55	-04	910	-245	
	N	same	R 67	17-16 04	-06	842	-245	
<u>December 8</u>								
10a.m.	NNE	N station	0					
	N	NNE "	0					
	NNE	S side inner SE cone	L 91	09-14 48	-05	801	-212	
	N	same	R 44	18-10 28	-08	1144	-212	
	NNE	E side S grotto	L 74	00- 7 54	-04	1540	-213	
	N	same	R 75	28- 7 57	-08	1530	-214	
	NNE	W side pit	L 30	21- 8 27	-04			

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Sunday	Date	December 9, 1923
	Monday	"	10, "
	Tuesday	"	11, "
	Wednesday	"	12, "

December 9

1 p.m.

Lava down 20 feet or so and still falling slowly. Depression of W of SE cones same as on 8th. S fountain area is a sink hole with lava streaming to it from N lake. Island by SW fountain 4 or 5 feet high. No fountaining except S area. Slow cracking and foundering of crust over entire pool. Some of plaster due to drop has already scaled off.

R H F

December 10

11 a.m. to 12 m. Two pools separated, appear to be slowly rising. S fountain feebly but constantly active. N and SW fountains active at times, feebler than S. No perceptible streaming, but frequently slabs of crust sink exposing a small patch of lava.

Material changes in the topography of pit. Main pool much enlarged but very indefonite in shape, covers old NE sunken area. The island has moved notably NW and apparently passed the SW source. SE cones on a high bench with a 6-foot cliff between them and the lava to the W. Also some cliffs of about the same height to the SW as though the central part of the bench had subsided. Aa on the sides of SE cones.

Only a little fume from SE cones. Fume in general thin. Heat moderately strong.

O H E

December 11

9 a.m.

Main and N pool overflowing slightly. A new pool some 30 feet in diameter had appeared in SW part of pit where one of the fountain groups had been playing December 8. Fountaining stronger. N and S fountains moderate; two weaker ones in SW source area. Island has moved further W and seems to be joined to bank.

8 p.m.

Heavy avalanche under S station.

O H E

December 12

10:45 a.m. to 12 m. N pool sunk in its cup and quiet. S fountain moderately strong, SW weak and N quiet. Slow streaming to the NE. Pool SW weakly active at times, usually quiet. Fume very thin.

O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

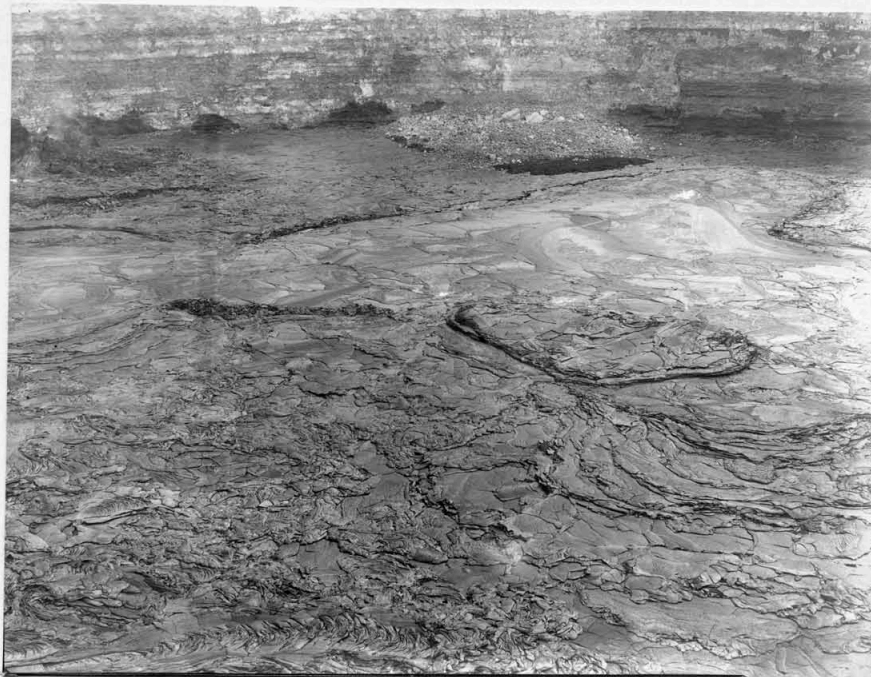
Hawaiian Volcano Observatory

Day Wednesday Date December 12, 1923
Friday " " 14, "

t	sta	subject	no	pl	scr	stop	ex	cam
<u>December 12</u>								
Noon	50 yd S of NNW	Southern part of pit	1	panch Ilford film	A		1.5	4x5
"	"	Eastern part of pit	2	"	"		1	"
"	"	Northern part of pit (Cloudy but bright)	3	East- man	"		1.5	"
							O	H E
<u>December 14</u>								
8 p.m.	NNE	N sink well	1	panch film		f/7.7	$\frac{1}{2}$	4x5
"	"	Dome fountain from W of SE cones	2	"	"	"	1.5	"
S		Gushers from SE cones	3	"	"	"	$\frac{1}{2}$	"
SE	"	" " " "	4	"	"	"	"	"
							O	H E



1. Southern part of pit, from S. of N.N.W.

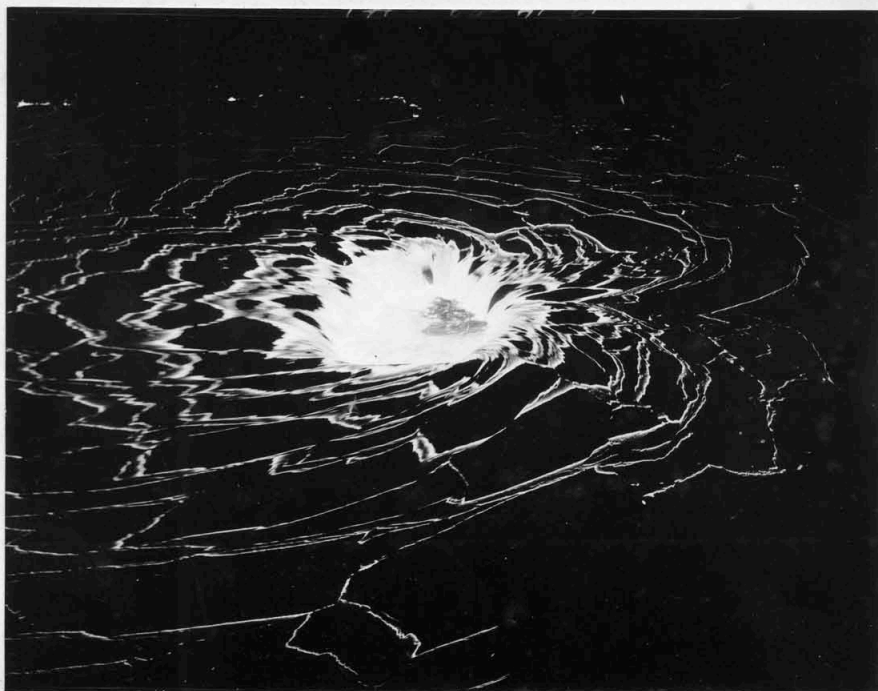


2. Eastern part of pit, from S. of N.N.W.

Dec. 12, 1923



3. Northern part of pit, from S. of N.N.W.



1. North sink well, from N.N.E.

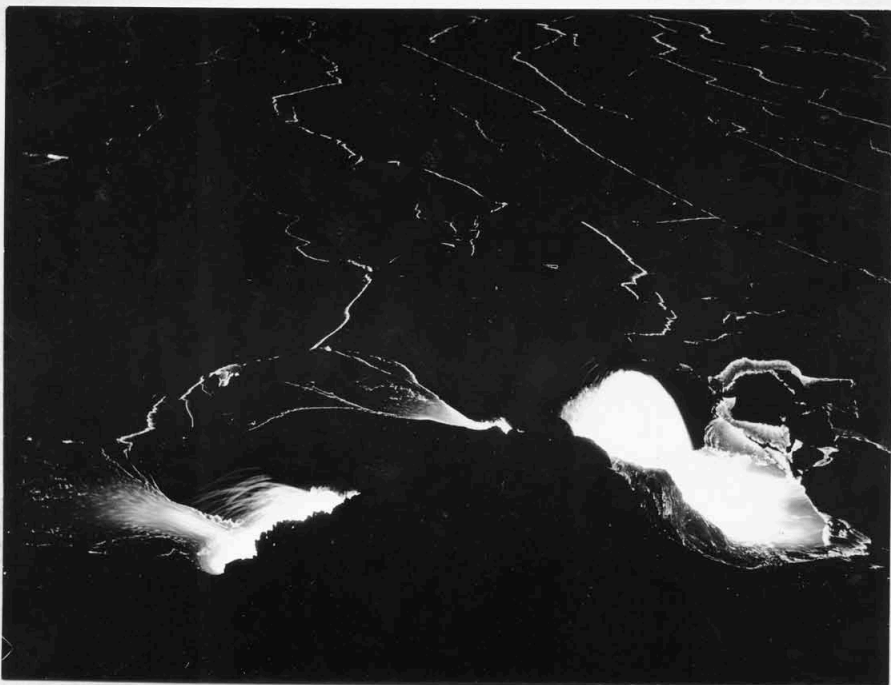


2. Dome fountain from inner S.E. cone, from N.N.E

Dec. 14, 1923



3. Gushers from S.E. cones, from S. station.



4. Gushers from S.E. cones, from S.E. station.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Thursday	Date	December 13,	1923
	Friday		"	14, "
	Saturday		"	15, "

December 13

2-3 p.m.

Strong fountaining at S source and weak at SW. Steady and moderately rapid streaming to NE from S source. Main pool assuming definite shape by down faulting of surrounding bench. Fume very thin, N and SE cones main sources.

O H E

December 14

2 p.m.

Main pool full. N pool, which was several feet higher than main pool, was overflowing and cascading into main pool. SE cones quiet and fountains played at S, W and N sources. Main pool was building a rampart between itself and NE sunken area. Benches about the same, though cracks along the margins of NE sunken area had widened slightly. Fume thin.

8-8:30 p.m.

Practically a repetition of the display of December 7. Cascades from S and SE wells into N pool. Dome fountains from SE cones 10 to 15 feet high, higher than a week ago. The streaming to the N pool was more rapid and the cascading was at times from all sides. N pool appeared fuller than a week ago, and during the evening it got still fuller, reducing the height of the cascade. Considerable fume rose from N pool, though less than a week ago, so that the glow as seen from the Observatory was less, though the activity was just as great. SW source weakly active, even less than December 7. No fountains other than the source cones.

About 6 p.m. as seen from Observatory the glow over E side of pit was bright as though the dome fountains had already started. At 6:20 to 6:30 p.m. the cascading began and brilliant glow was seen at N end, with emission of fume. It was reported that cascading stopped about 9:15 p.m., the pool gradually filling up until within 5 feet of the top, then it rose suddenly until it was full.

O H E

December 15

9:30 a.m.

During the night the lake had risen and covered the top of the avalanche under S station, but it subsequently sank about 20 feet.

This morning a slight rise in progress. About thirty rather small fountains playing all over the lake; no general streaming but slight local streaming to some of the fountains. SE cones quiet; no distinctive fountaining over S and SW sources and no streaming away from them. Large patches of aa over the S talus and around the SE cones. Heat strong, fume thin.

O H E

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Sunday	Date	December 16,	1923
	Monday		"	17, "
	Tuesday		"	18, "
	Wednesday		"	19, "

December 16

10 p.m.

Pit dull as seen from Observatory.

Fountaining at S and SW vents and occasional fountain in N pool which was depressed within its banks 8 to 10 feet. No streaming anywhere and only slight cracking and foundering of crust in a dumb-bell shaped pool extending NE-SW with the handle in the middle of the pit.

R H F

December 17

4:15 p.m.

Topography very much like that before the flood of December 14, with main pool occupying essentially the same basin that it did then. N pool unchanged. Whole bench appears to have risen, as the veneer of new lava is thinner than it was before the rise; lakes probably 230 to 235 feet below the rim of pit. The island in main pool has tilted strongly to the N and a new island has appeared S of it. S and SW fountains mildly active and N one at times feebly so. SE cones quiet and fuming, with solfataras incrustations on them. N pool quiet and crusted. Main pool shows considerable number of bright lines and bright patches where slabs of crust sink. Old cracks in bench are sealed up and no new ones have yet appeared.

O H E

December 18

2 p.m.

N and main pools have risen and are flooding the whole pit. Level of lake, judging by veneer of December 14, is 225 to 230 feet below rim of pit. N pool appears to be main feeding well, though at present it is not flowing rapidly. SE cones are quiet but a visitor at 11 a.m. reports them active. Fountaining variable, up to twenty groups, some of which are powerful. Some are migratory. No general streaming. Crusts thin, with frequent foundering of slabs. Heat strong, fume thin.

8 p.m.

The lava had risen, with N pool pouring out a more rapid stream. SE cones active. S source marked by thin skins and slow streaming away from it. SW source inactive.

O H E

December 19

2:30-3:30 p.m.

N pool overflowing into main pool, with varying energy, at times pouring out a river 100 feet wide. At times there is a broad low dome fountain over N source. There are some grottoes at E end of N pool which stand fully 15 feet above the level of the lake.

S fountain vigorous, without apparent streaming to it away from it. No fountain over SW source, but occasionally there are other fountains, mostly in NE portion of main pool. Main pool has definite shape and occupies all the central part of pit, leaving a margin of bench on all sides. This bench includes SE cones, at which place it is widest. A steep sided island has appeared almost in the geometric center of the lake. Heat strong, especially near N pool.

O H E

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date December 19, 1923

t	sta	subject	no	pl	scr	stop	ex	cam
2:30 p.m.	NNE	N side of pit	1	panch film	A	f/16	2.5	4x5
	"	SW " " "	2	"	"	"	"	"
	"	SE " " " (dull)	3	"	"	"	"	"
	N	N pool (dull)	4	"	?	f/7.7	1/25	"

O H E



2. Southwest side of pit, from N.N.E.



3. Southeast side of pit, from N.N.E.

Dec. 19, 1923



1. North side of pit, from N.N.E.



4. North pool, from N. rim.

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

Day Wednesday Date December 19, 1923
Saturday " " 22, " "

t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>December 19</u>								
2:30	NNE	N station						
p.m.	N	NNE "						
	NNE	N pool	L 27	22-16	12	-04	756	-218
	N	same	R 69	40-30	30	-05	346	-208
	NNE	W end island, main pool	L 48	25-12	28	-05	1026	-225
	N	same	R 80	49-16	10	-05	778	-228
								O H E
<u>December 22</u>								
1p.m.	NE	N station						
	N	SE "						
	NNE	N point SW island	L 52	50-13	50		955	-235
	N	same	R 36	18-16	32		797	-237
	NNE	S fountain	L 66	39-11	05		1195	-234
	N	same	R 36	20-11	40		1150	-237
	NNE	Peak inner SE cone	L 92	08-13	32		782	-189
	N	same	R 6	10- 9	15		1140	-186
	NNE	Right peak outer SE cone	L 94	45-12	10		850	-183
	N	same	R 7	10- 8	30		1218	-182
	SE	Supposed NE station	37	20				
								R H F

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Thursday	Date	December 20,	1923
	Friday		"	21, "
	Saturday		"	22, "
	Sunday		"	23, "

December 20

4 p.m.

A strong overflow from N pool joined a broad sluggish stream from S source well and moved clear to the NE bank of eastern pool. A rampart 4 to 6 feet high and 15 to 20 feet from the wall marked the eastern border of eastern pool. SE cones were higher than before, and glowing and rumbling. Five to eight fountains in action.

R H F

December 21

7 p.m.

Lava cascading into N pool with main source of streaming from S source. The drop of the cascade was 20 feet or more at first. The SE cones were active with several small streams flowing from the outer one and one stream from the inner one. The N pool slowly filled about 9 p.m. and rapid rise followed. The inner SE cone was drowned.

R H F

December 22

1 p.m.

Lava down about 25 to 30 feet but rising, with source at S. W banks of N pool broken down and a stream from it flowed W. One crag by SW bank of N pool and a small island in SW center. High level within a foot or two of 212-foot level of the 7th or perhaps higher.

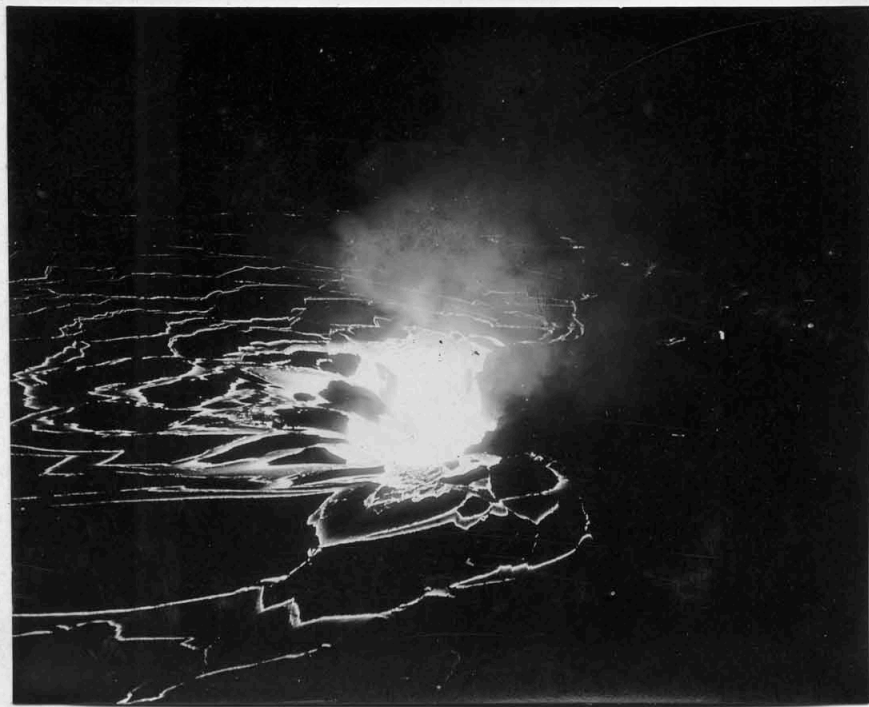
R H F

December 23

1 p.m.

Lava down, with N pool flowing and 6 or 8 feet higher than main pool. Several small islands at SW. One small fountain at S source well. Level about 240 feet below rim of pit.

R H F

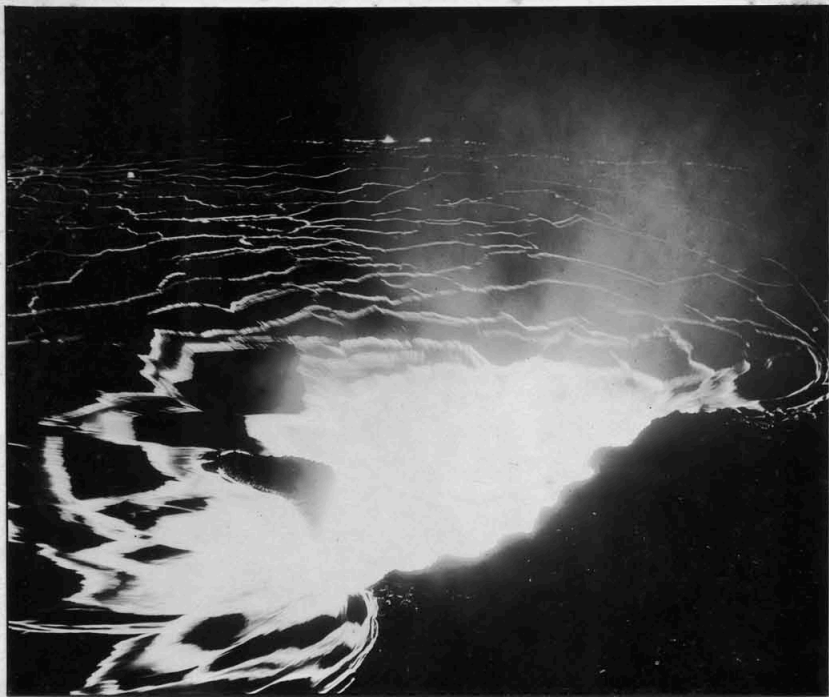


1. Cascade into N. pool, from N.E. rim of pit.



2. Cascade into N. pool, from N.N.E.

Dec. 21, 1923



3. Same as #2, longer exposure.



4. Cascade into N. pool, from S.W.



Looking toward S.W. side of pit from N. station.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Monday	Date	December 24, 1923
	Tuesday	"	25, "
	Wednesday	"	26, "
	Thursday	"	27, "

December 24
11 a.m.

Lava lakes quiet. SE cones dead and sulphur stained. Some streaming northeastward from S source well where there was small fountaining. Fountaining at bank in N pool.

R H F

December 25
1 p.m.

Lakes a little lower than on the 24th but with no marked changes. Considerable cracking and foundering of crust all over main pool. Fountaining at S source well and at bank in N pool. Lava in pools 245 to 250 feet below rim of pit.

R H F

December 26
11 a.m.

Lakes much the same as on the 25th except that N lakes was higher and nearly bank full. Streaming from S source well stronger and a rise was beginning as evidenced by toeing flows on NW floor. One puff was heard at SE cones.

R H F

December 27
11 a.m.

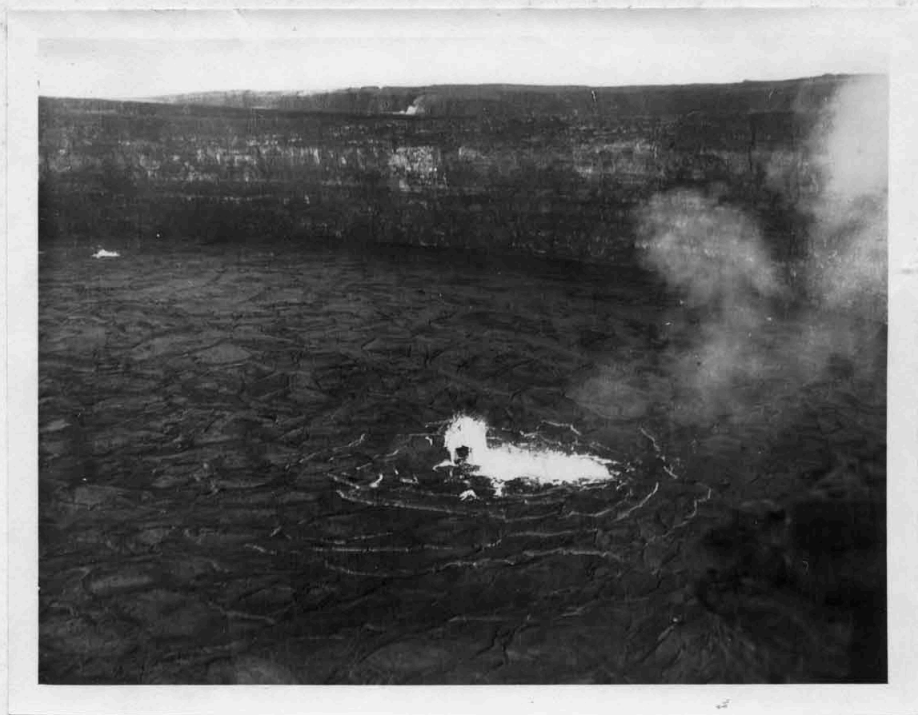
Entire floor covered with moving flood. Inner SE cone buried and slabs on top of outer cone. Turbulent large fountains at N pool locality.

By 11:30 a.m. the lava was sinking rapidly and outer SE cone appeared as an island. S source appeared to be main supply. Continuous fountaining at two places near SE cones, bubble fountaining at S source. High level appeared to be about 185 feet below rim of pit.

Within half an hour after the fountaining at N pool stopped the lava rose 4 feet or more to the top of SE cone island.

The highest level reached was about 170 feet below rim of pit.

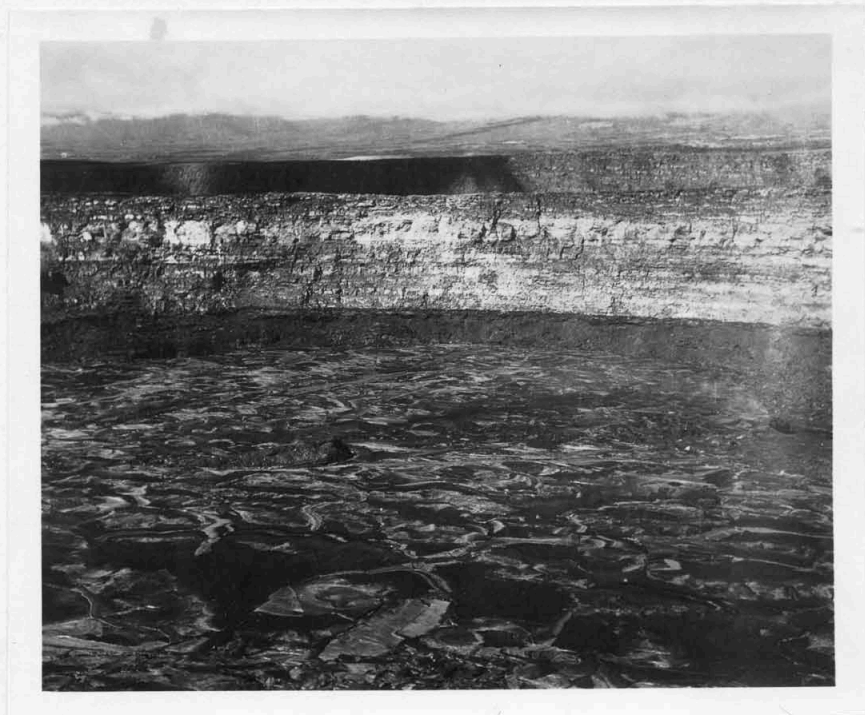
R H F



1. North pool, from N.E. rim.



2. Looking south from N. rim.



1. Looking north from S.E. rim of pit.



2. South side of pit from N. rim.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day	Friday	Date	December 28,	1923
	Saturday		"	29, "
	Sunday		"	30, "
	Monday		"	31, "

December 28

11 a.m.

Lava down so that SW island stood 8 to 12 feet above liquid and SE cones were on a platform 3 to 5 feet above pool. N pool 8 to 10 feet lower than main pool. Bubble fountaining at S source from which there was radial streaming. The lava was rising.

R H F

December 29

4 p.m.

Two islands in SE pool, two SW of big SW island and one elongated island with a tall W pinnacle S of SW island. Lava 12 to 15 feet lower than yesterday (216 feet below rim). Cascade to the SW from N pool with a drop of 5 to 6 feet.

R H F

December 30

4 p.m.

Lakes higher than on 29th. N pool cascading in a broad stream to the SW and in a very small stream SE into SE pool. Radial streaming from S source where there is bubble fountaining. Much smoke from inner SE cone.

R H F

December 31

4 p.m.

Lava lower than on the 30th. Two islands in SE pool, three small islands and three large ones in main pool. Cascade to SW from N pool smaller than on the 30th. Sluggish streaming to NE from S source well.

R H F

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
 Hawaiian Volcano Observatory

Day Friday Date December 28, 1923
Monday " 31, "

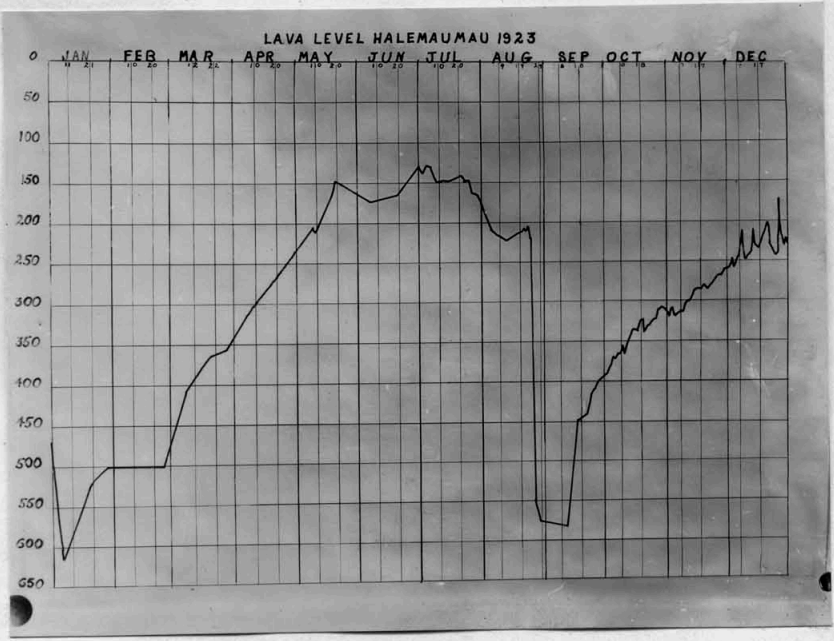
t	sta	pt	hor	vert	lev	dist	elev	h. i.
<u>December 28</u>								
11a.m.	NE	N station		0				
	N	NE "		0				
	NNE	N tip SW island	52	45-13	00	935	-216	
	N	same	72	40-15	30	785	-218	
	NNE	Right top outer SE cone	94	05-11	20	865	-173	
	N	same	45	05	8 00	1220	-171	
	NNE	S fountaining +	67	10-10	00	1260+	-222	
	N	same	75	00-10	25	1210-	-222	
								R H F
<u>December 31</u>								
4 p.m.	SE	N station		0				
	NE	SE "		0				
	SE	NE point S island	L 31	55-18	35	605	-202	
	NE	same	R 41	30-14	40	835	-218	
	SE	E tip SE islet	L 19	35-21	00	557	-202	
	NE	same	R 38	40-17	15	702	-218	
								R H F



1. Looking southwest from S.E. rim of pit.



2. Looking northwest from S.E. rim of pit.





2. Central part of lake, from N.N.E. rim.



3. South side of lake, from N.N.E. rim.

Dec. 31, 1923



1. North side of lake, from N.N.E.



4. North pool pouring into main pool, from point S.
of N.N.W.