Hawaiian Volcano Observatory Record Book 1919

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 duplicated from an original set housed in the rare book room of the U.S. Geological Survey Library at Reston, Virginia (catalog number 220(950) H3d). Because the record books from the U.S. Geological Survey Library were tightly bound, scanning was not practical. Instead, HVO volunteer Andrew Hara photographed each page, using a tripod-mounted Canon 5D Mark II camera with 16–35 mm lens. The photographs were then delivered to HVO volunteer Ben Gaddis, who processed each of the photographed pages by cropping and by adjusting the exposure and contrast using a photo editing program. The 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.

Hawaiian volcano observatory

Daily journal

Jan.-May, 1919.

U.S. GEOLOGICAL SURVEY
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JOURNAL

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

52326
162 TP N

156

ABBREVIATIONS

B-J A	Burke & James A screen
cam.	camera
C	Century
dist.	distance
elev	elevation
ex.	exposure
f	F. system of stops
F	Wratten F filter
F.P.	focal plane
Hale. or Hal.	Halemaumau
h.i.	height instrument (5 feet when not specified)
hor;	horizontal angle
H.V.O.	Hawaiian Volcano Observatory
I.P.J.	I. P. Jaggar
K	Kodak
K2	Wratten K
lev.	level reading
mon.	monument
no.	number
P	Premo
P.R.	Postal Rift
pan.	panorama
pl.	plate
pt.	point photographed or located
R.H.F.	R. H. Finch
scr.	screen
sta.	station
t	time
T A.J.	T. A. Jaggar
Tes.	Zeiss Tessar
vert. or v.a.	vertical angle
V.H.	Volcano House
W.M.	Wratten M
W.P.	Wratten panchromatic
Woll.	Wollensak

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

JOURNAL

Day Wednesday Date January 1, 1919.
Thursday " 2, "
Friday " 3, "

Jan. 1.
12:30 p.m. Lava appears stationery. Lakes low. Solfataric stain at the vents and much Pele's hair leeward side main lake. SE pond pit enlarged, liquid 15 feet down, streaming W. Main lake 10 feet down, stagnant skin. NE cone has slightly sunken pool next it on summit of slag heap. Edges of this pool glowing and glow at E end of slag heap. Heap along W wall base appears higher, smooth on top. Main lake region a distinct depression in floor. Open pits at N and SW lakes, and probably W pond also. Central cone and crag appear unchanged. Cone and depression, perhaps a pit, middle of S floor. Much smoke center and SW.

Jan. 2.
6:00 p.m. Lakes low so that liquid of main lake is only barely visible from SE station beyond edge of its inner pit. Some glow at NE cone and E of it. SE pond appears 30 feet down its inner pit. Main lake 20 feet down. Heavy stalactites in both pools. N lake a large pit making intense flare at night. Central pot and SW pond both open and flaring on the fume above. Much fume and general appearance of subsidence. Small earthquake felt at noon today.

Jan. 3.
11:20 a.m. Distinct sag in floors S and SE as though under lava of flows had poured back. Fresh rock falls on edge floor SSE and S. Much smoke from ponds and from N side crag and E cone locality. Mild slight hissing at SE wall vent, a mere glow crack with solfataric stain.
Noon rise in progress apparently, main lake rising and 15 feet below edge of its pit, SE pond 20 feet down. Cone gone and large glowing pot smoking strongly at central pond. Inward sag of floor around SW pond pit. Noise surging, rumbling and splashing. Heavy stalactite curtains around interior SE pond pit and at grottoes main lake. NE heap piled against wall, a conical slag heap, no flat top left, two cones.
Two fresh flows moving N and S from SW cone vent under wall midway between SW and W stations. Central crag has its SW pinnacle almost completely covered. Streaming eastward in SE pond and stagnant skin in main lake.
General condition appears stationary. N lake an oval pool streaming northward and fully as large as main lake, only 5-foot walls. Continuous bubbling on N side. Pond 100 feet long N-S. Marked valley SE to NW between the wall heaps NE and SW. NE cone only 15 feet down under NE wall.
12:15 p.m. Strong fall of November lava under N station to floor below.

T.A.J.

KILAUEA DAY SHEET

Massachusetts Institute of Technology

Hawaiian Volcano Observatory

Day Wednesday Date January 1, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Brunton.						
12:30p	SE	Central crag		5 30				
		N side lake		10 55				
		SE pond		20 40				
		N lake cone		4 45				
		SW pond		6 20				
		Central pot		7 0				
		NE cone		3 25				
		NW floor edge		2 45				
		Floor edge under W sta.		2 20				

T.A.J.

			no	pl	scr	stop	ex	cam	

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Saturday Date January 4, 1919.
Sunday " 5, "
Tuesday " 7, "

Jan. 4.
11:15 a.m. SE and main lakes both surging about 15 feet down their pits. Great volumes of smoke at W cone, central pot, central crag, W of main and N lakes, at SE pond, E of main lake and at E cone. SW heap against base of wall built higher, cascades from it into SW pond pit. Central pot glowing. More rock fall material on floor S and N. Heavy flings of melt N lake.
Measurements show general subsidence since yesterday except central crag and SW margin.

Jan. 5.
3:30 p.m. Pit very smoky. Lakes very low. Floor under SE wall appears very low but the heaps NE and SW remain high against the wall base. Considerable increase of collapse about lakes. N lake streaming northward. Main lake streaming southward and large cavern extends from it westward toward central pond pot which is glowing and fuming. Distinct inactive pit in summit of NE heap. Depression in their pits of main and SE lakes 20 feet, of N lake 12 feet.
Small tidal wave reported at Laupahoehoe.

Jan. 7.
11:25 a.m. (This morning about 5 a.m. very strong flaring above main lake and roar of fountains heard at H. V. O. in calm air. Remarkably sudden excessive tilt E and N last evening after 6 p.m. S tilt since.)
Pronounced resumption of rising since last evening indicated by measurements and conditions at pit and checked by fact that fume was excessively dense at 5 p.m. last evening and strikingly thinner at 9 a.m. this morning.
Lakes full of lava which has recently overflowed main lake rim. Seven or eight large fountaining places. SE pond larger and within 3 feet of rim with new ramparts. Main and N lakes have new ramparts 3 to 5 feet high. SW and W ponds remain in deeper pits, fountaining beneath cliffs 10 to 15 feet high. The SW heap completely revived, with flat top of crack and founder pattern, hot and crackling. Fresh glowing lobes with collapsed crusts from this heap northward. Powerful flow pouring rapidly down the slope from it eastward and cascading into the W pond pit. Smoke dense from N side central crag but less elsewhere, though it is abundant around SW pond. N lake fountaining continuously in middle, skinned over elsewhere and shows an island spatter cone S side of its center. Streaming tendency northward. Main lake streaming eastward in a curve to NE grotto where the bombardment is heavy. Occasional centrel fountains. SE pond bombarding its W shore and SW pond its N shore. No activity NE heap.
The rising appears to be slight as yet insofar as bench magma is concerned but the rise of liquid is marked. It should be noted that the sudden tilt E and N at sundown checked with the remarkable chill of a very exceptional night (42.5° minimum) but the SE tilt is usually the diurnal temperature effect. The recurrence of liquid flooding may still be a subsidence effect.

KILAUEA DAY SHEET

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Date Jan. 2, 3 & 4, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
Jan. 2.		Brunton.						
6 p.m.	SE	N side lake		12 10				
Jan. 3.		Brunton.						
11:20a	SE	N side lake		11 55		413	87	
		Bench over ditto		10 5		413	69	
		Orifice central pot		7 5				
		SE pond W side		22 5				
		Bench over ditto		18 20				
		Summit central crag		5 40		522	52	
		E edge SW pond pit		6 10				
		(Former SW cone, base)						
		SW edge floor		4 2				
		S " "		7 55				
		W " "		3 10				
		W cone pond smoke		5 15				
		S edge N lake pit		5 8				
		Base of E cone		12 55				
		NE cone		3 20		624	36	
		NW edge floor		2 40		1207	56	
Jan. 4.		Brunton.						
11:15a	SE	Central crag		5 35				
		Edge SW pond		6 50				
		SE pond		22 10				
		Edge above SE pond		18 50				
		N side main lake		12 35				
		Edge above ditto		10 20				
		S edge N lake		5 20				
		Central pot		7 25				
		NE cone		3 50				
		SW edge floor		3 50				

			no	pl	scr	stop	ex	cam	
Jan. 4.		SW wind, much smoke.							
11:15a	SE	S floor	1	W M	8x	f/16	1	4x6	
	"	Lake	2	"	"	"	"	"	
	E of SW.	SW pond	3	"	"	"	"	"	
	W	W pond pit	4	"	"	"	"	"	
	W of N	N lake pit	5	"	"	"	"	"	
	NNE	NE cone pit	6	"	"	"	"	"	

T.A.J.

1919, Jan 4



1

2

7

1919, Jan 4



3



4

Jag

8

1919, Jan 4



5



6

Fog

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Wednesday Date January 8, 1919.
Saturday " 11, "

Jan. 8.
6:00 p.m. With General Heard and party.
Strong revival of liquid lava flooding. NE and W slag heaps glowing and NE cone spouting and flowing. Toes pushing out. Main and N lakes brimming and fountaining with occasional slight sinking spells. SE pond squarish and about 40 feet across, with the liquid lava close to the edge. Violent bombardment of a recessed grotto dome with a rift through the middle on the N side of the main lake, streaming eastward and northward.
N lake occasionally flinging very high strings of melt at E and S ends. Central pot glowing and splashing. E cone hissing. Large fields of crusted glowing lava E, S, W and in the center, which are reported to have been actively flowing last night.
Soldiers of the Coast Artillery were standing on the NE slag heap and walking down the western slope of the heap to the edge of live flows in the NE central region. Their descent was effected with a rope at the 15-foot wall NE. The smoke from the pit has greatly diminished and at times is almost imperceptible, a characteristic of the period of intense liquid flooding. No special activity was noticed in the SW and W ponds.

Jan. 11.
4:30 p.m. Flooding of entire floor continues. Central crag has risen slightly and the only part of edge of floor remaining relatively low is NNW. NE cone has a flaming and hissing vent and is a steep sided pyramid 5 feet high. The heap of flows radiating from this point shows the narrow humpy trickle character and the pit on top of the heap has been obliterated. The N lake, 2 to 4 feet below its banks, was splashing with more or less continuous noiseless fountains against its S and E banks. Streaming probably S, hard to see. Its ramparts were low and it had overflowed extensively within a few hours toward the N where glowing flows with flat smooth surface were pooled against the wall E and W of the N sta. The main lake was streaming continuously W and the rim around it was only about 3 feet high but above this very large spatter heaps had been built on all sides so as to make an almost continuous lumpy rampart and it was evident that a heavy sheet flow with slightly festooned surface had recently poured southward from the lake over its edge. The grotto and fountaining activity was moderate. The SE pond was a raised cone with a large irregular cauldron boiling in its summit, the liquid lava only a foot or two down. All around it were fresh glowing flows. The E cone was a hissing filagree heap, small. The SW pond and W pond showed no activity as seen from a distance. Note that they are now pits where before they overflowed most. The central pot showed a filagree heap on its W rim and live flows were in motion to the W of it. The western heap showed increased height and glowing flows everywhere, tho' not conspicuously moving. The central crag appeared still more encroached upon by flows about its base and is getting to be a small object. In general the situation reveals recurrence of intense lava flooding with only slight lift of the bench magma. Measurement shows NE heap and edge SW pond <u>lower</u> than a week ago.

KILAUEA DAY SHEET

Massachusetts Institute of Technology

Hawaiian Volcano Observatory

Day Tues. & Sat. Date Jan. 7 & 11, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
Jan. 7.		Brunton.						
11:25a	SE	N side lake		11 5				
		N lake		5 10				
		Crag		5 25				
		Floor edge W		2 50				
		SW pond		6 15				
Jan. 11.		Brunton.						
4:35p	SE	N side lake		8 25		413	61	
		Near edge N lake		4 00		838	57	
		Central pot		6 00		838		
		NE cone base		4 00		624	43	
		Base N wall, cavern locality.		2 50		1131	52	
		Base NW wall		2 50		1207	59	
		" W "		2 28		1132	44	
		" SW "		3 12		1825	44	
		Central crag		5 10		522	47	
		Base S wall		7 45		434	59	
		SE pond cone pot		15 20				
		E cone		11 30		291		
		SW pond		4 55		574	49	

			no	pl	scr	stop	ex	cam	
Jan. 11.									
4:30p	E	SW	1	W M	8x	f/8	1	4x6	
		Streaming strong westward.							
								T.A.J.	



Fog

JOURNAL

Massachusetts Institute of Technology

Hawaiian Volcano Observatory

Day Monday Date January 13, 1919.
Tuesday " 14, "
Wednesday " 15, "

Jan. 13. In the evening from H.V.O. the SW wall cones were spouting and glowing flows of SW heap in line plainly visible as row of glow spots. Telescope shows some spurting. Crag not visible daytime, but SW edge plainly visible in telescope.

In night after midnight, with nearly full moon west, the thin trail of Mokuaweoweo fume extended NE showing drift from SW at that elevation.

Jan. 14.
12 noon. Intense flooding from SW wall-cone with "artesian" quality continues so that the whole pit floor seems to slope up against that wall, the highest wall of the pit. The NE wall heap no longer conspicuous as a heap, though two large cones surmount it and the flow heapings around it are now irregular and lumpy. Fresh falls of rock from 1918 bench NE on east side of NE cones. E cone a hissing filagree heap. SE pond surrounded by dull filagree heaps interior not visible, much Pele's hair. Main lake has five grotto domes, is 5 feet down its pit, and the fountains are large and vigorous, streaming northward. N lake splashing. SW pond has a high spire cone built above its E wall. W pond not distinct, in midst of flows from SW heap. Central pot now an indistinct cone. Central crag more submerged under flows. Smoke rather increased but as a whole thin. No marked changes in general aspect, but the high building against SW wall very conspicuous and floor there plainly visible from H.V.O.; glow of SW wall cone and flows plain in evening.

Jan. 15.
8 p.m. and thereafter. N central cone spurting high as seen from H.V.O. Flows N end of W heap moving. Splashes visible above main and N lakes. Intense building by liquid lava continues. W wall cone not spouting.

T.A.J.

KILAUEA DAY SHEET

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Tuesday Date January 14, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Brunton.						
12 noon	SE	Floor edge SW		2 45				
		W wall cone splashing		1 50				
		Edge floor S		6 35				
		" " W		2 10				
		" " NW		2 55				
		" " N		3 00				
		Base NE cone		3 50				
		" E "		9 50				
		N side lake		7 15				
		Summit crag		3 55				
		Near edge N lake		4 00				
		Base central cone		5 5				
		" SW pond "		4 10				
		" Central crag		5 55				

			no	pl	scr	stop	ex	cam	
Noon	XSE	SW panorama	1	W M	8x	f/16	1	4x6	
	"	Center "	2	"	"	"	"	"	
	"	NE "	3	"	"	"	"	"	

T.A.J.

1919, Jan. 14



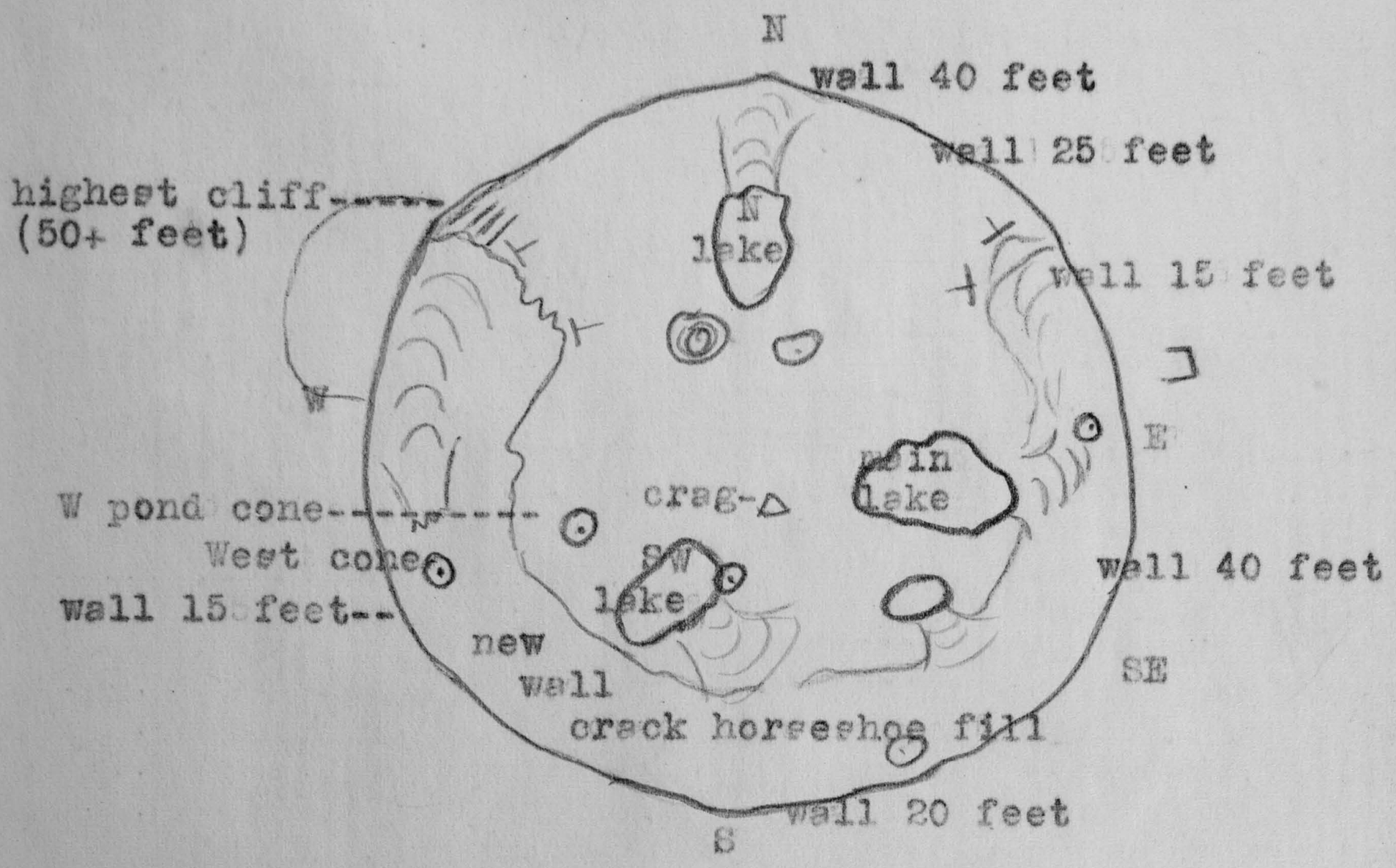


JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

 Day Thursday Date January 16, 1919

4:35 p.m. Pit from S:-



About 4:45 p.m. very voluminous overflow from E end of main lake, followed a welling up and overflowing of SE pond, both torrents pouring to foot of E wall and filling there to a point a short distance N of E station. The fresh fill here ended as a flat platform with a steep fall-off to a much lower surface by at least 10 or 15 feet and the former NE cone lay at about this fall line and was now obliterated. The ground here appears to have subsided prior to the building of the new E fill. The ground between SE pond and SE wall of pit was greatly fissured with some gaping along the wall crack and appeared swollen up. This cracked area was all flooded by the overflow. At the same time with these flows the N lake showed a fresh glowing overflow across its N lip and the W wall cone started a fresh flow following the wall northward down the steepest slope of the western heap. The general arrangement of the newest flows was in a horseshoe following the wall crack W, S and E, with steep slopes at the ends of the horseshoe leading down to lower ground N.
There were new cones, one at the base of the SSE wall and two on the floor SW of the N lake. The W wall cone was quiet but from under crust near it the big flow poured from a bright zigzag edge northward. The W wall cone stood just where the former W pond and W cones have stood, a little to the S of the old W station. The new SSE wall crack cone stands exactly under the S cone of February-March, 1918. The W pond cone was a glowing heap hissing and occasionally spurting. The central cone contained a large pot flaming. The E cone was flaming and spouting.
The SW pond was crusted and mostly level with its banks, the large cone S of it glowing. The northern cones puffed somewhat. A few

high grotto domes were built about the N and main lakes and the fountains puffed and sprayed within them, the activity being of the quiet spraying type with much low puffing and no rumbling. The spray at night from the main lake fountains plainly visible from H.V.O.

The central crag summit peaks protrude only about 4 feet above the general level of flows. The slope of the floor is now strongly toward the NE from the high heapings against the SW wall of the pit but from the central region the slope is toward the NW wall which still remains the highest wall of the pit. Next to it in height comes the SE wall, then the N, while the ENE and WSW walls are both very low, not more than 15 feet high.

The situation at present is somewhat puzzling as what little remains of the crag summit has risen, the clinograph tilt at the Observatory for the last two days has been westward, the microtremor of the rhythmic type has notably increased of late with each of the spells of liquid flooding and what the bench magma as a whole is doing is not measureable as the crags have been engulfed. This engulfing of crags by liquid lava continues in the case of the final remnant of the central crag and the December-January rise marks a liquid flood without precedent since 1916. If the clinograph evidence is trustworthy, the main lava column sinks just before each spell of flooding.

Today at 9 a.m. the fume was thin; at noon it was comparatively thick; at 5 p.m. it was thin again; these alternations marking rise, fall, rise of liquid.

T.A.J.

KILAUEA DAY SHEET

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Thursday Date January 16, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit.						
4:35p	SE	E	0					
	E	Old N	0					
	SE	N side lake	51 44	4 39	+2	418	34	
	E	ditto	59 33					
	SE	Base N central cone (northernmost)	57 38	2 58	+2	863	42	
	E	ditto	30 34					
	SE	Summit central crag	82 59	3 8	+2	528	29	
	E	ditto	67 56					
	SE	Base SW pond cone	97 53	3 4	+2	574	30	
	E	ditto	74 50					
	SE	Summit W wall cone	97 59	1 16	+2	909	17	
	E	ditto	65 10					
	SE	Near edge N lake (cone east side)	48 6	2 43	+2	838	38	
	E	ditto	21 11					
	E	SE pond cone	93 55	3 59	0			
	E	Floor edge under SE sta.(vertical cliff)	124 32	3 2	0	420	23	
	E	Floor edge under S sta.(vertical cliff)	101 38	1 50	0	793	24	
	E	Floor edge SW	78 26	0 51	0	1060	13	
	E	" " under W sta.(vertical cliff)	55 38	0 58	0	1220	20	
	E	Floor edge NW	36 3	1 57	0	578	40	
	E	" " under old N sta.(vertical cliff)	0 0	2 40	0	821	37	
	E	Central cone	62 12	2 15	0			
	E	Lower N central cone	33 15					

T.A.J.

			no	pl	scr	stop	ex	cam	

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Friday Date January 17, 1919.

2 to 4 p.m. Revival of strong flooding from W pond vent about noon, plainly visible from H.V.O. with telescope.
The vent became a standing fountain 20 feet wide backed on the south by a crust, the flood spreading from it fanwise and then settling into a rapid river of melt pouring northward to make a fill in the NW part of the floor. Another flow continues pouring steadily from the W wall-cone, part flowing to N and part to S, the cone region itself crusted over but the flow lava appearing under the W station as the N-flowing stream, and under the S station as a pool.
The floor E and SE has slumped considerably and the central region looks lower. The NE cone has resumed activity and filled the depression NNE observed yesterday, the whole NE marginal fill again assuming the appearance of a slag-heap.
The SW pond is obscured by crust, a high puffing and glowing cone marking it.
The main lake 4 to 6 feet down, surrounded by raised rampart and high domes NE, SW and E, the SW dome closed on lake side with glowing slit pot on top.
The N lake similar, 5 feet down, raised rampart and group of large domes E of it; and SW of it and away from the pond two or three domes, one a spire, rising above the floor; glowing cavernous grotto dome N of N lake.
At the central pond a cone. The central crag as before.
At the eastern edge of the great flow much up-ending of glowing crusts. At the source of the northern W-cone flow occasional increases of pressure burst the crust and make outflow through cracks.
General situation a marked increase of flooding after a few days of less strong flowing and probably subsidence below of the bench magma as a preliminary to this spurt.
The bench magma is no longer measurable except by the tip of the central crag, which is so imprisoned in the floods about it as to be untrustworthy for a measuring datum for the whole bench-magma column. Properly the bench magma ought to be measured by several floor points where there are no fresh flows, but such points are hard to find. The recent cracking SE, slumping NE, and north central changes probably were parts of a downward movement, and downward movement was shown last week at the NE cone and SW pond.
The intense flooding of liquid is like what happened in November when the column sank, but at present the flooding outstrips by building, any withdrawal, and the crag tip today is unquestionably lifting with the rise of the liquid.

T.A.J.

19

KILAUEA DAY SHEET

Massachusetts Institute of Technology
Hawaiian Volcano Observatory
Day
Date Jan. 17 & 18, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
Jan. 17.		Brunton,						
2-4p.m.	W	Central crag		3 45				
		N side lake		2 50				
		S side N lake		3 50				
		Base SW pond cone		4 10				
		Wall base NW		6 40				
		" " under old N		3 10				
		" " " E		2 15				
		NE cone		2 15				
		Wall base SE		2 20				
		" " S		2 25				
Jan. 18.		Brunton.						
4:30p	SE	SW edge floor		0 57				
		W wall cone		1 05		909	15	
		Floor edge S		3 55				
		Central crag		3 12		528	30	
		N side lake		4 10		418	31	
		N lake		2 15				
		SW pond cone		2 15				
		E cone		7 10				
		NE cone		3 00		624	32	

			no	pl	scr	stop	ex	cam
Jan. 17.								
2-4p.m.		Near view artesian fountain W arm cone	1	W M	8x	f/11	½	4x6
	W	Center	2	"	"	f/16	1	"

T.A.J.

1919, Jan 17





2

Jag

Massachusetts Institute of Technology

JOURNAL

Hawaiian Volcano Observatory

Day Saturday Date January 18, 1919.

Night a.m. less activity of flowing than in previous afternoon and evening, but later in night strong fountain in W pond locality. This morning everything higher, floor seen clear above NE half-dome on edge of pit, and fountaining pot at W pond.

4:30 p.m. Sag in flows under N station; slump and fresh falls from wall ESE. S wall-cone higher spire. Very large cones SE pond, SW grotto, and W grotto N lake.
Flows piled against SW pond cone, seen piling from H.V.O. at 2 p.m.
Made circuit of pit N and W. NE heap higher and flowing from edges. Cone on top. Main lake 3 or 4 feet down, streaming eastward. SE pond cone showed open pot splashing within. N lake overflowing northward. Northern flows of W heap have slumped. SW pond and W pond cones splashing but W wall-cone buried under its own flows. This western heap has flat top of live lava pooled and streaming steadily and smoothly from a glowing "V" eastward. This pool is 400 feet long and has been formed by the banking in of steep marginal overflows E, NE and N. Its level is only a foot below the rim of the pit SW and everything indicates tumescence of the bench magma in addition to piling up of the flows which will make this pool overflow the SW edge of the pit. A driblet cone has formed under the old S cone at the edge of the floor and this during the night built up greatly, making flows visible from H.V.O. The next day this had built a pile of lava only about 15 feet below the rim.
On this night the standing fountain type of activity ceased but there were flows moving on the western heap.

T.A.J.

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Sunday Date January 19, 1919.

Last evening the flat surface of W heap was 1 foot below SW rim of pit at SW station locality, alive and streaming east. Flows from heap all night but no more "artesian" fountains.

8:45 a.m. Visited pit and found the SW rim overflowing, one tongue in motion 55 feet from edge, headed towards the 1868 crack. Made circuit by S, W and N. West and SW pond cones splashing. North and main lakes brimming full. Flows moving on NE heap cone on top NE heap. Lakes fountaining, large dome grottoes. SE wall vent hissing. E cone flaming. SE pond a cone-pot splashing. S wall cone built up high above a driblet heap of its own making; flows from it in motion. This and NE heap may both reach rim soon. Live stream pouring N from W heap.

12:30 p.m. to 2:30 p.m. Cones rather quiet. Flows have ceased moving. Lakes 5 feet down, grottoes splashing. Some slight hissing. Floor easily accessible; crossed NE heap and went to rampart of N lake, of main lake and to central cone. The SW overflow now three or four lobes; the longest has progressed about 75 feet from rim; not moving. Lava in all the cones has retired a few feet down.
Remarkable steam spout close at hand from E outer steam jets of the rift aureole. Many small tornadoes, veering calm weather.

3:30 p.m. The NE heap cracked and foundered violently and floods poured over its margin. Just before this the N lake overflowed and the cone W of it sent out a steady flow for an hour or two. The main lake rose to brimming and the SW pond oven overflowed a little and collapsed somewhat, the overflow pouring into a cup-like sag in crust E of the oven which appeared as though the crust were subsiding over a pond. Flowing was renewed northward along the wall base from the W heap and some driblet flows at the S margin of that heap. SW pond cone has splashing orifice. Smoke dense from cracked floor SE and large cracks quite conspicuous in center and SE around main lake with greenish yellow and white sublimates. This cracking has opened the wall crack SE and the crusts there and elsewhere are drawn down, leaving on the wall the scar of their higher position. This cracking looks like central tumescence and wall crack subsidence.

Collected white crystals in cracks center of floor, <u>greenish yellow while hot</u>, taste like salt.

T.A.J.

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Massachusetts Institute of Technology

KILAUEA DAY SHEET

Hawaiian Volcano Observatory

Day Sunday Date January 19, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit.						
3:30p	SE	Base E cone		6 36				
		NE cone		2 6				
		N side lake		3 58				
		Near edge N lake		1 59				
		SE pond grotto		7 55				
		Base central cone		2 51				
		" SW pond cone		1 44				
		" W " "		1 10				
		W wall pool (cone)		0 26				
		Floor edge under S sta		2 56				
		New S wall cone		6 4				

			no	pl	scr	stop	ex	cam
12:30p		S cone schollendomes to overflowing SW rim	1	W P	8x	f/11	1/2	5x7
		SW rock pile (old S sta) to new overflow (75 ft. focus)	2	"	"	"	"	"
		From ditto to W sta.	3	"	"	"	"	"
		W to SW short overflows	4	"	"	"	"	"
		N side W niche to great Wern overflow heap	5	"	"	"	"	"
		E of new N to N and main lakes (very bright)	6			f/14	"	"
		E side N lake to N grotto (50 ft. away)	7	"	"	f/6.3	1/75	"
		Ditto to NE grotto (25 ft. away)	8	"		"	"	"
		N side main lake to SW grotto	9	"		"	"	"
		9 and 10 both 50 ft. focus.						
		Ditto to NE grotto	10	"		"	"	"

T.A.J.

1919, Jan 19





Jan 9

25

1919, Jan 19



3



2

Tag

1919, Jan 10





Jag

1919, Jan



7



8

Jag



9



10

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Monday Date January 20, 1919.

Night Jan. 19-20.
Pit much duller as seen from a distance. Glow chiefly from the lakes. Flows not conspicuous.

5 to 7 p.m. New spiracle hissing at SE wall cone. Flows in motion pushing out toes slowly at SW overflow locality, front now about 300 feet from rim of pit. Surface of W slag heap stands 5 feet above rim and collapsed somewhat in evening, showing glowing edges of the pool. All the cones flaming. General high pressure and active lift in progress during the evening. Lakes full and ten fountains splashing around N lake; three large ones around main lake. NE heap again building, swelling up and putting out marginal flows. Great heat and pressure and interhal fountaining in E cone and SE-pond cone. S wall cone also active. Large cracks from swelling in SE floor

T.A.J.

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory
Day Tuesday Date January 21, 1919.

5 to 7 p.m. Swelling up and high pressure continues. All the cones with flaming chimneys. Cherry red glow in cracks in floor. Hissing from eastern cones. Cracks increased in size and whitish stain beside them. Immense dome grottoes border the lakes. Liquid of latter 4 to 5 feet down. SW overflow has increased by the formation of new arms so as to make an extensive leaf-shaped area with lava of the elephant toe pahoehoe order with lobes 2 to 3 feet thick the crust of which collapses, leaving a hollow shell. This arrangement hard to understand as the flow appears to be hollow clear to the toes and not drained out to form massive flows below. Material of interior of flow appears to be entirely absorbed into its roof and floor when solidification takes place. Cracking and foundering process crosses upper surface of W slag heap pool. Surface of flows on slopes of this heap shows much slumping and glowing cavernous spaces.
Chief rising activity this evening in NE heap which has risen until the NE fill of March 1918 is largely overflowed. The flows from this heap at 6 p.m. were pouring in cascades into the caverns of collapse under the NE old wall and rapidly filling the depressed area. Cascades spectacular as the melt poured from under crust and found its way among the tumbled rocks and stalactite caverns, pooling in the depression below.
E cone a distinct splashing pot over a considerable wall of lava beneath. The cup-shaped depression in crust on E side of SE pond cone larger and more pronounced, a symmetrical basin occasioned by subsidence neneath but keeping a complete shell into which one driblet flow has poured from the oven on its W side. The basin is fully 30 feet across and 12 feet deep. The glow at night as seen from a distance now very strong. N and main lakes and several of the cones plainly seen from Observatory and even the great banners of flame can be seen through the telescope. Blowing heard in calm weather.

T.A.J.

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Wednesday Date January 22, 1919

10:45 a.m. to noon. New welling up of lava in SE wall crack which gapes open much. Tumescence, cracks wider SE floor, central crag remnant appears lifted. New spire cone SSE wall crack. SE pond cone and E cone both large and flaring. Main lake streaming eastward. New fill across NE niche has filled the hot caverns of March 1918 completely. NE heap higher and has extended itself northward so that there is a second heap with flowing pool on top under old N station, streaming westward. Fountaining adjacent SW pond cone on its W side seems to indicate SW pond reforming. Lakes high, fountaining. Large N cone. Fresh overflows SW small.

5 to 7:30 p.m. E cone has burst along an E-W rift and gushes flows continuously which spread during evening in wide pool. Lakes brimming and fountaining; E and NE streaming. Flow W from under crust W of N station. N cone jetting. All cones flaming. High pressure SE pond cone. Flood east sends streams S along E wall crack which is filled up from sources on both sides. Driblet flows NE heap. Walk out to N shore main lake and E shore N lake. High silent fountains and much bubbling. Occasional fountains top of W heap but no flows.

T.A.J.

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KILAUEA DAY SHEET

Hawaiian Volcano Observatory

Day Wednesday Date January 22, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit.						
10:45a	SE	NE heap		1 6				
		N side lake		2 57				
		N lake		1 22				
		Under old N		1 9				
		N cone (base)		1 47				
		Floor edge NW		1 19				
		Base central cone		1 56				
		SE pond cone		5 9				
		Central crag		1 47				
		Floor edge W		0 40				
		W heap summit overflowing (with cone?)		0 -2				
		SW heap summit		0 36				
		S floor edge		2 34				
		S wall cone		3 3				
		Base SW pond cone		1 8				
		" W " "		1 2				

			no	pl	scr	stop	ex	cam	
S of E	to SE	pond sag	1	W P	8x	f/11	¼	5x7	
"		Lake	2	"	"	"	"	"	
"		NE overflow heap	3	"	"	"	½	"	
E of N	to new N heap & N lake		4	"	"	"	"	"	
NW	height to W heap		5	"	"	"	"	"	
W	station looking at new flows		6	"	"	"	"	"	
From down SW outer slope looking back at flows			7	"	"	"	"	"	

T. A. J.

1914, Jan.





2

1919, Jan



3

4

Jag

35

1919, Jan



b



5

Jag

1919, Jan. 2



7

Jag

JOURNAL

Massachusetts Institute of Technology

Hawaiian Volcano Observatory

Day Thursday Date January 23, 1919.

9:00 a.m. Inspection through telescope shows all points higher and the lakes have been splashing in full view from H.V.O. all night. The W heap greatly raised, has shown some fountaining on top and now shows a live flow pouring northeastward from summit; it is probably pouring down the slope on other side also. This live heap the dominating feature of the pit. NE heap now in view.

11:15 a.m. S wall cone splashing. Streams N, E and SW from summit of W heap which is much higher. The stream over outside of pit SW travelling in strong rushes 10 feet per minute and fed by a continuous meandering rivulet 6 feet wide down the steeper higher part of the slope. Very strong stream 10 feet wide pouring down N slope of heap towards NW wall valley. All of the rest of pit looks low, cones flaming and hissing, lakes 6 to 8 feet down. NE heap high and making driblet flows. SW pond appears to be a pit.

5 to 7 p.m. Overflows from W heap have stopped. Trickle flows from NE heap. Lakes 4 or 5 feet down, rising somewhat toward 6 p.m. when N lake rose to within 1 foot of rim. Streaming in main lake E and W ffrom center, strong bombardment NE and SW grottoes. Collapse of crusts of yesterday's flows, high gas pressure in SE pond cone.

T.A.J.

KILAUEA DAY SHEET

Massachusetts Institute of Technology

Hawaiian Volcano Observatory

Day Thursday Date January 23, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
11:15a	W	Summit W heap		1 10				4 ft

			no	pl	scr	stop	ex	cam
10:45a		Front of flow 100 ft away looking W	1	W P	8x	f/11	1/2	5x7
		Channel in motion	2	"		f/6.3	1/35	"
		Front in motion 25 ft away, 300 ft from rim of pit. Travelling 10 ft a minute.	3	"		"	"	"

T.A.J.

1919, Jan. 23



1



2

1919, Jan. 23



3

Jan 9

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Friday Date January 24, 1919.
Saturday " 25, "

Jan. 24.
Morning. Middle region appears slumped, W heap higher and flowing N side of summit. SW overflows show additions but not greater length. NE heap making driblet flows. Lakes rather low.

3:15 p.m. No fountains of lakes visible through telescope.

Evening. Immense fountains visible from distance as well as near.

Jan. 25.
5:00 a.m. Streams E and N from W heap and lakes high.
9:00 a.m. Stream N and standing fountain top of W heap; lakes lower.
9:20 a.m. Pit noisy, heard from terminus. E, SE pond and S wall cones all blowing. Fresh black spatter at S wall cone. Region from S heap (around S wall cone) to N lake all lifted, stained and covered with Pele's hair. Large flow pushing SE under E station from NE heap. Seen fron SE, the W heap now cuts off view of W wall of pit all the way from old W station nearly to S station, and NE heap cuts off view NNE wall all the way from old N to NE station. S heap nearly cuts off view of S station. Two horns of central crag still 5 or 6 feet above floor. SW pond cone now a fresh high heap of flows. Central and N cones stained. Overhanging half-dome 7 feet high at SW grotto. Large crusted sag-basin on E side of SW pond cone remains. NW still the highest wall remaining. Large crevasses on all sides of the SE depression. Note. Hissing strongest in sinkhole region E. Hissing spell follows free gushing as lava tends to block its own orifices.

Lakes 4 feet down. Streaming eastward, fountaining not strong. SW overflows overlap edge of pit close to old W station and W heap greatly increased in bulk. Live flows pushing ahead in three places from W heap southwestward, the middle one 15 feet wide covered with heavy festoons and moving slowly. Trickle flows were pushing down the N slope of the W heap near the top. The flow from the NE heap piles up close against the front of the E shelter at its floor level so that the next flow ought to invade the shelter. One of the strongly hissing places was at the E bank of the main lake. Fume had considerably increased in the S central and SW pond region

5:40 p.m. Two flows pouring down NE slope of W heap. Lakes low.

T.A.J.

Massachusetts Institute of Technology

KILAUEA DAY SHEET

Hawaiian Volcano Observatory

Day Saturday Date January 25, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit.						
9:30a	SE	N side lake		3 0	0	418	22	
		Summit NE heap		0 38	+6	624	6	
		Base E cone		4 26	+4			
		Near rampart N lake		1 39	+2			
		Floor under old N station (heap)		0 25				
		Floor edge NW		1 22				
		Base SE cone		5 00				
		W pond cone fountain		+0 8	0			
		SW pond heap		+0 4	0			
		W heap summit (W cone)		-1 0	0	909	14 above	
		SW wall locality		+0 25	0			
		Under S station		+2 14	0			
		Summit S heap (opposite S cone)		+2 2	0			
		Base N cone		+1 40	0			
		Summit central crag remnant		1 20	0	528	13	
		Central cone (base)		1 44	0	538		
SE		Old N	0					
		New W	53 43					
		" S	100 25					

T.A.J.

			no	pl	scr	stop	ex	cam	

Massachusetts Institute of Technology

JOURNAL

Hawaiian Volcano Observatory

Day Sunday Date January 26, 1919.
Monday " 27, "
Tuesday " 28, "

Jan. 26.
2:40 p.m. Smoke increasing especially on central floor. Hissing almost entirely ceased. Lakes 6 feet down. SE pond open as a small well. NE heap flows have overtopped upper NE shelf of 1918. Overflows of SW much longer -- 600 feet from former SW rim of pit, measured by pacing, and 50 feet wide from tip to tip of lobes of leaf-shaped area. Summit of W heap well above W station. Cones all smoking. No flows in motion. E cone nearly submerged under flows.

Jan. 27. All day the fume showed great increase in density, rising in heavy volutes from the eastern, southern and northern floors, and the lakes were low, no glow or fountains being visible from H.V.O. at the main lake rampart. The measurements showed some increase of height of floor locally and gave no evidence of subsidence of bench magma.

Jan. 28. The distant view in the morning shows SE pond cone gone practically, great quantity of smoke, some slight slumping by measurement and no visible fire. Tilt indicates stationary condition.

4:30 p.m. Near view shows as principal change a large pit and pool at SE pond, the pond where former cone was and the sup depression of recent days forming E end of new pond. Pond 50 feet long E-W, 20 feet doen below general floor level, crusted, splashing W end and tunnel apparently leading toward SW grotto of main lake.
Main lake 20 feet down; stalactite grottoes NE and SW with sluggish activity; walls vertical and slightly overhanging; much Pele's hair; stagnant surface.
N lake 15 feet down, same condition. N cone has open window 1 foot across on E side leading into large glowing cupola, lava splashing below.
W arm cone has glow at night. S wall cone smoky, glows at night. Glow from lakes. Cannot see crag on account of smoke. Central and SW pond cones remain, NE heap somewhat slumped, with lines of arched crust over tubes below. Some stalactite drip in glow caverns. W heap high, glow cavern on top. No change in SW overflows. Central region of pit stained, no hissing, low gas pressure, retirement of liquid main change. E cone a low glow heap.
Walked over the floor to main lake, N cone, N lake and across NE heap.

T.A.J.

KILAUEA DAY SHEET

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Date Jan. 26 & 28, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
Jan. 26.								
2:40p	W	Summit W heap		-0 40 (angle of elevation)				3'8''
Jan. 28.								
4:30p		Brunton						
	E	N side lake ca		4 30	(lake 20 ft down)			
		Base N cone		1 45				
		NE heap		0 00				4'
		Summit W heap		-1 5				
		Base central cone		1 0				
		E cone base		5 0				
		S wall cone		0 55				

			no	pl	scr	stop	ex	cam
Jan. 28.								
4:30p	ESE	New SE pond	1	W P		f/16	1/5	5x7
	E	Main lake	2	"		"	"	"
	E	NE overflow	3	"		"	"	"

T.A.J.

45

1919, June 28



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Jaf

1919, Jan. 28



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Massachusetts Institute of Technology

JOURNAL

Hawaiian Volcano Observatory

Day Wednesday Date January 29, 1919.

11:15 a.m. General stagnant condition of bench magma. Lakes 25 feet down. Much smoke, especially dense volumes rising between SE pond and S wall cone. Measurements indicate NE heap slightly up, W heap slightly down. Large SW grotto half-dome and other portions of rampart around main lake have fallen; fountaining activity moderate; much crusting; streaming to NE grotto. No marked gas pressure. SE pond yesterday had low margin on eastern or cup side, today that margin is higher relative to the liquid. Floor increasingly stained along lines of cracks. Note salt crystals blue-green in very hot cracks, white when cooled.
N cone still bright and glowing.
Night glow conspicuous above the three lakes, central cone, W pond cone and a cone on summit of W heap. E and S and SE wall cones also glowing.

T.A.J.

KILAUEA DAY SHEET

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Wednesday Date January 29,1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
11:15a	E	N side lake		4 10		370	27	
		Base N cone		1 10				
		NE heap		-0 50		260	up 4	
		Summit W heap		-0 50		1052	up 12	
		Base central cone		1 10		573	12	
		E cone base		5 40				
		S wall cone		0 40				
		W pond cone		-0 5				

Note. SE station is 11 feet above E station.
E station 3 feet above old E. Computed from notes of Aug. 20, 1918.

T.A.J.

			no	pl	scr	stop	ex	cam	

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Thursday Date January 30, 1919.
Friday " 31, "

Jan. 30.
6 p.m. Main lake greatly enlarged by collapse of all ramparts except the NE one and the lake pit elongated eastward over a tunnel extending toward E cone. Lake now 250 feet long by 100 feet wide. Activity increased, glow at night brighter, more large central fountains, streaming various. Sharp alternations between rising and sinking spells. Lake 30 feet down and distinct tunnels exhibited E and W end with more indistinct ones suggested under NE and SW walls. Flings of melt heavy in fountains. N cone shows increased glow, eaten through into a filagree on W side. Large flaming patch around E cone, bright glow SE wall cone, considerable glow in cracks of NE heap and at S wall cone. Flaming chimneys central cone, W pond cone and W heap.
This withdrawal of liquid in main lake particularly interesting in the tunnels revealed, the one leading E being a distinct tube of circular cross-section 10 feet in diameter and 25 feet below the floor level. Such a tube must have originated in the course of the recent building up, either along a flow line or a fracture. The tunnel at the other end leading toward the central cone appears more like the arched top of a deeper persistent channel and there may be a second orifice forking northward there. These tunnels and the wells revealed in 1917 indicate that the persistent lakes are centers of deep rising gas with such honeycomb connections maintained as the circulation and heat supply demands.

Jan. 31. Only two cones flaring in center at night p.m., probably central and W pond cones. Bright glow from the three lakes.
Said to be sluggish by visitors. No marked change in height, smoke continues.
The rapid cessation of glow in W heap and its continuance in NE heap checks with greater subsidence of former.

T.A.J.

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Saturday Date February 1, 1919.
Sunday " 2, "

Feb. 1.
3:40 p.m. SE and main lakes both relatively higher to the subsided floor and fume thinner. SE pond has overflowed bottom of cup E of it and the wall over it W is 12 feet high. Fountain bubbling up on its W side and fountain bombardment against its N wall.
Main lake crusted, 15 feet down, NE rampart still stands, fountains SW grotto and E end.
N lake 10 feet down, fountains against NW wall, crusted.
No blowing noise, bench magma stagnant, glow and salts NE heap and E cone area, N cone flaming
8:00 p.m. Very marked increase of number of fire areas as seen from H.V.O. Nine spots counted, SE, main lake spray seen, central cone (two spots) flaming, W arm pond chimney, W heap, N cone, N lake, SE pond.
Spray of both N and main lakes flung above edge of their inner pits.

Feb. 2.
6:00 p.m. Main and N lakes brimming and with active fountaining grotoes. N lake has extensively overflowed to the NW, making a wide cracking and foundering pool against the wall and showing a crusted-over streamway leading from the lake's edge. The main lake appeared ready to overflow and was sending high flings over the E rampart which was building rapidly. Streaming eastward. Occasional flings from a fountain at SW pond. SE pond overflowing in pulsations sluggishly eastward. Surface of pond crusted over and occasionally the crust would burst, make central fountains and the pond would go down a foot or two and then recover. The S wall cone building by splashing. E cone a patch of flaming cracks evidently leading to a large fountaining chamber below and occasional spray was flung up through the larger crack. Gas pressure renewed, some hissing, flames in central and W pond cones, N cone flaming and glowing on its W side.
The tilt at this time is strongly westward, the measurements of floor points show no rising and it seems probable that this is a spell of liquefaction and escape of liquid accompanying what is really subsidence of the deeper lava column.
Saw white flame of burning spume on E bank of lake, thrown out like a splash of flaming kerosene.

T.A.J.

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Massachusetts Institute of Technology

KILAUEA DAY SHEET

Hawaiian Volcano Observatory

Day Saturday Date February 1, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
3:40p	E	NE heap		+0 30				
		W heap		-0 40				
		Central cone base		+0 55				
		N side lake		4 5				
		Summit crag		1 40				
		E cone		6 30				
		Base N cone		2 5				
		S wall cone		1 5				

T. A. J.

			no	pl	scr	stop	ex	cam	

JOURNAL

Massachusetts Institute of Technology

Hawaiian Volcano Observatory

Day Monday Date February 3, 1919.

12:20 p.m. At 10 a.m. the main, N and SW ponds were all overflowing vigorously as seen from a distance and the new floods now appear from main lake east and north, from N lake northwest, and from SW pond short flows over its southern lip. The S wall cone is greatly built up and now a ring-shaped pot belching bubbles through a heavy lava-filling, the individual bursts lifting the whole cone surrounding the pot. Next to it was a second cone hissing through a live spiracle. Flow pouring from these cones eastward and northward at base of wall under SE station. Cones only about two feet below rim of pit and 20 feet from the rim. Other fresh flows from this source have poured along the wall crack toward the S station where the wall crack shows depression and the floor is swollen up away from the wall crack. Ponds again contracting by the building inward of grotto ramparts, half-domes 6 to 8 feet high. Four or five fountains in each of the lakes and at least one in SW pond. Crag remnant gone. Northeastern and southwestern heaps as yet show no sign of revival.

The general situation indicates stationary or slightly subsiding bench magma and pronounced revival of liquid lava taking effect in the lakes and dominantly along the SE-NW depression between the two heaps of recent building. After a subsidence accompanied by solidification at the smaller vents, this is what should be expected as the lake vents are larger and have remained open and the slag heap vents were small and have become sealed. The S wall cone heap now appears to be taking the place of the two other heaps.

T.A.J.

KILAUEA DAY SHEET

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Monday Date February 3, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Brunton.						
12:20p	SE	Base S wall cone		3 10				
		Summit W heap		-0 5				
		Edge SW pond		+0 15				
		Grotto N side SE pond		5 55				
		N side main lake		3 10				
		Base N cone		1 47				
		Near edge N lake		1 55				
		Base central cone		2 5				
		Summit NE heap		0 55				

			no	pl	scr	stop	ex	cam
12:20p	SE	Flowing S wall cone	1	W P	8x	f/11	1/2	5x7
	"	Brimming lakes (SE pond in foreground)	2	"	"	"	"	"
	SSE	S wall cone spouting (15 foot focus)	3	"		f/6.3	1/100	"
	"	Ditto (same focus)	4	"		"	"	"
	S cone	SW pond revived	5	"	8x	f/11	1/2	"
	W	N (new NW fill)	6	"	"	"	"	"
Near	new N	Nlake overflow	7	"	"	"	"	"

T.A.J.

1919, Feb. 3



1

Fog

1919, Feb. 3



2



5

Jog

56

1919, Feb. 7





1919, Feb. 3



6



7

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Tuesday Date February 4, 1919.

9 to 11 p.m. This has been a day showing pronounced rising of the lakes in the morning and at 6 p.m. The lakes now only moderately high. Main lake rising during the evening from 3 feet down to something less. SE pond at first crusted over and almost indistinguishable. Later the crust broke up and revealed a circular pond 30 feet in diameter, flames breaking through the crusts, and some fountaining. Later this pond sank about 5 feet revealing red hot banks, stalactite drip and tumbled glowing crust and overhang in places. Then the pond recovered slowly.

The main lake does not partake of these movements of the southeast pond at all. Similarly the N lake had a sinking spell quite independent of the main lake. The S wall cone flaming. SW and W ponds fountaining occasionally, W heap still dark, central cone flaming, E cone rebuilt and hissing noisily with sharp spears of flame.

NE heap completely revived with a 10-foot puddle fountaining continuously in its eastern summit and flows pushing down its western slopes, the whole heap renewed, higher and glowing; even the NE half-dome only about on level of heap summit.

Present condition a striking example of different vents and lakes holding up at different levels. W pond higher than SW pond, latter higher than SE pond, SE pond higher than main lake and fluctuating independently of it, NE heap much higher than lakes and N lake lowest of all.

Renewed gas pressure and liquid welling. Very strong spell of fountaining some hours after midnight but the next morning the lakes were all down and the pit somewhat smokier.

TAJ

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Wednesday Date February 5, 1919.
Thursday " 6, "

Feb. 5.

Towards noon rising of lakes and overflowing reported. NE heap has large cone on top, which appears inactive. Since Monday county workmen have been building new trail from automobile terminus to pit.

8:00 p.m. Pit dull. NE heap cracking and foundering, alive.

Feb. 6.

1 to 4 p.m. Lakes 2 to 4 feet below banks. SE pond somewhat lower with glow edge. S wall cone has been high and very heavy fresh overflows from it with coarse festooned surfaces all the way to E station. W heap smoking as though reviving. NE heap has a flat slaggy cone pot at its E end, was cracking and foundering last night. Pot inflating and ejecting rhythmic bursts of gas and sputter lava from an oven at its SE side. Could approach this and stand close beside it. Heap heavily crusted now. Large dome grotto with curtain W side main lake and several domes at N and NE sides. Large domes N lake. Streaming eastward and from crust surface to grottoes. Activity variable, lake rising and falling.

This is a period of apparent stationary lava so far as surface of pit floor is concerned. The abundant floor flows recently may have been compensated by some sinking of bench magma beneath them. Fixed points of bench magma are hard to find in the absence of crags. Measurements show rising at W heap and central cone of moderate amount.

6:00 p.m. Strong fountaining and high level in lakes and flaming from the chimneys.

T.A.J.

Massachusetts Institute of Technology

KILAUEA DAY SHEET

Hawaiian Volcano Observatory

Day Thursday Date February 6, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.	

			no	pl	scr	stop	ex	cam	.
1:15p	NE half	dome to NE heap cone	1	W M	K2	f/22	1/5	Woll.	
	E of	SE to NE grotto	2	"	"	f/5.6	1/10	"	
		(nos 1 & 2 bulb)							
2:15p	do	to do	3	"		f/3.8	1/100	"	
	Edge lake	E to NE grotto	4	"		"	"	"	
	do	to do	5	"		"	1/50	"	
	do	to W grotto dome	6	"		"	"	"	
		(all foregoing 4x5)							
3 p.m.	S of	E to E cone	7	W P $3\frac{1}{4}x4\frac{1}{4}$	B-J A	f/22	1	"	
	8 ft away,	NE heap vent	8	"	"	f/3.8	1/25	"	
		(Wollensak shutter works too slowly)							
								T.A.J.	

1919, Feb. 6.



1



6

Fog



2



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1919, Feb. 6



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Fab

1919, Feb. 6.



7



8

Fog

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Friday Date February 7, 1919.

8:30 a.m. Lakes high. Broad fresh flow pouring from S wall cone which is greatly built up until it is nearly to level of S cone of 1918. This flow overflowed rim 20 feet just E of S cone.

11 a.m. This flow had crusted and lakes lower, but a hot flow was seen pouring northeastward from W pond cone on slope of W heap.

3 p.m. S wall cone overflows farther: about 40 feet from edge of pit toward trail, then cascades into wall crack under S cone to S station.

8 p.m. Overflows S wall cone renewed during past two hours and flows now have probably reached the new trail. (Verified next day). Main lake also overflowing towards the south.

General notes. On this day the NE heap quiet, its summit cone closed. N lake surrounded by six symmetrical half-domes and curtained grottoes with subordinate ramparts between the domes. Lake level up and down during the day through a short range, in general 4 to 5 feet below the rampart. Made circuit of pit N and W, climbed to summit of W heap. W pond cone on the slope of W heap is a fountaining pot. SW pond has three or four domes around it but the liquid not visible. Flow from W pond pot seen earlier through telescope not conspicuous. Summit W heap greatly collapsed over whole plateau and without incandescence. Crossed head of SW overflows.
SE pond crusted and appears to have been invaded by the heavy flows from S wall cone; fountaining against its N rampart.
Main lake unchanged in general aspect.
While the NE and S building by flows has done much piling up, the central and northwestern floor of the pit has no appearance of rising and the W heap has definitely slumped.
Query: May there not be a critical point passed when the liquid at any time crosses the edge of the pit in overflows and so relieves the lava column within the pit of the pressure of so much weight? This would be analogous to the geyser mechanism.
In the night the S cone showed very brilliant fountaining at times.
The N cone has become less bright during the week but still stands. Much blowing at E cone and at a come alongside the open pot of S wall cone. Significence (?) of double cones, one gas and one lava?

T.A.J.

Massachusetts Institute of Technology

KILAUEA DAY SHEET

Hawaiian Volcano Observatory

Day Friday Date February 7, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit.						
2 p.m.	SE	N side lake		1 50		418	14	
		NE cone		-0 20		624	3	above
		N side SE pond		3 4				
		Base central cone		1 38		538	15	
		" SW pond cone		0 24				
		" W " "		0 38				
		Summit W heap		-0 21		909	4	above
		" S wall cone		+0 36				
		Base E cone		3 13				
		" SE half-dome of N lake (about N lake level)		1 11				

In 9 days lake rose 24 feet, or 2.7 feet per day (had previously subsided 4 ft. per day)

Central floor " 8 " " .9 " " "
NE heap built up 10 " " 1.1 " " "
SW heap rose 3 " " .3 " " "

S wall heap also built up 10 feet and overflowed edge of pit.

On Jan. 25 central floor was 16 feet below rim so that recovery is merely a return to the former level by inflation with liquid lava and gas.

Rate of recovery of central floor .9 feet per day only one half the rate of previous subsidence 1.7 feet.
Rate of recovery of SW heap .3 feet per day not comparable with its previous subsidence 3.25 feet.

			no	pl	scr	stop	ex	cam
	E of S	Cascade to wall crack	1	W P	8x	f/8	1/2	5x7
	"	Flow under S station	2	"	"	f/11	1	"
Summit	S cone	to oven S wall cone and gas spiracle alongside.	3	"	"	"	"	"
Edge	flow	Oven splashing	4	"		f/6.3	1/35	"
	S cone	Front of flow	5	"	"	"	1	"
On flow, 50		ft away, to curtain in oven after subsidence (30 min. after No.4)	6	"	"	"	1/2	"
7-8 p	H.V.O	Daily series to pit		Seed L Ortho		f/6.8	1 hr.	
								TAJ

1919, Feb. 9



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68

1914, Feb. 7





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109

1919, Feb. 7



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6

Fog

JOURNAL

Massachusetts Institute of Technology

Hawaiian Volcano Observatory

Day Saturday Date February 8, 1919.
Sunday " 9, "

Feb. 8.
Noon Fresh flow from S cone locality reaching 350 feet down slope so as just to cross new trail. Workmen have built a detour around front of flow.
Cone now quiet. Floor more smoky in SW pond region. Lakes 6 feet down, rising slowly during morning. Hissing continuous at E cone and NE heap cone has changed in shape and produced extensive new flows. Summit now a sharp horn as seen from NE in profile, forming the protruding cover of an oven facing N, within which the circular crusted pool heaves sluggishly.
The new flow from S cone was voluminous inside pit, crossed the SE pond and evidently cascaded into it, was joined by other flows from the main lake and penetrated a few feet into the interior of the E shelter. The N lake completely changed with reference to the spatter domes and extensive fresh floods from it filling the northwestern region. It is now brimming and appears ready to overflow again.

8-10 p.m. Extensive flows from the N lake reported.

Feb. 9. NE wind and rain storm.
No special activity observed in morning.
In late afternoon fresh flows towards the E shelter from the NE heap reported.
Glimpses through mist in evening show the lakes luminous and NE heap flashing.

T.A.J.

KILAUEA DAY SHEET

Massachusetts Institute of Technology

Hawaiian Volcano Observatory

Day Saturday Date February 8, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.	

			no	pl	scr	stop	ex	cam	
Noon	Front of flow across new trail, 2/3 way up trail, looking toward Uwekahuna.		1	W P	8x	f/11	½	5x7	
	SE	S cone & new flow	2	"	"	"	"	"	
	S end	NE heap to flow in E shelter.	3	"	"	"	"	"	
	Near new N sta. remnant (Nov. cone summit) to NE heap		4	"	"	"	"	"	

T.A.J.

72

1919, Feb. 8



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Fig

1919, Feb.



3



4

Jog

Last night very brilliant display from NE cone emitting a standing fountain which played up to considerable heights and sent flows E and S.

Noon. Made a circuit of the pit E and N. Lakes 6 feet down, S cone quiet, E cone large and built up with fountaining pot in center. NE heap seen through telescope at 9 a.m. to have a standing fountain, now sluggish fountaining pot in summit; trickle flows pushing and piling intermediate slopes. Fresh flows from it have made out on the floor towards the S and a heavy block of flows has pushed 100 feet E across the old trail and straight towards the wooden toll house belonging to the Observatory. Front of flow 200 feet from house and smooth sloping ground between. This flow of quite different quality from the heavy toe lava of the NE heap previously. It is a lava which solidifies in light shells with shredded edges and some blade and ea tendency. It is not the heavy bulbous shells like the SW overflows but breaks down in crusts like crumpled pasteboard. The sudden gushing of this vent last night was simultaneous with a very sharp tilt to the E which continued well into the morning.

The N lake shows extensive fresh floods of lava which have poured N, NW and W. The W heap shows no changes but the SW pond spatter domes are growing in height.

The S station is surrounded by fresh lava from the S cone which has poured in a narrow flow 30 feet wide over the edge of the pit just W of the station and has run off to the S 200 feet. This flow was nearly cold and is believed to have been formed simultaneously with the flow which damaged the trail last Friday night, Feb. 7. The oven and blowing cone at the head of these flows were found quiet, without visible glow.

The SE pond was visited; its surface was 6 feet down, crusted, and the crust somewhat inflated and a whitened spatter dome stood on its N margin. The rampart otherwise around this pond was slight.

The rampart around the main lake was very heavy and covered with Pele's hair. The main activity was toward a double grotto N and NE with a drawing of the gas-inflated skins in that direction and large spatter domes had been built above. The western grotto retained its symmetrical half-domed curtained quality with moderate fountaining below and in the afternoon the curtain was seen to fall. A hissing spiracle had been built above the vent midway between the SE pond and main lake.

There is no marked change in the level of the floor points. The N cone appears less conspicuous. The N lake has probably enlarged somewhat and become circular. Nine fiery points could be counted in the distant view of the pit at night.

The general situation appears to be continued rising by

liquid flow, the gushes shifting from one point to another. Query: Does this shift imitate in miniature the shift from Mauna Loa to Kilauea and back again?

4 p.m. Revisited pit. No heap more active, flows pouring from summit chiefly southward. Summit fully 20 feet above floor of E shelter. Lakes and other vents same as before. The fume at present is thin but not excessively so and there are many smoky areas in the S central part of the pit.

T.A.J.

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KILAUEA DAY SHEET

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Monday Date February 10, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.

			no	pl	scr	stop	ex	cam
Noon	ESE	NE heap	1	W M	8x	f/11	½	4x6
	"	Toe of flow NE	2	"	"	"	"	"
	E	S cone	3	"	"	"	1	"
4 p.m.	Looking S across new overflow		4	"	"	"	"	"
	Snap shot of NE grotto		5	"		f/6.3	1/200	"
	"	" " " "	6	"		"	"	"

T.A.J.

1919, Feb. 10



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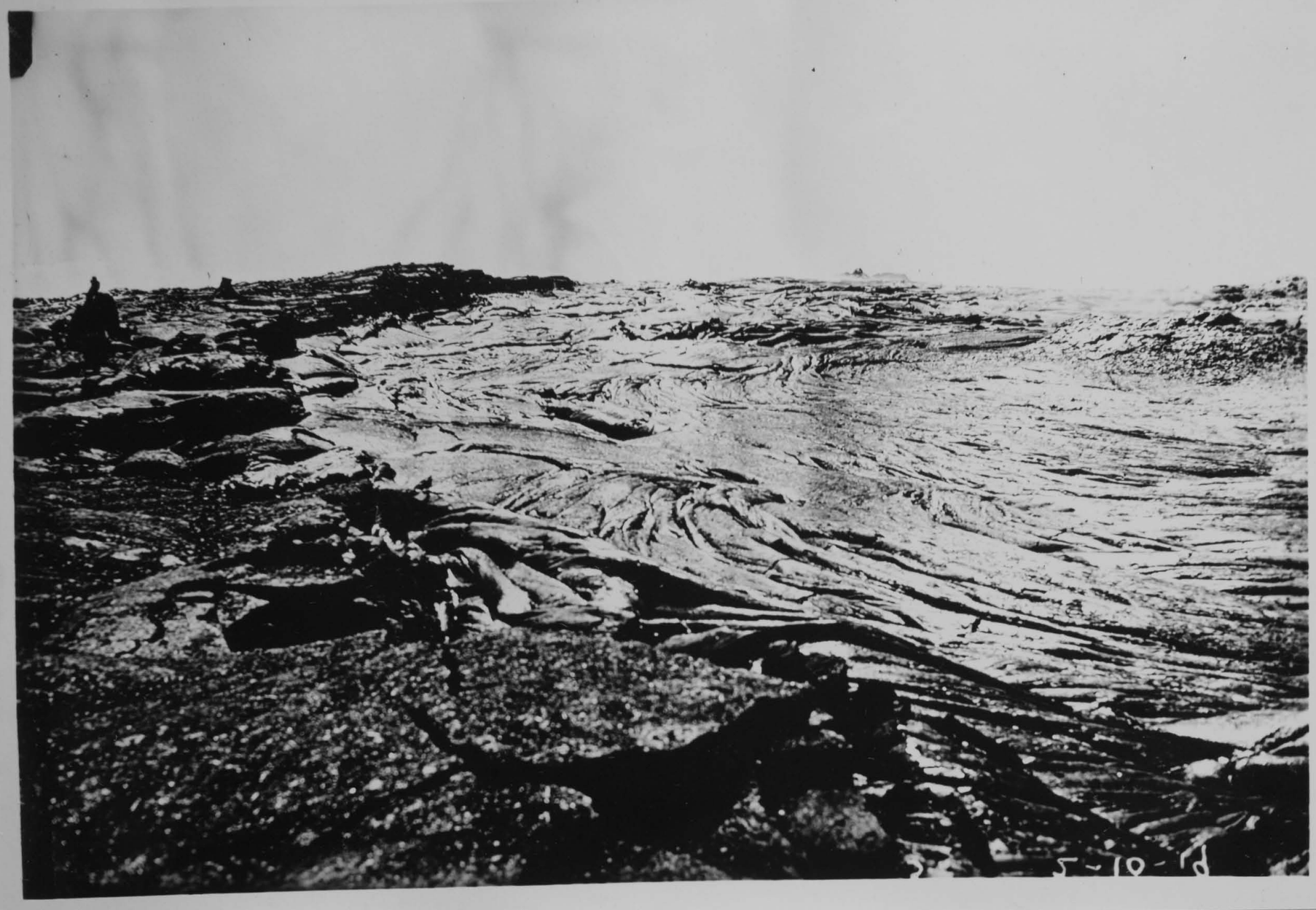
1919, Feb. 10



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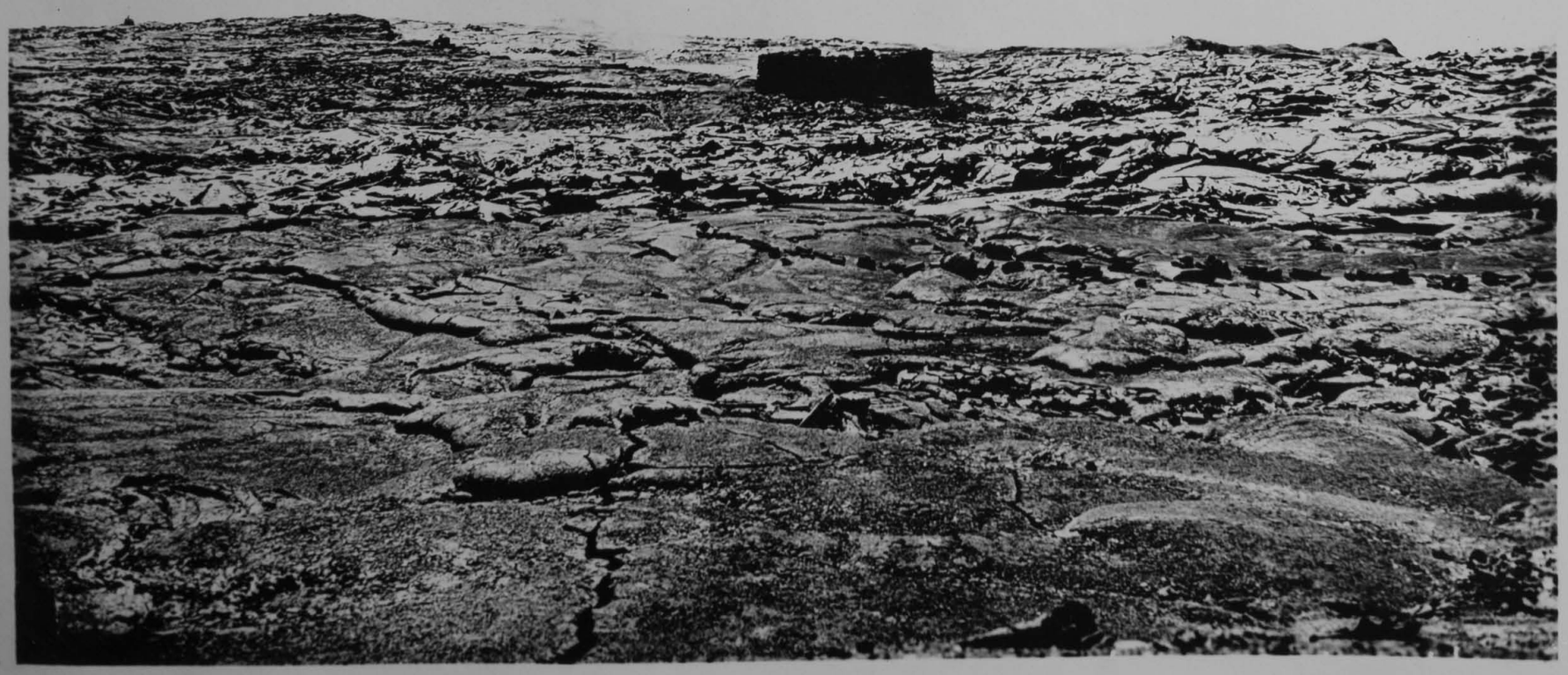

4

Fog

1919, Feb. 10



5



6

Fog

JOURNAL

80

Massachusetts Institute of Technology
XXXXXXXXXXXXXXXXXXXXXX
Hawaiian Volcano Observatory

Day Tuesday Date February 11, 1919.

Last night glow spots of crater seen from distance seven in number. This night nine in number including revived S cone and N cone adjacent to N lake. The four lakes, N, main, SE and SW, make glow on fume above. The E cone makes blue flame while the other cones exhibit incandescence.

9 a.m. Lakes 6 feet down. NE heap has built sharp cone on top and a secondary platform or pot adjacent to it on the E which has been the source of the E overflow. Driblet flows making out eastward from slopes of heap and main overflow has pushed forward 50 feet nearer to Observatory tool house. Fresh lobe of flow has piled up 5 feet high almost completely filling interior of E shelter. U.S.G.S. bench mark back of shelter surrounded but not covered during day. N lake has brimming spells with high fountaining. Main lake and E ponds little changed. Much Pele's hair to leeward of lakes. Much smoke in S central part of pit.

Afternoon. NE heap summit cone hissing and flows slightly increased in vigor. E cone has open pit in summit, lava fountaining below. SE pond crusted mostly but occasionally rises somewhat. Flowing on N side of NE heap has stopped.

Started workmen removing the tool house to be set up 200 yards farther north, back of NE half dome.

T.A.J.

~~Massachusetts Institute of Technology~~

KILAUEA DAY SHEET

Hawaiian Volcano Observatory

Day Tuesday Date February 11, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit.						
2 p.m.	SE	E	0					
	E	SE	360					
	SE	Base E cone	9 55	3 4	+4			
	E	" " "	334 49					
	SE	Front E overflow (ca)	-15 7					
	E	" " "	145 8	3 2	+3			
	SE	Summit NE cone	17 55	-0 55	+4			
	E	" " "	223 32					
	SE	E end main lake basin (lake 6 ft. down)	38 42	1 22	+4			
	E	ditto	301 34					
	SE	W end ditto	60 25	1 56	+4			
	E	" " "	296 36					
	SE	Base N spatter dome SE pond	60 8	3 3	+4			
	E	ditto	330 30					
	SE	S side SE pond	75 11					
	SE	N dome SW pond	92 2	0 19	0			
	E	" " " "	309 30					
	SE	S " " "	100 18					
	E	" " " "	311 27					
	SE	Base central cone	73 4	1 22	+4			
	SE	Summit S cone	140 7	0 2	+2			
	E	" " "	346 36					
	SE	Base W dome N lake	55 20	1 11	+4			
		(View of N cut off from E)						

			no	pl	scr	stop	ex	cam
4 p.m.	E of	SE to NE overflow	1	W P	8x	f/8	1	5x7
	" "	" " house site	2	"	"	"	"	"
	NE heap	to inveded E shelter (camera on fresh flow)	3	"	"	"	"	"
								T.A.J.

1919, Feb. 11



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1919, Feb. 11



3

Jog

Massachusetts Institute of Technology

JOURNAL

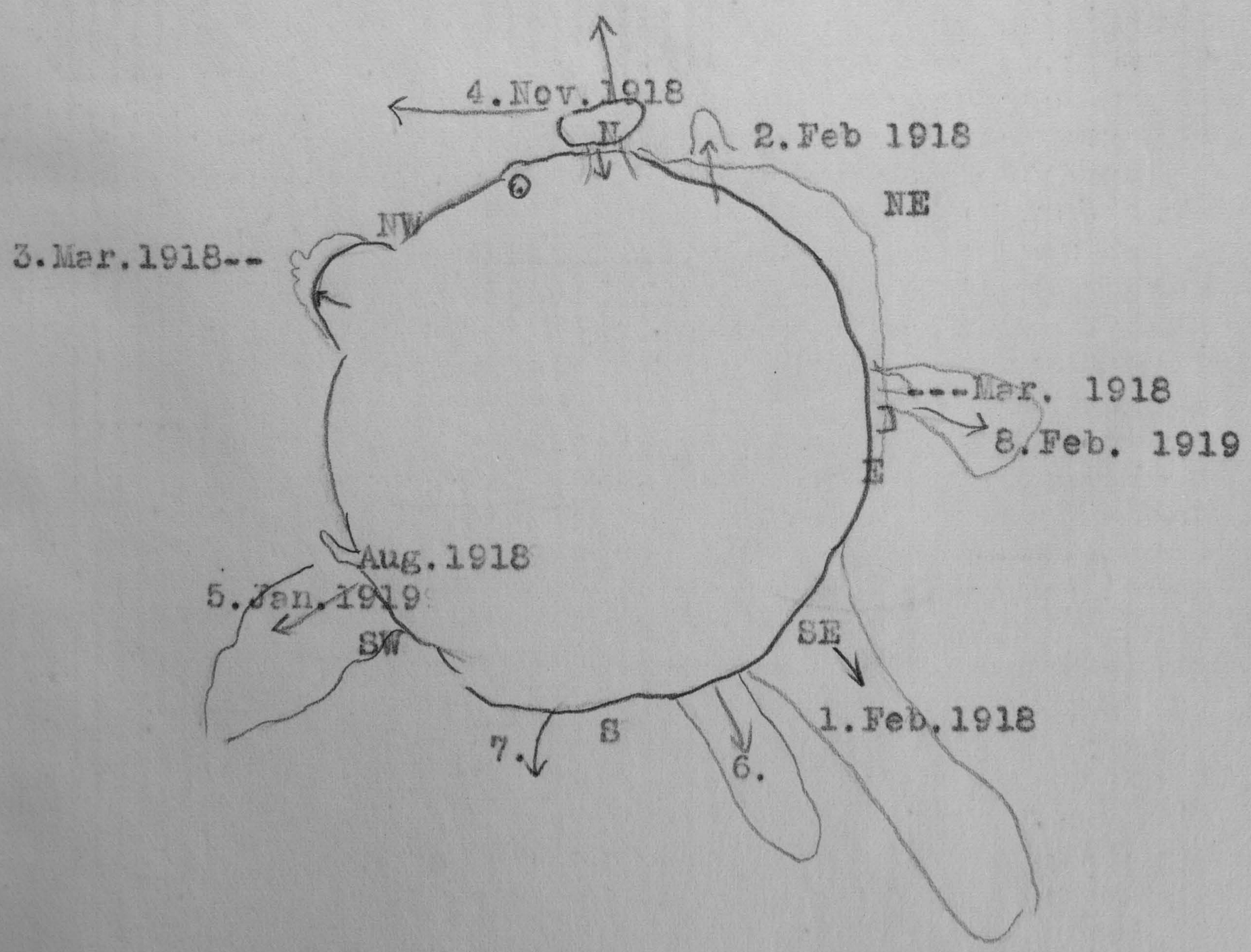
Hawaiian Volcano Observatory

Day Thursday Date February 13, 1919.

Last night all the fire holes bright but without flows visible at a distance.
Today pit dull, much staining and Pele's hair, no flows observed in motion in morning, glow at S, NE, W and N cones. Main lake and SE pond 15 feet down. N lake 10 feet down. Open pot, lava 15 or more feet down, in E cone. Glowing interior chamber seen from N rim of cone hung with stalactites. Grottoes in main and N lakes curtained and rather sluggish. Much fume in S central and SW pond regions. Nothing new W or south.
The later flows of NE cone heavy and solid, the one which welled up suddenly and continuously the night of Feb. 8-9 (along with strong E tilt) was light with aphrolithic tendency. The flows of yesterday were heavy bulbous massive toes piling forward. In the same way the first flows across trail of S cone and the first flows of W heap were hollow frothy shells, the later ones massive. The most dense glass of all is the overspatter of the lakes.
Both the S and NE cones maintain a hissing spiracle cone beside the one which acts as a lava pot at source of flowing. The NE heap in fact maintains several pots or knobs each at separate flow source, while highest of all is a spatter covered flaming and hissing sharp pointed cone which appears to be the gas vent for the system. Apparently with a first flow at time of sudden rising the gas is distributed and the flow foamy; afterwards with gas chamber established at the vent the gas largely escapes there and the lava pushing out is heavy.
In afternoon somewhat increased hissing at the cones. At 4:04 p.m. NE cone burst its head off and large volume of very liquid lava domed up in artesian fashion and flooded south, moving 100 feet in four minutes. Flood 40 feet wide. A few fountain bursts at source and then rhythmic bursts every 5 seconds more or less. The flow settled down into stream 3 feet wide at source, pudding-like surface orange red; below crusted and congealing at edges as a papery pahoehoe of broken crusts. Some shredding but no marked as, except in angles of broken crusts at extreme front. At 4:30 p.m. 200 feet forward with stagnant front, spreading irregularly.
Flow continued all night, cone spurting until near midnight and thereafter this decreased. Flows at first S, later E.
This outburst of NE cone recalls Perret's observations and photograph at the sudden outburst of a bocca above Bosco Trecase on Vesuvius in 1906. The lava in the NE heap was accumulating a gas pressure marked at the sharp summit cone by increased hissing between morning and afternoon. After 3:30 p.m. a little jetting of lava spray was observed at the orifice and a small block of driblet crust on the SW side of the summit of the cone was seen to crack and tip back a little where the blowing and spraying were increasing in violence. This was all that heralded the final gushing. The gushing was not preceded by any slow welling out through cracks or through the top of the cones of liquid lava. There came a sudden collapse of the whole structure, the cone literally blew itself to pieces and instantly a geyser effect resulted from release of pressure and extremely liquid lava fountained up in dome shape and spread all about the orifice, slopping, streaming. cascading down the slope during the first few seconds

like a flood of syrup. The first fountain was perhaps 10 feet high and the gas explosions through it sent up spray 15 feet or thereabouts. The standing fountain lasted only two or three minutes and there was a first flood to the N and W on the top of the heap as well as to the south. This northern branch quickly subsided and the cone which settled down to steady flowing had a gash opening not more than 18 inches wide which gave vent to the pulsation flow with spraying explosions every few seconds that continued all the evening. There was no earth jar at the time of the outbreak and so little noise that some persons standing close by did not see the fountain until their attention was called to it. The fountain vent stood fully 40 feet above the level of the main lake some 300 feet away.
The whole phenomenon from the bursting of the cone on was precisely like the uncorking of a bottle of champagne and the rise, overflow and decline of the foam are unquestionably reactions directly due to changes of pressure.

The pit in 12 months from Feb. 23, 1918, to Feb. 10, 1919, has overflowed the rim in eight places:



T.A.J.

KILAUEA DAY SHEET

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Thursday Date February 13, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Brunton.						
10:40a	SE	E end lake rampart		1 55				
		NE cone		-0 55				
		Base E cone		3 10				
		" W dome N lake		1 15				
		Summit S dome SW pond		0 50				
		N dome SE pond		3 5				
		Summit S cone		0 0				

PHOTOGRAPHS:

SE	SE pond and main lake yellow stained domes.	1	W P	8x	f/11	¾	5x7
E bench mark surrounded by flow		2	"	"	"	"	"
Looking down into glowing interior of E cone, 20 ft. focus.		3	"	"	"	"	"
		no	pl	scr	stop	ex	cam
Detail of central cone spiracles & W cone from near center of pit.		4	"	"	"	"	"
N lake & N cone from W slope of NE heap (yellow green with sulphur & Pele's hair.		5	"	"	"	"	"
Light shelly lava with aphrolithic tendency at edge, NE slope & summit of NE heap. Heavy bulbous lava right foreground.		6	"	"	"	"	"
S hummock to new overflow S sta.		7	"	"	"	"	"

T.A.J.

1919, Feb. 13





2



3

Jag

88

1919, Feb. 13

1919, Feb. 13



4



6

Jag

1919, Feb. 13



7

Fog

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Friday Date February 14, 1919.

9 a. m. New overflows of NE heap completely surround E shelter and the east U.S.G.S. bench mark is covered up. These flows were pushing ahead all night and are moving now in slow toes at the fronts. The E front is no farther advanced but more spread out and piled up. The S front has curved around the shelter, buried more of the old trail, reaches nearly to the E station monument and has greatly advanced toward the main lake. Cone on top of the heap hissing slightly.
Main lake and SE pond same as yesterday. Some increase of activity of main lake, sounds as though rising. W grotto curtain of main lake closed across below, fountain spray from within through a hole in curtain above.
W pond cone appears increasing in height. Other features of pit unchanged. Glow orifices at night the same. Several big flaring flames. Smoke today slightly less.

Evening. Renewal of flaring on fume above at summit of W heap and the NE heap dark. Apparently the W heap is reviving.
The W pond cone two very bright spots. S cone also bright.
Other points as before. N cone dark.

Finished rebuilding tool house.

T.A.J.

Massachusetts Institute of Technology

KILAUEA DAY SHEET

Hawaiian Volcano Observatory

Day Friday Date February 14, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Brunton.						
9 a.m.	Old N	Summit NE cone		1 40		562	16 above	
		Rampart main lake		+0 45		707	10 below	
		Base W dome N lake		1 55				
		" W cone		0 40				
		" central cone		1 20				
		" S cone		-0 10				
		Summit W heap		-0 10				

Main lake 14 feet below north B M (3700-foot level)
Summit NE heap 27 " above " "

			no	pl	scr	stop	ex	cam
9 a.m.	E of SE to E		1	W M	8x	f/8	1	4x6
	ditto New location tool house.		2	"	"	"	"	"
	SE flank NE heap to E shelter surrounded.		3	"	"	"	"	"
	New flow (25 ft) to where B.M. is buried.		4	"	"	f/11	"	"
	NE high ground to first and last NE flows.		5	"	"	"	"	"
	1918 flow ESE to old trail and E station.		6	"	"	"	"	"
	Tessar lens.							T.A.J.

1919, Feb. 14



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Fig

1919, Feb. 14



3



4

Jog

1919, Feb. 14



5



6

Jog

JOURNAL

Massachusetts Institute of Technology
Hawaiian Volcano Observatory

Day Saturday Date February 15, 1919.

4 p.m. Pit dull. No marked gas pressure. Considerable smoke. No flows in motion. Glow in W and S cones. None observed in NE and central cones.
SE and main lakes 10 feet down, N lake 20 feet down, making latter some 16 to 18 feet lower than main lake. Main lake hence higher than yesterday, N lake lower.
Stalactite grotto pot as before under N rim of E cone with lava surging about 12 feet down. Striking feature of such a pot is the uniform color of the interior incandescence, the melt (except splash from the fountains), walls and stalactites all holding a uniform bright orange glow while the night view shows a continuous banner of bluish flame playing through the opening which is about 3 by 4 feet in diameter. The splash from the fountains on the walls is brighter yellow.
The pot in W heap which was seen flaring spasmodically last night somewhere near the top of the heap and to the W of the W pond cone, is not conspicuous today, shows no signs of incandescence or spurting, and tonight after dark is not in evidence as seen from a distance.

7 p.m. Glow of Halemaumau dull. Two bright incandescent spots at W and S cones, moderately bright glow above N and main lakes, dim glow above SE and SW ponds, pale flame at E cone.

T.A.J.

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

JOURNAL

Day Sunday Date February 16, 1919.

The northeast cone has two lumpy summits.
Measurements these days show floor extraordinarily stationary.
About 6 p.m. NE cone had broken out with moderate fountaining and more flows which piled up in E shelter and spread E, S and SW without greatly extending front except in direction of E cone where the flows came to within a few feet of the cone.
Pit dull during night and NE cone became dark. Lakes reported low.

T.A.J.

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

JOURNAL

 Day Monday Date February 17, 1919.

4 to 6 p.m. East and main lakes 8 feet down. North lake 15 feet down. Conditions of activity unchanged. Considerable smoke S and SW and some smoke around N lake. NE cone hissing mildly and NE heap trickling sluggishly on SW flank. Large flames above pot in heap W side of N lake and from openings of W, E and S cones; from filagree heaps SE side of N lake, E end of main lake and spiracles between main and SE ponds. N rampart and much of NE dome broken down at main lake. SW pond glowing dimly.

The summit cones of NE heap are now irregular lumps, the active hissing cone being the northern one.

The spasmodic breaking down of these cones and gushing over of liquid lava appears to be the same process as the former sudden and rather explosive breaking up and cracking and foundering of the flat pooled lava of the summit of the heap before it became so high and peaked.

The thickening of the flanks and concentration of the summit to a single cone or group of cones has probably increased the interval between eruptions, these being due in all cases to gas accumulation foaming up and overcoming the roof resistance. Where, as in the recent breaks, the orifice broken is small, the structure strong and the release less extensive, we get an effect more prolonged and of the artesian quality, whereas with the large surface the slopping over was sudden, short-lived and extensive.

This process appears to be merely an extension of what is going on in the lakes all the time, crusting over and lifting, breaking up, fountaining and subsiding. The difference consists merely in the pressure or not of a closed dome of roof over the pool and a limited gas supply as in the case of the heaps, as contrasted with a larger gas and heat supply sufficient to keep the adjustment of the crust surface thin and continuous fountaining gas escape around the margins. The critical physical difference between the two appears to lie in the chamber of confined gas. In the dome this chamber accumulates pressure which induces sudden release. In the lake the equivalent of the chamber is a bubble accumulation under a flexible skin, the lower surface of which is partially gas-proof, while all the margins are incessantly making and breaking and locally developing the hissing gas chambers of the grotto domes imperfectly sealed.

These evolutionary stages of growth on a small scale are frequently suggestive of what may be going on on a larger scale (1) under the tumescent dome of the Halemaumau floor as a whole and (2) under Mauna Loa through the ages. How far can such analogy be pushed with reference to larger alternations of eruption and what is the limitel dimension of possible gas chambers? The interior of such a flaming cupola or incandescent grotto as the present E cone or the hollow northern cones of August and November

1918, with an even glow chamber within, intense oxidation of gases, and lava splashing below, the size of o orifice sufficiently large to keep an adjustment without explosion, appears to furnish a picture of what the interior of the more explosive spasmodically flowing cones is like.

Compared to geyser mechanism the lakes would be like the boiling water pools, relatively unconfined expressions of a boiling underground level of the fluid, but not at a common level because each pool is dependent on the relation of its form, size and height to the system of underground passages and the supply of fluid and of heat. The blowing and eruptive cones are like the steam growlers and geysers, orifices similar to the others but smaller and self-confined by the reason of the apportionment of their small size to their capacity to clog themselves with incrustations. This last limitation in the case of both geysers and blowing cones makes it seem improbable that the gas chamber analogy drawn from the latter can be pushed to account for larger mechanisms. There may in the latter be <u>foam chambers</u>, of various viscosity, where increased pressure condenses the gas increasingly, while still permitting gas pressure and heat reactions, as in the foaming pyromagma under the lake crusts.

T.A.J.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date February 18, 1919.

At 8:30 a.m. the NE heap had again broken down its northern summit lump and was fountaining and spouting and flooding the slope of the heap northeastward. An interesting feature of the rapid flood at the beginning of the eruption was the presence of bright yellow flashes totally different from the reddish orange of the melt bursting through the flow some distance below the summit fountain. These were seen through telescope and might have been burning wooden sticks engulfed in the flow if any such sticks had been left there.

In the early morning, about 6 a.m., the lakes had been high. About 9 a.m. the flows were pushing northward and northeastward on the heap and the activity of this flowing spell continued until early evening.

About 3 p.m. the summit cone was hissing and lifting a lid but the pressure was relieved by an outbreak on the northeast flank of the heap and the flow overran the higher edge of Halemaumau on the N side of the NE half-dome, pouring in one tongue around the half-dome and in another northward.

A visit to the pit at 7 p.m. showed that there were twelve flaming cones and four lakes. The NE heap was quiet, the N lake dull and relatively low, the main lake about nine feet down, vigorously bombarding the NE grotto, with flaming vents in the ramparts E, N and W, the western one being a high chimney pot on top of the west dome.
A pot had opened at the central cone locality and was splashing and flaming. The W cone was flaming and the SW pond glowed dimly. Flames rose at the spiracle locality between the SE and main lakes, the filagree cone on the N brink of the SE pond showed high gas pressure and flames and the lava in the east cone was somewhat higher. The S cone was bright and all the vents showed gases flaming under pressure. The bench magma showed no changes of level.

T.A.J.

JOURNAL

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

Day Wednesday Date February 19, 1919.
Thursday " 20, "

Feb. 19. Pit smoky and no special activity noticed. Six main glowing areas in the evening.

Feb. 20. In the morning the N lake was low, the main lake fairly high, crusted and apparently rising and the lava in the E cone was lower so that the grotto cavern extending southward under the cone appeared deeper.
No flows were seen in motion and gas pressure had ceased at the NE cone. The pit was smoky.

T.A.J.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date February 21, 1919.

11 a.m. Lava in E cone and main lake 15 feet down and N lake something similar and fountaining noisily. Main Lake as usual. East cone interior somewhat less bright. Smoke dense. NE heap quiet. New flows of February 18 around N side of NE half-dome, fill NE station niche completely, two tongues of overflow 50 feet N and 30 feet E. Solid toes of lava.
Great increase of solfataric staining, sulphur, alum, gypsum. Fuming SO_2 cracks in 1918 lava around SE station and all around old S cone. Solfataric staining on the floor and cones. Floor edge S of SE station appears slightly swollen. Morning measurements showed no changes of level.
Found W heap caved in on top with a pool area 50 feet long and a live pot of sluggishly bubbling lava 7 feet long at S end of pool. West cone glowing and stained.

Evening. Main lake reported higher and large flame at W grotto cone. View shows seven flaming cones and five ponds -- N, main, SE, SW and W heap.
Cones flaming and ponds making glow.

T.A.J.

PHOTOGRAPH RECORD

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

Day Friday Date February 21, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
11a.m.		Near view solfataric cracks developing at SE station	1	W P	8x	f/16	1	5x7
		NE stone pile to NE flows surrounding old half-dome NE	2	"	"	"	1	"
		New overflows of NE heap from direction of Hot Cracks	3	"	"	"	1	"
		From between new and old N to center	4	"	"	"	¾	"
		Fountaining pot 7 feet long top of W heap	5	"	"	f/11	½	"
		ditto	6	"		f/6.3	1/100	"
3:45p		Special photo, given to Bishop Museum:- Skeleton Uwekahuna (5-foot focus)	7	W M		f/16	2	4x5

T.A.J.

1919, Feb. 21





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Fog

1919, Feb. 21



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1919, Feb. 21



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Jog

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date February 22, 1919.

4:10 p m. Lakes rising, increased gas pressure. Steady, quiet spraying type of fountaining. SE pond 1 foot down and crusted; fountain playing inside of the filagree cone on N brink, the spray spitting out through the apertures. Main lake 2 feet below rampart, streaming to N and NE grottoes, high silent flings of melt and much ballooning and spraying. Rampart building beginning again.
North lake 3 feet down, quiet high-flung fountaining all around margins, and occasional central cracking and foundering followed by central fountaining. This lake almost perfectly circular so that the crust makes a circular rug which is balloned or swollen very symmetrically in the center prior to breaking up.
The recently opened central pot on the N side of the central cone has built above itself a peaked cone 5 feet high with glowing apertures in its side which are hissing and puffing. This the noisiest feature of the pit. No activity observed elsewhere. W and S cones glowing. E cone has filled up its pot with a crusted pudding and two comparatively small openings on the S side reveal the fountaining chamber beneath where the lava is high, approximately at the main lake level. Intensely hot looking banners of yellowish flame under pressure rise from the openings. Smoke is very dense around the S cone and the yellow deposits of free sulphur with much of the free sulphur smell have increased in the cracks at the SE station. NE cone appears dead.

It is worthy of note that this revival, like the one recorded a short time ago begins with rising of the lakes, which will probably overflow before the movement spreads to one or more of the heaps. It may be that the building in of the lake margins plus the increase of pyromagma generated finally forces exit through the smaller and higher vents.

Query: When lava first breaks its way up wall cracks or back of pit rim, is this always preceded by central tumescence which arches the crust of the epimagma or so jams back the block of rim rock that the tilt opens the eruptive fissure so that it gapes downward? Downward gaping should be expected wherever there is upward flexure at the marginal limit of tumescence.

T.A.J.

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

SURVEY RECORD

Day Saturday Date February 22, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		4 ft NW of old N -- Sta. 1						
		NW height (new sta.) -- Sta. 2						
4:10p	Sta. 1	to old W	0					
	" 2	" new W	0	0 40	0	444	5.1 up	
	1	W margin N lake	12 6	1 54	0			
	2	ditto	97 26					
	1	E margin N lake	32 45	1 52	0			
	2	ditto	96 4					
	1	Base W cone	18 36	-0 6	0			
	2	ditto	38 14					
	1	Base new central cone (puffing)	35 3	0 28	0			
	2	ditto	61 21					
	1	W dome main lake	46 33	0 16	0			
	2	ditto	68 40					
	1	NE dome main lake	59 49	0 11	0	704	2	
	2	ditto	74 51					
	1	N dome SE pond	56 10	0 10	0			
	2	ditto	66 58	ca				
	1	S cone	50 40	-0 14	0			
	1	SW pond dome	28 13	-0 8	0			
	2	ditto	42 51					
	1	Base NE cone	85 29	-1 59	0	529	18	
	2	ditto	93 54					
	NW	Old N	123 17					

T.A.J.

Lake 5 feet above north B M (3700-foot level)
Summit NE heap 30 " " " "

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

JOURNAL

Day Sunday Date Februery 23, 1919.
Monday " 24, "

Feb. 23.
9:00 p.m. Lakes 4 feet down, continuous spraying bombardment N and NE banks of main lake. Flaming from the cones. SE pond quiet and glowing with fountaining inside of filagree dome N end. Fumes still dense especially around S cone. E cone orifice a little more open but still small and on the N side of former orifice. Large flame banner from it and through it the same large interior chamber can be seen, bright yellow heat, surging lava a little lower than yesterday.
The NE grotto activity of main lake now in the open against nearly vertical bank with half-dome above and during a half hour of observation, the fountaining migrated slowly to the N bank. The spurts were quite rhythmic at 1 second intervals, spray flung up 30 to 40 feet and outward horizontally over the crusts of the lake 75 to 100 feet, occasional heavy flings slopping back on the lake surface. Streaming toward the active corner. Occasional crackings and founderings of crust about 3 inches thick, followed by bright-line formation and thinner skin. No central fountains observed except the bubbling which follows foundering of crusts. Usual slight subsidence revealing red hot margin of about one foot depth when breaking up spell occurred.
In general slightly lower liquid lava than last night.

Feb. 24. No special activity observed and fume dense until evening.

10:00 p.m. N lake brimming and fountaining high, other places rather dim.

1:00 a.m. (25th) All the lakes high, fountains of W heap visible in spurts, central pot flaring.

Swelling of bench magma begins.

T.A.J.

JOURNAL

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

 Day Tuesday Date February 25, 1919.

7:00 a.m. N lake fountains still high. Fume much thinner.
N lake lower an hour later.

Lakes high and brimming all day; observed at 10 a.m., 1 p.m. and 4 p.m.
Central cone has changed its shape and from Uwekahuna appears to have emitted a straight flow across floor northwestward.

4:45 p.m. Strong overflow E and S cones.

5:30 p.m. The S cone had become two standing fountains 6 feet high and 10 feet wide, flooding to the SE in great volumes. E cone also standing fountain. E cone flow advances 3 feet in from 30 to 45 seconds and at 5:30 p.m. when this was measured at the front, the flow was 30 feet wide where it crossed the edge of the pit, the E station appeared partially submerged and the front had reached the former site of crater hut and was pushing eastward.
The flow from S cone followed the old courses toward the trail and toward the S station and sent voluminous and very liquid flows two-thirds of the way down the new trail, destroying at least half of the trail and pushing probably twice as far as the former flow had gone. By 5:50 p.m. the sources changed from standing fountains to spurting fountain vents and the flows rapidly stopped motion. During all of this the lakes were high and fountaining violently and continuously around their margins and in the evening seventeen glowing points could be counted in the distant view of Halemaumau. The N lake overflowed northwestward during the night.
Much the most remarkable feature of the new spurt of rising was the renewed tumescence of the southeastern half of the pit floor which carried the rim with it and foreed up the rim into a pressure ridge standing 10 feet above its former level, tilting back the SE station 20° and keeping the relation of floor to relief of rim above floor the same as it had been before. Thus at the SE station and just S thereof the floor edge had been only about 2 feet below the rim. Farther N about midway between E and SE stations the rim had stood some 8 feet above the floor. After the uplift the pressure ridge still stood about 8 feet above the floor
This means that the swelling up of the floor had carried with it as a unit a length of some 200 feet or more of rim, lifting it and mashing it back so that the face of the rim presented to the floor remained unchanged but back of the edge this length of rim moved like a block of hard wax and became mashed upward along a crescent curve in both vertical plan and ground plan, so that the result left the egde steeply sloping away from the pit in an elephant's-back curve for a distance 15 or 20 feet back from the margin of the floor. This pressure humping of the rim all happened between 10 o'clock this morning, when the rim was nearly flat, and 4:30 this afternoon when it had reached its maximum angle of say 35° dip of surface in the middle of the humped zone.

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

 Day Tuesday Date February 25, 1919.

This movement is just what happened to the SW rim in February 1918 and at the NW cone locality just before the sudden overflow through cracks back of the rim October 31, 1918. The recent fuming around the SE station and deposit of sulphur as precursor of uplift indicates that deep cracks were opening and giving access to the lava gases in response to the wave movement of tumescence in the epimagma. Strong eastward tilting and measured rise of many points of the floor accompanied this revival which began February 24. Note that the time agrees closely with the February 22-23 swelling and overflow of 1918.
A sharp earthquake after 9 p.m. showed eastward offset after the quake and appeared to check with the pressure indicated by the tumescence.

Note that the sulphurous cracks of the Postal Rift and Sulphur Banks may on large scale indicate large tumescent pressure.

TAJ

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

PHOTOGRAPH RECORD

Day Tuesday Date February 25, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
5 p.m.	S ridge	to S cone fountains	1	W P	8x	f/6.3	1	P $3\frac{1}{4}$x$4\frac{1}{4}$
	" "	" " " "	2	"		"	1/20	"
	SE	" " " "	3	"		"	"	"
		Second trail monument and flow	4	"	8x	"	1	"
		Fountain at E cone, close up	5	"		"	1	"
		ditto	6	"		"	1/35	"

TAJ



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1919, Feb. 25



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Fog

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115

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

Day Date

Wednesday February 26, 1919.
Thursday " 27, "

Feb. 26.
6:30 p.m. East pressure ridge still higher. South cone spitting and very high. Old S cone entirely buried and also much of the S tube ridge. East cone flaming.
Main lake fountaining continuously with 30-foot spraying and unusually violently all along its N bank. North lake similarly active in its grottoes.
NE heap glowing on top and fume considerably reduced.
All the vents alive and increased glow at night.

Feb. 27. N lake high all day; other points as before, W heap more built up above the pond there.
Fume rather dense.

TAJ

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

JOURNAL

 Day Friday Date February 28, 1919.

2 p.m. Circuit of pit by E and N revealed pronounced elevation of epimagma, making a pressure-lifted rim extending all the way from the site of the old SW station by S and SE to the new flow at the E station. The fresh flows of the inner floor are also lifted by the epimagmatic movement so as to present raw edges in places rising above the upward pressed rim of old rock. Thus at the S cone the cone itself has been broken and lifted, revealing horizontal glowing cavities, hissing somewhat, between the layers of the ruptured fresh flow material. The floods of the recent S cone flows have poured some 600 feet to the S and a like distance forking to the SE with much wider development near the source. The overflow of the rim here extends practically all the way from the SE station to beyond the S station and the fresh flow material is itself mashed up 8 to 10 feet high to form part of the pressure rim. The S station is entirely buried and the SE station is borne high on the flank of the pressure rim at an angle of 40 degrees and is fractured.
Farther N the pressure rim reaches its maximum height of 15 feet above the general level outside and at the E cone flow it slopes down to the floor level. Except in this ESE region the inner floor where it abuts against the pressure rim is itself lifted to or above the rim level so that as one looks at the Halemaumau surface from the high ground NE the pressure rim is a puffed up lip hemming the brimming epimagma which extends westward from the lip as a high flat surface with the cones, domes and lake ramparts rising still higher. The intense tumescence has elevated the entire eastern and southern parts of the pit so as to cause all the region between the NE and SW lava heaps to rise somewhere near to the lava heap levels, greatly diminishing their relief.
The N lake has recently overflowed extensively and also swollen up and built ramparts so that it, too, is becoming a separate heap, gaining on the adjacent NE heap.
The W pond is again an open pit 40 or 50 feet in diameter with lava splashing a short distance below the rim, and the W heap pot has built up a broad cone 10 feet high.
The central cone and SW pond ramparts are both pronounced.
The W heap cone was glowing and hissing in spasms and an occasional harsh puff was heard from one of the domes of the N lake.
The NE heap cone appears to have been recently added to and to have ejected short flows.
The lakes were 5 or 6 feet down within their cups, the N lake rather less than the others. Moderate fountaining was in progress and very dense smoke rose from the southern half of the floor. It was evident that the NW floor was subsiding and drawing away from the wall, it showed marginal slumped crusts and cliff rocks had fallen on the surface in many places between the old N station and the W niche. Tumescence is still in progress shown by incessant tumbling at the pressure rim.

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

JOURNAL

 Day Friday Date February 28,1919.

The E cone flow reached some 300 feet and passed beside and a little beyond the old hut site. All of these flows showed the same characters of brittle crusts in the first rush, somewhat heavier lava later and slumping surfaces during the cooling. The tumescence showed such strong differential movement near the E cone that the fresh flow crusts of February 25 have been compressed and arched upward making cavernous hollows under broken slabs.

TAJ

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date February 28,1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
Survey for location of new N cone and NW stations (NW height)								
2 p.m.	Old N	Old W	360 0	-40 0	-6			50"
	"	NW	-25 14	- 1 6	-3			
	"	New W	- 3 44	- 0 52	-4			
	"	N cone flag (new sta)	-60 25	- 0 59	-4			
	New W	Old N	0 00	+ 0 59	0			
	"	NW	35 20	+ 0 24	0			
	"	Old W	-122 38	6 46	0			
	"	N cone flag	8 26	0 44	-1			
	W	Old N	0 0					
	"	New W heap cone sum.	-96 32	0 58	0			
	"	New W pond rim	-63 56	1 11	0			
	"	Base NE grotto dome	-42 15	+0 19	0	937	3	
	"	" central cone ?	-44 24	0 16	0			
	"	NE cone	-28 0	-0 10	0	1137	3.3	
	"	NW dome N lake (ca)	- 7 8	1 26	0			
	"	Floor edge under NW station (fallen stone)	34 43	5 13	0			

TAJ

Lake 18 feet above north B M (3700-foot level)
NE cone summit 30 " " " "

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Friday Date February 28,1919.

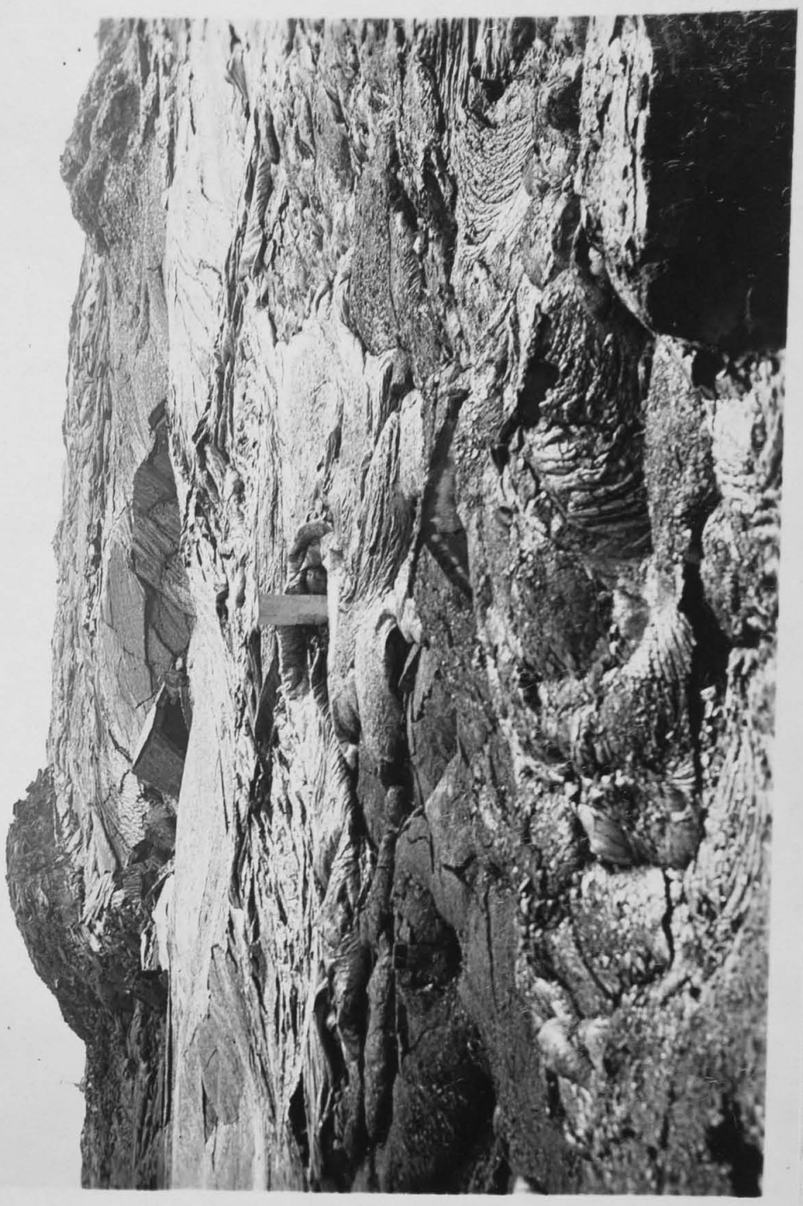
t	sta	subject	no	pl	scr	stop	ex	cam
2 p.m.		Trail to E pressure ridge	1	W P	8x	f/11	¾	P
		Upraised S cone looking SW	2	"	"	"	"	"
		Near view SE station	3	"	"	"	"	"
		From near E shelter to end of ridge N	4	"	"	"	"	"
		NE stone pile to new E cone flow and house site looking SE	5	"	"	"	"	"
4:30 p		S ridge to extension of pressure ridge S station locality	6	"	"	"	"	"

TAJ

1919, Feb. 28



1



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1919, Feb. 28



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

JOURNAL

Day Saturday Date March 1, 1919.
Sunday " 2, "
Monday " 3, "

Mar. 1. In the evening main lake overflowed about 6 p.m. and at 9 p.m. the NE heap broke out again. The main lake flow poured east past the E cone and flowed to the steam cracks SE of the old hut site. The NE heap flowed east and west, the eastern flow toward the old hut site, the other making an island of the NE half-dome and extending the overflows toward the Postal Crack.
There was also flow from W heap to NW inside the pit.
The S cone had changed to five spiracles of different shapes.

Mar. 2.
5-6 p.m. The several cones SE are scattered along the wall crack from the S cone to SE station. Fume thinner.
SE pond 5 feet down, blistered crust, fountaining in cone N side. Main lake 3 feet down, heavy folding crusts, ballooning, fountains under crust agitating it without breaking through, usual activity NE.
N lake nearly brimming, activity in several marginal grottoes. NE cone glowing. Large red-yellow flames from E cone. Usual flaming and glowing elsewhere.
7:15 p.m. NE cone burst open and played with a standing fountain for a half hour; thereafter less active; swift flows E and W, mostly W.

Mar. 3. No marked changes; trickle flows on NE heap; appearance of fresh flow northwestward on W heap; bright glow at night; tumescence less.
Cone on NE heap very high and large, open shaft splashing in jets.
Flames at S cone and at E cone. Pit brilliant at night with fifteen points of glow.

Very large forest fires have developed in line several miles long on E flank Mauna Loa in Kapapala ranch lands. In three days fires have spread rapidly. Flames much whiter than pit; smoke similar but browner. Drought.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date March 4, 1919.

NE cone has become the most conspicuous feature at Halemaumau, a high tower surmounting the NE heap, 12 feet high.

6-7 p.m. S cone hissing in spasms, peculiar shape with hood on top and open glowing face of orifices facing SW. New live flow barely moving extending S from a source at the W heap cone 1300 feet long and 50 to 100 feet wide. This the longest overflow of 1919. Evidently took place this afternoon. W heap cone large, open and splashing, with second flow from it trickling down NW side of heap. These flows began at 4:30 p.m.
View from NW station gives comprehensive idea of the high lift of SE half of pit filling. N lake appears nearly on same level as NW cliff and NE tower appears 40 feet above N lake. All the other southeastern features much higher than level of N lake and above the eye, so that there is no longer any looking into the pools. W pond has again formed a filagree cone. SW pond shows two domes and a flame banner shooting through a fissure farther east. Central cone a filagree pile. S and NE cones both glowing.
Main lake large, and liquid splashing about level of rampart occasionally in both main and N lakes.
The pressure rim around edge of pit S and SW higher than before, in places 15 feet high and the ESE ridge is nearly 20 feet high. The surface seen on climbing to the top of the S pressure ridge is an expanse warped and rolling pahoehoe flows sloping off toward the center of the pit.
NE heap putting out trickling toes and NE half-dome nearly buried under them. These trickle flows are at present extending the heaping towards the NE.
E cone flaming and SE pond very quiet.

In evening ten glowing points and four lakes visible, the W and W heap ponds being again glowing cones.
Fume thinner.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date March 5, 1919.

11:30 a.m. Crossed pit from SE to N lake and then made circuit by N and W.
Lakes about 5 feet down, usual activity.
Eastward streaming in main lake, spatter dome building at E end.
NE cone hissing. Driblet flows from it northeastward still in motion. Fresh looking flows across N rampart of N lake extending towards the NW but the NW floor under the cliff continues to remain low and the cliff high.
No new developments W or S.
The area of the W arm pond and SW pond is nowadays very fumy and consists, from the central cone southward, of a humpy slope from the W heap as a summit, consisting in the main of flows from that heap with the two ponds dimly glowing pits sunk in the slope and in the midst of the smoke. The W arm pond is generally surmounted by a cone and has recently, once or twice, been the source of flows pouring westward.
The central cone is a flaming heap with some other spiracles near it.
The SW pond appears to remain an open pit but the fountaining activity in it is not conspicuous. The two or three spatter domes about it have recently collapsed or been overflowed and so become inconspicuous. The floor from there to the high southern pressure rampart at the margin of Halemaumau is merely uplifted irregular pahoehoe.
The S cones are peculiar in shape, the two eastern ones being spiracles about 3 feet high, one of them of curved contorted form. The main cone rises above an uplifted block of the bench magma at the wall-crack and has organ-pipe drip down its southern face. Adjacent to it is another ordinary cone.

TAJ

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

JOURNAL

Hawaiian Volcano Observatory

Day Thursday Date March 6, 1919.

12:45 p.m. Last evening flows seen pushing toward the E from the NE heap and these now found to have developed long extension of the pile of driblet flows out to the eastern fuming crack covering the entire area which surrounded former site of hut. Lakes as before 3 to 4 feet down. W heap pond seen splashing on S side of cone. Swelling appears to have ceased.
S cones unchanged. Driblet flows in motion in vicinity of remnant of NE half-dome, only the summit of which remains visible. Top of E shelter still remains visible, about level with the heaps around it.
Same bright glow at night, five ponds and about ten glowing spots.

TAJ

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date March 6, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
12:45p	N end	pressure ridge to NE cone	1	W P	8x	f/11	½	P
	" "	" " " new driblet flows toward hut	2	"	"	"	"	"
		SE station and L. A. Thurston	3	"	"	"	"	"
								TAJ

1919, March



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3

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date March 7, 1919.

12:30 p.m. Strong flows from about 8 a.m. on, all the lakes high.
Main lake cascading across its E rampart and flow a few hundred feet eastward. NE cone spurting with umbrella gushes and the heap making driblet flows ENE. Central cone has sent flows northward around N lake, and SW pond has built a high dome and sent short flows southward.
At time of visit NE, E and S cones hissing. NE cone a steeple 15 feet high.
Main lake brimming and fountaining high along N bank.
Central cone an open pot surging and fountaining. W heap cone an open oven fountaining and overflowing and about noon sending a fresh flow a short distance southwestward.
NW wall valley persistently low under cliff about 40 feet high.
W arm pond a strongly hissing cone and the largest dome of SW pond appears very near this.
N lake one foot down with vigorous action.
The NE cone steeple a very prominent feature.

TAJ

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date March 7, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Brunton						
12:30p	NW	Summit W heap cone		+0 15				
		New W pond dome		-0 50				
		S cone		-1 5				
		Central cone		-0 15				
		NE dome main lake		-0 30		947	8.3	
		NE tower (cone)		-1 15		1017	23	
		E grotto N lake		+1 55				
		NW floor edge line of B M north		+6 10				

Lake 37 feet above North B M (3700-foot level)
NE tower 55 ft. " " "

TAJ

PHOTOGRAPH RECORD

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

Day Friday Date March 7, 1919.

t	sta	subject	no	pl	ser	stop	ex	cam
12:30p		N end of pressure ridge and NE cone	1	W P	8x	f/11	1/2	P
		Near view NE cone	2	"	"	"	"	"
		NE fountain main lake looking W	3	"		f/6.3	1/200	"
		ditto	4	"		"	"	"
		Near view NE fountain looking S	5	"		"	"	"
								TAJ

1919, Mar. 7.



1



2

sag

1919, Mar. 7



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Jap

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date March 8, 1919.

9 a.m. Fume a little denser. Pit had been less bright during night but the two lakes were fountaining high in early morning hours (1 a.m.). Now no live lava visible from H.V.O.

Noon Lava visible in N lake two feet down.

7:30 p.m. In evening bright fountains, high level of lakes; everything bright. Later dull. NE cone not glowing.

In night bright fountaining SW pond and SW pond dome disappeared.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Sunday Date March 9, 1919.

10 a.m. NE cone the same. Central cone glowing on N side. SW pond splashing and building a small spatter dome, but the large pile gone. N lake overflowing. Fumes rather thin.

In early afternoon no flows on NE heap.

4-6 p.m. Main lake 4 feet below rampart, tunnel grotto glowing and dripping at W end. Surging grotto continuously throwing out surf at NE corner, another at SE corner. Hissing and flaming at S spiracles, S cone, NE cone, central cone, W heap cone, W pond cone and E cone. W heap cone 7 feet high, glowing holes flaming on top. Crossed middle of pit from W heap cone past central cone to main lake. W pond an open circular pit 50 feet across, ballooning crusted lava 4 feet down, with occasional flings of melt. Cone on E side of pond.
Central cone an irregular heap 3 feet high. East of it a crack dark cherry red 6 feet down, showing even interior glow of bench magma (epimagma) 700°-800° C.
N lake one foot down, strong drift of surface to northern active grottoes. Occasional settlings of both N and main lakes, with bright edge, one to two feet.
Trickle flows eastward from NE heap flanks in several places, and remarkable development of large schollen-domes appearing in the eastern part of the heap, far out towards the steam crack and also in region near the E shelter. A large dome 50 feet long and 10 feet high just E of shelter. The S pressure rim W of S station site now fully 18 feet high with frozen lava cascades over it (from SW pond?)

Rainy at night. Flow spots E of NE heap.

TAJ

JOURNAL

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

 Day Monday Date March 10, 1919.

Morning. Rainy. Flows seen NE heap. Other features appear unchanged.

3 p.m. Less gas pressure at S spiracles. Lakes a little lower (6 or 7 feet down). Grottoes same. E side of NE tower making spiracles by gas hissing carrying lava drip half-way up tower. Flow from the large schollen-dome E of shelter making a new oval patch of heavy pasty lava about size of schollen-dome and beside the other. This shows, as does the lava oozing through cracks in top of dome, that the schollen-dome is swollen up by the increased thickness of its shells, the resistance to peripheral or forward motion, and perhaps the increased viscocity of the lava within. The lava in this trickle-heap tube system is relieved of gas by the cupola hissing at the cone. Is it also oxidizing more within by oxygen from that cupola? Is the changed viscocity at different stages of lava flowing measurable? And are the gases emerging at different stages measurably different?
The fresh lava surface east of main lake rim appears different from yesterday.
The schollen-domes are increasing in size so as to make a considerable hilly relief in the eastern extension of NE heap, some of them 15 to 20 feet high, eight or ten large domes. Trickling continues in several places. This NE heap repeating the history of the S heap of March, 1918. Stain and tumescence ? SE floor.

Evening. Flow from NE heap.

Note. The oxygen-supply theory for fountaining and cone explosions certainly applies where the gas explosion can be heard in a cone and probably when crusts founder or banks fall in and fountaining results.

There appears, however, to be ample cause for the continuous grotto fountaining, (if we grant a large supply of gas during the rising periods), in the crusting over of the surface of the lakes and the necessity for the escape of that gas through layers of vesiculated lava under the crust, which are increasingly viscous towards the surface.
The inflation of the crust at intervals and the excessive escape of gas necessitating breaking up and sinking spells, during a prolonged rising period like the present one, and the continuous hiss from the confined gas in cone cupolas all give evidence of a mechanism which is actuated by rising gas, is clogged by surface radiation and solidification and produces effervescence or ebullition wherever gas restraint overcomes crustal resistence.

The continuous surf-like surge at a grotto fountain like the NE grotto observed yesterday is essentially the same phenomenon as the continuous artesian welling up at a standing fountain. In one case the confined foam beneath the crust of a lake releases its expanding gas at the mar-

ginal grottoes, wells up there continuously and is compensated continuously by a foundering of skin drawn toward the place where gas escapes. Possibly the drawing in this direction is actuated by a surface grade in the direction where the release of the larger bubbles of foam from the under layers causes collapse of those layers in a zone increasingly collapsed in the direction of the fountaining grotto. The drawing away of the crusts at the bright-lines would thus be a continuous slipping down grade of the surface skin accelerated at the grotto by cracking and foundering and perhaps a moderate amount of the explosion vacuum effect also. The prime motive for a continuous fountain, however, would be merely the escape of the gas below tending to inflate the crust.

The marked contrast between this and the continuous bubble fountain phenomena of the subsidence period resides chiefly in the speed of the overturning, for even in July, 1912, there was a slightly crusted area on the side of the lake remote from the most active bombardment and if the explanation here offered is correct, we must agree with Day and Shepherd that that was a time of maximum gas release; the excessive gas caused explosively rapid escape either marginally or along lines determined by a pull of the crusts in the direction of a valley formed in them by an excessive linear drainage of the subsurface foam through some marginal grotto or grottoes. Doubtless convection aids in bringing about this effect which leads to the phenomenon of the travelling fountains. There is certainly an appearance of down grade to the surface slope of a pool which develops strong streaming in one direction. The failure of the tests made with compressed air injected below the surface and with compounds rich in oxygen, and the success of the log of wood end-on and the bottle of water in generating a fountain cast considerable doubt on the oxygen theory. The log of wood and the water bottle appear to open a way by explosion or combustion in the viscous surface layers. Furthermore the spectroscope prism test on grottoes seems to show that combustible flaming gases such as would be required by the oxygen theory are not always present. Does this not mean that the overturning circulation of the lakes at flameless times achieves oxidation more completely than the mechanism of blowing-cones which always contain combustibel gas.

TAJ

JOURNAL

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

Day Tuesday Date March 11, 1919.

Morning. North lake high. New cone at SSE wall crack from last night's activity. Renewed tumescence S. Yellow stain accompanying tumescence in region of SE pond.

Noon. Main and north lakes brimming. New cone SSE spouting from glowing cavern on its W side. Snaky driblet cascades congealed down face of pressure rim (outside) from this cone's activity of night before. E cone hissing harshly, NE cone hissing mildly. Flows pushing out from NE heap N of and higher than top of E shelter. Wall of this shelter all covered with lava except S end.
Very light spatter from E cone seen.
Main lake streaming to NE grotto.

3 p.m. Main lake 6 feet down, N lake 3 feet down. Former crusted and activity sluggish; latter with glow margin, much ballooning and bombardment NW side.
New SSE cone 4 feet high. In hot cracks of floor N of main lake salts deposited azure blue and bright green and white; appear soluble, taste brassy and tend to change color on removing from heat. This change of color in one case observed was a bleaching. In another case the salt at the moment of removal into the cold wind turned green rapidly, the color spreading across the surface as though the salt were either deliquescing or drying. Is this chrome alum or copper sulphate? The blue variety exactly the color of azurite.
Cones hissing mildly, E cone the strongest.

5:15 p.m. Strong gas pressure was renewed all through the lava column. N lake overflowed northward to the wall. NE heap broke out in many places to the E and N. Cones hissing noisily. Main lake fountaining high. Western cones and ponds appear lively also.
New SSE cone burst open with a standing fountain, which, however, did not demolish the cone but settled into a cascade about 5 feet wide and 18 feet high tumbling in a rivulet down the steep face of the pressure ridge. The S cone at the same time was spurting southward and flaming. The lava from the SSE cone pooled below and divided into two main forks which spread as a thin syrup about the region of the two upper trail monuments, progressing some 300 feet. The toes at the front of this flow were very snaky and tended to recurve and lift their extreme tips, swelling within a fine-textured skin quite different from the coarsely vesicular texture of the bulbous flows of the NE heap. The surface as it cooled was a mottled purple and the absence of marked vesicle lace on the smooth skin suggested that the extreme aeration of the lava in cascading down the 18-foot slope had caused unusually complete discharge and combustion of gas before solidification.

During evening pit bright and NE heap flows in motion.
Night activity moderate.

TAJ

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date March 11, 19191

t	sta	subject	no	pl	scr	stop	ex	cam
		SE lava cascade	1	W M		f/6.3	5 min	4x6 TAJ

1919, Mar. 11



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

JOURNAL

Hawaiian Volcano Observatory

Day Wednesday Date March 12, 1919.

New flows from N lake, NE heap and SSE cone.
Yellow stain around SE pond area pronounced.
N lake region appears lower by measurement.

9:00 p.m. Photographed pit in daily series from Observatory because very brilliant, five lakes and seven or eight points of light and a long flow extending the NE heap far to the east; probably longest flow yet during 1919.

9:10 p.m. Both main and N lakes showed fountaining above their ramparts.

9:30 p.m. A sudden flare as of collapsing bank at SW pond.

Puffing sound at crater could be heard at Observatory at 9:00 p.m.

Strong W tilt in progress.

TAJ

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

JOURNAL

Day Thursday Date March 13, 1919.

Morning. Measurement from distance indicated SE pond cone and central cone had collapsed, SW pond larger domes of recent record are gone and some subsidence was indicated locally.

4-7 p.m. Made circuit of pit by S and W. SW wind. Collected gas at cones. Cones hissing and flaming.
W pond skin ballooning, 5 feet down, large filagree cone on E side of pond. Large flames from this cone and at SW pond.
N lake bright. Hot flows on NE heap. One glow hole low on S side of NE cone. E cone hissing and flaming.
Great change at SE pond, where the pond has enlarged to three times its former size and has nearly joined the main lake along line of former crack and flame. Only small partition 5 feet thick separating the two lakes and swift streaming northwestward toward and under the partition in SE pond, and swift eastward streaming in main lake where the grottoes were very bright. Both lakes 6 feet down.
This collapse at SE pond, the sinkhole region, (along with the intense W tilt) shows beginning of subsidence which is coming soon probably. SW pond domes collapsed earlier, similar tendency.

Gas Collections.

New tubes from E. S. Shepherd with fusible ends, 250± cc.

Tube 1. S cone hissing strongly from vertical crack one to two inches wide; glowing cupola within; crack on W side of cone near summit. Thrust in a hole back of flame, orifice 1 inch diameter; immediate filling of smoke, sublimates abundant, some water within (a few drops). Tip broke and sealed with a small cork. Sealed with fusion twenty hours later.

Tube 2. SSE cone, large flaming orifices over frozen cascade SE face of cone. Thrust in hottest orifice four inches diameter, tube bent inside cupola. Sealed with rubber tube for twenty hours, then fused.

Tube 3. W heap cone. Filagree orifices SW side of cone. Thrust in small hissing hole one inch diameter or less, sealed off the glass in the flame at the entrance. Resealed twenty hours later.

TAJ

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

JOURNAL

Day Friday Date March 14, 1919.
Saturday " 15, "

Mar. 14. SW wind. Pit fumy in consequence. Fume moderately thin, however. Morning measurements show nothing new. Night previous pit rather dull, but continued trickle at NE heap and fountains occasionally visible from the lakes. Lakes reported 15 feet or more down, but high after midnight.

Walked around Kilauea crater SW. View from SW cliff shows well new flows S and W, the cone slope of Halemaumau, and the unsymmetry of the raised E lip and unaltered NW cliff.

Mar. 15. Another fork in the long ENE flow from the NE heap moving last night. This the main change this morning. Fume rather dense especially W and SW. New flows from NE heap pushing S.

6 p.m. Bright banners of flame and high gas pressure at SSE cone; main lake and SE pond 6 feet down. Partition still holds. SE pond quiet except for spraying fountain N side, ballooned up crust all around edge of pond, now broken in, leaving a hollow shell.
New short fork of E flows beyond E steam crack forking N.
E extension of NE heap cuts off view of hut from the SE region.

Gas Collection.

Collected gas in hole 4 inches across on N side of summit of E cone, good sample. Sealed at 9:30 same evening.

Note that the collection of gas from the wall-crack cones makes more sublimates in the tube, and more smoke when hot, than the collections from the lake margin crusts or the lake margin grottoes.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Sunday Date March 16, 1919.

11 a.m. to 1 p.m. Made circuit east and north. New flow from NE heap pushing S along E side of pressure rim.
NE cone has open cavern E side at base, hung with stalactites, and much recent spatter from it. Glowing heaps just S of cone at source of the new flow.
N lake nearly brimming, crust pulsating with gas, fountains around margins.
At noon S and SW ponds brimming and W pond welled over and lava cascaded N and S over lip, the S flow pushing SSW as an overflow, the N one making a sheet 200 feet or more wide which poured down into NW depressed part of pit.
Fountaining at source and high flings at SW pond.
W heap cone high and hissing.
S cones hissing and flaming. Other activity as before.
Main lake less high than N lake.
The flow from W pond did not reach the wall, but the N lake went over the edge later and made a similar flow of glassy habit which joined the W pond flow.

Gas Collection

Tube 1. Closed grotto completely curtained off NE side N lake. Small hole near summit of grotto dome, lava splashing within. Appears to be ideal for the lake gas.

Collection successful. Sealing next day; rubber tips for temporary seal for all this period of collecting.

Tube 2. Collected from flame spurt in open crack in crust N side N lake. A little lava on end, broke off end and sealed with rubber tube and copper wire. Appears good collection.

Both these tubes show no such sublimates as the E and S cones.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date March 17, 1919.

2 to 5 p.m. With assistance of L.A. Thurston collected gas at W pond, E cone and N lake.

S and SSE cones hissing loudly.
SE and main lakes rather low, 8 to 10 feet down. (Said to be very low in evening, but rose near midnight.)
Driblet flow making out from cracks in ground N base of E cone, and lid 3 feet square being lifted one or two inches in spasms by gas, on top of this flow about over its vent. Gas rushes out with hiss.
Live flows pouring on NE heap.
Cracks across pit from W end main lake to N cone, two to three feet wide in places, not glowing for 15 feet down. These cracks large, continuous and partly new.
W pond 2 feet down, ballooning and fountaining in a western grotto; pond smaller and cone E of it smaller and rather inactive.
W heap cone hissing and making spiracles.
Central cone hissing from large orifices on its E flank.
N lake 2 feet down, flinging stringy fountains with much new construction at large domes along N bank. Streaming to NE.
Summit NE heap shows interesting changes. The open cavern at base of tower has huge stalactites covered with fresh spatter. Two mouths 3 feet in diameter emitting pasty flows and lifting lids in midst of sub-circular puddings 20 feet across just SE of tower. Spiracles building at S base of tower with strong hiss. Near foot of heap SE open deep brightly glowing caverns under thin shells revealed by collapse, rather dangerous places to walk over; perhaps 10 feet deep.
The excessively glassy shell of lava splash over top of NE heap recalls similar one on NE fill of last year; this one also appears after heavy rains. This shell shows as surfaces beneath, and found some typical as a little farther down slope.

Gas Collection

Tube 1. Tip under lifting and hissing lid of crust. Held lid up with stick. East cone. Good conditions. Sealed in evening.

Tube 2. Tip into soft bursting bubble through crust of W pond. Perfect condition. Sealed in evening.

Tube 3. Tip into spiracle, very small orifice, hissing, top of curatined dome N side of N lake, next to heavy fountain. Perfect condition. Sealed in evening.

TAJ

145

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

JOURNAL

Hawaiian Volcano Observatory

Day Tuesday Date March 18, 1919.

2 p.m. Approaching from road terminus the floor lifted above the pressed-back pressure rim SSE looks higher, arched from E station site to S station site. As a whole this lifted tumescent SE half of the surface of the lava column is a "cumulo-dome". SE station broken and pressure wall steeper.

The SSE cone an open dome with a window 2 feet across facing SE where the lava inside is so high that it splashes out. A group of driblet spires and heaps near it. S cone hissing, but the hissing today not so marked at the vents as yesterday.

E cone flaming, the area hissing yesterday and lifting the lid now quiet.

SE pond 4 feet down, has recently (since two days ago) risen to brimming, shown by a crust edge still clinging all around, and a crust bridge at this level across all the extension of the pond towards the main lake. The live part of the pond is a circle, with overhang and grottoes N and E, cracking and foundering at 2:30 p.m., but apparently rising.

Main lake also higher, 5 feet below its rampart; deep fiery grottoes NE, SE and W; much staining, smoking and cracking for 20 feet east of it.

NE heap still pastily bubbling but from two small heaps with 3-foot craters about over the western vent of yesterday. The eastern vent quiet and solid. Just S of and adjacent to the NE cone was a blowing mouth (photographed) which opened and closed like a crocodile's jaws, jetting through a skin flap fierce puffs of flame(?) and gas, and emitting a trickling glassy snake of lava. Mouth 3 inches across and skin 18 inches long. Hot cavern of collapsed crust NE of tower. A row of spiracles near the active mouth above described.

N lake high and rose to brimming at 3:30 p.m. W heap cone has made two new gas spiracles on its W profile.

4 p.m. The NE heap gained pressure and broke into flows, the largest one pouring down its W side.

This heap now manifests its active spells of this type by swelling all through its tube system, cracking, swelling its domes and letting lava well out on top, at the extremities and through cracks in many places. The lava leaves voids which collapse, and the toe lava in front of such places is more solid than the shells vacated. The pasty crater fillings now on top are very different from the liquid standing fountains of a few weeks ago. In general the flow lava now is more substantial than the SW flows of January.

Evening. At 6 p.m. strong rise in lakes. At 7 p.m. overflow N lake E of N domes towards wall; high fountaining until 9 p.m., then lower. During high spell flow at E front and along course of NE heap flows. Brilliant fountains SE pond and spitting SSE cone. Large banners of flame at the cones have ceased.

At midnight the new craters on the NE heap were spouting.

TAJ

1476

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date March 18, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit						
2 p.m.	NW	Summit W heap cone		-0 8	0			
		" " pond "		-0 17				
		Central cone		-0 48				
		South cone		-0 46				
		SSE cone		-0 48				
		NE dome main lake		-0 40		947	10.5	
		(summit 8 feet above liquid)						
		North cone		+0 26				
		NE cone summit		-1 50		1017	32.5	
		" " base		-0 50				
		Cone N of N lake		+0 18				
		Base wall under N bench mark		5 35				

Lake 35 feet above N bench mark (3700-foot level)
NE tower 65 feet above N bench mark.

TAJ

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date March 18, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
2 p.m.		SSE cone and broken SE station	1	W M	8x	f/11	½	4x6
		Pan of SE pond to SW (crust cracking)	2	"	"	"	"	"
		Pan of SE pond to NW	3	"	"	"	"	"
		Gas mouth dribbling NE cone	4	"	"	f/8	"	"
		NE cone looking NE	5	"	"	f/11	1	"
							TAJ	

1919, Mar. 18.



1

Fog

1919, Mar. 18



2



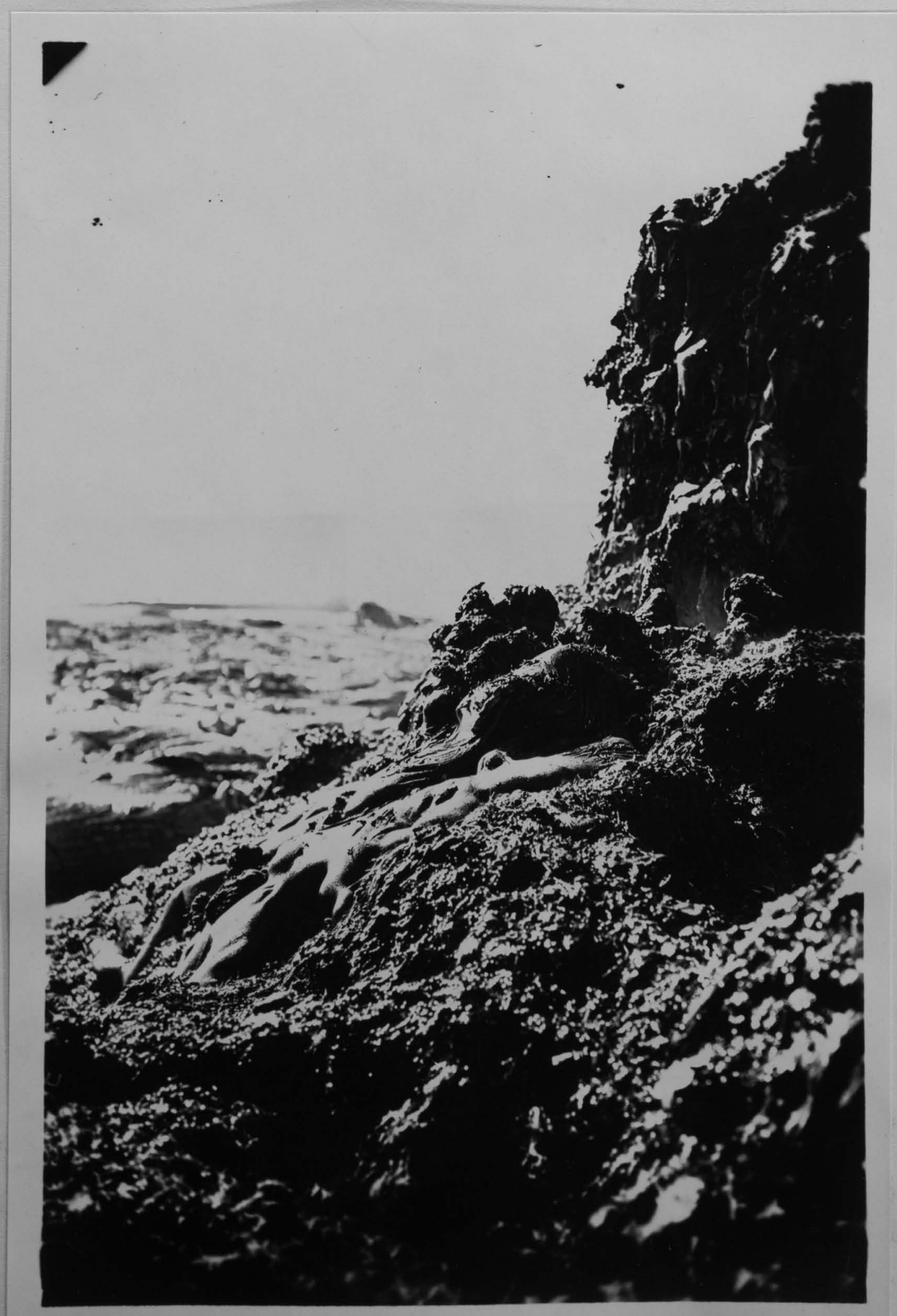
3

Fog

1919, Mar. 18



5



4

Jag

JOURNAL

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

Day Wednesday Date March 19, 1919.
Thursday " 20, "

March 19.
10 a.m. to noon.

Dripping oval window, facing SE, in SSE cone; lava splash out of it; closed during morning to a puffing mouth. E cone hissing and flaming as usual. S cone hissing.

Main lake 4 feet below rampart. Usual grotto fountains and some bubble fountains along a bright line where the streaming was eastward.

SE pond splashing at renewed spatter dome NE corner. Central cone glowing and flaming.

W pond overflowing in steady stream northwestward as before.

N lake about 2 feet below banks, usual grotto fountains.

NE cone has new cone 6 feet high developed beside it on the S where driblet mouth specimen was collected. This cone hissing and glowing. The two craters a few feet farther S now quiet and crusted over solidly. Flows pushing from NE heap S and E. The flow of last night from N lake did not reach N wall but N cone overflowed the surfaces immediately around it.

March 20.
4 to 6 p.m.

SSE cone brightly flaming. Cones hissing, high gas pressure continues. Cracking SE floor.

NE heap flows making out extensively S so as to reach shore of main lake, to base of E cone and to push beside the pressure ridge southward toward the trail. This heap now reaches nearly to the N lake, covers the old NE wall of the pit, extends over a third of a mile out over the Kilauea floor ENE and makes many tongues running southward from this eastward extension. It is heaped up all the way to the outer steam crack on the E with numerous swollen domes.

Main lake low relative to its banks; lake about 12 feet down. Northern rampart dome cracked open showing cherry red glow within. Large flame from crack W of main lake.

N lake 3 feet below its banks, pounding in grottoes N and E with heavy crusts and occasional cracking and foundering.

Central cone bright and flaming.

W pond quiet and SW pond fountaining.

Fresh flows on upper flanks of NE heap and the spiracle cone S side of the tower built up into a chair-like structure. Another orifice a few feet farther E hissing and building driblet spiracles. Very smooth lava here flowing in snaky toes. Its vesiculation excessively fine grained.

TAJ

JOURNAL

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

Day Friday Date March 21, 1919.

6:00 p.m. High gas pressure continues. Small spiracles north of SSE cone making driblet flows and that cone also bright. Small flow moving on NE heap a few feet E of pressure rim which has semi-aa texture with crusts upending at its front and the paste under the crusts solidifying as typical aa so that rough chunks drop off as separate units. The surface pahoehoe of this flow of the rough ropy character, the live stream feeding the flow of lava of the apparently smooth toe type.

NOTE. Here is a case where aa is solidifying but there is not the slightest suggestion in the appearance of the melt of its being surcharged with gas. The toes and the live stream are both of the smoothest type of gas-free pahoehoe and the aa appears on the interior surfaces. Can the tendency to aa solidification be a function of the oxidation of the iron rather than of gas expansion?

West heap cone has glowing summit.
Main and SE lakes fountaining and spraying under high pressure. East cone dribbling and flaming. Lakes 6 feet down, heavy crusts, tumultuous cracking and foundering with bubble fountains, the melt appearing somewhat more granular and pasty than of late.
Much development of cracks SE floor.
The flows from NE heap have poured over E bank of main lake into the lake for a length of 20 feet of shore.
Main lake appears somewhat larger, a long oval with E-W axis.
SE pond active over a circular area and its extension as far as the partition separating it from the main lake is crusted with bulbous shells. This pond at no time has developed ramparts like the other lakes, though it has one spatter dome on its NE margin.
The other vents were bright and flaming as usual and the N lake in the evening was high, fountaining above its ramparts.
Fume on this day thin and much noise heard from the pit even at the Observatory owing to calm weather. East pressure ridge was in motion with rocks falling from both its E and W sides.
Pit very bright in evening.

T.A.J.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date March 22, 1919.

In morning north lake fountains visible from Observatory.

3 to 5 p.m. Less brilliant opening at the southern cones but the puffing continues. NE heap still putting out flows and making driblet mounths on top. Main and SE lakes unchanged. N lake high as before. W and SW ponds have built large domes. Central cone has collapsed to a small open pond 30 feet across with active fountaining on its W side.
Large chasms opening along a line from the main lake towards the NW and the crack leading to the N cone also opening wider and very hot in places. The development of these cracks probably due to collapse of central cone rather than to any renewed swelling.
West heap cone a large square topped structure, 10 feet high and 12 feet broad, with a glowing orifice facing northwest near the top, and near it, a new driblet spire 3 feet high has been built and several smaller spiracles.
No new flows appeared SW or S.
No cracking had developed in the NW floor which remained low and unchanged.
Fume continued thin.

In the evening considerable flows continued to push eastward on the NE heap.

T.A.J.

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

JOURNAL

Day Sunday Date March 23, 1919.

8:00 p.m. Marked increase of smoke and lakes generally lower.
Main and SE lakes 18 feet down, N lake 12 feet down.
Lakes rose during next hour. Crust over surface of lakes, streaming not evident; fountaining in the grottoes and, during the rising spell, extraordinary high gas pressure, flinging the spray from the NE grotto of main lake out at an angle of 30 degrees for a distance of fully 150 feet. This happened when the rising had nearly blocked the top of the arch of the grotto and the crust against it impeded the gas escaping from beneath, so that instead of fountaining there was prolonged blowing against the grotto wall and the spray was deflected outward by the roof wall.
It was evident from the accounts of earlier visits this day that the liquid lava was fluctuating rapidly.
Central pond dull; W pond bright; SW pond shows glow heaps.
SE wall-crack spiracles have become large flaming cracks,
Flames and gas pressure strong at E cone and driblet mouths blowing glass with loud hiss at S base of NE tower. This hissing has increased owing perhaps to increased effervescence accompanying beginnings of subsidence. South side NE heap flowing in several places and craterlet spurting at S end of line of summit vents.
Two flows near summit on S flank broke out about 9 p.m., bursting through crust making holes at first about a foot square and developing standing springs of lava which bubbled continuously for a half hour or more. Odor of sulphurous acid to leeward of the bubbling springs. Stream pouring down slope from springs, moderate viscosity, wrinkled pahoehoe.
The floor over all the region north of main lake covered with new piles of bulbous flow lava from NE heap and considerable extensions also have made out to the south between E cone and main lake.
The SE pond was crusted and spraying from its grotto.
The central region showed increased cracking; cracks were found of apparently deep origin cutting through the NE heap flows east of the N lake and the main lake showed cracks glowing back from its east rampart and the rampart elsewhere had fallen in in several places making the lake larger.
The general situation indicates increased disturbance of the bench magma, some subsidence of lake magma, and increased effervescence of gas and open gas chambers under vents causing smoke and collapse. There is no definite sign of sinking bench magma as yet. The W cone was puffing loudly, but the southern vents had changed to quiet blowing and much flaming.

T.A.J.

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

JOURNAL

Day Monday Date March 24, 1919.
Tuesday " 25, "

Mar. 24. Lakes reported low with strong fluctuations in height. No great change. Some flowing from NE heap at night and occasional spells when fountains show above edges of lakes as seen from Observatory.
Fumes dense.

Mar. 25. Same general conditions. Increase of breaking down of margins of lakes.
West heap cone continues bright. Flames at E and southeastern cones but less incandescence. NE heap swelling and occasionally flowing.
Visible fountaining less as seen at a distance but occasionally shows at N lake. Flaming at SW pond.
Fumes dense.

T.A.J.

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

JOURNAL

Day Wednesday Date March 26, 1919.

2:00 p.m. Great increase of swelling into domes east extension of NE heap. Fresh glowing flows top of NE heap and three arms down slope west and north, the latter extending 600 feet.
Main lake 20 feet down below portions of rim. New V-shaped extension of it by collapse in direction of E cone. Lake covered with heavy crust, fountaining in three grottoes, some high spray above rim.
E cone blowing. SSE cone glowing less than before. An open pot north of it with large flame and rumble of fountaining pool below. Smoke greatly increased in these areas.
Cracks extending NW and N across center of pit much wider, up to two feet across and in places can see down for 25 feet without much heat or incandescence. Central pool too low to see; perhaps 20 ,feet down; rumbling.
N lake enlarged out to north cone south of it so as to be half again as big as before with its rounded curve preserved only on north side. NE corner also broken in. Live tube leading to curtained off grotto with stalactites hanging NNW corner of lake. One half of N cone remains on brink. Lake 6 to 12 feet down. Some cracks across flows from NE heap on NW flank of heap.
Large sulphur cone along crevasse line a few feet south of N cone and sulphur stain also in S cone region. Blowing due to gas pressure at cones greatly diminished.
Crossed NE and E flanks of NE heap -- no fresh flows or especial heat. Found additional aa flow next to the one formerly reported and more completly in aa condition at front of flow. Both flows small, singularly localized and same habit as iron gray last flows of S heap pf March, 1918.

In evening bright flare on fume cloud, occasional fountains in N lake visible from Observatory, large flame SE pot and brightest glow north side N lake.

T.A.J.

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date March 26, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
2 p.m.	W knob NE heap	to east	1	W P	8x	f/11	1	5x7
	Ditto	to NE tower	2	"	"	"	"	"
	Summit NE heap	to lake	3	Seed L Ortho	"	"	"	"
	Ditto	to NE tower	4	"	"	"	"	"

TAJ

Nos. 3 and 4 double exposure.

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1919, Mar 26



1



3

709

1919, Mar. 26



2



4

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date March 27, 1919.

1:00 p.m. SW wind. Made circuit of pit by S and W.
Gas pressure greatly diminished. Pot SE at top of pressure rim with bridge across, 3 by 6 feet in diameter, flaming; leads into a wider chamber 15 feet in diameter and 20 feet deep, narrowing at bottom to a fountaining and splashing well; entire interior orange incandescent and dripping. Noise a hollow rumble, due to fountaining below and cimbustion above. Cracks and stains around orifice.
Slight glow in SSE cone.
Main lake has collapsed at west end so as to join through with central pond lengthening to 600 feet. SE pond remains separate. Both lakes have 20-foot walls; much crusted; partition between them a continuous isthmus 50 feet wide and showing no tunnel; the abandoned channel of the recent high level and enlargement of March 12. South pressure rim looks somewhat lower.
Walked across weak shells of lava to edge of SW pond which had joined through with W pond excepting a low partition remaining close to pond levels 15 feet below margins. Traces of smooth walled cylindrical shafts at east sides of both ponds where the domes had been.
West heap cone replaced by a pond occupying entire area of former W heap pond and during the last two hours a lava stream had been pouring from a tunnel in the direction of the SW pond downward at a flat angle into the bottom of this W heap pond. A spatter heap lay beside this half frozen rivulet making an irregular hump covered with lava splash in the southern part of the bottom area of the pond pit. This pond lay about 18 feet below its margin.
Went to western edge of N lake. Found lava there 12 feet down, fountaining around north margins; otherwise mostly covered with crusts.
Crossed eastern extension of NE heap; found nothing new.
The E cone was glowing and flaming but without much noise.
The general situation shows slow subsidence, collapsing of liquid lava chambers and marked pulsations of rising and falling liquid. The pit was moderately fumy and the glow at night very spectacular on the fume cloud, with occasional brilliant flaring from individual ponds locally.

TAJ

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date March 27, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit.						
1 p.m.	NW	Edge W pond (no cone)		0 00	0			
		Summit central cone (W edge main lake)		-0 20	0			
		Summit NE grotto cone of main lake (23 feet above lake)		-0 42	0	947	11.5	above
		NE tower summit		-1 36	+5	1017	28.4	"
		Cone N edge N lake		1 10	+5			
		Site of N cone (S edge N lake)		1 16	+5			
		(SW wind)						
		Lake 23 feet above bench mark (3700-foot level)						
		NE tower 60 ft. " " "						

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date March 28, 1919.

12 noon. SE pot showed dark interior, bridge has fallen in, fountaining audible below. SE pond and main lake about the same -- 20 feet down; the east floor appears sagging and lower. Spatter margins near main lake level slopes from center of pit eastward from two feet above lake to lake level, suggesting eastward subsidence of bench magma.
E cone shows open hole two feet across lined with stalactites at its north base and other flaming orifices in its flanks. The cone looks ready to collapse, shattered and stained and covered with much Pele's hair, the individual strands thickened with solfataric incrustations. The liquid lava seen splashing in large chamber below, fountaining hard; chamber incandescent; depth of open space above liquid 15 feet.
Visited summit of NE heap where at irregular intervals of from 5 to 20 minutes a loud deep puffing noise of gas was heard, amounting at times to a roar. The upper part of the recent flow of two days ago on the west side of the summit region was found to be a group of collapsed channels with smooth linings still hot and leading by horizontal ducts into the side of the closed crater heaps. In one of these channels was found a hot cavern with pinkish glaze and delicate stalactite bunches and drip.
The NE tower was glowing through cracks and covered with gas mouths built out in extraordinary shapes.
Occasionally the accumulated gas pressure within the internal lava chamber of the heap achieved release by puffing through the tower, and during the greater puffs at long intervals, one of the western channel tubes would eject a roaring blast horizontally of gas and flame which on one occasion was prolonged for several minutes so as to bring the walls of the tube from black to a state of incandescence and with such violence that black papery crust material and fragments of the lining of the vent were blown out in showers. The orifice in this case was not a hole in a cone but a horizontal tube at the upper end of a flow about two feet high and eight inches across; the opening being where the festoons which had roofed the tube had collapsed.
The N lake was about the same as yesterday with streaming toward the north and fountaining in the grottoes, but the chasm leading southward had apparently increased in size and was smoking most of the way to the main lake.
The yellow sulphur heap just south of the N lake was partly broken down.
The NE dome grotto of the main lake was covered with Pele's hair above and appeared ready to collapse, being much shattered. The wall which it surmounted, 20 feet high, was deeply undermined at the base by the active fountaining for 20 feet of length horizontally. The streaming in the lake was northward and eastward from quiet crust covering the western half.
General condition continued slight subsidence.

TAJ

JOURNAL

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

 Day Saturday Date March 29, 1919.

2:30 p.m. to 4:30 p.m. Blowing vent of NE heap glowing but only faintly puffing. Glow in cracks of heap still abundantly in evidence. Fragments thrown out by puffs of yesterday found to be lava chips of the orifice up to 4x5 inches in size, mostly small and light. E cone about the same.

Main lake crusted over in eastern pool except for founteining in NE grotto, and at narrows streaming vigorously westward in a curve to a grotto on the south side. The streaming hence reversed since yesterday. Marginal cliffs around lake about 18 feet high, much hung with lava splash and Pele's hair.

SE pond continues surrounded by high cliff 20 feet high but the activity as in the main lake is reversed in direction, with bombardment now against the south bank where a spatter heap had been built up. The partition between the two lakes continues as before to be a shallow channel left bare by the lowering. The SE pot was now more broken in, showed drip glaze on walls of coffee brown color and a small pot below glowed and could be heard fountaining. This was fully 25 feet down.

The SSE cone was glowing more than yesterday, flamed brightly at night and rumbled somewhat. The S cone had broken away on the southeast side, making an overhang and producing a tumble of debris mixed with fragments of the overturned pressure rim. There was revealed inside an inner smoking cracked shell where the rumble of the internal lava could be heard. Among the fragments from the collapsed cavity were many varieties of stalactite lumps showing high gloss and brilliant oxidation colors from yellow through many shades of brown and red to blacks and green, and some of these oxidation tints appeared to be imposed on previously solidified ordinary lava of the pahoehoe toe and spatter variety. Higher up the slope, near live solfataric vents, there were yellow sulphur incrustations. Specimens of these materials were collected.

At SW pond and W heap pond found latter a shallower pit than two days ago, with puffed up crusts in the bottom, a grotto over quiet liquid lava at the NW end and gas hissing from glowing cracks at edge of crust at SE end near the tube which appeared to lead toward the other pond. At the combined SW and W ponds the pit appeared enlarged, the partition between the ponds in the two halves of the pit persisted and the SW pond was quiet and heavily crusted. Not so with the W pond, however, which was covered with thin skins, bright lines and streaming currents toward the east, and on the east side fountains burst from under the wall with considerable violence at times. This eastward streaming took its rise at a channel 5 feet wide and 20 feet long in which lava rushed northeastward like a mill race from a source at the base of the cliff bounding the pit. The place where this spring welled up lay directly opposite the southeastern tube of the W heap pond which was only about 60 feet away and at a somewhat

higher level. The surface of the west heap pond lay only about 8 feet below the general level, whereas the ponds in the other pit were fully 16 feet down. A spell of sudden sinking in the W pond developed a central fountain, showed a bright rim over two feet deep and in the course of about two minutes the torrent stopped and the lava of the pond poured into the channel where the artesian spring was reduced to bubbling fountains. The lava in the channel went down some 4 feet. Then in the course of only five or six minutes the pond recovered, the eastward streaming was resumed and the well spring piled up its lava again in the channel to a height 4 or 5 feet above the level of the lake and the sluice-like rush of the foaming torrent was resumed. There was nothing to indicate that this ran over an inclined bed. It seemed rather to pile up within its narrow containing walls and so produce a foam that maintained a surface grade downward in the direction of the pond. As the pond filled up it tended to encroach on the stream and shorten it. The channel was merely a way built by lava solidifying to confine itself from the well spring as a source and in dimensions was almost the duplicate of the one seen two days ago leading in the opposite direction into the W heap pond from the tube at its SE corner. The SW pond showed no changes of level during the fluctuations of the W pond. Its only activity was a little bubbling at the southern margin of its crust.
In general -- the smoke was denser, the N lake was noisy and situation showed little change.

TAJ

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

JOURNAL

Day Sunday Date March 30, 1919.
Monday " 31, "

Mar. 30. Lakes reported lower.
Glow at night bright, southern and central flames bright over lakes.
No marked movement in floors.

Mar. 31.
2:30 p.m. SSE and S cones emitting very heavy smoke. SE pot dark but shows a small hole in bottom leading to a large fountaining chamber of brilliant orange glow perhaps 30 feet down. Dense smoke also from cracked area around E cone which shows a sulphur-stained circle of 20-foot radius on floor outside of cone SE side.
Examination of W heap pond shows same 10 feet deep, full of broken crusts with hissing glow cone, low in south central part of pond pit.
The W and SW ponds 25 feet down. Former streaming strongly east from stream pouring out from under bank SW corner (scar of higher stream of two days ago shows on a terrace above). SW pond streaming slowly south.
Crossed floor SE side SW pond. Floor much shattered.
Central arm of main lake has 40-foot walls like a canyon; streaming west. East pool of lake only 25-foot walls, large active curtain grotto NE. Glow and flame in floor south of west end of main lake, south of where a half of old central cone is preserved on the top edge of lake pit.
Went around SE pond on its south side. Found it 35 feet down, large arched tunnel at lava level leading out in direction of E cone, large fountain and spatter bank at SW corner of pond.
No blowing at summit of NE heap. N lake 25 feet down, slow streaming north, some fountaining at south side.
Shattered crusts and smoke from W heap pond to W pond, from W pond to main lake, from main lake to N lake; back from edge of N lake on its east side.
Slight subsidence of bench magma but mostly lake magma as yet.
Glow at night (March 31-April 1) over lakes, bright flame in center crack, flame at southern cones almost gone.

TAJ

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

PHOTOGRAPH RECORD

Hawaiian Volcano Observatory

Day Monday Date March 31, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
2:30 p	Gravel flats	to Halemaumau	1	W M	15x (orange)	f/22.5	2	C 4x5
	Bedd of road	to SE station	2	"	"	f/11	½	"
	W pond (25	looking north feet down)	3	"	"	f/16	1	"

TAJ

1919, Mar. 31



1



2

Jag

1919, Mar. 31



3

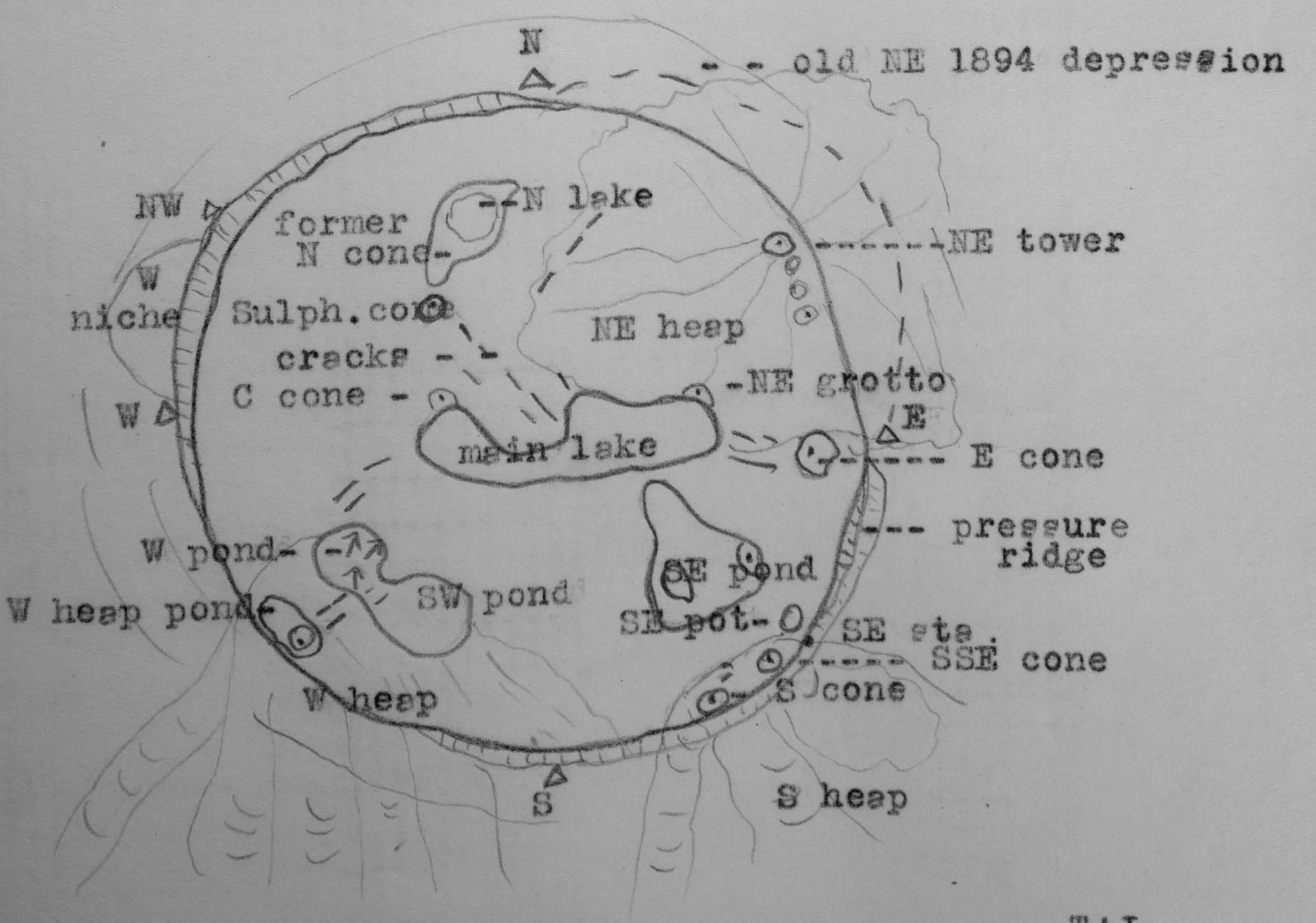
Fog

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date April 2, 1919.

4:30 p.m. East cone has broken in and an open funnel reveals boiling lava 8 feet down through an irregular orifice three to four feet in diameter. The lava bright orange color with many small bubbles on the surface, floating, not bubbling. Drip falling from the roof makes spots on the lava but this appears different from the bubbles. Streaming of surface in pot northwestward.
NE cone hissing and flaming again moderately through the cone adjacent to tower.
Main lake higher, 20 feet down at east end, streaming east, east end breaking in, smoking cracked ground between it and east cone.
North lake much higher and larger, 4 feet down north end, 15 feet southeast end and an upward bulge in the ground between the two parts, not wholly accounted for by the lake's breaking back into the high ground of the NE heap. Has this ground swollen? There is much appearance of swelling north side of main lake and everywhere there are hot cracks whitened with deposits. At the south end of N lake the breaking back extends now to the yellow sulphur heap and the lake is greatly enlarged. April 1 was hence the day of lowest level and final breaking back of the ponds to their maximum size.

Plan of pit April 2-3, 1919:-



TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date April 3, 1919.

3:30 p.m. Circuit of pit south and west.
Hissing heard south. West heap pond building a large spatter dome inside, summit flush with rim of pond depression. W and SW ponds higher, about 12 feet down. SW pond crusted. W pond crusted SW side, streaming against bank NE side.
N lake brimming and two immense domes built on W side; smaller ones around N side; cliffs on E and S sides about 7 to 10 feet high, made by the breaking back of the pond on that side into the rising ground of the NE heap.
NE tower hissing loudly from vents on its south side.
Main lake high (15 feet down) and more broken back into smoking ground north and east so that the pool is wider N-S, narrowing to the central pond channel, and longer in the direction of the E cone.
E cone choked in its main funnel but with open mouths on each side, bright with high pounding lava inside.
No changes noticed southeast but SE pond doubtless higher.

Night. At night the N lake brimming and all lakes bright.
Some glow southern cones.
The NE tower vent in the evening was ejecting umbrella splashes with loud metallic clang and gobbling explosion noise which could be heard at Observatory. During the night the vent built up a second tower beside the main one so that in the morning the profile was changed to a wide double peaked turret.
In the early morning hours the explosions from a vent on NW slope of heap and flows moving there.

TAJ

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date April 3, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit.						
3:30p	NW	Edge of W heap pond		0 44	0			
		W pond		0 00				
		SSE cone		-0 48				
		NE rim main lake		-0 26		947	7.2 above	
		(lake 15 feet down)						
		N end N lake		1 48				
		NE tower		-1 46		1017	31.3	"
		Central cone		-0 32				
		From N end to S end of N lake (greatly lengthened)	24 30					
		Lake 24 feet above bench mark.						TAJ
		NE tower 63 feet above bench mark.						

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date April 4, 1919.

2:30 p.m. The south cone was more tumbled; hissing; shows some flame at night. The other SE vents fairly quiet.
The SE pond surrounded by an inner circular bench 10 feet down, the pond surface 3 feet lower; streaming north; fountain northeast side.
Main lake similarly about 13 feet down; streaming against north bank and shows inner bench of recent higher level.
E cone two glow chambers east and west, crusted funnel in middle, spatter on rocks of fresh black glass. Dense smoke west of it.
NE tower has new tower equally high with main tower beside the latter and south of it, both about 15 feet high. Fresh galssy flows about its base. New short flow NNE from summit. Very long flow, smooth glassy pahoehoe, starting from the cone vent NW of NE tower and below it near the top of the heap. This was seen as the second and lower eruption last night. This flow poured in a long ribbon all the way to beneath the N cones of November 1918, (new N station), passing to the north of N lake.
N lake brimming high; splashing over at N end, but with much Pele's hair on the new large domes of the west bank. Deep cracks with glow below to the northeast of lake.
No change NW wall valley. W heap pond unchanged, large "doughnut" cone. W pond 10 feet down, streaming east, closed grotto east end with open pot on top. Stream mark across isthmus from SW pond to W pond, as though a flood had poured across last night.
SW pond crusted.

TAJ

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date April 4, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
2:30 p	Summit	NE heap to N lake and long new flow	1	W P	8x	f/16	1	5x7
		Looking NE at NE tower new cone and flow foreground	2	"	"	"	1	"
		N cone station (new N) to N lake	3	"	"	"	1	"
		Looking SE, dome in W heap pond	4	"	"	"	1	"
		Curtained grotto east corner W pond	5	"	"	"	1	"

TAJ



1



3

Fog

1919, April



4



5

Jag

1919, Apr



2

JOURNAL

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

Day Saturday Date April 5, 1919.
Sunday " 6, "

April 5.
Early morning. Pit quiet and unchanged.
Rise during morning so that lakes reached the inner benches.

Afternoon. N lake fountains visible.

9:00 p.m. Flow pouring north from a standing spring in north part of NE heap. N lake very high and some flow north of it. W pond splashing high from its east grotto.
No glow NE tower. E cone splashing. S cone flaming. Lakes bright.

April 6.
10:30 a.m. From H.V.O.
Pit quiet. Fresh flow across NNE border N lake. W pond spatter dome in view in profile of W heap. Smoke as a whole not dense, but dense locally E and S cones. Lava visible in N lake and fairly high. New heap at lower part of N flank on NE heap (vent of last night).

6:00 p.m. Lava of N lake very high. W pond also fountaining above margin.

8:15 p.m. The newer S spire of the NE tower burst open on the east side and threw out jets with muffled explosions, heard at H.V.O.
Two glowing flows NE of N lake.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date April 7, 1919.

3:30 to 4:30 p.m. SE and S cones about the same. SSE cone open pot. SE pot has hissing spiracle on wall inside.
Increased opening of cracks SE floor.
SE pond about the same, inner circular pool annular bench, bench 10 feet down, pool 4 feet more.
Cone built on bench NE side.
E cone same.
Main lake 15 feet down, crusted, border fountains, streaming west in channel to central pool.
NE tower added to, is irregular south and has new puddle of glassy lava. Live vent spouting and flowing and lifting lid on flank of NE heap northwest. Stream two feet wide and several hundred feet long pouring sluggishly from this vent northward.
Greatest change is extent of flows from NE heap to the northwest which now are piling up and extend along wall valley nearly to NW station, fill entire space between N station and N lake, and this width is maintained all the way up flank of heap and fresh toes now making out west of tower.
N lake growing circular again and building up on north and west banks. These banks three feet high; south and east banks 8 feet high. Stagnant crust, marginal fountains.
West ponds little changed, 12 feet down; fountain flings W pond; cone W heap pond; SW pond crusted.
No fresh flows southwest.

6:00 p.m.± N lake high.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date April 8, 1919.

4 to 5 p.m. This is a stagnant spell with liquid risings and fallings, but no marked floor movement.
Circuit of pit south and west.
No changes at southern cones.
W heap cone hissing and glowing. W pond has filagree cones under its east cliff and an inner terrace 10 feet down with lake 3 feet lower. SW pond crust higher than W pond; no activity.
Crossed floor north of the western ponds. Bright glow and flame hole two feet across north of central pool. Smoking area farther west seems to mark a tunnel line leading to west pools. Main lake now quite long, a canyon 20 feet deep and 60 feet wide on the west, and a much larger pool 250 by 125 on the east about 12 feet deep. East pool crusted, inflated and with border fountains but not visibly streaming. Whole lake 450 feet long at least.
N lake large and round, no change in height.
NE tower hissing in occasional puffs, the flow vents of yesterday quiet.
E cone very bright and noisy.
Large fountain against northwest bank of E pool of main lake continuous. Crack from narrows of lake to N lake an open crevasse but not specially hot or fuming. Dense smoke from between E cone and main lake and around S cones. Main lake continues to break back at east end and the cove there has a terrace of crust.

NOTE. The lifting of lids at the cone vents at sources of flows, making two cracks open on each side of an apex, is much like the sector movement which opened Mokuaweoweo and Haleakala. The corner of lifted lid makes eventual central shaft when a fountain forms.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date April 9, 1919.
Thursday " 10, "

H.V.O.

April 9. Pit quiet and smoky in morning.
Fume thinner in afternoon.
About 6 p.m. N lake brimming and NE cove of main lake throwing up visible spray.
At 8 p.m. fountains N and W ponds visible.
The flows of northwest slope of NE heap between the N lake and N station are swelling into numerous "scholl-endomes".

April 10.
5:30+p.m.+ The most marked change at Halemaumau is the total cessation of blowing in NE heap. The tower and other vents quiet and the northwest vents of heap cold.
Marked rising and building in the lakes, however.
E cone puffing and glowing.
Main lake 10 feet down, border grottoes active.
N lake bombarding banks south, west and north, especially north where high flings and spatter are building the bank.

8:00 p.m.± From H.V.O. fountains visible in SE, main, W and N lakes; latter very high.

TAJ

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Thursday Date April 10, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
		Experiment. Wollensak.						
		Focal plane shutter, two inch opening.						
5:30 p		High fountain N lake, N end, 40 feet away	1			f/3.8	(tension (6 clicks	
		Ditto	2			"	9 clicks	
		Irregular fountain N lake, N end, 40 feet	3			"	12 "	
		Fountain nearer 25 feet away	4			"	12 "	
		Ditto (two exposures)	5			"	9 "	
							TAJ	
		Development 30 minutes, strong developer (double strength).						
		Too near subject for this shutter.						

1915, Apr. 10



1



2

Jag

1919, Apr. 10



3



4

Fog

1919, Apr. 10



5

Jay

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date April 11, 1919.

Pit at night moderately bright.

11:45 a.m. Same general conditions. Same hissing at S cones. Main lake streaming west; occasional large central fountains; grottoes northwest, north and southeast; some bubble fountaining during sinking spells; 10 feet down, terrace of last night's high level at east end. Large new hot crack near south end extending from northwest corner of E pool of main lake to N lake on east side of sulphur dome:-- that is, farther east than the Sulphur Dome crack and parallel to it. Central pool crusted much of the time.

Much hot cracking and white staining of crack walls in floor. Noted this east of N lake and north of main lake. The ground snapping in many places, noted northeast of main lake and in the flows swelling into tumuli north of N lake.

N lake brimming and the north border fountains of yesterday have built domes over themselves 5 feet high northwest and north. Fountain splashing at west bank and a terrace at south end with some outflow-fountaining from under it. Fume moderately thin. Occasional central fountains in north lake. Much ballooning of skin in both lakes.

A place which was unique in the quality of its incandescence was a small patch about 2 feet in diameter on the north side of and adjacent to one of the new glassy puddles on top of the NE heap and a few feet northeast of the tower. This was cherry red, a small area of cracked fragments, with some glowing cracks below, without solfataric staining, hissing or any other noise or any evidence of opening beneath. It appeared like a bed of fiery charcoal. The fragments were 2 to 3 inches in diameter and the material ordinary broken pahoehoe. Adjacent to it on the south was the edge of the toes of the bronzy glass flow puddle, on the other side was ordinary pahoehoe in which this glowing patch occurred as a small flat bed of coals. One could stand an inch away from the patch on hot but dark lava; across the boundary within the patch all was glowing as though oxidation were quietly in progress. There was no smell a foot away from the live cracks and apparently no flame.

TAJ

PHOTOGRAPH RECORD

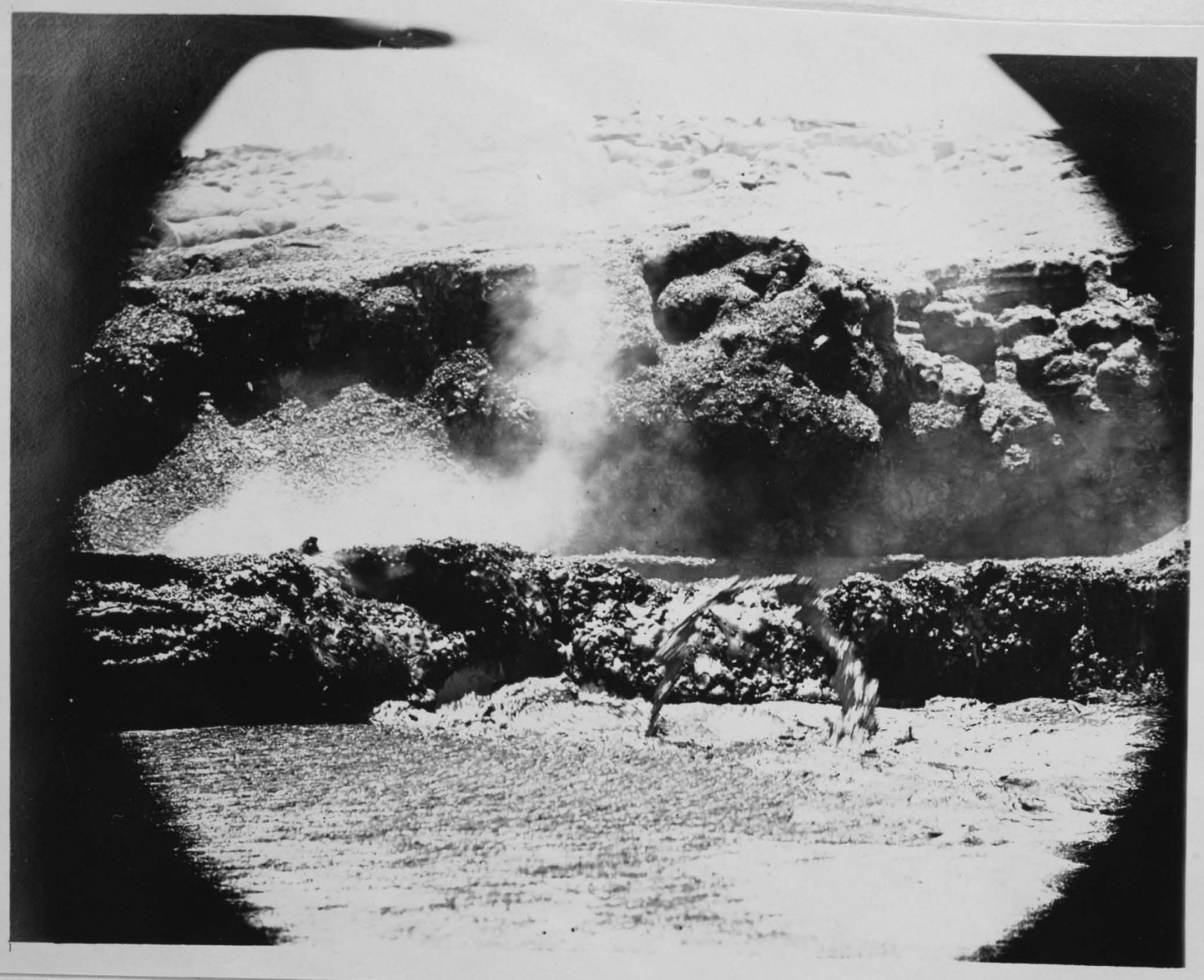
U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date April 11, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
		Experiment. Wollensak.						
		Focal plane shutter, two inch slot.						
11:45 a.m.		SE fountain main lake 90 feet away	1			f/7	12 clicks	
		N fountain main lake 100 feet away	2		F	f/5	12 "	
		Central fountain main lake, 60 feet away	3		"	"	12 "	
		Central balloon main lake, 60 feet away	4		"	"	12 "	
		NW fountain and central pool, 300 feet	6		"	"	12 "	

Development of these plates with double strength Eastman powders and one hour produces developer fogging. No. 1 overdeveloped, No. 3 shows the fountain and speed nearly quick enough. Much greater speed possible, however, on these plates.

TAJ

1919, Apr. 11



1



2

Fog

1919, Apr. 11



3



4

Jag

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date April 12, 1919.

Lakes moderately high in morning in view from H. V. O. Fume much thinner east and south. Large spatter domes in a ring around the N lake. Spatter dome at W pond larger. Puddle flow from E cone in morning.

8 p.m. All lakes high and spurting, even SW lake. E cone bright. N lake overflows to northwest. No fire discernible at S cones or NE heap.

TAJ

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

JOURNAL

Day Sunday Date April 13, 1919.

Morning. Strong movement of mass elevation in progress revealed by measurements this morning. Recent N lake overflows caused by the tipping of the cup of the lake northwestward owing to this rise of bench magma which centers somewhere to the south of the middle of the pit. Reports indicate that rocks were falling from the southeast pressure ridge last night.

5 to 7 p.m. SE station tipped up at higher angle, pressure ridge 25 feet high. Wall crack between SSE and S cones flaming in three places and hissing. SE pot is wide open chasm without fire. E cone has a puddle flow around it, widest on north side, which came out yesterday morning. Cone has formed a new spatter heap on its east side through the cracks of which the lava within is seen boiling and there is much flaming and rumbling. SE pond region greatly lifted. NE tower hissing and glowing through cracks which extend up its western face.
Main lake 6 feet down; streaming westward; and during the two hours sank about three feet. Fountaining vigorous. Heavy skins ballooning and flaming. Lake lower than last night relative to its margins, which latter have lifted. This shown by terrace level at east end, high scarp between lake and SE pond, and broad flaming crack parallel to edge of lake a few feet back from north verge. Much gaping of cracks and incandescent bench magma shown through them in region between main lake and north lake.
N lake within a foot of its north and northwest margins and fresh heavy flows cover the region northwest of it having poured over the lip of the lake. Flaming closed grotto domes around the lake; streaming northward; much cracking and foundering of heavy crusts. South and southeast margins of the lake lifted and 10 feet above liquid.
Bright glow seen above W and SW ponds.
Later in the evening lakes high and very bright fountains seen in vicinity of E cove of main lake and at N lake.

TAJ

JOURNAL

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

Day Monday Date April 14, 1919.
Tuesday " 15, "

April 14. Lakes high most of the time and strong continued upward swelling. Fume distinctly thinner.

6 to 7 p.m. Rocks falling from pressure ridge.. SE station concrete platform has completely fallen and outer face of ridge nearly vertical in places. Flaming and blowing wall crack south as before. New dome of E cone has yawning crack in its flank leading to dripping interior and entire cone has been uplifted with the rising bench magma. Steep dome slope from here up to region of SE pond. Partition between SE pond and main lake appears completely fallen away leaving an open canyon extending from the south side of the E pool. Noise of rising bench magma continuous and occasional jolts felt. The noise a series of snapping, creaking and crunching sounds with now and then tumble heard of blocks falling in crevasses.
Streaming in main lake mostly northward to bombardment of north bank.
Gas pressure continues in NE tower.
Later in evening lakes very bright on fume cloud above making marked reddish glare; glow points visible from a distance at E cone and N lake. The banch magma elsewhere appears to be rising faster than the liquid. The cliffs around the main lake are from 15 to 25 feet high.

April 15. Floor higher and notably so southwest as well as in center and around eastern lakes.

Evening. From H.V.O. Lakes bright. Fountain of east end of main lake visible above verge. E cone bright glow. Dim glow on NE heap.

TAJ

192

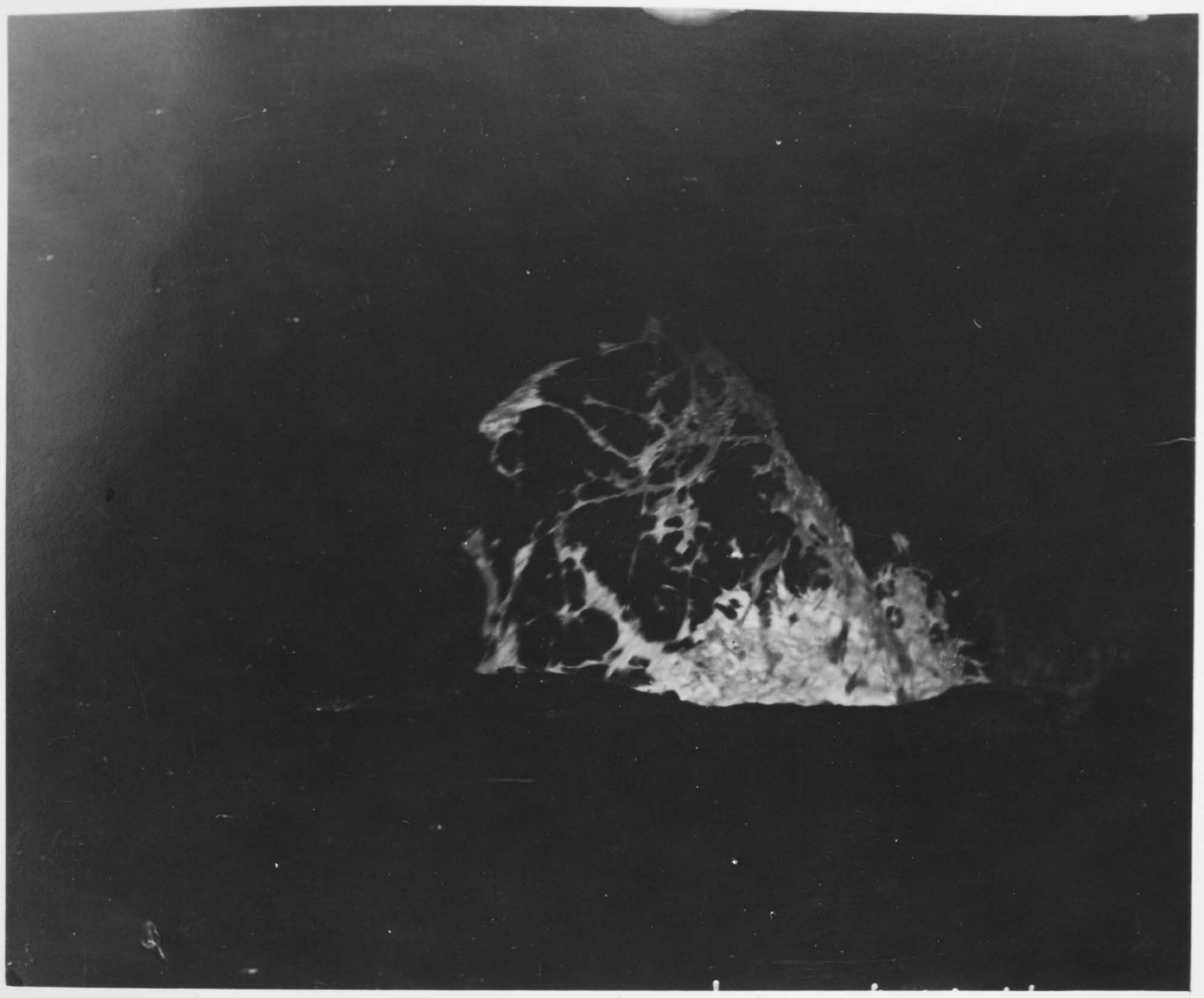
PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date April 14, 1919.

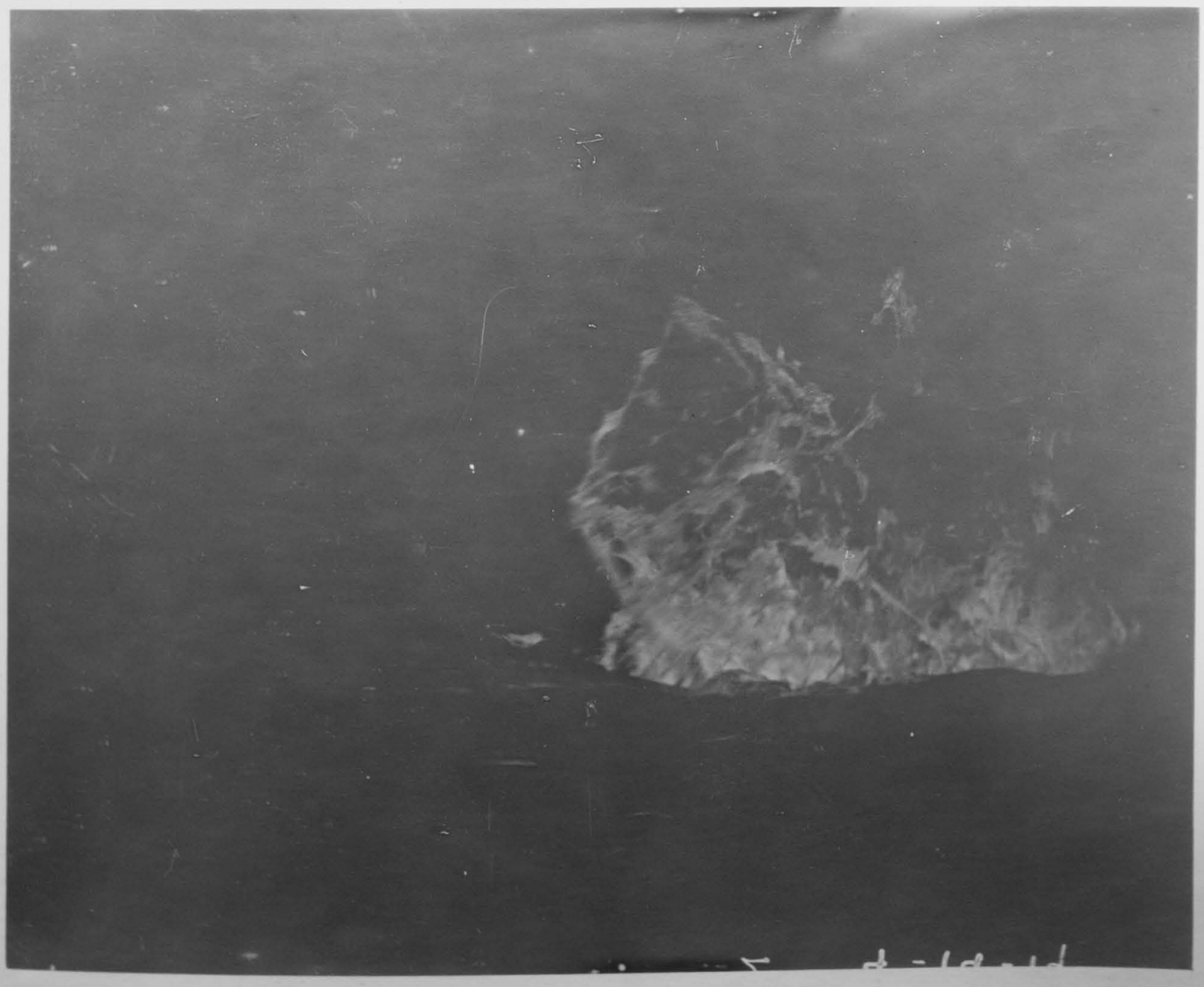
t	sta	subject	no	pl	scr	stop	ex	cam
		Evening test Wollensak camera with F.P. shutter having slot reduced to 1¼ inch. Maximum tension.						
6-7 p		E bank main lake to fountain flings of N grotto	1	W M		f/3.8		
		do to do	2	"		"		
		No. 2 fumy, No. 1 nearly clear.						
		Speed probably about 1/75 sec. Plates developed 50 minutes Eastman powder ordinary tank strength. Underdeveloped -- should be double strength.						

TAJ

1919, Apr. 14



1



2

Log

JOURNAL

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

Day Wednesday Date April 16, 1919.

11 a.m. Strong swelling continues. Rocks sliding on the pressure ridge. Floor of pit now a distinctly arched dome with the center about the region of the central pool. The swelling has arched up the new flows of the NE heap and the marginal upward bend of the renewed tumescence extends in from the north end of the E pressure ridge to and through the E cone, lifting the latter on the ridge so formed. All the ground is high from the E cone to the SE pond and beyond, while the fall-off is sharp along the line from the north end of the E pressure ridge to the E cone. From here northward the edge of the lift passes under the center of the NE heap, making fractures in the summit cones and lifting all the western flows of the heap almost to horizontality. Following the margin of the uplift around to the north, the lift has pinched the new flows between the N lake and the N cones of November so as to mash back the north rim of Halemaumau there and tip the surface northward as far back as the bench mark platform.. This new pressure has broken open the cavern under the November cones and within were found grapevine stalactites with stalagmites below, the latter in this case unquestionably due to lava drip. The longest stalactite found was twenty-one inches long, a slender worm exactly like those of Thurston's Tube.
The NW wall of Halemaumau continues high.
The SW margin of the old pit is again revealing itself, as the upthrusting cylinder of bench magma here breaks across the new southwest overflows, and extends the pressure ridge from the vicinity of the old SW station in the direction of the W station. The entire pit outline is now marked by either actual cliff or pressure ridge except in the region immediately north of the E cone where it is marked only by cracks in the NE heap. The center of the uplift forms craggy cliffs on the south side of the central pool and these are about on a level with the summit of the NE tower, probably 60 feet above the N bench mark.
S wall crack flaming and hissing and yawning open at the cones. Another chasm extending straight south to this crack from the SE pond.
SE pond quiet and crusted, 10 feet below the rim southeast side and extended continuously as a canyon into the main lake where at the junction of the two the cliffs are 30 feet high.
Main lake streaming eastward, building a spatter dome at its east end where the liquid is 10 feet down in contrast to the central region where the cliff over the lake is 30 feet high as mentioned above. All of this is accounted for by the central rising.
NE tower vents hissing and glowing.
E cone an open pot splashing and building a dome 6 feet high on the south side and double that height on the north side owing to the uplift.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date April 16, 1919.

N lake 6 feet down on the north side, 15 feet down on the south side, very quiet and crusted, with some activity in the northern grottoes which are curtained.
The whole cup of the lake has been upheaved bodily and tilted northwestward. There are smoking chasms between the north lake and the main lake.
The W heap pond has obliterated its rim except a small remnant north, the cone is small and splashing over and forms the source of a flow which at noon was trickling southwestward and making toes in a pooled area 50 feet from the cone but inside the pressure ridge limits. It is just outside of this that the new pressure ridge is asserting itself by crunching up the recent overflow lava.
W and SW ponds both high and building spatter heaps, the former on its north and southwest sides, the latter at its south end. Cliff margins of these ponds only 4 or 5 feet high. Partition between the ponds wide and ponds somewhat smaller than before. Driblet spiracles forming above cracks in the floor in the wall crack region southwest of the ponds.

Note. The displacement of a pond cup by tipping it up on the flank of a dome of tumescence, so as to cause it to spill over in the direction of the tipping, is an added argument in proof of the shallowness of the lakes and the superficial character of their cups. The N lake strikingly illustrates this at present and its ring rampart can be seen by mere inspection to be tipped northward, the spatter domes of the south side standing higher than those of the north side in spite of the fact that the latter are bigger. The overflow of the northwest bank was contemporaneous with the tipping and the higher cliff of the southeast bank is proof of a tilted basin or saucer.

TAJ

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PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date April 16, 1919.

t	sta	subject	no	xx	xx	stop	ex	cam
		Cloudy.						
11 a	100 ft.	E dome main lake fountain	1	14 clicks		f/3.8	1¼ sec	Woll.
	"	" " "	2	"	"	f/5.6	"	"
	"	" " "	3	"	"	f/8	"	"
	60 ft.	S dome SW pond	4	"	"	f/16	"	"

TAJ

1919, Apr. 16



1



2

1919, Apr. 16



3



4

Fog

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date April 17, 1919.

Last night at midnight a strong flow seen from H.V.O. pouring eastward along the line of trail. This appeared as a gleaming silvery ribbon east of Halemaumau this morning and between 7 and 9 a.m. the front made progress from the region of the lower trail monument towards the region of the front of the first overflow of February 1918.

10:45 a.m. On reaching the pit the source was found to be a vertical chasm in the pressure ridge adjacent to and on the east side of the broken S cone and the lips of the chasm were plastered with spatter and Pele's hair. Fifteen feet above the ground an open window 3 feet in diameter in the face of the curtaining which elsewhere covered the rent revealed a lava chute falling rapidly and continuously, the window dripping with the liquid melt. The flow below was smooth glassy fine-grained and silvery just as in the former case (March 11) where the feeding source was a pressure rim cascade. The pool at the foot of the cascade was covered with a thick shell and here the entire flow could be crossed in a distance of about 100 yards. The liquid was pouring rapidly through tubes below to the many fronts which were of the smooth snaky toe variety. The entire flow was of this material and spread distributing its arms widely

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date April 17, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
10:45a	NW	W	0	+0 22	0			50 in
		Cone E end W pond pit (profile of floor)	51 20	-2 15	0			
		Cone N side main lake (profile of floor)	72 52	-2 16	0	800 ca	31.68	above
		S end of N lake pit	74 53	-2 2	0			
		Summit NE tower	94 18	-1 34	0	1017	27.9	above
		Base dome N end N lake	103 20	-0 5	0			
		Base wall under N bench mark	142 10	+4 12	0			
		N bench mark	142 10	+1 24	0			
		N cone station	133 14	+0 38	0			

Main Lake 30 feet down.
Floor over lake 64 feet above mark
Lake 34 feet above mark
NE tower 60 feet above mark.
North B.M. platform tilted N 8°34'

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date April 17, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
10:45a	Gravel	flats to crater	1	W P	8x	f/22	½	5x7
		Cascading chasm S cone	2	"	"	f/11	"	"
	W sta.	N lake dome } panorama	3	"	"	"	"	"
	"	NW wall }	4	"	"	"	"	"
	NW	N lake } panorama	5	"	"	"	"	"
	"	W pond pit }	6	"	"	"	"	"
	"	W niche (W station tilted?)	7	"	"	"	"	"
	Near view looking SE, sulphur dome NE end N lake (lake 15 feet down)		8	"	"	"	"	"
		Snaky pahoehoe and NE tower looking SSE	9	"	"	"	"	"
	From	SW cone of NE heap to E cone and distant new flow	10	"	"	"	"	"
								TAJ





Jag

1919, Apr. 1



3



4

Jag

1919, Apr. 17



5



6

Fog

1919, April



7



8

Jag

1919, Apr. 17



9



10

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date April 18, 1919.

Last night the extreme east toe of the flow bright. The fountains came into view at E cove of main lake and in N lake, otherwise glow above lakes. Flow reached same limit as February 1918 flow when it stopped.

Today no great activity. Fume thin. Swelling continues, especially NW floor rising so as to cut off view of W niche from H. V. O. The source region of the S cone flow not visible from H. V. O., behind pressure rim and uplifted floor. The entire floor dome now cuts off view of S rim of Halemaumau from SE to W station; latter still in view.
Domes of N lake more broken away northwest; two domes remain north.
Fountains in night seen occasionally at E cove and in N lake, the latter a continuous glow on one occasion. E cone continues to glow. Fume moderate. Rainy.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date April 19, 1919.

6 p.m. SE long flow firm glistening driblet lava still glowing in some cracks. S wall crack flaming and hissing. E cone flaming on top and splashing within.
Main lake about the same in height, 15 to 20-foot walls, but greatly enlarged in N-S direction on east side of E pool by collapse of NE grotto banks. Streaming out from S arm (former SE pond) and usual grotto fountaining.
N lake region exhibits remarkable extension of the swelling to the north so as to make a slope from the lifted N lake all the way to the postal rift, past and involving the north corral region and the north driblet cones of 1894. The N lake is itself affected by this lift so as to make it greatly enlarged by collapse of its southeast and northwest sides. On the southeast side is a high wall frequently crumbling into the lake in spectacular avalanches. A tumbled crevasse extends through in the direction of the main lake. Near the north end of this crevasse a cavern under the bank of the N lake was emitting a rapid torrent into the lake from the direction of the western ponds. The lake was very tumultuous owing to the avalanches. The collapse of the northwest bank took the form not of a cliff, but of a broken subsided flat which had submerged itself beneath the lava of the lake so as to make a shelving beach effect. At the northeast end two of the spatter domes remained intact on the brink 15 feet above the lake level with the fountains splashing below. The streaming was mostly northward. Yawning cracks and chasms in the swollen floor all around the lake, many of them with hot air rising, indicated the progress of uplift of bench magma.
The NE tower was hot but quiet and the glow crack up its western face was cool enough to permit collection of driblet spiracle specimens.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Sunday Date April 20, 1919.

Forenoon or noon a fountain burst out at Postal Rift west of Pele's Kitchen and made a long flow on the floor of Kilauea crater to the northwest.

2:30 p.m. The front of this flow was a quarter of a mile from its source.

2:57 p.m. Irregular seismic disturbance.

7:00 p.m. The lakes distinctly higher, pronounced gas pressure, tumescence less, relieved by the great flow at the "Postal Crack". This flow in the afternoon seen pushing in great volume a quarter of a mile from its source with rippling cascades of glowing melt all over its surface.

Now found the source to be two small cones side by side built above a crack on the NW side of the hottest fuming "Postal Rift" cracks and from this source the stream poured steadily and with moderate rapidity for a quarter of a mile in the direction of Perret's Cone. The stream widened out in oak-leaf shape and appeared to be ordinary pahoehoe. The fountaining and spurting at the cones was moderate and commonplace.

The N lake walls were 10 to 20 feet high and more defined on the NW, no longer avalanching and the southwestern torrent had ceased and its cavern filled up. The wall around the SE side had straightened and adjusted itself and the chasm leading to the main lake was less conspicuous.

10:30 p.m. Later in the night the lakes were seen to be brimming full and an overflow fountain at the E end of the main lake sent a short flood to the E cone and beyond. Apparently this flow reached the steaming channel on the NE side of the old auto terminus for the next day a still glowing flow was found there.

TAJ

JOURNAL

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

Day Monday Date April 21, 1919.

6 p.m. At about this hour the E cone overflowed and sent a cascade eastward to the region of the steam cracks.

9 p.m. This flow had now crusted over and the circuit of the flow was made on the east, the front being stagnant and glowing.
Main lake about as before with bombardment E and NE, streaming largely westward and a new platform of overflow lava at the E end made by the flow of last night. This flow had passed the E cone on its N side and was covered with the new E cone flow of tonight. Lake 10 to 20 feet down.
A pint bottle of "White Rock" aerated water was thrown into a bright glow line where the streaming was westward and in a few minutes developed an enormous central fountain which played for several minutes and then slowly migrated to the W wall and went out of action.
The N lake about as before building new curtained grottoes at its NE end and showing a 3-foot glow edge from temporary subsidence. Many cracks in different parts of the floor showing incandescence in the bench magma beneath.
Postal Crack flow still progressing at its front which by the next day extended half the distance from the center of Halemaumau to Perret's Cone and had sent two forks to the west in the direction of Uwekahuna. This much the longest flow of the entire 1918-19 series. Fifty per cent longer than the SE flows.

NOTE. This water bottle test dependent probably for its effectiveness on the inflated condition of lava when the upper viscous layer is just ready to rend.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date April 22, 1919.

5:30 p.m. Eastern flows and E cone unchanged. S cone region hissing.
Main lake same as to level, with sinking spells at intervals. First sinking spell showed a 4-foot glow rim, large central fountain in SE part of lake, streaming mostly westward and northward. Sinking spells at intervals of 20 to 40 minutes, quick recovery in 10 minutes more or less, cracking, foundering and drift to N bank bombardment. Very intense explosive outbursts against wall and from under crusts at beginning of subsidences; outbursts began N, extended to NE and E. N lake brimming full and quiet mostly.
Small amount of rising in bench magma, mostly stagnant.
Postal Crack flow source building small cone. At noon strong fountaining there. Steady progress of fronts, two toward Uwekahuna, the main front shaped like a hand progressing toward Perret's Cone. Reached 0.6 mile from Halemaumau center.

Evening. Some fountains at E end main lake, at N lake and high jets from W pond.

The fingering front of Postal Rift flow bright with live toes all night.

TAJ

JOURNAL

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

Day Wednesday Date April 23, 1919.
Thursday " 24, "

April 23. Halemaumau quiet. Some caving of lake shores reported. Postal Rift flow 0.9 mile from Halemaumau, continues moving with glowing toes in evening at upper W fork and at main front.
Some fountains at N lake visible from H.V.O. at 7:30 p.m. After midnight a high level in N lake. Tumbling banks main lake reported in evening.

April 24.
11:00 a.m. Flow 1.2 miles from center of Halemaumau.

3:00 p.m. In early afternoon explored Postal Rift flow which is a moderately smooth pahoehoe now extending slightly beyond Perret's Cone and W of it. The flow is a ribbon 100 to 300 feet wide, rather uniform all the way from the source, spreading continuously by slow oozing toes which at 3 p.m. were alive on the W side of the frontal lobe. The front has moved 100 yards or more since this morning. The upper western lobes were not found alive. The source still a small cone 3 feet high with hissing and flaming cracks on top.

5 to 6 p.m. Found N lake brimming full and dribling over with two large high-flung fountains playing continuously by the spatter domes at N end. Rest of pond crusted. Ravine in direction of main lake has widened.
Main lake shows same sinking spells, 20 minute intervals more or less; northward streaming and bombardment N shore. Cliffs 10 to 30 feet high. During inflation periods large balloons of skin. At W end of central pool a narrow chasm opened clear down to pool level 3 to 5 feet wide extending through to W pond. Two similar chasms less wide and not open to lava level extending from N lake towards main lake.
Crossed floor N side main lake to W pond stepping across these chasms. Found W pond circular with walls 10 to 12 feet high on side of main lake and brimming level with its rim on W side, the cup tipped up just as at N lake. Farther W the W pond cone as before, hot and fuming. No fresh flows seen from the western ponds.
The extension westward and northward of the swelling in Halemaumau has reduced height of NW cliff slightly by lifting floor and the remnant of old rim now perhaps 2/5 of former circumference. At the two ends of the NW semicircle the cliff still shows but is more in the nature of a pressure rim (NNE and WSW). W station still more deformed with westward tilt.
No change south. No tumbling in pressure rim. S cone hissing. S sluice-way covered with a few snaky driblet trickles from above. Large masses of heavy bright colored oxidation stalactites in the chasm left by SE pot. E cone flaming.
Present situation a pulsating adjustment of column to escape of lava through Postal Rift.

TAJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date April 25, 1919.

2 to 3 p.m. Main lake walls slightly higher by about 3 feet. Three foot spatter margin below over liquid. Rising and falling pulsations continue. Streaming at first north and west, then north and east as an immense central fountain developed and expended itself at E bank.

Measurements indicated this morning rising bench magma SE, stationary elsewhere. Main lake cliffs 15 to 30 feet.

N lake has 4-foot walls NW; a block of that wall was seen to fall in. Cracking and foundering. Usual fountaining N end. Both lakes have ballooning skins.

Promontory SE of junction S arm and main lake has a 10-foot spatter margin, S arm a 3-foot terrace, rest of main lake a 3-foot margin. Top profile not changed. Apparently the higher spatter rim has fallen away in places other than SE.

Hissing at S, E and NE cones.

The E pressure rim now marked from E cone to NE tower by crunching up of NE heap flows, cracks and ridges.

Postal Rift flow continues to push N. Spread during night, mostly widening the front zone eastward. Flow at noon 1.4 mile from center of Halemaumau.

At night glow seen at E cone and at Postal cone.

TAJ

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date April 26, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Transit.						
11:40a	NW	W		+0 44				
		W pond (cone E) skyline		-3 0				
		N rim main lake "		-2 58		800	41.2	above
		S end N lake "		-2 45				
		NE tower		-1 16	(?)	1017	22.4	
		(NW station has lifted, NE tower stationary)						
		N end N lake		-0 8				

Tilt of N Bench Mark 8.5° N.
" " W station 4.5° SW.

TAJ

JOURNAL

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

Day Saturday Date April 26, 1919.
Sunday " 27, "

April 26.
11:40 a.m. Main lake lower; E end 15 feet high, N cliff 35 feet, S cliff 25 feet. Streaming west and out from S arm. Spatter rims of main lake much fallen away.

Hissing at S cone and E cone; none heard at NE cone.

N lake lower, 7-foot NW wall extended into spatter rim under high SE wall. Rampart wall at NE end 12 feet high and broken away. Cavern open extending toward W ponds.

W and SW ponds have both overflowed since Thursday, short flows 200 to 300 feet westward and southwestward across pressure rim. Ponds now down. Flows probably Thursday night.

Fume denser but still thin.

Postal Rift flow continued pushing forward all day until it was nearly half-way from Perret's Cone to N wall of Kilauea. In evening flow arm toward Perret's Cone pushing actively east.

April 26-27 night, flow and source both glowing.

April 27-28 night, source glowing. Flow has stopped. No glow.

At Halemaumau glow over a S pot at wall crack and bright flare over lakes. The dome swelling, on NE side of the crevasse line from S arm to N lake, seems sinking more than SW side. NE side N lake caves in, no spatter domes left.

Incandescence at E cone and Postal cone.

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

Day Monday Date April 28, 1919.
Tuesday " 29, "

April 28. Fume slightly increased, floor stationary, some increased caving of lake banks. No activity at Postal Rift flow except glow and flame at source.

Noon. Visited end of S arm and SE wall crack region. Lakes very low, 25 to 40 feet down. S arm crusted with end pond oval and narrow channel leading to main lake. Big chasm narrowing southward extending from S arm toward S wall crack. Large crevasses all through this region. Found small fountaining pond at S cone locality with black rim, 10 feet across and 15 feet down, and lava could be heard surging within. This is the well which makes a glow at night.

E cone flaming and rumbling vigorously through vents on W side. Some swelling and cracking in SE flow.

Central pool crusted, streaming in E pool eastward, fountaining activity moderate. Central fountain opposite tunnel leading to E cone.

N lake covered with very heavy crust, fountaining only at N corner. Depression 15 feet on the N and 30 feet on the S. Spatter domes all fallen in from NE rim.

Noises heard in bench magma indicating renewed movement and appearance of swollen floor from the NE looks as though NE sector were subsiding somewhat. Some rocks sliding from pressure rim and E cone.

Evening. Lakes rose to where fountains showed above banks of both main and N lakes. E cone flared brightly and source of Postal Rift flow showed glow, very bright after midnight. No glow in front of Postal Rift flow as seen from a distance.

April 29. No change in elevation and no activity above lake rims observed during day. At nightfall glow in E cone and Postal Rift source, and incandescence seen once at E end of main lake.

7 p.m. Outburst of liquid lava in middle of frontal region of Postal Rift flow, making a standing spring and spreading lobes.

8:30 p.m. Two such springs feeding the revived front.

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SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date April 30, 1919.

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Brunton.						
4:20 p	NW	Peak over main lake (Lake 30 feet lower)		-3 5				
		NE tower		-1 45				
		Clinometer tilt N Bench Mark platform -- dip 9° 5' N 10° E						
		" W station "				4°35' WSW		
		Post of W station out of plumb				4°37' WSW (checks)		

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date April 30, 1919.

4:20 p.m. Fresh flow SE, of silvery dense textured lava with snaky toes, pooled under a new sluiceway vent which has opened in the face of the pressure rim a few feet farther east than the former sluiceway. This lava has trickled around the upper trail monument. S wall-crack pond boiling and fuming.

E cone flaming and rumbling.

Main lake cliffs 12 to 30 feet high; streaming westward and northward; fountaining under N bank.

N lake 6-foot cliff on the N, 20-foot cliff on the S; streaming northward, bombardment along straight NW bank in seven niche grottoes in a row. Two other fountaining grottoes at SE bank. N lake now diamond shaped with long axis NNE-SSW. NE wall of this lake has slumped down along a series of vertical breaks so as to reach the pond edge without cliff and with surface inclined about 30°. The S ravine leading to main lake enlarged and has pulpit pinnacle at entrance.

Cone at Postal Rift larger and hissing like a freight engine. The Postal flow in its frontal pool midway between Perret's Cone and N wall of Kilauea is flowing from vents which open from time to time in the middle of the flow and keep the lava working out so as to enlarge the front in different directions. This trickling continuous last night and today and tonight.

W and SW ponds united as a large single pool at the end of the chasm leading from the main lake, and W of them the W heap pond is a pool 20 feet across with two spatter heaps and fountains level with the brink flinging up lava over a fresh voluminous flow which has flooded the outside slope away from Halemaumau during this day and is still glowing and crackling. This flow probably came from overflow of both the western ponds. The group of ponds now occupies a niche in the dome of uplift surrounded by a horseshoe wall progressively higher toward the center of the "pit" and open toward the SW. The W heap pond occupies the middle of the opening and the larger pond occupies the bow of the horseshoe.

The flow has swept in a broad sheet from this entire niche a half mile to the SW, extending much farther than any of the other southwestern flows. It appears to have progressed in a number of separate forkings and distributing arms and consists of heavy shell pahoehoe easily broken in and not at all of the habit of the southeastern recent flows. The longest stream has poured in the direction of the outcrop of the '68 cracks in the Kilauea cliff to a distance about equal to that of the southeastern and eastern flows half a mile or more from the center of Halemaumau. At the end the flow has pooled and widened on flatter ground. Two ages of flows were encountered, one slightly less hot, suggesting that flowing has been going on here for two days past.

The floor continues to rise slightly but no sounds of motion were perceived. The NE tower smoking from its W base with mildly sulphurous fume and whitened cracks as though roasting. No evident glow in daylight. Loosening of rocks and opening of fissures noted in W niche.

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

Day Thursday Date May 1, 1919.

SW overflows continue. Postal Rift flow continues making out at the front, spreading considerably in the direction of the northern part of the Uwekahuna wall and surrounding islands of old lava.

At night the lakes high and fountaining over their banks, bright flaring from SW pond, and both E and Postal Rift cones and front of Postal Rift flow glowing.

In evening very strong pulsations of rising and falling noticed and some falls from bank of main lake during sinking spells.

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date May 2, 1919.

3:30 to 6 p.m. S wall-crack pond sending up blue gas and small live holes flaming and spitting in SE stalactite chasm (former SE pot). E cone flaming and glowing as usual.

Main lake high, within 5 feet of E bank; streaming westward and northward and fountaining in curtained grottoes N and NE.

N lake heavily crusted and building spatter domes SE side and E. Lake within 2 feet of N brink; walls 15 to 20 feet high S. Inner margin 1 foot above lake surface and this overflowed during afternoon by strong cracking and foundering spells due to excess of inflation of the crust.

NE tower smoking more strongly at its W base and considerably stained.

Postal Rift cone 5 feet high and a broad dome hissing noisily through flaming gas driblet spiracles. The tunnel leading northward to front of flow shows a cracked ridge above it with small driblet cones at intervals on top of the ridge. This suggests cupolas in roof of Thurston's Tube.

The cavern formerly known as Pele's Reception Room, a few yards N of bench mark, which was overflowed in November now proves to be still open at the old orifices N and S. These are small vertical holes in the November flow with drip lava lining the sides and small drip heaps below on the floor of the cavern.

Western ponds show more fresh overflows with glowing fronts, some 200 feet down the SW outer slope, numerous lobes. W heap cone built higher and splashing inside. W pond brimming and fountaining. The chasm through to main lake somewhat choked.

4:30 p.m. E cone burst open on top and sent a double cascade down its N slope, one stream 6 feet wide and one 2 feet wide, uniting into a flow which poured 200 feet eastward and spread out. Flowing ceased quite suddenly about 5:30 p.m. Main lake showed high level all through this flowing, streaming from a bright line at edge of crust directly westward away from the E cone tunnel. Curtains at northern grottoes fallen away and activity there strong as well as at the S bank of central pool. Large central fountain seen at 5 p.m.

Grotto SE side N lake quiet at 5 p.m. Northward streaming and lake quiet.

When the flow from E cone ceased the remnant lava trickling down cascade and at head of flow developed stiff pastiness very rapidly and the flow was crossed here at the head just 10 minutes after the flowing ceased. It was very hot but firm and hard.

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

Day Saturday Date May 3, 1919.
Sunday " 4, "

May 3. Lakes high and brimming.

Weather calm, so that roaring from the Postal Crack flow source was heard at H.V.O. Postal flow increasingly active, widening in many places; seven streams counted, including one along highest W fork; cascade into broken region NE of source and several places along course. Toe of flow moving to W wall of Kilauea.

May 4. High lakes, swelling floors. Dense smoke from N side of E pool, elsewhere thin. Brilliant display at night on clouds.

Postal flow very vigorous; line of lights like those of a city from source to front. Roar of gas at source cone heard at H.V.O. and N lake almost continuously visible.

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

JOURNAL

Day Monday Date May 5, 1919.

Lakes continue high. Strong lift at maximum SW profile. W and N stations have also lifted more by measurement since April 27. Smoke dense in center of Halemaumau only.

Postal flow cascading on broken ground NE of source. This flow widening in many places and front against N part of Uwekahuna wall. Perret's Cone surrounded by tongues of flow, island of old lava remains W of it.

3 p.m. SE wall chasm hissing and glowing in one small hole. Swelling increased. Crest at S wall now 40 feet above trail level. S wall-crack pond an elongate chasm of wall crack about 50 feet long with crusted lava within 8 feet of the upper surface and hissing gas spiracles in the crust. Much fume and greatly broken ground.

S arm, E cone and main lake about as before. Streaming westward and northward. Dense smoke at summit cliff north of lake.

N lake crusted, SE spatter dome enlarged, two border fountains in action. Increase of slopes from central region to margins of the new Halemaumau dome especially conspicuous where old N station has been lifted more and a steep slope is developed E of it leading steeply down from the N lake upheaval to the fill of 1918 at the N end of the 1894 bench area. The effect of the renewed tumescence is intense also at the W niche where the old semicircular ledge is crushed and broken.

Postal Rift cone covered with eight or ten gnarled gas spiracles and hissing loudly. The cascade locality of this flow proves to be over the W wall of the horseshoe cliff enclosure N of Pele's Kitchen. This cliff on its E side shows similar cascades of 1894. The flow has poured over the wall in several places and pooled beneath in glistening pahoehoe which was pushing forward vigorously when visited. The live cascade was crusted over. The lava below the cascade was notably denser and more silvery than that above. This ancient horseshoe depression appears to be an old lake on the flank of an upheaval of some time prior to the '90's just as the N lake is on the flank of the present upheaval.

Found the W heap cone overflowing and an extensive fresh flow, still very hot, covering the southeastern side of the southwestern flow heap. Apparently these southwestern flows continue to spread unremittingly.

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date May 6, 1919.

Last night after midnight the Postal Rift cone burst open in a standing fountain and gave vent to a voluminous surface flow as before, similar in volume to the first flow. This fresh lava poured over the top of the older flows of the series, making new fronts mostly E and W, and during the day tending to fill the pulpit rock depression N of Pele's Kitchen. The pulpit rock by evening of today was surrounded with new lava and the spouting from the cone still continued at 7 p.m.

11 a.m. There was nothing new at the lakes except that they were slightly down at the moment and in the N lake an inner spatter margin 4 feet above the liquid and some high spatter building E and SE gave evidence of the high level of the previous night. The main lake was streaming swiftly northward and a central fountain in the E cove was the focus of local streaming to it from both E and W.

The measurements showed increased height of bench magma. On the N side of the E pool there was intense glowing and flaming in a curtained shaft up to the top of the cliff 20 feet above the lava and this N cliff on its summit near the central peak was smoking densely as though the rock were eating away in the direction of the N lake. The smoke at the W base of the NE tower had become slight.

The N lake was crusted but fountaining in four or five border grottoes.

The fume from the Postal Rift area was remarkably thin and some back-flowing from the cone there had invaded part of the area. This cone was a new structure about 5 feet high vomiting a steady stream northward which rose at the orifice 2 to 3 feet and swept away in a channel 5 feet wide, maintaining several standing waves. The melt appeared to be of low viscosity.

In addition to the floods spreading on the surface W, NW, N and NE from the cone source to distances from 100 to 600 feet and more, there was continued pushing of the lower end of the flow, chiefly eastward, so as to make a new extension on the E side of Perret's Cone now entirely surrounded.

All day long the lakes remained comparatively high and at 6 p.m. the fountains in the lakes were plainly visible from the Observatory.

8 p.m. There were three marked arms E, N and W of freshly glowing lava in the upper part of the Postal Rift flow and two glowing arms at the front of the flow E and W. The cone was still spouting.

The occurrence of strong flowing after intense swelling repeats what has been the rule this year.

TAJ

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PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date May 6, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
		Tessar lens						
11+ a.m.		Looking W to Postal Rift cone gushing (50 ft. away)	1	W P	8x	f/11	½	5x7
		Pele's Kitchen to N	2	"	"	"	"	"
		" " " Postal Rift	3	"	"	"	"	"
		" " " Halemaumau	4	"	"	"	"	"
		Looking W at lifted N rim	5	"	"	"	"	"
		NE heap to E cone	6	"	"	"	"	"
								TAJ

1919, May 6



1



2

Fog

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1919, May 6



3



4

Jag

1919, May 6



5



6

Log

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date May 7, 1919.

6 p.m. Circuit of pit by S and W.

Wall of SE chasm cracked and glowing. S wall chasm puffing and shows large flame from gas cone on surface of pond there and driblet flows down outer wall.

SW pond puffing and fountaining and at times makes bright glow. Overflows from W heap cone have not lengthened at the extreme front SW but short fresh flows still hot have overflowed the rim of Halemaumau close to old W station and other flows, pouring along the wall inside the pit, have overridden the S side of the W niche.

Viewed from the W station the N rim cones are almost completely cut off from view and nothing can be seen of the edge of the main lake, the N lake or of the NE tower. The W heap cone is at the top of a new lava heap and the high wall back of the SW pond has lifted more. The W station appears still more tilted.

The Postal Rift cone quiet but flaming. Fresh backflows from it have invaded much of Postal Rift region and stopped some of the smoke. All the upper part of Postal Rift flow glowing and main torrent of flow pouring from a low vent in the western arm so as to supply an elongate active flow parallel to the Uwekahuna wall south of Uwekahuna station. Glow at present has stopped in the Perret's Cone front.

N lake tending to become round again through building in of margin. Six to eight feet down on the N and 30-foot cliffs on the S. Activity in one or two NW grottoes and a central fountain at the W end of the pond with ballooning skins.

Climbed to crest of uplifted floor, reaching N verge of central pool. Found a broad chasm extending from the ravine S of the N lake to within 25 feet of the central pool. This chasm 10 feet wide and 40 feet deep with broken rock on its bottom which appears to be 15 feet above N lake. Cliffs around central pool appear 40 feet high and pool fountaining violently against base of its S wall. Heavy smoke from central peak N side of narrows between central pool and E pool.

Streaming in main lake strongly westward with pattern of bright lines and current pouring out from both E cove and S arm. NE grotto not fountaining but a very brilliant cracked and flaming surface high up the wall. Lake appears comparatively high, about 10 feet down at its E end.

E cone about as usual.

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date May 8, 1919.
Friday " 9, "

May 8. Lakes about the same. Rise of bench magma less. N lake building up margins.

The Postal Rift flow continues brilliant at night. It is moving E and W and reaches Uwekahuna wall S of Trig. Sta.;and the E branch forks around the broken ground E of pulpit rock depression and makes out into the sag W of Little Beggar and bends N.

The main line of Postal Rift flow, freezing from foot upward, and dark in Perret's Cone vicinity, forces outlet E and W like a cross. Three fountaining points above in medial line, apparently three cones including the source.

At 11 p.m. the source cone burst and made a short flow N. The line of cones over main tunnel below like the Thurston Tube cupolas.

May 9. Lakes continue high and occasionally fountaining over. Smoke at center and W distinctly denser, (but there was heavy rain last night).

Central and western fountains in N lake seen from Kilauea rim in afternoon.

Postal Rift flow continues to push. In the afternoon a stream seen in W upper arm, in evening two live areas at Perret's Cone fronts, and from 6 to 7 p.m. all upper part alive as well as the Perret's Cone front. Streams especially lively in medial zone, cascading E from broken ground, and at E front.

At night glow as usual, beacons at E and Postal cones, reflection over lakes and S wallcrack.

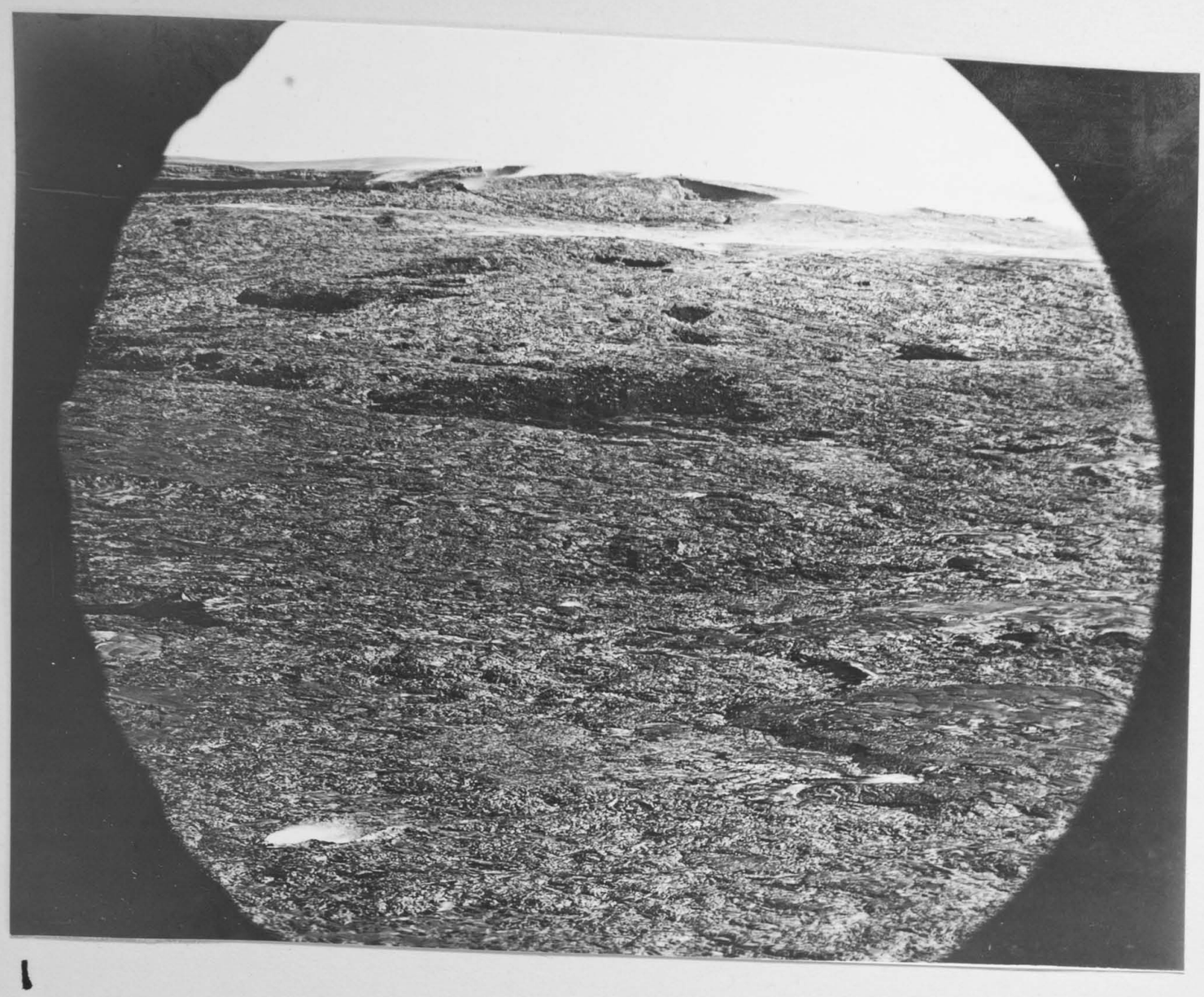
TAJ

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date May 9, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
		Wollensak Vitax lens.						
3 p.m.		From N corner Kilauea (opposite Military Camp) to Postal Rift flow	1		F filter	f/45	25 sec.	
		From under Uwekahuna signal (shelter of cliff) to Halemaumau	2		"	f/32	15 "	
								TAJ

1919, May



1



2

Dec

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

PHOTOGRAPH RECORD

Day Saturday Date May 10, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
9 a.m.		S wall-crack chasm and live driblet cones hissing and driblet cascade	1	W P	8x	f/11	½	5x7
	From E	edge looking NW detail of W pond	2	"	"	"	"	"
Pan.	From summit of uplift to E cove of main lake(SE)		3	"	"	"	"	"
	From summit of uplift to E cove main lake (NE)		4	"	"	"	"	"
		Chasm S end S arm	5	"	"	"	"	"

TAJ

1919, May 10



1

Taf

1919, May 10



2



5

Jag

1919, May



3



4

Jag

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

JOURNAL

Day Saturday Date May 10, 1919.
Sunday " 11, "

May 10.
9:00 a.m.

S wall crack hissing and flaming. SW lake has border fountains N and S. W cone hissing; no fresh overflows. Streaming S to grotto dome S corner of SW lake. Lake L-shaped from union of SW pond and W pond. Brimming on W side and 20-foot cliff on E side.

Climbed to summit of floor SW side junction of main lake and S arm. Walls of central pool fully 45 feet high. Streaming eastward and from S arm northward. E cove banks 5 feet high. Two chasms extending southward from both E and W sides of end of S arm, the eastern one 4 feet wide. Marginal terrace 5 feet above liquid in S arm.

N lake crusted surface, grottoes building at SW corner as well as on other sides.

E cone becoming quieter, showing yellow sulphur stain.

Postal Rift cone puffing and the flow progressing steadily; alive in many places on all three arms.

In evening and all night big cascade over broken ground W of Little Beggar. Source cone seen spouting late at night.

May 11.

Fume very dense on N side of main lake and some time this day the central peak at this place caved in. Bench magma continues stationary. Lakes high.

Postal Rift flow vigorous, with tendency for its glowing and moving portions to break out in many places very generally distributed through all three arms.

In evening the whole flow looked like a bed of hot coals and about midnight there was a spouting vent at the source cone, really a new cone a few feet NE of the original one.

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JOURNAL

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

Day Monday Date May 12, 1919

2:50 p.m. In making circuit of Kilauea crater NE and S to take photographs, Halemaumau appears as a smooth dome with big chasms in its crest. The curvature, however, is not simple but complicated by the series of slight outlying ridges which represent the gradual building in to the present center.

As seen from the E there is the inner lava column scarped on the S and slightly notched on the N. Next comes the faint ridge or terrace made by the Pele's Kitchen eminence on the N corresponding to the "New Lake" hump on the E (1885 margin). It is of interest to know whether there is not another ridge encircling the inner series representing 1868 somewhere in the northeastern half of the crater.

From the S trig station (3698) of Birdseye the afternoon light brings out some interesting revelations concerning the mechanism by which the large S bay of the crater was filled (1894?). The middle of this bay has a large smooth surfaced pool of crust evidently formed by cracking and foundering while the marginal portions are heavy bulbous pahoehoe which pushed away from this central pool. It will be remembered that there are two or more high driblet cones near the northern margin of this bay. Did these represent deep breaks, up which the lava welled as sources for the filling, just as the Postal Rift source recently welled up? Or did the whole accumulation follow surface tubes from Halemaumau? The former is possible as Halemaumau in 1894 was presumably lower than at present; on the other hand, the latter mechanism would be like the NE heap, and the gas concentration which produced it.

The Postal Rift flow furnishes illuminating evidence as to how the great fill of Kilauea crater has progressed. The mechanism with this flow is quite systematic: (1) an outbreak through a crack; (2) a very liquid long straight push; (3) lateral widening of the front; (4) a stagnation spell so that lava stiffens; (5) a revival at source overflowing former crust and so starting lateral arms near source; (6) reheating of the whole system and revival extended to other paths of least resistance. This process repeated in spasms. It is evident that according to the slope of the ground, the piling at the source, and the duration of the stagnant spells, we can get by this process different results, though doubtless the general grade is a function of the viscosity of this particular kind of lava mixed with these particular gases. It will be observed that the Postal Rift flow demonstrates the capacity of the lava to move both radially out straight, and concentrically by throwing out wings.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date May 12, 1919

4:30 p.m. Visited pit. Found E cone noisy with gas rushing through a new summit hole. The summit of this cone is very close to lake level and distinctly below the pressure ridge extending from it to the E cove.

Main lake showed no marked changes; streaming was N and E; level about as before. North verge of central pool showed no more breaking away toward the N lake but the ground all over the crest of the dome uplift was whitened and cracked and hot. The central peak had fallen into the lake.

N lake about the same as before.

Found the Postal Rift cone again covered with hissing gas spiracles and next to it along the course of the crust over its northeastern stream was a steep spatter cone, 4 feet high and similar to the northern 1894 cones. The W wall of the Pulpit Rock depression was now obliterated and the Pulpit Rock rose only a few feet above the fill surrounding it. The entire depression was covered with the new lava which had crossed it to the steep falling-off broken ground on the NE side and cascaded down over that ground in several places, making an extensive flow below and beyond in the direction of H.V.O. There were now several elongate arms of the flow trending northward from the western wing.

In the evening the flow seen to be generally alive and making toes in many places. Lakes fountaining high as before.

In general this is a period of high level, high gas pressure and an equilibrium satisfied by the steady outpouring of the Postal Rift flow.

NOTE. The aggregate flows now since 1918 are quite comparable to a Mauna Loa flow in volume.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date May 12, 1919.

t	sta	subject	no	pl	scr	stop	ex	cam
		Ross wide angle lens						
2:50p		Head of Kilauea Iki to Halemaumau	1	W P	F	f/32	15	5x7
		Prisoners' Camp trig sta. to Halemaumau (some wind)	2	"	"	"	"	"
		From SE primary sta. to Halemaumau (much wind)	3	"	"	"	"	"
							T	A J

1919, May



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1919, May



3

Fog

242 U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

JOURNAL

Hawaiian Volcano Observatory

Day Tuesday Date May 13, 1919

Lakes continue high. Fume N side main lake.
Postal Rift spouting at source of flow in the night and flow active.

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

Day Wednesday Date May 14, 1919

S and E cones the same. Main lake a little lower, 8 feet down at E end. Glow and smoke N wall. Postal Rift flow activity at many fronts W and N, the eastern arm stagnant.

10;00 a.m. to 12:30 p.m. S wall cones quiet. E cone diminishing noise and glow. Main lake streaming E and N. N lake with border activity about as usual. Increase hot cracks and smoke in high ground N of main lake. SW lake shows little change, no new overflows. No marked change in level in N or SW lakes, each lake 5 feet spatter banks on side away from center of Halemaumau and irregular high cliffs bounding the inner sides.

Explored Postal Rift flow. Crossed flow to cone source on very heavy, crusted lava, with crusts a foot or more thick. The two source cones partially drowned by this new lava and hissing and flaming as usual. Followed down W slope of this lava heap to the front which is now against the talus base of Uwekahuna cliff at the ash-section locality. Found swollen domes with the shark-skin and aa type of lava freshly oozed out in small quantities. Toes in motion at fronts NW and N. Found large dome in process of swelling up near NW front. Apparently the conditions favoring dome formation are (1) isolation of outlying lava pools connected with main flow by small ducts so that local viscosity increases, the margins congeal, but the pressure through the ducts finds relief by lifting; (2) a second condition favoring swelling is the increase of viscosity occasioned by a lull in source supply, followed by revival, increasing pressure through the ducts on the crusted and impeded lava which has thus viscidified; (3) similar effect is produced by revival on any one lobe or arm of a flow, which has had a chance to viscidify and stagnate through the temporary withdrawal of the activity from that lobe to some other lobe. In every case hitherto observed the swelling tendency is strongest at the lobes most distant from the source, though with dwindling activity, such as occurred in the NE heap, the dome making may spread inward toward the center. As to the cause of the pressure which forces inflow under a dome center, that appears to be threefold, weight of thickening crust areas, gas expansion in bubbles and direct hydrostatic effect due to slope from source to the site of doming. The front at the extreme N lobes near Perret's Cone has developed extensive doming and there are some large domes toward the W where the grade is steep and the frontal pools isolated.

Crossed flow about middle of its main course to the eastern lobe. Found middle hot but the subterranean channels appear to be small and distributed. Found the E arm below the large cascades quite stagnant, the lava there showing much variety of texture and some swollen domes.

JOURNAL

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

Day Wednesday Date May 14, 1919

In general at present the main lava column is stationary, the flow of liquid lava continues, and the NE sector of the Halemaumau bench magma preparing, as shown by the cracking and smoking, to break down between the N and main lakes.

Query. Is this breakdown directly related to the conversion of the under magma into pyromagma carried off by the Postal Rift flow and engendered by the release of pressure which the withdrawal of that great weight has occasioned?

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date May 15, 1919

Marked change in cessation of dense fuming N of main lake where the ground N of E pool has collapsed enlarging the NE cove. The fume at W corner of N lake also much diminished and at present, owing to the extension of the Postal Rift flow southward around the margins of the pooled area, the solfataric area of hot cracks has almost completely ceased fuming. This opens to view from the Observatory the region NW of Halemaumau.

In the evening the lakes were low and dull, the beacon light of the E cone dim and the Postal Rift source very dim. There were three bright glow points along the upper main course of the flow, but otherwise the upper and eastern parts were dark and the active glowing and flowing confined to W and N lobes.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date May 16,..1919

About 4 a.m. the Postal Rift source cone had burst into spouting activity and the cones there were still fountaining at 9 a.m.

It was now evident that the sector N of the main lake was sinking strongly, lakes remained low and the general bench magma surface had sunk about a foot.

6 p.m. S wall-crack vents quiet. E cone has one small flaming orifice on W side of its summit, and between there and E cove of main lake part of the pressure ridge has collapsed to a cup shaped hollow. Main lake 20 feet down at E end, walls 50 feet or more high S and W, N walls only 30 feet high and great enlargement of N side of E pool. The entire block of ground from there to the N lake chasm has rifted and subsided and the rifts are some of them two to three feet across and extend from the N end of the new cove westward in a curved line to join with the SW lake chasm. These new cracks cross nearly at right angles the N lake chasm.

N lake lower than before but still only 10 feet down on the N side. It is much enlarged by general collapse of its inner spatter margin, including the large domes at the E side. Very thick crusts cracking and foundering with tendency to build spatter heaps on some of the crusts. Pasty lava and dull grottoes with stalactites.

In the main lake the streaming was northward and eastward with a quiet stalactite grotto at E cove and some bombardment NE.

The Postal Rift cone puffing and flaming and much glowing cavernous space in the lava around it. Live toes moving at the ash-section locality base of Uwekahuna wall.

There was increase of white vapor in considerable amount from the area of November 1918 cones and flows near and W of the N bench mark.

During the night the lakes remained low and the Postal Rift flow continued active with pronounced outbreaks in the N medial portion and at the several fronts E of Perret's Cone.

T A J

SURVEY RECORD

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

Day Friday Date May 16, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Beginning of survey from rim of Kilauea.						
		Simplex transit.						
		From Birdseye W to						
		Birdseye SW (3704')	0					
		Toe SW flow	5 6	4 12	0			
		W sta. Hale.	23 29	3 6	0			
		Cliff summit SW lake	29 32	2 12	0			
		SW lake cone	26 18	2 46	0			
		SW limit N lake	33 0					
		NE " " "	38 11					
		N lake chasm (top)	34 13	2 12	0			
		Summit dome profile (over tip S sector)	35 8	2 0	0			
		Summit SE sector	36 36	2 4	0			
		" NE tower	42 39	2 40	0			
		N bench mark	37 30	3 50	0			
		Source cone P.R. flow	47 25	5 2	0			
		SW limit P.R. flow	- 2 6					
		NE " " "	89 37	4 33	0			
		NW " Nov.1918 flow	32 0	7 40	0			
		SW " " " "	4 58	6 10	0			
		Halemaumau hut (front ground)	52 12	3 22	0			
		Central floor SW above	3700-foot elevation		--	87 feet		
		" " NE "	"		"	67 "		
		Main lake "	"		"	37 "		

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date May 16, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
11:40a		From Birdseye W station (next S of Uwekahuna) to Halemaumau	1	W P	8x	f/22	1	5x7
		From ditto to P.R. flow (Panorama)	2	"	"	"	"	"
							T	A J

1919, May 1





2

Fog

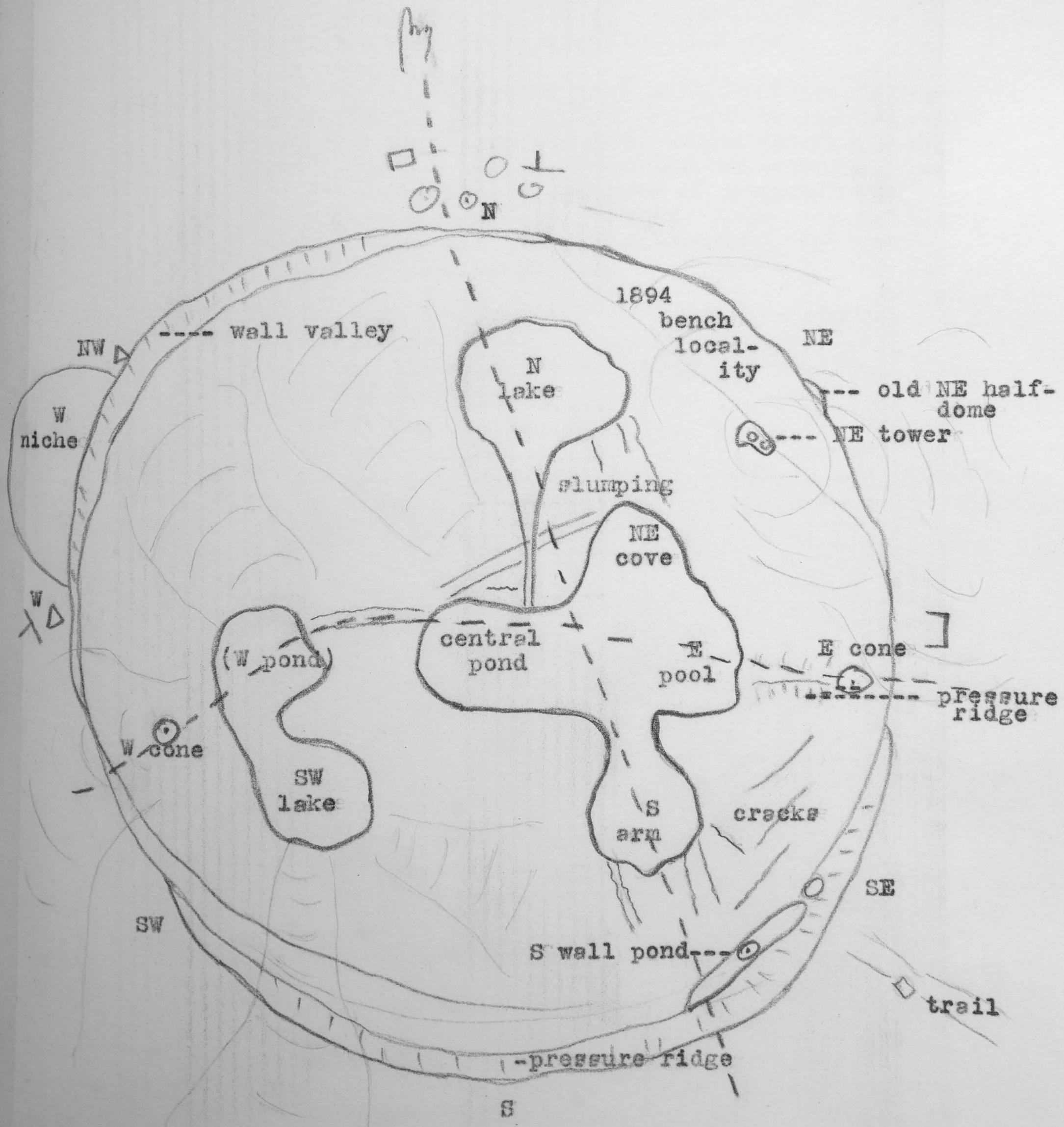
250

JOURNAL

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

Day Saturday Date May 17, 1919

Sketch map Halemaumau. (Dotted lines show the two main crack systems)



JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date May 17, 1919

Lobes of the Postal Rift flow E of Perret's Cone increased in size and changed in pattern. The front under northern part of Uwekahuna wall has become stagnant but the region both E and W of the intermediate part of the flow on the SW side of Perret's Cone has been spreading out in hooked and forked lobes.

The slumping of region N of main lake continues with some increase of smoke suggesting further undermining and the wall SW of central pool is nearly continuous with wall SW of N lake. Possibly the sinking of liquid in the main lake and maintenance of comparatively high level in N lake (the edge of which is at a much lower level) mean that the two are approaching the common level of a single united lake.

In the evening fountains of the N lake showed a little above rim; Postal Rift flow active below but dim at source and in upper parts. Lakes bright, E cone dim, S wall-crack some illumination.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Sunday Date May 18, 1919
Monday " 19, "

May 18.
3 to 4 p.m. No hissing S wall-crack. E cone pounding and puffing. Main lake walls, 20, 30 and 50 feet high, streaming swift E and NE out of central pool and S arm. Some fume from ground N of central pool. No further subsidence noticed there. N lake at 10 a.m. had shown brown avalanche cloud S side. Trace of this now seen in S wall where a high splash mark stands 20 feet above liquid. N lake shows 12-foot walls N, 40-foot walls S.

Postal Rift cone again changed in form. Open pot on top 18 inches in diameter leading to glowing well inside where lava is pounding and splashing. Rumbling and puffing noise.

SW lake lower, 15-foot walls SW side, 30-foot walls E. The flat between SW lake and W cone site has again sunk to a channel form 50 feet wide and the W cone replaced by an oval pond 50 feet long, with streaming SE to NW. This pond depressed 8 feet below its margins. SW lake rumbling and plashing. A 15-foot spatter margin stands across the entrance to the chasm leading to the main lake.

The general situation so far is merely a recurrence of subsidence coupled with enlargement of lakes such as has happened frequently before, for instance about March 25. Fume remains thin and the Halemaumau dome high and stationary.

In the evening the Postal Rift flow dimmer but glowing in lower part and at source. N lake fountains showing, other lakes dull.

May 19. Fume somewhat denser, especially at S wall crack. No marked change in level. N lake fountains show above margins at times. Glowing pot in Postal Rift cone; source very bright. Flow especially active in northern, middle section and against W wall. All the lakes bright at times including S arm and S wall-crack. E cone dim.

T A J

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

JOURNAL

Day Tuesday Date May 20, 1919

Fume thinner but in the evening increasing in region N of central pool and at Pele's Kitchen. Measurements show in morning a distinct lowering of southwestern sector walls one or two feet. The SE crag E of the S arm making a distinct jog in the profile of the Halemaumau dome and standing higher than the cliff on the W side of the S arm.

6:30 p.m. Found fume rather thin at S wall-crack. Bright banners of pinkish flame rising from large summit opening at E cone. Main lake 25 feet down at E end, SE crag 50 feet high, SW wall 40 feet high, N wall 30 feet high. Streaming northward in a broad river from a dark crust in the S arm with six or seven border grottoes fountaining in the NE cove, in the E cove and in the central pool.

SW lake flaring brightly. N lake streaming from S corner to N corner and active spatter domes building along NE shore. N shore 10 to 15 feet high, S cliff 30 to 40 feet high.

Explored summit area between N and main lakes. Only change observed was increase of high incandescence in chasms with much very pungent sulphurous acid fume. Saw one deep chasm 10 feet across and 30 feet deep leading down to a cavernous extension below, choked with debris above; the cavern leading toward the W side of the NE cove. This block of ground appeared to be breaking up farther, with dominant rifts extending westward from the NE cove and crossing the chasm that leads southward from the N lake.

The Postal Rift cone had glowing holes at each end and a large banner of flame in the middle.

The general situation as revealed by the abundant flames and quiet spraying type of border fountains points to renewed rising of liquid lava and a culmination of the recent subsidence. No movement was detected in the bench magma. Lakes were dull in the evening and the Postal Rift flow as before.

T A J

JOURNAL

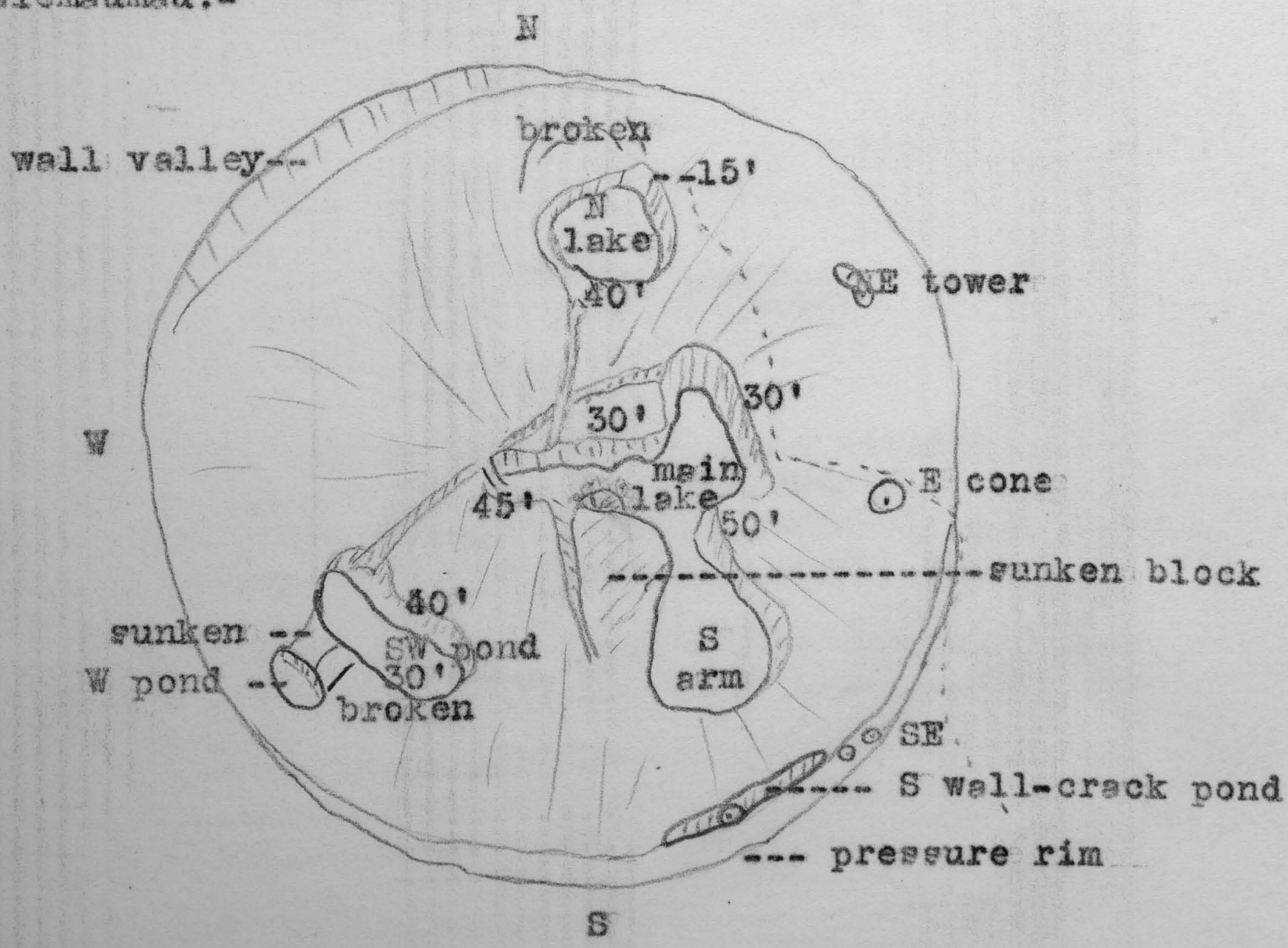
U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

Day Wednesday Date May 21, 1919

Morning reveals sinking of block of raised floor (Halemaumau dome surface), 20 feet down since last night at 7 p.m., on W side of S arm -- the block which started subsidence yesterday.

2:00 p.m. The cliff there now 20 feet high only, has slumped bodily with its upper surface flattening and sloping a little towards S arm, the block being bounded on the W by a crevasse S from central pool. This crack may be the S extension of the N lake chasm. (See plan). There is a tumble of down slumped large cliff matter at base of sunken block on N side, resting on lake bottom at a flat angle. The other cliffs of the lake rather higher than before, lake lower. Swift streaming from S arm, much heavy and tumultuous central fountaining in single large fountains. Streaming sometimes around corner E very rapid. SE point more a crag than ever, rising 50 feet above lake. Bench W side of S arm only 20 feet above lake. Cavern with inflow at end NE cove, a distinct crevasse.

Halemaumau:-



Figures -- heights above lakes.
Broken line -- trail across bench magma.

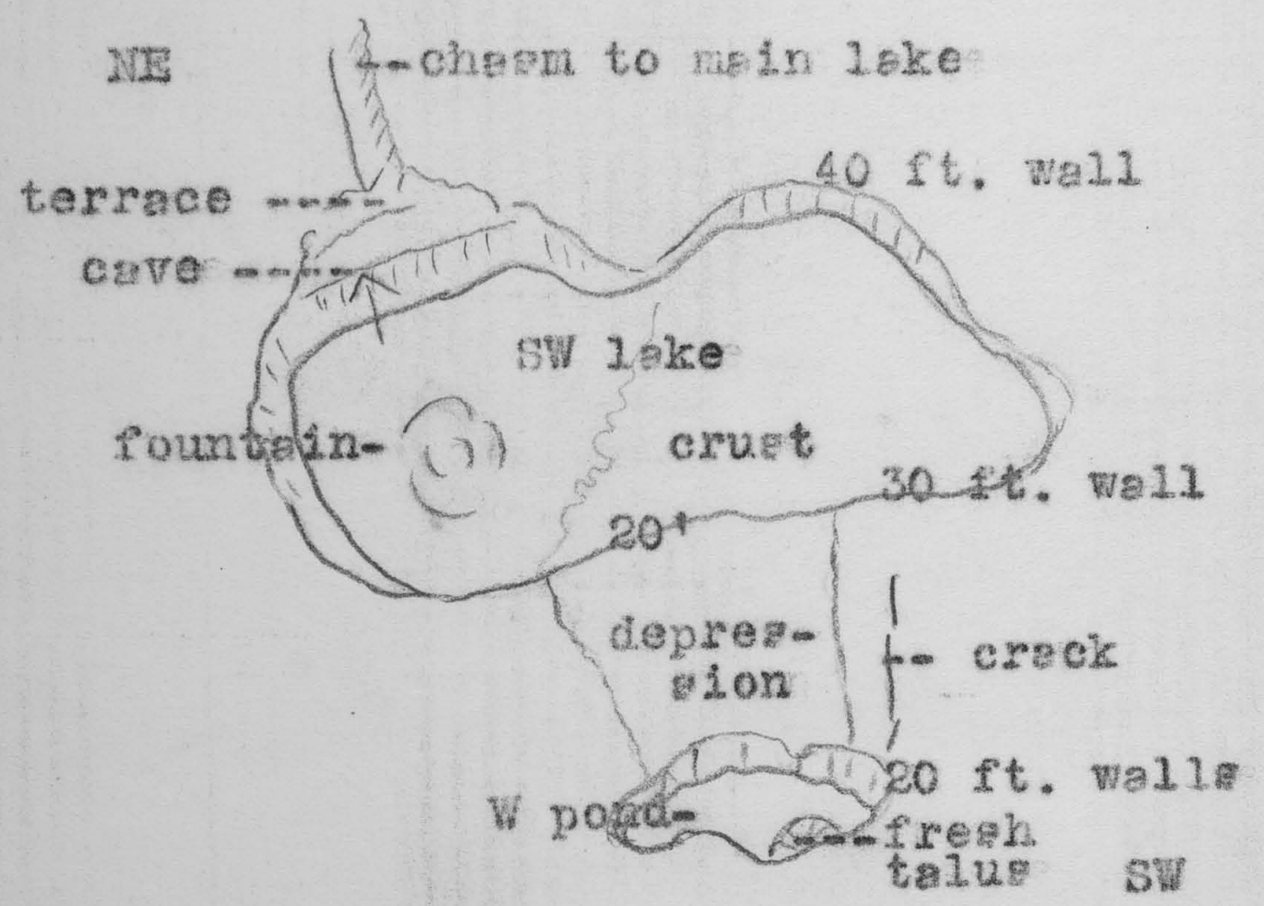
Fume moderate.

N lake lower, N side 15 feet down. Smoke from NE corner. Some active grottoes but not building like last night.

No noise heard or fire seen at Postal Rift cone in the distance.

SW lake lower, walls 30 to 40 feet high; surface crusted. W pond also lower and crusted; shows fallen banks SE and SW corners.

West ponds:-



Seen from the E, the SE crag now a distinct scarp above the sunken S block. Such a sudden subsidence of a large block should by analogy with former occasions be compensated by a lift somewhere else.

Lakes dull at night. Postal Rift flow dull but alive over center and W part. Two light places at source region.

T A J

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PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

Day Wednesday Date May 21, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
2 p.m.	NE of	main lake to SW sunken bench	1	W P	8x	f/11	½	5x7
	E of	main lake to NE cove	2	"	"	"	"	"
	NE of	main lake to E cone	3	"	"	"	"	"
	E of	main lake to central pool	4	"	"	"	"	"
	SE of	N lake to N orth side N lake	5	"	"	"	"	"
	NE of	N lake to South side N lake	6	"	"	"	"	"

T A J

1919, May 2



1



3

1919, May 2



4



2

Jog

1919, May 2



6

5

Log

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date May 23, 1919

Bench magma slightly lower. Fume thin except from top of N lake chasm which has developed dense fume again and which appears ready to cave in.

Great activity in lower northern part of Postal Rift flow. The whole flow widening to the E and N especially and showing its glowing toes in that region but not especially in the southern arms. Bright glow at source and one point W of source.

E cone flaming dimly. Lake illumination rather dim, especially N lake.

10 to 11 a.m. S pressure wall has gradually broken up into numerous pinnacles. E cone quiet but has a flaming hole on top. No change in main lake level, but it has been about 4 feet higher as shown by a border terrace and this takes the form of an isthmus clear across the lake just W of the S arm channel tending once more to separate off the central pool. Streaming has notably changed to stagnant E and NE, westward in middle of E pool and northward out of S arm.

N lake shows no change except a low marginal constructinn terrace like the main lake. Nothing new observed at Postal Rift flow source.

Climbed to summit of NE tower. Could not see into lakes from there. Only fuming there from the ground at W base. Tower spiracles warm but not hot.

General situation appears to indicate a slight revival of rising in the liquid lava and tendency in the bench magma to become stationary again.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date May 24, 1919

8:00 a.m. Postal Rift flow continues voluminous pushing in its northern fronts and Perret's Cone appears pretty well submerged.

Halemaumau appears about the same with increase of smoke at head of N lake chasm. Summit of Halemaumau dome is still only slightly below line of far rim of Kilauea as seen from the Observatory.

6 to 7 p.m. E cone flaming. Main lake higher and nearly flush with isthmus dividing it from central pool. Strong flow northward out of S arm. Dense smoke rising from chasm extending W from NE cove and also from N lake chasm.

N lake about 20 feet down on N and E sides, crusted over, with occasional cracking and foundering and a more or less rhythmic explosive fountain which bursts out from under the edge of crust about every 2 minutes immediately under the chasm ravine leading southward. Streaming northward along the N and NW banks.

At the Postal Rift source cone a small window in the floor a few feet N of the cone revealed a brilliantly incandescent cavernous space under that part of the floor and about 12 feet down a steady slow flow like a river of the brilliant liquid melt poured N in a majestic torrent. Some fountaining could be heard and by looking into the hole obliquely the margin of what appeared to be a standing fountain could be seen under the source cone. The effect was as though one looked through a skylight opening into a large chamber below. This chamber appeared to extend scores of feet N and W where blue fume rose through the cracks, strong with sulphurous acid. This was the river of melt feeding the ever pushing front far to the north. This front was seen to be brilliantly streaming after dark.

Mr. Thurston states that the current flowing below seen through this window is quite like what the Little Beggar cone showed through its upper orifice when it was alive and also that the growth of this arched over pool source is quite like the process which developed the "New Lake" of the early 80's. If the present roof should fall in and make a lake, we would have a repetition of the New Lake phenomenon.

The previous night the N lake was very dark. This night N lake as seen from H.V.O. is moderately bright, the main lake brighter and the Postal Rift flow source very bright. N end of flow active all around and E cone dimly flaming.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Sunday Date May 25, 1919
Monday " 26, "

May 25.
2:30-4 p.m. Lakes about the same. Partition wider at isthmus between the central pond and the east pool. Streaming N from S arm. Live grottoes S side of isthmus and NE cove. Large central fountain developed in E pool. Central pool appears quiet. N lake cracking and foundering.

Postal Rift source cone shows the same roof window and stream in tube beneath. Flow continues active at northern fronts as seen at night.

N lake frequently quiet and dark at night. SW lake bright in spells and main lake mostly bright at night.

May 26. Smoke increasing. Slight sinking continues. Bright flame at E cone. Postal Rift flow continues vigorous. Bright glow holes at Postal Rift cone.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date May 27, 1919

Noon. Postal Rift flow continues to move over floor of Kilauea. No live toes found at W front which is piled against the Uwekahuna cliff face for several hundred feet of length from ash locality northward. High driblet heaps and schollendomes. Window at source and filagree orifices in source cone studied carefully with the following result.

The stream seen through window is 12 feet down and occupies a tube 15 feet wide. It is flowing about 4 miles per hour. It may not be more than 3 or 4 feet deep. Through the orifices in the cone one looks down into a dome-shaped cavity 15 feet deep and sees lava spouting up in gushes through the conduit well. There are two such standing fountains, one 10 feet farther E than the other, the western one possibly source for a western tube. The eastern one is seen through the window and feeds the northern torrent which flows NNE. The window is at the top of the eastern wall of the tube, and the base of the western wall where the liquid surface lies against it can be seen by sighting into the window very obliquely. The window is two feet across, oval N-S. Near it and N of it is a second hole, but plugged with flowing matter. Some stalactites can be seen in the cone cupola. The glow inside is bright orange and flame plays from the window and from the filagree orifices of the cone. Strong SO_2 smoke rises through cracks N and W of the cone. SW of the cone there is bright yellow sulphur stain in a patch 20 feet across and 20 feet from the cone (leeward).

There are similar sulphur stain patches to leeward of the SW pond and of the E cone. Smell is of free sulphur.

Main lake 20-foot cliff E, 30-foot N, 25-foot S, 50-foot SE and W. Streaming N, grottoes W and NE. Central pool stagnant and more shut off. Dense fume from central chasms. The chasm extending W from NE cove appears to be extending itself eastward across the cove to the NE tower, where there are lines of breaking and renewed smoking. At 1 p.m. an avalanche cloud seen here (pit developed).

N lake 15 feet down on N, 40 feet down on S. Stagnant, cracking crusts with lines of bubbling in the cracks. Grotto cave SW.

SW lake shows more subsidence and breaking in the isthmus between it and W pond. Isthmus floor 3 feet above the lakes. SW wall over pond 15 feet high. Broken tumble NW side, pulpit rock SE side. Fountaining and cracking NW end SW lake, crust SE end. SW wall of lake 25 feet high, NE wall of lake 40 or more feet high. Dense smoke from chasm corner of lake (N end).

S wall-crack is alive, pungent fume to leeward and some glow at night.

T A J

JOURNAL

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

Day Wednesday Date May 28, 1919
Thursday " 29, "

May 28.
3:00 p.m.

No marked changes in lakes. Some continuous central fountaining in E pool. Fume dense on top of dome. N lake very quiet and crusted over; this makes the N lake dark at night as seen from a distance. E cone flaming through filagree orifices on top.

New pit opened on E side of NE tower thus accounting for avalanche seen. This pit 30 feet across with a stagnant crusted lava pool 15 feet down, some glow at edges and a little gas hissing. Rocks revealed in wall of pit deeply oxidized red. The shaft opened by the pit lies directly under the tower which overhangs the region of the lava pool. The smoking here has disappeared and the main collapse is just where the fuming solfatara was.

Postal Rift source-cone window and torrent in tube same as before. Estimated speed of current about 6 miles per hour. Followed flow to Perret's Cone region where driblet flows were found pushing through cracks in top of swollen ridge. A considerable elongate flat-topped swollen area of lava which already looks old occupies the line of the first flow W of Perret's Cone. This appears to be the main tube from which others ramify. The flow at present is both extending laterally and breaking out in pools through the middle in many places, widening along the whole length from near the source to the N wall of Kilauea. The lava which has oozed out in the later part of the active period through the schollendomes is much of it the blue-gray shark skin type, very heavy and with patches remarkably glassy, made by a ringing, hard crust about an inch thick over rougher lava beneath. This crust shows transparent glassy blisters sometimes blown into distinct bulbs. The blue gray color appears to be a surface stain and is frequently iridescent. As in the midst of this blue gray lava is not uncommon but occurs in no large amount. As a whole the Postal Rift flow consists of firm bulbous pahoehoe.

May 29.

E cone appears to be caved in and no longer shows glow at night. N lake dark at night. Fume column at N lake chasm thinner in morning, denser toward evening.

Postal Rift flow very vigorous over all its lower half and second glow hole W of source cone bright. Fume from both these source holes.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date May 30, 1919

Noon. S wall-crack appears more cracked. E cone has collapsed to a shallow tumbled pit full of red oxidized rocks.

Main lake about as before with 15-foot wall at E end, 30-foot N, 20-foot wall S, 45-foot crag SE and 40-foot wall W. Partition separating E pool from central pool 4 feet high. Streaming out from S arm, and with occasional breaking up of crust, streaming was revealed pouring into NE cove. Fume dense in two columns rising from NE cove crevasse and from N lake chasm. SW summit of NE heap has an open hot cavern revealed by the breaking in of a circular hole 10 feet in diameter on its E side.

The NE tower has broken down so that its entire southern half has fallen as a slope of tumbled rock into the pit below, choking the lava pool there so that no further activity is in evidence.

N lake crusted over but higher, with new spatter border. Lake only 8 feet down on its N side. Under the chasm at its S corner a vent at the lake's edge gives out a noisy roar once in two or three minutes and a little lava comes out when it blows.

Postal Rift source shows increased rapidity of stream below. Saw sunlight spot on stream below where sun shone through a window above. A second opening 200 yards farther NW along the line of the tunnel has been formed by breaking in of the roof for a length of 30 feet and width of 15 feet. This place and the cone source were both giving up columns of blue fume. In the collapsed cavern the lava torrent was revealed cascading over a slope into a brilliant broad portion of the tube beyond, the part exposed to the air being partly crusted and showing wrinkled skins.

The flow continues to glow brilliantly at night over all its lower northern expanse, spreading continuously and building up by many outbreaks in the middle portions. The presence of a tube in the upper part of the flow floored with rushing lava but not completely filled in contrast to the earlier days of the flow when these tubes were filled to the point of spasmodic overflow at the source indicates a waning in the flow simultaneous with the moderate subsidence going on at Halemaumau. This change must have some effect on the vesiculation of the lava at the front of the flow and perhaps accounts for the very heavy blue and shark-skin types making out there, these being freed of gas by the long sluiceway in the upper tubes.

General subsidence continues as shown by the daily measurements, and the opening of voids at the several collapsed areas and under the smoking crevasses indicates retirement of the liquid lava locally. That this is differential, however, is shown by the relative rising of the N lake.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date May 30, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Survey for location crater hut.						
		New station, 2nd S of Uwekahuna to						
		Birdseye S	0					
		crater hut flag	76 13	1 53	+4			
		1st sta. S of Uweka-huna	151 43	-2 33	+3			
		Uwekahuna base	161 55	-3 41	+3			

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date May 30, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
11:30a	Looking	NE, collapsed tower	1	W P	8x	f/11	½	5x7
	"	SE, " E cone	2	"	"	"	"	"
	"	W, central pond isth.	3	"	"	"	"	"
	"	SW, cavern in W knob of NE heap	4	"	"	"	"	"
		N grotto N lake making Pele's hair	5	"		f/8	1/100	"
		S wall N lake smoke above	6	"	8x	f/6.3	1/35	"

T A J

1919, May 30





1919, May



3



2

1919, May 30



6



5

Hawaiian Volcano Observatory

Daily Journal

1919 June - December.

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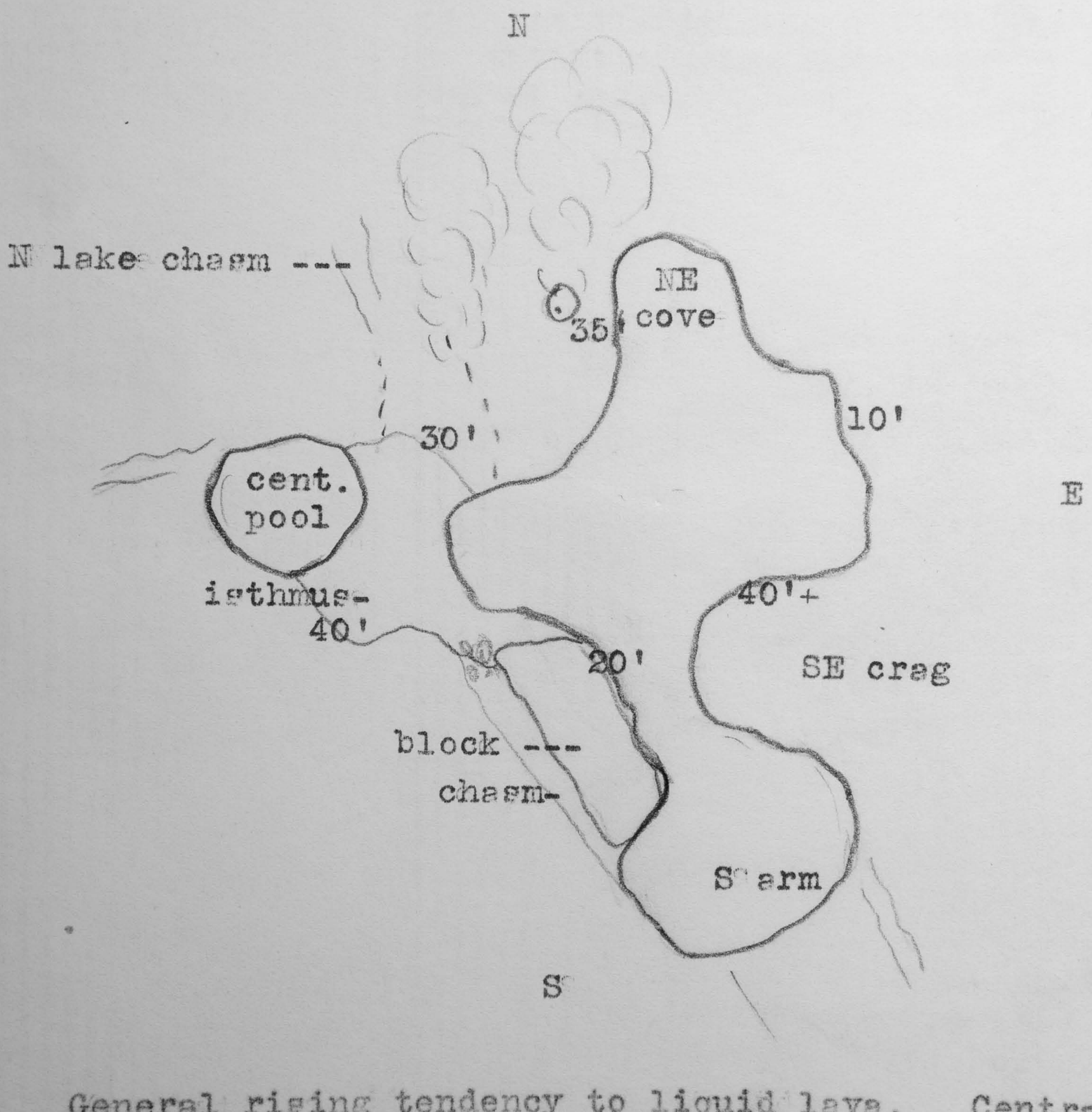
JOURNAL

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

 Day Sunday Date June 1, 1919

11 a.m. Explored S wall-crack. Found crevasses numerous and extensive between S arm and S wall crack. Everything crusted and tumbled in latter but live lava can be heard pounding beneath a pile of smoking and sulphur stained rocks. The gas spiracles at summit of last trickle flows down pressure wall now quiet, with a large partly collapsed cupola chamber beneath. SW wind permitted circuit around to S and W, and climbed to summit of Halemaumau dome from that direction. Found walls about main lake as indicated in sketch map

Main lake from SW summit Halemaumau dome:-



General rising tendency to liquid lava. Central pond rose and overflowed isthmus towards noon. E pool high but did not share this movement and is mostly crusted. S arm crusted. Later E pool broke up and showed northeastward streaming. Found very bright orange red iron oxide at edges of hot cracks on high summit of bench magma.

Found SW lake and W pond very high. W pond overflowing isthmus in direction of SW lake. Latter quiet but later developed fountain in SE corner. On SW side of

SW lake three or four spatter drip columns attached to cliff 6 feet high at margin of lake which appear as though lava had cascaded down from under crust at upper edge of cliff. In reality this structure must have been formed by persistent flings from fountains below up against cliff at one point.

Found Postal Rift source tunnel with lava running 10 miles an hour and the open channel farther W about as before but with some curious shell-like crusts of peculiar pattern formed across the torrent as it cascaded across the opening from the cavern above to the deeper tube beneath.

N lake high and quiet rhythmic blowing in vent under chasm continues. Wall on N side only 6 feet high. Some general cracking and foundering which spread across the lake and left a quiet crust.

T A J

JOURNAL

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

Day Monday, June 2, 1919 Date
Tuesday, " 3, "

June 2.
2-5 p.m.

Placed flags at following stations: Volcano House, Waldron's Ledge, E prisoners' camp, Birdseye's SE and E stations; and in Halemaumau at:- end of S arm, summit SE crag, summit bench magma S of central pond, bluff E of SW lake and pressure ridge where it starts SW of W pond. Have previously flagged two stations on summit of Kilauea crater margin S of Uwekahuna. This work is for relocating a group of stations around Halemaumau, all former ones being destroyed or moved.

Found lakes somewhat lower. Main lake 4 feet below platform separating it from central pond, mostly crusted, occasional border outbursts E and at grotto under sunken SW cliff. This cliff block has sagged away from the high ground W of it leaving a chasm 10 feet wide and 30 feet deep. Found SW lake also lower with some central fountaining breaking through crust.

No special change in N lake.

Very heavy smoke from the central chasms and glow at night from beneath this smoke.

Postal Rift flow continues brilliant at night with brightness sufficient to illumine walls of whole N end of Kilauea crater and to make luminous the vapor and clouds above. The luminosity in the flow itself now is scattered brilliant points where the liquid lava is welling up. The whole northern area of the flow appears at night like a glowing pool and in the day time it has a decidedly bluish tarnished color different from its earlier lustre. Both the tunnel openings at the source region glow at night and the main and SW lakes are bright. There is a flame spot under the central smoke but the N lake is notably dark. There is no longer any sign of glow at the E or S cones.

June 3.
11:00 a.m. and 4:00 p.m.

Lakes still lower. Main lake 15 feet down at E end, streaming northeastward. SW lake lower. N lake dull and crusted. Smoke dense from center of dome. In evening Halemaumau dull and Postal Rift flow remarkably dull as compared with recent days.

Located two stations marked with iron pipes embedded in concrete on high ground E of NE cove and E of E cove respectively. This work done by Messrs. Sumner Roberts and Chas. Thorndike, cooperative observers, assisted by A.K. Seu, assistant at Observatory.

The telemeter measurements show continued slight localized subsidence of the bench magma.

There was a very pronounced earthquake registered yesterday at 4 p.m. with tilt change from excessive W to an eastward movement. This quake felt strongly in Kau 1½ minutes.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date June 5, 1919

6 to 7 p.m. Pit increasingly dark, lakes quiet and crusted. Subsidence continues. Postal Rift flow continues with some lessening. Smoke and glow increasing on high ground S of N lake. (N of main lake).

E cone has slumped bodily, perhaps 10 feet, and the ground all around it shows slope inward to a hollow center with much of the cone preserved in the center.

Main lake heavily crusted for hours in the afternoon with curtained grottoes and no visible streaming.

The glow locality at base of dense summit smoke N of main lake is a patch of crevassed rock 20 feet in diameter where the gas seepage has raised the temperature accompanied perhaps by oxidation of the rock so that the area looks like a bed of glowing coals with flames playing through the interstices. The sulphur fume and water vapor are dense rising from the midst of the hot area and the whole place appears liable to cave in and produce a lava pot.

N lake also crusted except for a liquid area under the chasm ravine S side. This place appears rising with edges of the liquid overflowing the crust of the lake and inflow from the curtained grotto under the chasm. At night this place flared in sudden spasms occasioned probably by the rhythmic gas explosions every few minutes.

Postal Rift source cone and window as before; flowing stream in tube possibly a little higher and slower. The collapsed tube farther NW all crusted across the open part but below and beyond the broad cavern as before with steady stream pouring northward. The flow below at night breaks out in many places on the surface and spreads against the wall corner under the Military Camp so that all that border of the Kilauea floor is filled with a pool of fresh lava from the gypsum crystals locality on the W to the wall N of where Perret's Cone was on the N. (Wooded blocks SW of Volcano House.)

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

JOURNAL

Day Friday Date June 6, 1919

Morning. Central and southeastern region of Halemaumau dome 1 to 3 feet lower. Fume denser.
Carried out in morning first measurements of a location survey with Sterling 4-inch transit from Waldron's Ledge station of Birdseye. Thorndike and Roberts continued this work from Prisoners' Camp E in afternoon.

3 to 4 p.m. Placed five flags as follows:-
Hal. E -- north end pressure eidge.
Hal. SE - over SE chasm pot.
Hal. S -- on S ridge of 1918 (over tube)
Hal. NE - on summit NE half-dome of 1894 (remnant)
Hal. N -- north cone of Nov. 1918, place of new N station, now changed in level (over old N rest house buried under lava)

More slumping of cup around E cone. High ground N of S chasm much slumped. Main lake as before, 15 feet down E end, stream from S sem to NE grotto. New fall from cliff N side central pool.
N lake crusted, periodic blowing from chasm grotto S, cracking and foundering patch at W bank. N bank N lake 8 feet high.

Night. Bright flares in S arm and SW lake, glow at central smoke and the two tube localities of source of Postal Rift flow. This flow bright at times and spreading eastward in N end of crater.

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date June 7, 1919

Fume appears thinner and some breaking visible W side NE cove. Postal Rift flow making long arms eastward from northern part of flow. Measurements show irregularity of movement of dome of bench magma in Halemaumau.

Noon. Found main lake pouring in violent cascade and torrent into hole 20 feet wide at N end NE cove under smoking crevasse above. Downpour made a roar which could be heard some distance back from the rim. Inside the cavity the liquid was churning and piling up. Streaming out from E cove. S arm and central pool directions but for a spell streaming changed so as to divide in middle of E pool and pour partly southward into S arm.

No changes observed at smoke hole or N lake. Latter appears rising, occasional explosion at the rhythmic fountain locality under chasm, heavy crust most of the time night and day.

Postal Rift source tube found unchanged at both openings, with current in tube somewhat slower.

8:30 p.m. Found cascade still pouring without cessation. Observed spells when the churning pool inside the cascade pit sank lower so as to make cascade more rapid. The lake shows no lowering, bank 15 feet high at E end and the grotto S of central pool isthmus has built up a half-dome of spatter indicating rather rising than lowering with reference to confining cliffs. Embayment in isthmus appears deeper on E pool side. Heard occasional movements in the loose rocks at end of pressure ridge S of E cone.

Blue flames from under crusts E. Noticed a row of 11 flames over the Postal Rift source vents. Some activity central pond and SW lake.

T A J

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PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date June 7, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
9 p.m.		E bank main lake to NE cove	1	W P		f/6.3	½	5x7
		E bank main lake to NE cove	2	"		"	2 min	"
		NE bank main lake down to cascade pit	3	"		"	1/35	"
		NE bank main lake down to cascade pit	4	"		"	1/5	"
		SE high bank main lake to NE cove	5	"		"	5 min	"
	Flat	E of E cone, general view looking toward the lake, Thorndike and Roberts in silhouete on bank	6	"		"	12 min	"

T A J





1919, June 7



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Fog





JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date June 9, 1919

12:30 p.m. Edge of fall NE cove 15 feet long and curved with concavity toward the pot, an angle in W end of curve. Fall steeper than before. Stalactites in the glowing pot. Stream curves to the W inside. Fall fully 20 feet.

Continued slight subsidence. Streaming in main lake from channel leading into S arm which is now crusted over and very narrow. Fresh fall of rocks on isthmus from cliff S side of central pool. Spatter dome grottoes in E pool on SW and SE sides. Smoke from central high ground denser than ever.

N lake continues quiet and without illumination at night.

T A J

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PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date June 9, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
12:30p	E bank main lake to NE cove cascade		1	W P	8x	f/8	1/3	5x7
	NE bank main lake to NE cove cascade		2	"	"	f/6.3	1/10	"
	SE high bank to NE cove cascade (shows edge of fall)		3	"	"	f/11	½	"
								T A J

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1919, June 9



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JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date June 10, 1919.

Noon Cascade continues to pour down in NE cove and the Halemaumau dome is slightly lower. General break-up in main lake. Level of lake somewhat higher and form of cascade has changed so that curvature of actual fall in plan is convex down stream, the opposite of what it was yesterday. The cascade liquid is higher relative to the roof above it and splashes against the roof making accumulation there. The interior churning level appears 15 feet down. A crust accumulation has built out from right bank of cascade.

The smoke from central summit crevasses less than before and in the evening the glow spot at base of smoke seen to have disappeared.

N lake at times bright again.

Interior of E cone hissing slightly and making sulphurous acid gas. Interior of cone hung with many long rough stalactites of reddish brown color showing the feathery accumulations of iron oxides in many places. The stalactites hang side by side in close ranges, one to three inches in diameter and two to three feet long, with spaces of only two or three inches between the individual hanging stalks.

SW lake lower with walls 20 to 40 feet high, one curtained grotto N side, the rest crusted over. W pond also low and crusted.

The bench magma at N end of main lake has sunk so much that the hut to the NE which was a few weeks ago in full view from the E bank of the lake is now cut off from view by the NE heap.

The marked sinking of the SW lakes, relative rising of N lake, and holding of equilibrium in main lake all are facts suggestive of an adjustment occasioned by the yawning open of the crevasse which produced the NE cascade. It looks as though the cascade were accelerating the inflow from SW lake to main lake and thereby draining the SW lake making it lower; whereas the void being filled by the cascade is sufficiently in communication with the N lake to raise the level of the latter. The main lake as an intermediate area holds its own and even gains slightly.

T A J

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

Day Wednesday Date June 11, 1919
Thursday " 12, "

June 11. Rainy and misty. NE cascade continues in action. The bench magma is subsiding. Smoke dense central crevasses. Postal Rift flow somewhat diminishing in volume of output and brightness of flowing parts along northern fronts.

June 12. In morning Halemaumau dome appears decidedly lower, especially on E side. Some glow at base of central fume seen at night and fume very dense.

In afternoon Thorndike and Roberts collected large block of stalactites from E cone and they reported some glow in gfound near NE tower.

9 p.m. Ground near E cone more cracked and lower than two days ago. Main lake streaming brightly and rapidly toward NE cascade. Latter has clogged its own passage with accumulations from side and roof and the fall is largely concealed inside of cavern. Rapidity of inrush increased at times.

Dense smoke but only dim glow from central crevasse region.

N lake has curtained and constructing grottoes on N and NE sides, is mostly crusted, with some fountaining around borders.

Postal Rift source cone and window over tube flaming and lava in tube flowing more slowly and appears lower. Second opening in tube farther NW shows distinctly lower and more sluggishly moving lava, making the visible cavern which extends northward deeper. The hot fume coming out of this cavern quite tolerable and much less acrid with SO_2 than the fume from the source cone.

SW lake this day reported 10 feet lower than W pond but both are low in their pits.

T A J

Saturday June 14, 1919

11:50 a.m. S wall-crack region increasingly craggy and tumbled and cup depressed around E cone increasingly deep and cracked.

Main lake streaming rapidly and hotly from closed channel leading to S arm. Lake has been recently within 5 feet of E verge; now 15 feet down. Grotto SW side inactive and sunken bench above it only 15 feet above lake -- has sunk more. Cascade NE cove has built a middle rock of accumulation dividing the fall in two, one torrent pouring into a hole NE, the other NW.-- the original hole. This middle obstruction may be raised bottom material: it cannot be there and divide the fall in two without a bottom to stand on.

N lake heavily crusted; occasional bursts at the southern chasm margin; the N and NE grottoes sluggish; streaming northward; lake lower than before by 5 feet.

Much heat at NE tower and some fume. Fume very dense at summit cracks and considerable fume at S wall-crack and Postal Rift.

A large sulphur patch NW of N horse corral recently developed, perhaps over the tube connecting Halemaumau with Postal Rift. Postal Rift flow continues as before but sluggish.

General situation slow subsidence and continued flowing. Bench magma heard moving; occasional rock falls at lake, E ridge and NE tower.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date June 14, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
11:50a		Looking N at interior broken E cone showing ranges of stalactites. 50-foot focus. Stalactites one to three feet long. Cone fuming. This the same cone as earlier photo, glowing stalactites.	1	W P	8x	f/8	½	5x7
	E bank	main lake to NE cove with cascade divided by built-up bottom	2	"	"	f/11	½	"
	NE bank	to crusted channel entrance of S arm	3	"	"	"	½	"
							T	A J



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1919, June



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

JOURNAL

Day Monday Date June 16, 1919

5 p.m. General subsidence continues. Increased fume at E cone and revived glow there. Main lake lower and streaming hotly to cascade which sweeps into the wall in two torrents. Interior of cavern now obscured by crusts and curtains. Lake 18 feet below bank at E end, 4 feet below central isthmus. The sinking of S floor has made the S wall-crack pinnacles begin to stand up as an infacing escarpment.

Fume dense from bank E side of cascade and from summit crevasses.

N lake much lower relative to its N wall which stands 20 feet above the liquid while the S wall appears no higher than before. The marginal spatter benches show no inclination. Only explanation appears to be that the block by the smoking crevasses has sunk along with the lake. N lake cracking and foundering with heavy crusts breaking up.

Postal Rift flow tube shows more sluggish flow. Lava is somewhat lower as the W side of stream can be seen through window. Under the N wall of Kilauea the flow is bright and is progressing in isolated spots.

W pond deeply sunk with 30-foot walls in places. Isthmus between it and SW lake 10 feet above it. SW lake very low; 50-foot wall on W side, 60 on E. This lake considerably enlarged, with stalactite cavern at SE end, streaming towards main lake chasm, and another active cove NW. W pond has glowing cavern with inward streaming N side. W pond distinctly higher than SW lake. Latter appears at present as though it might be lower than main lake. Looking to the S the infacing escarpment of the S wall-crack appears to be curving around in the direction of the SW wall of SW lake as though the inner block of bench magma confined respectively by this wall, by the higher ground E of E cone, by the NE tower, and by the N side of N lake, were subsiding as a unit. There are wide and deep crevasses extending southeastward from SW side of SW lake. It should be noted that the escarpment on the inner or E side of SW lake appears to have sunk relative to the outer or W side in just the same way that the inner S cliff of N lake has sunk.

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date June 17, 1919

3 p.m. E cone area more slumped; a flaming and rumbling pot has developed through the remnants of the cone.

E bank main lake more caved in, cascade continues in action and fume dense above. Current streaming out rapidly from under bridge of crust at entrance to S arm.

N lake crusted, some border fountains making much Pele's hair and one fountaining pot in crust E of center.

Postal Rift tube shows lower lava flowing sluggishly and the northwestern opening has extended its crusted area so that the flowing lava can be seen far inside the cavern with difficulty and at a lower level than before.

Collected worm stalactites in hot cavern under SW knoll of NE heap, this cavern now being cool enough to enter.

In evening Postal Rift flow very dull but active at one or two points under N wall of Kilauea crater. Cascade illumination ceased during night at main lake.

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

JOURNAL

Day Wednesday Date June 18, 1919

5 p.m. This morning fume was denser from both summit cracks and cascade locality. Fume columns now are thinner and general rising activity is evident in the lakes.

S wall-crack pond high and active with a boiling puddle 10 feet in diameter.

E cone pot larger and lava splashing within, occasionally throwing out spray.

Main lake higher, cascade no longer visible, replaced by a sluggishly bubbling border pot at the end of the NE cove. Crust over most of lake but actively constructing spatter half-domes on the N and S sides of W cove of lake, at E cove and against NE bank. The northeastward streaming, so characteristic of late, may be present under the crust but is not shown.

Fume increased at NE tower but decreased at central chasms. A small tunnel in debris of summit chasms inclined downward to the N showing glow in its bottom.

N lake has rhythmic explosions at S border pot with sympathetic upheaval of the adjacent lake lava at the shore; and numerous spraying fountains around the N and E shores attest high gas pressure and rising liquid. Central part crusted with some cracking and foundering. Like the main lake about 5 feet higher than on previous day.

Postal Rift source tube has stream slightly higher and more rapid.

SW lake and W pond both higher. Heavy fall of S bank into W pond seen. W pond 35 feet down, SW lake 10 feet lower. This lake now appears fully as large as main lake and has a fountain locality against its northeastern bank where large dome fountains burst at short intervals with a somewhat rhythmic quality. This is same locality as rhythmic fountain of W arm pond of last year. The chasm leading to main lake is open for the upper 20 feet, below that there is a shelf or floor 25 feet above the SW lake which represents a former lake shore. Still lower there is a cavern at the lake margin. Between the W pond and SW lake the isthmus floor is now a tumbled slope with a rampart of debris at the W pond end, which stands 5 or 6 feet above the W pond level. The slope to the SW lake reaches a level only about 3 feet above the lake.

General situation appears to be the beginning of a rise.

Evening. Some bright outbreaks in flow along N wall of Kilauea.

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

Day Thursday Date June 19, 1919
Friday " 20, "

June 19.
Morning. Measurements show irregular movements, still downward, and greatly diminished fume. Cascade again in action, main lake lower with bright glowing margins. N lake about as before. S arm a subcircular pond enlarged. Lava of recent risings has extended through the broad chasm on the SW side of the sunken cliff block W of the S arm and this cliff block has sunk lower so that its upper edge is only about 6 feet above the main lake.

Cascade reported still pouring at NE cove in the afternoon but in the evening it had choked up and ceased visible cascading.

This alternation of rising and falling in the pot to which the cascade pours, coupled with the very sudden marked diminution in volume of the central fume column, suggests a turning point with fluctuating conditions while the interior voids are filling up.

June 20. Roberts and Thorndike today checking the newly located Halemaumau flags by stadia measurements from flag to flag. Previously the locations have been made by transit intersections from the stations on the Kilauea rim and this now platted by enlargement from the photographic map to the scale of 100 feet to the inch.

They report the crater this morning to show no cascade at NE cove until 10 a.m. when the streaming across the lake developed into a cascade by a marginal subsidence. Lake prior to this time crusted but with spraying border fountains building spatter banks. Similar activity noted in the N lake. E cone a glowing and rumbling pot as before. Measurements show continued slight subsidence of bench magma.

Fume today notably thin. Glow continues at Postal Rift cone and at N front of Postal Rift flow.

During the later morning hours and again in the afternoon some avalanches reported at Halemaumau with puffs of dust and rumbling, or in the morning what was described as a metallic clatter of falling rocks. The place in both cases appears to have been at NE cove of main lake.

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

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Hawaiian Volcano Observatory

Day Saturday Date June 21, 1919

10 a.m. Main lake high; marginal fountains building on S and W sides; slight surface current moving towards NE cove. No cascade. N lake also high with marginal fountains.

SW lake not so active as other lake. Grotto and slight streaming toward central pool. W pond slightly higher than SW lake.

Stream in Postal Rift cone moving slowly.

10 p.m. Lakes the same as in the morning except for prolonged central fountains in the main lake moving in a northerly direction.

Roberts.

JOURNAL

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

Day Monday Date June 23, 1919

5 to 7 p.m. The last three days just at solstice time have produced conspicuous changes in Halemaumau. The sinking of the prism of bench magma in a central block around the lakes has proceeded with increased rapidity, so as to develop an escarpment 15 to 20 feet high, infacing toward the center of the pit S, SE and E from the S wall-crack to a point N of the NE tower pit. This movement has defined the edge of Halemaumau pit, leaving the pressure rim and NE tower outside of it. The NE tower wall-crack has begun to fume and glow, a puddle of lava has formed in the hollow on the N side of the E cone and there is glow and dense fume at the S wall-crack.

The infacing escarpment where the E cone has subsided is now a vertical cliff cutting off direct approach to the E bank of the main lake. In order to approach the main lake it was necessary to makema detour to the N, down a steep slope between the E cone and NE tower. The relief of cliffs around main lake was much as before but the dominant streaming was westward and active spatter grottoes were building on all sides. The NE cove cascade locality was represented by flaming orifices in a spatter bench which puffed noisily. The cove had extended itself 20 feet farther N by collapse, this part being floored with tumbled debris and hardened lava. During a temporary sinking spell there was swift streaming with bubble fountaining northward under the bank at the cascade locality. The lowest part of the E bank stood 15 feet above the lake. The SE crag was 30 feet high, the western cliffs over central pool 40 feet high and the block N of the lake depression had subsided so as to be from 20 to 25 feet high above the central isthmus. The S block was only about 8 feet above the lake at the edge of its sloping surface nearest the lake.

Climbing up on the summit of the N central block the smoke holes were found with greatly diminished fume and down two of these holes glow could be seen. The northernmost showed a shaft inclined northward at a high angle 10 feet in diameter, narrowing below and showing 30 feet down a tube curved both in plan and in elevation ending at the bottom in a live boiling pool revealed through an opening 6 feet in diameter hung with heavy stalactites. This lava must have been at about the level of the N lake. It was fountaining and the surging currents moved first to the north and then to the south. This tube was an interesting revelation of the subterranean honeycomb of passages which connect the different lakes..

The N lake showed abundant spraying shore grottoes and spatter benches with the usual rhythmic outbreaks at the S corher every two or three minutes. There was a large flaming curtained grotto at the N.

The Postal Rift source cone was studied carefully through its orifices and the stalactites within were mostly slender drip structures of the teat form but some were distinctly

of the worm type hanging motionless in the orange colored incandescence of the interior and added to evidently by slow accretion of fused material from the walls. The standing fountain or cascade continued pouring from the S toward the N and through the window in the tube farther N the steady flow continued, much slower than before with drawn-out bubbles bursting the surface and a general pasty appearance. The flow at the front as seen at night was distinctly brighter than before and the lakes for the last two nights have been brighter.

The measurements of the bench magma show increased sinking of the benches around the main lake and around the N lake but the NE and SW escarpments show little change.

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

 Day Tuesday Date June 24, 1919

6 p.m. Measurements this morning showed continued subsidence of the central prism but there is little sign of downward motion this evening. Relative to their margins the lakes were distinctly higher with high gas pressure and many rapidly constructing spatter half-domes and crescent niches. The S wall-crack now has a cliff 10 feet high facing northward as its southern wall and all the broken ground N of it has slumped and tended to close the cracks. The S arm appeared a few feet higher than the main lake with southward streaming and a vigorous spraying fountain building a crescent of spatter at its S end. The central pool was sluggish and the main lake much higher than the day before reducing the height of all its border cliffs by 5 feet. At 6 p.m. it had risen, the streaming was northeastward and several of the western grottoes went out of action during the rising choked full with crusted lava.

The inclined shaft of the central smoke hole was found to have only a small window 3 feet across at the bottom showing the live lava below.

The N lake was streaming northward with a violently spraying fountain on its W side and several others along its N shore. It appeared 5 feet higher than on the previous day.

There was no change at the Postal Rift source vents. A series of solfataric areas between the Postal Rift and the N station marked the course of the subterranean passage leading to the Postal Rift flow. These places showed abundant hot coatings of alum, sulphur and other salts.

Very large chasms concentric with the edge of the subsided prism were found just back of the NE tower, and also back from the edge of Halemaumau NW, this last chasm extending all the way from the NW station in a curve to and through the cone vents of the November flow of 1918.

The W pond and SW lake have come to a common level through the rising of the latter and the sinking of the central prism has brought all of the cliffs around these two lakes to about a common level some 25 feet above the liquid lava. The SW lake was streaming towards the main lake chasm. This chasm extended down practically to the lake level and the W pond was very slightly above the SW lake level. The W pond fountained sluggishly and had opened a small new arm southward. The block of ground W of the W pond remained high and promised to stand up as the rim of a new pit just like the rest of the semicircle of the pressure ridge S and E.

No changes were observed under the NW wall of Halemaumau and apart from the chasm back of the wall above mentioned, there was no sign of pronounced subsidence effects anywhere in the sloping floor NW of the N lake. Measurements, however, from the Observatory indicate that

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date June 24, 1919

floor has gently subsided.

The general situation indicates a rise of liquid lava and the slump of a large prism of bench magma but there is no evidence yet as to which of these will dominate in the near future. Up to the present solstice appears to have produced an acceleration of bench magma subsidences.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date June 26, 1919

11:30 a.m. General subsidence of bench magma continues and lakes remain relatively high. S pressure rim escarpment jagged as result of caving of its inner face, this face now being distinct new pit wall 12 to 15 feet high. This wall extends in a curve around to the E and NE with the tumbled E cone at its base. From this new eastern verge the subsidence of the E bank of main lake such that one can look into the lake basin and see much of the live lava.

Lake streaming eastward, large elongate spatter half-dome SW side where the sunken cliff block has the edge of its upper sloping surface entirely submerged by the spatter rim W of the channel leading to S arm. Cliffs bounding lake lower than before relative to lake level.

New circular pool of lava has developed at base of NE heap escarpment which is now a vertical cliff 15 feet high. The NE tower has completely fallen into the pool below. This pool 50 feet across and overflowing in heavy bulbous pahoehoe which has spread 150 feet to the NW in fan-shaped flows.

At noon this pond overflowing and highly inflated, lost gas suddenly from beneath its crust and the crust sank, releasing a prolonged hiss of gas around its margins which made an overpowering smell of SO_2 to leeward. The crust foundered in the melt and the latter sank some 15 feet in the course of the next half hour leaving a bright glowing margin with the overhanging inflation crusts all around the border. Then the liquid recovered and started to rise, making small trickle flows around its inner margin. There was a cavernous tube left in the direction of the recent overflow. The summit of the NE heap escarpment had large crevasses concentric to the Halemaumau pit.

N lake comparatively high as before with marginal spatter domes building and central cracking and foundering.

Lava in Postal Rift source tube low and extremely sluggish, flowing not more than a half mile per hour. Chamber under source cone shows continuous artesian spring as before and growing stalactites of both kinds.

No new developments at summit smoke holes of central crevasses.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date June 26, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Tessar lens.						
11:30a	New E	escarpment to S escarpment	1	W P	8x	f/11	½	5x7
	New E	escarpment to SE crag	2	"	"	"	"	"
	New E	escarpment to NE cove	3	"	"	"	"	"
		Looking N at new NE pond	4	"	"	"	"	"
		Looking SW at window in roof of tube and P.R. source cone, near view	5	"	"	"	"	"

T A J

1919, June 26



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1919, June 26



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1919, June 26



JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date June 27, 1919

3 to 5 p.m. Inspected line from crater hut to Little Beggar corral B.M. and set up, flag at latter point, summit of flag 13.75 feet above B.M. (3633.46 feet above sea level) making flag 3647.21 feet above sea level. This flag for angular measurement from hut to determine elevation of latter. Triangulation from Kilauea rim has now located and produced tentative elevations for hut and crater flags, and this will be checked by stadia traverse from hut around Halemaumau with elevation of hut checked by the corral flag and Birdseye's B.M. there.

E cone sag still lower. Revived large elliptical pool of lava in S wall-crack chasm with fountain at W end. Pool 60± feet long.

Main lake high as before with built-up spatter domes, northeastward streaming. E bank 12 feet above lake; eastern cliffs otherwise 20 feet above lake; western cliffs over the central pond 30 to 40 feet high.

NE pond again high and again temporarily sinking. N lake has built large spatter domes W, N and E sides. Older banks 15 to 30 feet high above lake. Occasional bursts as before at S corner.

Postal Rift source as before and flow continues to burst out at isolated points far to the N.

Summit smoke hole again shows pot of fountaining lava 30 feet down with northward drift of streaming and occasional sudden acceleration of streaming.

Crossed center of Halemaumau dome from here finding some difficulty at the large central chasms. SW lake appears lower in its cup with violent fountaining at E end and eastward streaming. Walls 30 feet high and more in places. W pond crusted, with enlarged extensions N and S, the northern one showing some crusted lava and the southern one making a puffing roar through the tumbled debris..

General situation indicates continued subsidence of bench magma with rising of liquid lava competing with the sinking bench magma. Fume thinner.

T A J

JOURNAL

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

Day Saturday Date June 28, 1919
Sunday " 29, "

June 28.
4 p.m. Main lake slightly lower than day before. Marginal fountains. No predominating current. Single fountain at S end of S arm. S arm nearly on a level with main lake.

E cone still glowing and puffing. NE pool under NE tower site has flow increasing in size. Conduit covered with heavy crust. Lava apparently rising and falling periodically neneath crust. Periodic blast of gases through crack in crust followed shortly by slackening of flow.

Heavy fumes at S wall-crack increasing in volume. Lower pool quiet.

Roberts.

June 29.
4 to 5 p.m. Subsidence of bench magma continues. Main lake high and active with bright lines and eastward streaming. Border fountains especially W.

NE pond high; later broke up and made fume strong with sulphurous acid.

N lake shows slumping of N bank and the usual activity.

Glow at base of E cone.

Postal Rift flow tube shows continued sluggish stream.

T A J

5 p.m. Lava in N flow cone moving slowly. One foot of wall on far side of tube visible through window.

Main lake low. Slight streaming towards grottoes on W side.

N lake low. Grottoes on N and W sides collapsed at 5:30.

Roberts.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date June 30, 1919

E cone still fiery. Summit crevasse tube well high and active.

At 10 a.m. NE pool low with no sign of recent flowing. At 12:40 p.m. this pool higher.

Main lake fairly high and crusted. N lake fairly high with border grottoes.

Wall of pit N and NE much steeper by collapse. Well defined crack revealed, running from NE tower site to N station; new cracks around NW station.

W and SW lakes crusted except for violent fountain at E corner of SW lake. SW flag scarp on E side of SW lake unusually low the surrounding banks showing signs of recent collapse; all central territory subsided. S pit off W pond much larger but inactive. Considerable steam in cracks near SW station.

Inner wall of S pressure ridge recently collapsed, no more wall-crack, nothing but outside ridge. S pool still active, 10 feet deep. SW wall of S arm collapsed more.

Thorndike.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date July 1, 1919

10 to 12 a.m. Slow subsidence continues in the bench magma and S pressure ridge now stands about as high above inner flat as above outer flows. Much smoke from E cone pit and some fresh driblet lava.

Main lake very high relative to its banks, much border construction, surface about 10 feet down at E bank, rising slightly during morning. Vigorous fountain at W cove in isthmus; increasing depth of that cove. Fountaining in S arm now separated by isthmus from E pool.

Inclined tube of central crevasse full of smoke so that well below is not visible.

NE pond has circular opening in crust and melt seen below 5 feet down, sluggish and glowing.

N lake appears as much lower than before as the main lake appears higher. The crevasses along E side N lake have widened and block on lake side has subsided 6 or 8 feet making a new cliff farther back. Lake streaming northward; usual border fountains. The entire N margin of lake shows increased slumping making the northern banks 20 feet high. N lake hence about 5 feet lower than before while main lake is about 5 feet higher.

Postal Rift flow continues in motion and outbreaks of small streams are pushing over the surface in the N corner of Kilauea crater.

During misty drizzle in evening great clouds of white vapor arose from whole surface of flow.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date July 1, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
10 a m		S wall pinnacles	1	W P	8x	f/11	½	5x7
		NE pond, near view	2	"	"	"	"	"
	Summit	crevasses to S wall	3	"	"	"	"	"
		Looking NW at fallen NE end of N lake	4	"	"	"	"	"

T A J

1919, July 1



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JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date July 2, 1919

4 p.m. Main lake quiet, steady streaming from base of cliff near E cone. Grottoes inactive.
Wall crack extended from site of NE cone to old '94 cones on rim. Large grotto in main lake on N side near junction with central pool.
N lake low, looks as if its banks were being undermined.

Roberts.

3 to 5 p.m. E cone fiery and smoky. NE pool dead at 3:20 and 4:20 p.m.
Main lake medium height. Active grottoes W, otherwise crusted. NE cove enlarged.
N lake shows further collapse of walls at E and at S chasm and part of W wall seen to fall.
Crack along rim from NE cone site to N station markedly widened and extended through spatter cones of 1894. N to NW station cracks widened and more numerous. Ground around NW station much broken up. Crack running from NW to W station too wide to jump across; quite hot.
Recent landslide has filled most of N pit off W pond. NW wall of SW lake collapsing; current (6 knots) rushing towards active grotto at E corner. S arm of SW lake all crusted over at 3:30 p.m. Lake level 5 feet below continuous shelf. E chasm shows distinctly. W side considerably collapsed. Central territory looks lower. W pond boiled up for a minute. W pond level perceptibly higher than SW lake. New small hole with molten lava in SW corner of W pond.
Crack between SW station and W end of S pressure ridge a little wider and hotter. S pool still active; solitary crag on pressure ridge above it has collapsed. No change in S arm. SE scarp almost entirely isolated.
Main lake at 4:05 p.m. comparatively lower, E bank within 4 feet of spatter shelf immediately below it. Westward current of 4 knots. W grottoes still active. N lake also lower by a foot and a half. Central pool 6 feet below chasm crust, active surface current to SW lake.
By 4:20 p.m. main lake had dropped another 2 feet.

Thorndike.

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

JOURNAL

Day Friday Date July 4, 1919

3 to 4 p.m. S infacing escarpment still higher, large poised pinnacle has fallen in S gap (fell before July 2). Lakes all lower, main lake highest relative to its banks. Cliffs around main lake about as before relative to liquid. Lake streaming westward. Strong fountaining in W cove.

E cone has open pot boiling and rumbling. NE pond has pot in middle of crust as before, lava inside about 15 feet down and smoke has increased. Chasm in NE heap above this pond wider and extended in direction of N station. Definition of old rim complete all the way from S scarp to old rim on N side of pit. S escarpment shows inward sloping block falling to talus on side toward pit; inside of that the floor is flat and all the flags set up in piles of stones have been lowered in upright position without overturning, showing that the bench magma prism sinks as a unit with almost no differential disturbance.

N lake appears low; has four border grottoes, prolonged continuous central fountains with migratory tendency and streaming toward them. Subsidence indicated at margins. No rhythmic fountain at S corner. S cliff 50 feet high, E 30 feet high, N side a down-broken slope 20 to 30 feet high.

Postal Rift source window nearly dark. Dull red glow in hardened flow bottom of tube. Cupola under cone shows brighter glow but no motion. A small last festooned flow glowing at site of former fountain. Farther down the tube is a new collapsed roof area showing vermiform stalactites and a narrow festooned hardened flow making a sort of longitudinal ridge in the bottom of the tube. Vermiform stalactites were abundant in the source cone also. The cascade cavern in tube farther down was unchanged in form but the interior to the N was faintly cherry red and almost completely dark.

The SW lake was much lower with walls 25 to 40 feet high and inner spatter rim standing 8 feet above lake. Central fountains near N side of lake with streaming toward them. W pond at slightly higher level covered with skin and cascading continuously over a fall about 3 feet high toward the E into a bubbling pot which appeared to be nearly at SW lake level. The W wall bounding the W pond was nearly 50 feet high and the extensions of the pond N and S by collapse were enlarged. The general situation appears to be continued subsidence with the N and SW lakes taking the lead, the bench magma following and the eastern and southern ponds tending to remain highest.

T A J

JOURNAL

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

Day Sunday Date July 6, 1919
Monday " 7, "

July 6.
11 to 12 a.m. Cliff over E cone higher. Southeastern flags now show sufficiently below the observer so that SE crag is visible beyond SE cove pipe monument. E cone buried under slope of talus and new glowing chimney thereby created in the talus.

Main lake streaming westward, height and grotto activity as usual.

N lake shows occasional strong central fountains, glowing and flaring high filagree patch in W wall and the usual four or five border fountains. Depth unchanged.

Postal Rift source orifices nearly dark and hissing resumed in vent at bottom under source cone. The W tube a few hundred feet from source cone has caved in showing abundant worm stalactites. Solfataric fume rising through new flow E of source cone where Postal Rifts are buried.

At night all the lakes bright and general conditions stationary.

July 7.
6 p.m. Fume rather dense. Occasional slight adjustments in wall-crack. Measurements show very slight subsidence.

Glowing puddle and flaming chimney at E cone locality. Main lake streaming westward. Occasionally western spatter grottoes collapse into lake. No changes in liquid levels. Large central fountains develop in N lake and at intervals the crust becomes inflated and collapses with some marginal sinking. Flames abundant in border grottoes and through crust. Streaming southward at S corner and usually northward elsewhere.

T A J

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

JOURNAL

Day Tuesday Date July 8, 1919
Wednesday " 9, "

July 8.
8:30 to 10 p.m. Abundant flames. Lake levels as before. Strong central fountains. Much gradual cracking of crusts with slow development of zigzag bright-lines in long extended lines of cracking. This process especially noticed in N lake. The large fountains which would break put centrally in N lake were first toward the NW and then toward the E, migrating northward and eastward to expend themselves under the bank. Flaming curtained grottoes in both N and main lakes.

NE cove of main lake has become totally crusted and the northern half of the east pool remained largely crusted all evening. Streaming from SE cove westward to large grottoes SW and W. These had built heavy overhang which caved in twice. The isthmus leading to S arm high and covered with Pele's hair.

Glow from NE and S wall-crack pools and from S arm, central pond and western ponds. Some movement heard in E wall-crack. Sinking continues, especially in N central part of pit. Liquid lakes show no changes in relative levels. Some tendency to rapid flow under bank W sides of both main and N lakes.

Glow has ceased in Postal Rift source and flow regions as seen from a distance. Glow at pit moderate. Conditions stationary.

July 9. No more glow seen from Postal Rift flow.

Smoke at Halemaumau rather dense, glow moderate. Measurements indicate slight subsidence about central crevasse region. Tilt record appears to indicate stationary condition.

T A J

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

JOURNAL

Day Thursday Date July 10, 1919

11 a.m. Main lake high. Marginal fountains under shelves along the sides. No building on margins. Slight current toward central pool. NE cone giving out heavy fumes.

N lake quiet. Fresh falls of rock on N side. West lakes very quiet. Heavy fume from W pond.

Wall crack between end of SW ridge and SW flag enlarged and very hot. Central pool small and nearly hidden by shelf of lava.

Roberts.

Subsidence continues.

3 p.m. Wall over E cone 35 feet high. Small lava puddle there and rumbling, glowing chimney in talus a few feet farther S.

General level of bench magma so sunken that one looks across entire surface of central lava from E brink to basin of SW lake.

Main lake streaming westward and about as before. NE pond and crevasses fuming. N lake slightly lower, new curtained grotto NW, trend of streaming toward NW and away from E bank.

Large crevasse trending from NW station in a curve through the two sulphur patches to Postal Rift cone. This crack has moved greatly, the block toward Halemaumau sinking, leaving a wall two to three feet high in places. The crack emerges at the pit end just behind NW station where it forms a tumbled crevasse 10 feet wide and continues as a chasm through the W niche floor to the cracks back of the W station. Forking from it a crack extends on the E side of the W station, also trending southward along the wall-crack of the newer fill.

W pond a crusted oval 50 feet below the W cliff, with two small pots showing the liquid lava about 4 feet below the crust. SW lake under walls 20 to 30 feet high with fountaining in its western cove and westward streaming. What little streaming could be seen in W pond also trended slowly westward.

Climbed S pressure ridge at site of old S station and found lava inside a flat plateau over all the SW quadrant of the pit. The S wall-crack pond was now a deep smoky chasm and the lava could be heard rumbling below but was not visible. The S arm showed a circular pool in heavy crust entirely shut off from main lake and banks and crust covered with mat of Pele's hair. The lava of the pool was glowing and bubbling without currents.

General situation continued very slow subsidence.

T A J

JOURNAL

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

Day Saturday Date July 12, 1919
Sunday " 13, 1919

July 12.
11:30 a.m. Heavy fume from NE pond which almost obscured main lake. Slight hissing from E pot.

Main lake high. Small grotto fountains. Slight current towards central pool. N lake low, fountains in W corner.

W lakes high, very quiet, no current. Lava shelf around W pond increased in size so that pool is hardly visible. Streaming from SW of pond towards SW lake.

Cracks around W station increased in size and making towards NW station.

July 13.
10:00 p.m. N lake very quiet, no central fountains.

Main lake strong current setting SW. Lake surface lined with fire cracks at right angles to current. No heavy crust forming. Activity in grottoes under fallen cliff on SW wall.

Heavy fumes from NE and E cones. Trace of H_2S from N cone?

Faint glow from SW lake. W pond dark.

Roberts.

JOURNAL

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

Day Monday Date July 14, 1919
Wednesday " 16 "

July 14,
3 p. m. N lake high , very little marginal activity. Grotto on N side collapsed and covered with talus from bank. SW lake high and quiet. No action in W pond.
Heavy fumes from NE cone.

Roberts.

3 p.m. Bench magma stationary. No change in general aspect of crater. Fume very dense at NE wall-crack.
Main lake high, nearly overflowing isthmus to central pond. W lakes quiet and crusted. N lake about as usual with curtained grottoes and glow-holes in wall NW and W; and occasional central fountains.
Postal Rift source cone has caved in on top and some fresh splash material around orifice suggests a recent short-lived sputtering below.

T A J

July 16.
3 to 5:30 p.m. Hardly any change. Cove extending W from main lake widened by breaking away on S side. Main lake quiet and crusted. Streaming not apparent. Much smoke NE wall-crack.
N lake cracking and foundering, some very large central fountains, grottoes NW and W. Levels of lakes show little change. SW lake bright at night.
Fume as a whole rather dense. Glow recently has been dull. Postal Rift flow reported still to show glow at front.

Roberts and Thorndike have completed measurements and map of new Halemaumau. This day set up 11-foot tepee tent on NE side of N lake and made tests preparatory to measurements of lava tide. Located pile of stones S side N lake in addition to tent site. This line to control distance of points measured at lake margin. Located another pile of stones N side SW lake for a point on bench magma making sharp night profile against glow from SW lake. Plan to use W station as flag signal for daily observations.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date July 17, 1919
Friday " 18, "

July 17. In afternoon and evening Roberts, Thorndike and Emerson made experimental run of transit observations from tent E side of N lake. Attempted to use tin shields for marks on bench magma cliffs W of N lake but could not see them at night.

July 18.
10 a.m. Continued stationary smoky condition. Main lake fountaining against W bank. N lake quiet, new cone on bank building on W side, three border fountains (W, NW and N). SW lake completely crusted over, hissing from under crust at NE corner. Large pulpit rock separated from ground N side isthmus between W pond and SW lake tending to fall southward. W pond has one circular pool, fountaining on N side. Cenrtal pond a crusted circular pudding without open pool. Near N side W pond depression a large glow heap of tumbled rocks flaming.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Date July 19 & 20, 1919
" 21 to 25, "

July 19 & 20. Preparations made for beginning lava tide measurement from tent at N lake on July 21 with workers Jaggar, Roberts, Thorndike and Emerson.

During these two days no marked changes in Halemaumau which continued smoky and by measurement stationary. The sinking had ceased.

July 21 to 25 this investigation was launched, tents were set up and the men worked in shifts taking observations with transit every 20 minutes night and day. It is hoped to continue these observations for a month and the results will be compiled later. Suffice it to say at this time that the occurrence of strong and continued rising from the first days of the work has given unexpectedly pronounced changes of angle in the measurements made, the whole surface of the lava column doming up quietly and continuously. Throughout it all, to the instrument men camped directly on the bench magma, there have come no shocks of earthquake and the entire movement has proceeded as a pasty flow. The creakings and snappings of the S ridge are in the outer old wall rock against which the swelling lava is exerting pressure.

T A J

JOURNAL

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

Day Monday Date July 21, 1919
Tuesday " 22, "
Wednesday " 23, "

July 21. Strong rise beginning. Fume thinner from NE wall crack. Liquid lava coming up, spatter ramparts forming, flames, blowing and spraying fountains.

N lake building an inner bench, cove NW corner, streaming to E and NW. SW lake bright, pounding against S shore. Driblet cone forming in W pond. Main lake streaming E and fountains E, NE and SE. S arm and central ponds fountaining. Bright puffing vent in bottom of E cone depression.

Bench magma rising, some sliding rocks.

At 2:45 p.m. after series of very heavy rain showers followed by crustings of N lake and spells of cracking and foundering, there came a violent spell of this kind when the whole lake sank suddenly four feet, with hundreds of violent fountains developing which expended themselves against the N bank of the lake. Otherwise alternation in afternoon of crusting and breaking up.

About 7 p.m. N lake overflowed inner bench on its SW side.

July 22. Cascade across crust from S arm to main lake in evening. Falls of rocks frequent from SE wall of N lake. Comtinued strong rising of both lakes and bench magma.

Throughout July 21 and 22 lakes building ramparts and contracting in area. Large gas balloons were blown in the skin of N lake.

At 10:45 a.m. N lake overflowed rampart and these overflows continued until past noon.

July 23. Fume now distinctly thinner.

SW lake streaming to S corner activity. Blowing cone at W pond.

The N lake continued to have spells of overflowing and building up its rim, alternating with marked cracking and foundering and sinking of liquid one to two feet. There were about seven border fountains. Occasionally very large central fountains would form and migrate to the banks and flames were abundant at the border cones. The rising of bench magma had now become very pronounced, amounting locally to 3 or 4 feet per day.

T A J

JOURNAL

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

Day Thursday Date July 24, 1919
Friday " 25, "
Saturday " 26, "

July 24. Fume much thinner. SE crag now in full view again from H.V.O.

Main lake has built large spatter domes E, SE and NE, the E one opposite E cone depression. The N lake in occasional spells, as at 4 a.m., overflowed its benches so as to fill cup all the way to the walls on all sides. Overflows of rim common at other times. Large gas balloons. At times of break up prior to the development of central fountains and strong cracking and foundering, the crisis would begin with hissing gas flames in serrate lines through straight cracks of crust followed by fountainings at same spot which developed into immense turbulent doming and flinging fountain areas. Then would come general brilliant cracking and foundering all over the lake with multitudes of bubble fountains and there would be a sinking spell followed by a quick crusting and recovery.

A heavy fall of cliff rock SE corner of N lake at 8:56 p.m. produced one of these break-ups.

July 25. N lake quiet and crusted in early morning with spells of general cracking and foundering. All night a.m. high spraying fountains from border grottoes in all the lakes.

E cone a driblet spire sputtering and blowing glass through small orifice. Main lake streaming eastward.

SE ridge creaking and rocks rolling down outer slopes. Telescope from Observatory shows that this ridge is being pushed back to the E.

July 26. In morning main lake had overflowed E bank and driblet spire at E cone formed a hooked pipe 6 feet high.

In evening SW lake found L-shaped with banks built in and the chasm leading to the main lake much wider than before. W pond depression all filled by overflooding and no open vent visible. Now a mass of crust. Spatter fling over S ridge, probably from S wall-crack pond. Ridge creaking.

Avalanches S wall of N lake. This lake up and down with tendency to overflow banks at certain hours as shown by tide measurements. Spatter margin 8 feet below E rim of basin and only 4 or 5 feet NW.

Main lake overflowed E bank strongly about 7 p.m. Fountains of main and N lakes in view from H.V.O.

T A J

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

JOURNAL

Day Sunday Date July 27, 1919

Rising continues strong but creaking and tumbling in SE wall less. Main lake has filled up E cone depression and the E cone is replaced by a pond with grotto fountain on W side.

Main lake banks in afternoon 4 feet high, Spatter rims, eastern fountains, current E. S arm cut off. Central pond fountaining at E end and streaming thither.

N lake now nearly level with NW corner of bank and will overflow there first as lowest place. Flooding wide overflow margin NE at times, no such bench under SE cliff. Whole lake cup has thus tilted northward. From tent on NE brink of lake the skyline profile is now the SW cliff of lake and one can no longer see the SW c lake cliffs and profile of near bank of SW lake as before. In like fashion the whole upper surface of Halemaumau floor has risen as an arch as seen from H.V.O. beginning at N base of S ridge and extending to N station. Singular localized depression of central blocks only, recorded by measurements today from H.V.O. Fume from central crevasses quite dense, but almost gone from NE wall crack. No lava or glow at NE wall crack. Glowing cracks opened extending N across floor from N lake. The crack from NW station toward sulphur spots and Postal Rift has partly closed by uplift.

At 10:28 p.m. cone opened N of 1894 spires near N station and made a new flow NNE of Halemaumau covering ground on SE and E sides of source region of Postal Rift flow. This vent now a mere spatter area 20 yards across with flow area radiating from it; at source a hissing crack and heaving slabs and one gas spiracle; a low ridge of spatter also. New flow area W short of Pele's Reception Room cavern; NW short of Postal Rift source cone, which remains dead; NE strong extensive flow has passed to the E of Pele's Kitchen (crater cone) in direction of Little Beggar; E the new flow, a pahoehoe with broken crusts, fills the hollow W of the hut high ground, from there to the 1894 spires, and very close to the old edge of Halemaumau ENE.

Flow now(July 28 a.m.) solid, hot, but easy to walk over.

A. Romberg, who has been experimenting for four days past with a seismograph in Pele's Reception Room (cavern), reports creaking and some rock fall in that cavern July 26-27. The seismograph there has indicated excessive tilts away from the Halemaumau center and towards the north, sometimes sudden or rapid movements.

In the evening the N lake was rather sluggish.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date July 28, 1919

Main lake down in its cup of cliffs; that is, the bench magma is rising more than the liquid. Five-foot vertical walls of spatter bank around lake. SE and E flags have fallen over. Crack from NW station toward Postal Rift is closing as the rising lava column thrusts northward.

In evening the new N flow shows active streams pouring through saddle E of Pele's Kitchen. No visible activity at its source.

SW lake streaming to S grotto and in evening shows high spray at its N side also. Cliffs around main and SW lakes about 25 feet high, SE crag and W walls highest of them.

From 7:30 to 8 p.m. watched main lake. At 7:34 crust broke up and the whole lake streamed rapidly, with two feet or more of sinking, towards the east. Large dome grotto SE, other active marginal places SW, NW and NE, occasional brilliant spraying display E. The break-up happened again at 8 p.m. No simultaneous break-ups at N lake, as recorded by Roberts at tent.

Climbed SE crag and saw S arm a large pool with large stalactite grotto SW corner and streaming vigorously southward. Pond very bright. In the high partition between S arm pond and main lake was a bubbling spring of lava which appeared to well up there and pour southward towards the pond. The rampart around the pond was a 4-foot wall of same character as that around the main lake.

In the night much quiet crusting of N lake and no such frequent break-ups as before.

T A J

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PHOTOGRAPH RECORD

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

Day Monday Date July 28, 1919

t	sta	subject	no	pl lens	scr	stop	ex	cam
X 8:30 a	N	New flow	1	Tessar	8x	f/8	1/2	K 5x7
	"	#4 of lava-tide survey showing transit tent and N lake	2	"	"	"	"	"
10:10a		Transit tent to S wall of N lake	3	"	"	"	"	K 3¼x5½
		Transit tent to W station	4	"	"	"	"	"
								T A J



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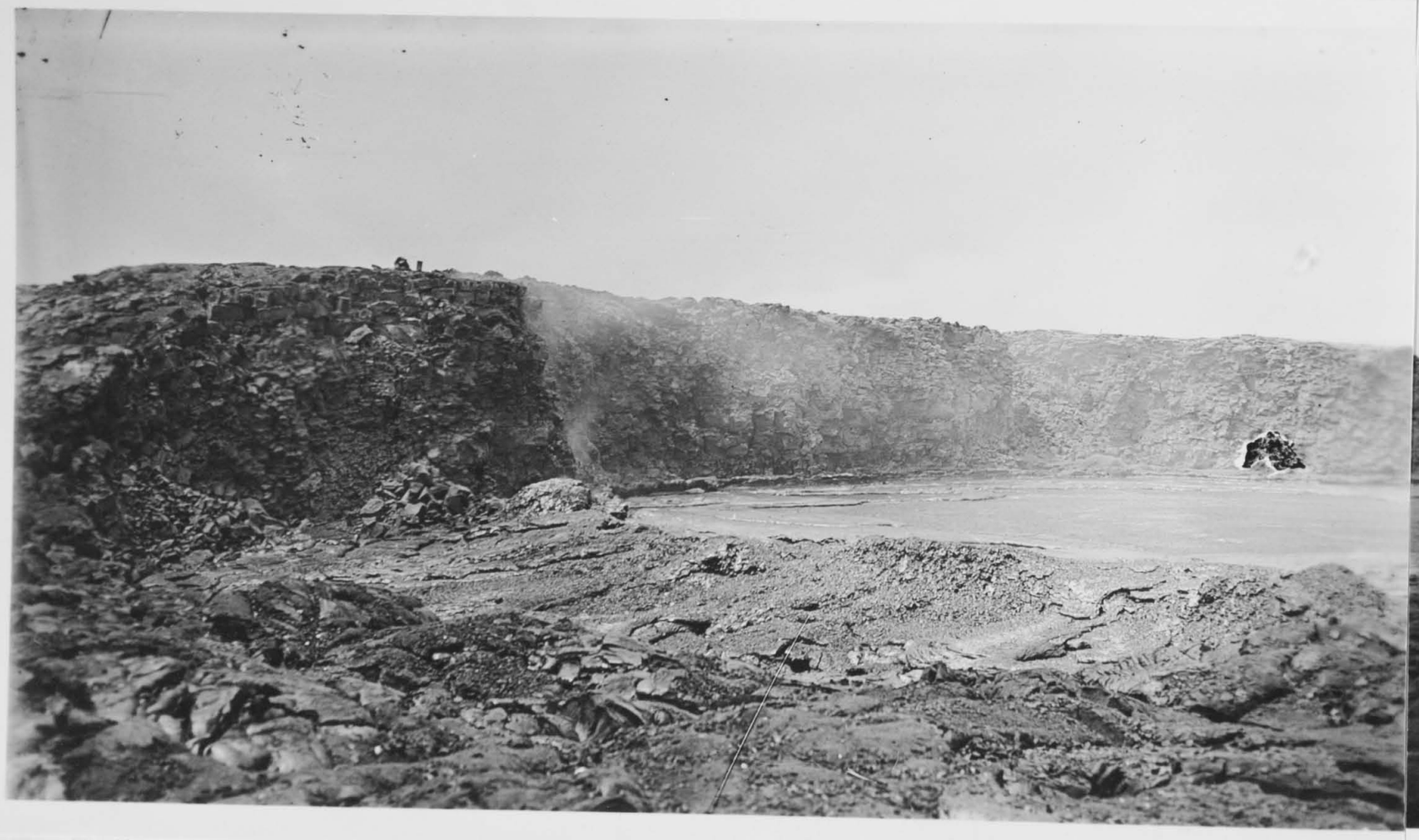

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4

Jag

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1919, 3

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date July 29, 1919

In early morning hours rapid rise of central region, N lake mostly below its rampart until 5 a.m. Later in the day built two very large spatter domes on W side. At 3 p.m. broke up after two hours crusting and driblet flow over N rampart 15 feet.

Central region shows 12 or 15-foot rise in a day according to H.V.O. measurements.

N flow moving slowly. NE ridge of bench magma between main lake and NE heap remnant has risen, cutting off view of tents at E side of N lake as seen from automobile approach above E pond. Latter now a small crusted circular pond with some hissing. S ridge has risen greatly forming new outer talus.

Note that the N lake has no spatter bench on S cliff side owing to being tilted in its cup northward and so doing its overflowing N and its bench building N. It must be receding or lowering on S side, though that does not show in apparent height of cliff. The cliff has been scaling off there, owing to incessant tilting northward of its face past the vertical.

In afternoon tramp with Romberg to hunt caverns suitable for a seismograph in E region towards Kilauea Iki and S to Lee's Pit. Found several caverns, some quite hot, with species of blue-green algae which appear different from those of the ash cliff. One good cavern chamber, a "bubble", facing the E fume slope on wall of Kilauea, on E side of the NE plateau.

N flow toes glowing and N lake fountains bright from H.V.O.

T A J

JOURNAL

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

Day Wednesday Date July 30, 1919

The large dome grottoes of N lake and central fountains t there in full view from H.V.O. in daytime. This lake high and overflowing at noon. Lava surface very high, the S ridge, SE cliff and W central walls being the three highest points of the rising dome of bench magma.

The swelling continues so that in evening the W station nearly shut off from view of N lake tent by W wall profile of N lake. N lake has a nearly circular rampart with evenly spaced grotto domes, about twelve. Strong overflows in night from N lake and from main lake E. Main lake rampart wall 8 to 10 feet high in evening with dome grottoes 12 to 15 feet above lake. W cove deeper, but partition from central pond persists.

Castellate group of crags has parted from wall W side of NE cove and great chasm open extending NW from NE cove. All these central crevasses yawning open from uplift, wide gorges between main lake and the other two lakes.

New N flow moving at front, a snaky trickle a little way down slope E of Pele's Kitchen. Only a hissing vent at source; gas pressure there strong.

Motion, creaking, and tumbling of rocks continues at S ridge; occasional small falls of rock from cliff S of N lake.

T A J

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

JOURNAL

Day Thursday Date July 31, 1919

6:30 a.m. Main lake higher, liquid across isthmus leading to S arm, streaming into S arm. Rampart only 5 to 8 feet high. N lake has filled high behind its rampart so that new surface is only 10 feet below tent ground. General effect of the uplift is to close crevasses outside of Halemaumau rim limits and open them in central region.

No tremor whatever felt in tent lying in cot 100 feet from NE side of N lake, though the deep rumble of the fountains can be heard plainly. Standing on the rampart, or on the cliff adjacent to main lake on the east, tremor can be felt from fountains under the bank below.

S wall in motion.

11 a.m. Flow through S ridge at wall pond locality with trickle tube down wall and flow pooled and extended in two lobes each 100 yards long, one headed due S on E side of tunnel ridge of 1918, the other W along base of pressure ridge. Smooth "syrup" pahoehoe like the other flows with a cascade at their source. S wall in motion.

W pond floor has a driblet cone of the barrel shape spouting and lifting a lid on N side and flowing sluggishly and making Pele's hair. SW pond elongate, low within its rampart, not especially active. N lake sluggish and reported to show sudden sinkings (Emerson) without cracking and fountaining.

Rigged a pole for signal at W station in case it goes out of sight as the lava dome rises, during the tide measurement.

In afternoon striking thunderhead and anvil clouds over Mauna Loa both yesterday and today.

The rising and falling N lake has changed from the heavy crusting and sudden bursting and sinking to balloon skins and more or less open soft surface, with the same spells of bubbling and sinking at intervals. This means that the accumulation and release depends not on surface crust but on the upper viscous layer at all times subject to thickening by radiation cooling and gas expansion. Is the thickness of the crust a function of convection stirring, this being at a maximum when sinking is in progress?

6:15 p.m. It is conspicuous that the ENE rim of Halemaumau, just N of E pond, is pushing up into a new pressure ridge, with rounded profile on outer side. The lava surface inside is lifting strongly and evidently lifting the E wall-pond bodily, though the latter is raised also by numerous overflows of main lake.

On passing S pressure ridge saw large boulders roll down in two places and heard creaking.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date July 31, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
6:30a	NE bank to SE crag main lake		1		8x	f/8	1	P
	" "	S ridge	2		"	"	"	"
	" "	tents and new flow	3		"	"	"	"
	E rim	Main lake	4		"	"	"	"
	" "	S ridge	5		"	"	"	"
	Trail	S ridge W	6		"	"	"	"
11a.m.		New S pond overflow through S ridge	7		"	f/11	½	"
		S pressure rim, overflow from W	8		"	"	"	"
	W	W pond cone. Spouting, flowing and lifting side lid	9		"	"	"	"
	W	Panorama of SW lake	10		"	"	"	"
	W	ditto, S end	11		"	"	"	"

T A J

1919, July 3



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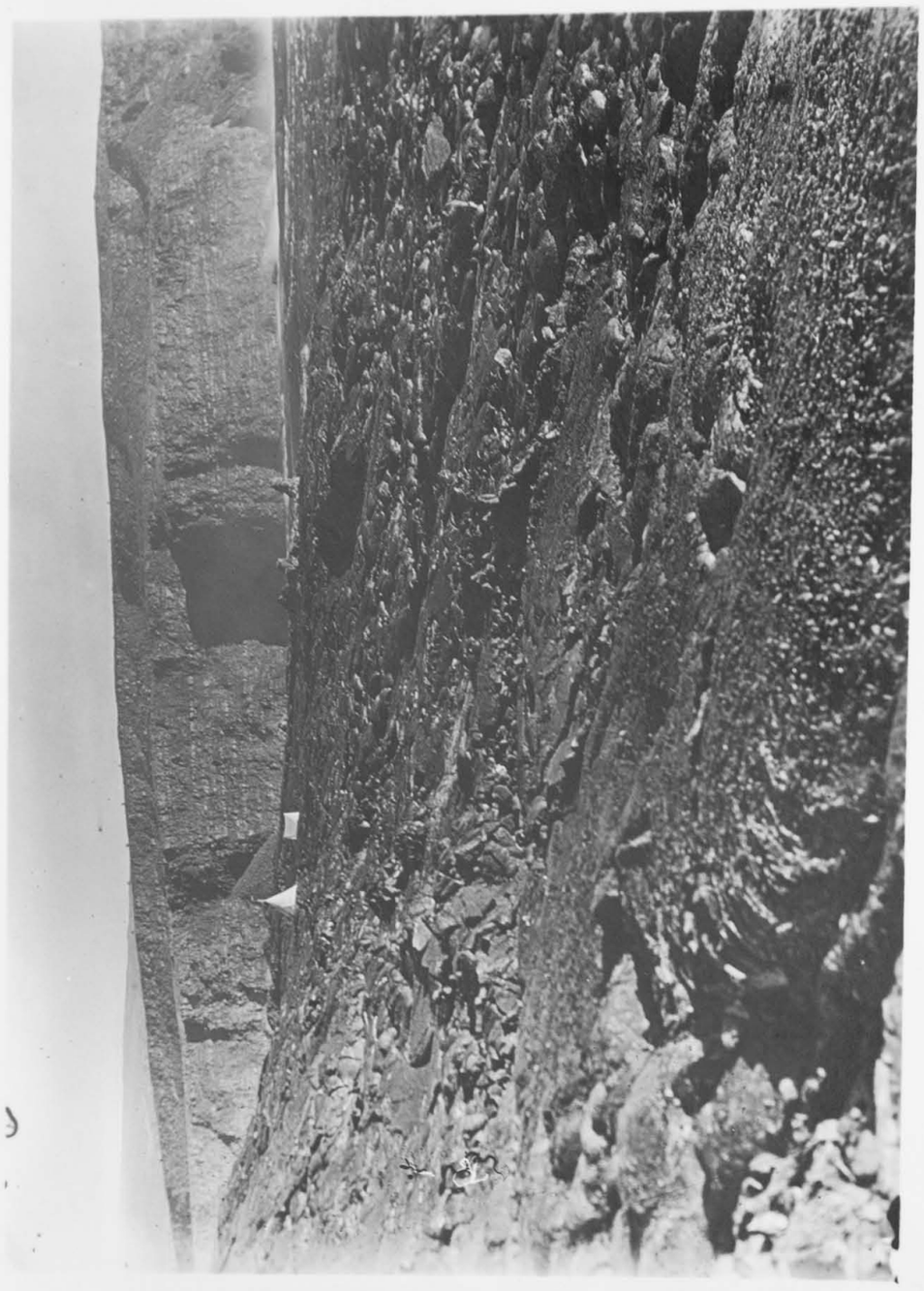
1919, July 31

1919, July 3



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11



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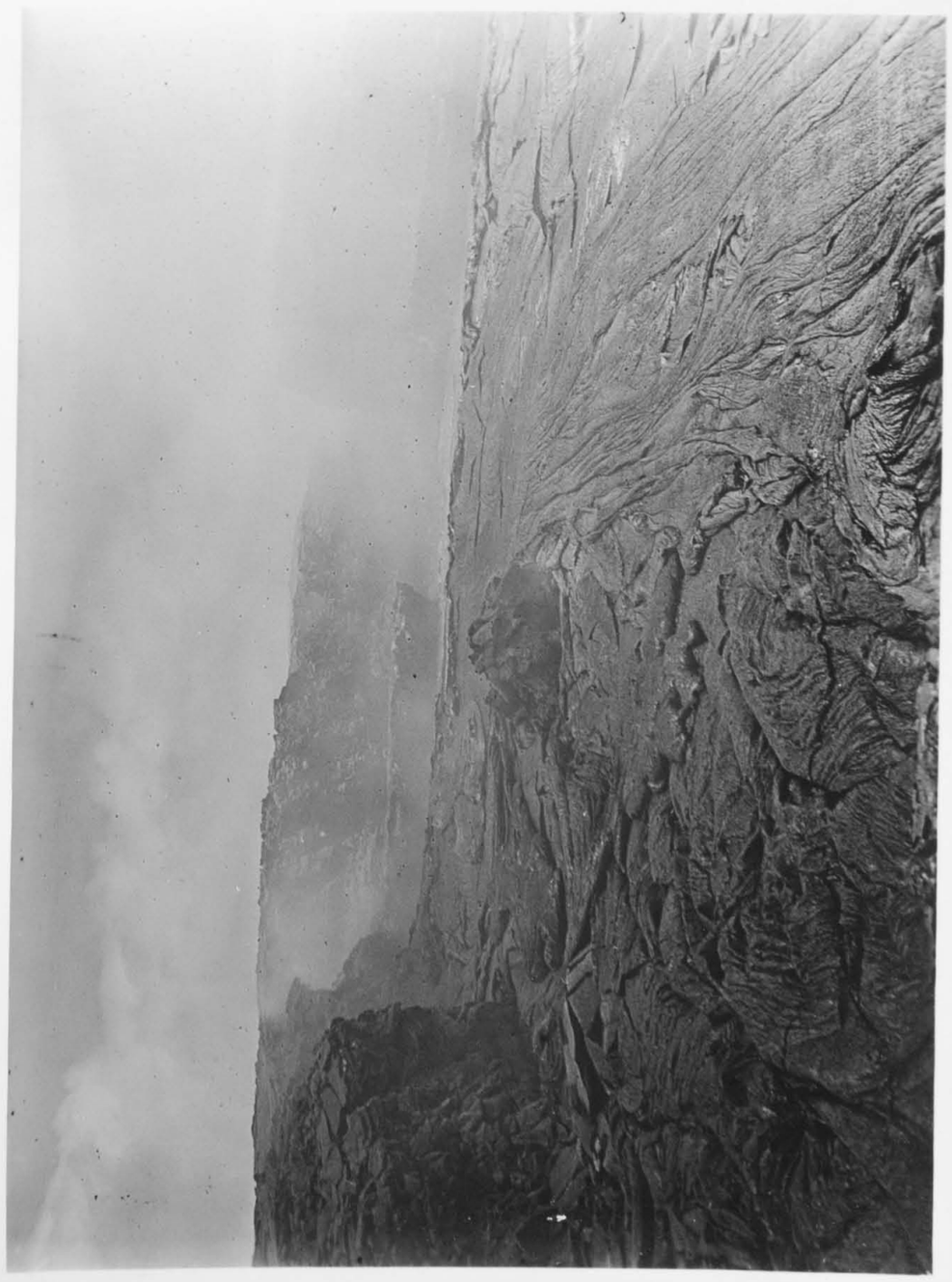

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JOURNAL

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

Day Friday Date August 1, 1919
Saturday " 2, "

August 1. At 6 a.m. no motion observed at S ridge. ENE pressure ridge markedly higher. Inner lava surface about E pond higher. S floor now greatly domed up, skyline from NE edge of Halemaumau, and cuts off view of inside S wall. Main lake view cut off within its rampart wall. Lakes brilliant and overflowing in night.

N lake has overflowed older ground near tent 30 feet from bank. Extensive flows NW which soon will be through gap to NW wall valley. Inner floor or ring platform of N lake wide E, N and NW; along base of lifting S cliff only a broken shelled off spatter scar 3 feet high.

Now using (began last evening) pole on W station for signal as the concrete post is nearly cut off from view.

The castle crags W side NE cove have collapsed. There is now central smoke and some smoke W and S. No revival of flow through S wall which was short. The N flow continues to make toes glowing at night.

The rising and falling of N lake threaten to cut off view of liquid from transit tent, so high is the rampart.

August 2. In early morning hours lakes stagnant. Before 6 a.m. rising N lake. In forenoon an overflow of rampart N lake. Afternoon reported spectacular but low. In evening the N flow increased at front with several lobes glowing in filagree pattern. Source cone hissing.

Glowing cone hissing at E pond. Latter level with E rim of Halemaumau nearly. Rising dome of bench magma continues. The E bank of main lake as seen from E rim of Halemaumau now crag like in appearance. The lake inside its cup of raised rampart material preserves its level 6 to 8 feet below the inner wall. Streaming from W to S arm and to E bank. S arm continuous with lake.

In evening lakes moderately bright, two fountains of N lake in full view of H.V.O., flaring in S arm.

Smoke from Halemaumau moderate. The dome shows pronounced rise.

Notably strong continuous tilt W!

T A J

JOURNAL

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

Day Sunday Date August 3, 1919

9 a.m. Swift streaming from central pool main lake into S arm Grotto at end of S arm 20 feet high. Central pool a long arm connected with main lake. Wall between central pool and SW lake standing but low and cracked. Lava streaming from the base of this wall. Shaft on cliff between main and N lakes glowing and puffing. New spray all over the rock at top of this hole.

New small flow of lava from E cone pond. W pond overflowed towards W station.

Roberts.

N flow swelling all over its source region; source vent glowing and hissing; toes pushing down slope both E and W of Kitchen and in the evening spraying gas spiracle in a live lobe of flow just E of Kitchen.

N and W rims of Halemaumau appear again strongly pushed up and tilted back. The crevasse extending NE from NW station closed and its walls compressed locally into pressure ridges.

N lake rather low in evening. Main lake continuous with S and central ponds. A pressure dome arched and more or less broken at NE base of steep slope leading up to high ground of central crevasses.

Mr. R. H. Finch arrived from Washington to become first assistant at this Station, and he at once joined the force of workers at the transit tent, making five men available for the shifts instead of four.

T A J

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

JOURNAL

Day Monday Date August 4, 1919

The uplifting movement has now created a new pressure ridge ENE and the E pond flows are level with the E brink of Halemaumau, with the E cone restored and puffing and glowing on the surface of the crusted pond.

The N lake for the twenty-four hours ending at noon had risen and fallen within its rampart so as to make it difficult to see the liquid edge at the measuring station. It therefor became necessary to move the transit station and a new canvas hut was built on the high broken ground a few yards N of the N lake commanding a good view of the W station and of the two lake-edge points and the lantern box at the cliff summit SE of the lake. Work of measurement was suspended for about six hours and resumed at 7 p.m. The lake tended to rise towards evening.

The main lake was streaming majestically from the central pond cove, now continuous with the lake and probably continuous through the chasm all the way to the SW lake. The eastward radiation of the bright lines in plan with river-like flow into the NE cove and S arm, and all isthmuses gone, suggested the similar E flowing fan-shaped streaming which was photographed in the late summer of 1916.

Roberts reports a deep pit in the central crevasse region with a spouting lava cone in its bottom.

The E bank of main lake and the region to the S are lifting rapidly into craglike masses which rise between the observer and the lake as he approaches from the E rim of Halemaumau. The cliffs around main lake are comparatively low, 10 to 20 feet high, except SE and W.

N flow continues to swell and push forward, partly over the surface of upper part of Postal Rift flow.

Rising and overflow have necessitated removal and replacing of the tents where the transit observations are in progress, but this has been done without serious interruption of the work of incessant measurement of the lava tide night and day. The measurements every twenty minutes have now been continued nearly three weeks.

T A J

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

JOURNAL

 Day Tuesday Date August 5, 1919

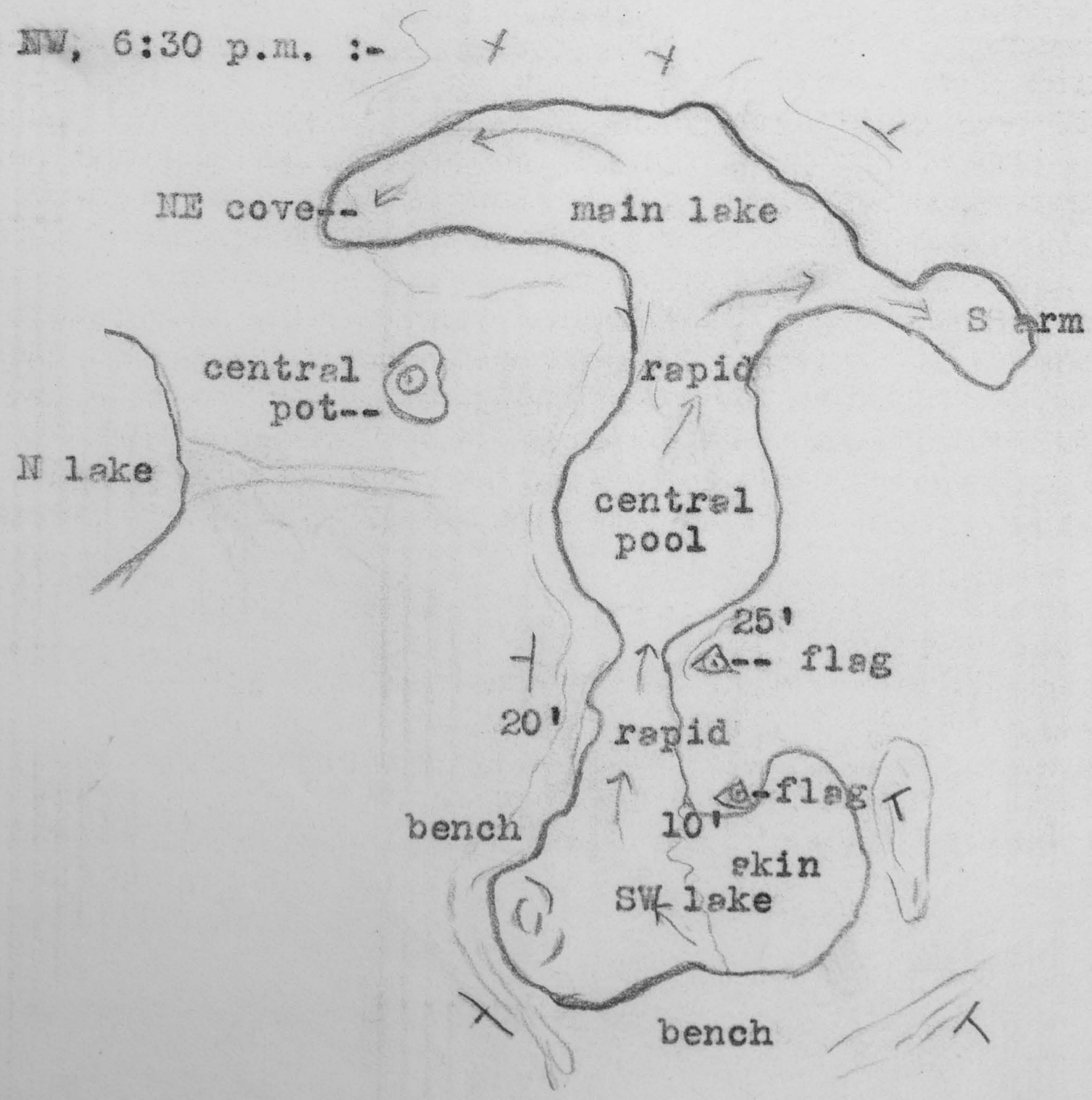
Strong movement upward in night and early morning with overflows of the N lake. Main lake at 6:30 a.m. streaming with typical radiation bright lines in a river-like torrent from a center at the chasm leading to SW lake. Streaming eastward where the currents flare out to pour into the NE cove and the S arm. E bench 5 feet above lake and ramparts still high. E cone puffing and flaming.

Some motion in S pressure ridge, the outer face of which is very steep and summit over 40 feet high. The ridge shows two concentric walls, one within the other as seen from the S. The movement has been so strong as to completely destroy the plastered tube and flow lava of the saddle which gave vent to the lava flow of July 31.

At about 9 a.m. the N lake overflowed voluminously on all sides and poured through the gap into the NW wall-valley.

In the evening at 5:30 p.m. the approach to Halemaumau from the SE revealed the fact that another cascade had poured down the outer wall from the S wall crack and a large live cone surmounted the wall and was spouting at intervals. Exploration SW showed a new flow of fragile crusts which had poured from the W pond flat probably last Sunday at the same time with the flow which had poured from there along the wall-valley under the NW station. The overflows of the NW corner of the N lake have also poured down to foot of cliff under NW station.

From NW, 6:30 p.m. :-



JOURNAL

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

 Day Tuesday Date August 5, 1919

The SW lake rampart on the W side showed a distinct downward inclination from S to N and the streaming in the lake swept in the same direction, the southern part being crusted over. Inspection of the lake from its N margin at cliff showed conditions as in the accompanying sketch map, the SW lake now drawing in a surface torrent continuously through to the main lake and S arm. There were standing rapids at the narrows leading to the central pond and a current less swift from the central pond to the E pool. Another rapid current poured from the main lake through the narrows into the S arm where a very large grotto dome receives the final downrush of the circulation. This in turn possibly follows a tunnel westward back to the SW lake. The recent sudden change of habit in the main lake from crusting spells to bright line streaming was coincident with the yawning open and breaking down of the chasm which admitted the flood from the SW lake. If we consider that the NE cove connects through with the N lake by the tunnel line revealed during the recent cascading spell, it becomes evident that we have a circulation in lyre-shape from W to E and back by looping N and S quite similar to the symmetrical circulation of the lake of 1916-17.

The present joining together of the lakes and establishment of a larger area of surface circulation suggests the beginning of a break-down which may again unite all the lakes into one.

During the night the N lake had increasibgly high spells which culminated in strong overflows early the next morning.

T A J

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

JOURNAL

Day Wednesday Date August 6, 1919

About 4 a.m. the N lake again overflowed into the NW wall-valley and this continued until 6 a.m.

About 5 a.m. the S wall cone was again overflowing and sending double cascade down the steep outer face of the pressure ridge and this spread as is usual with these cascading flows in thin liquid glassy lava making glistening toes of dense consistency. This whole series of S wall-pond overflows has been in marked contrast to the SW lake and W pond overflows, the southern ones being always heavy, smooth and glassy, the western ones light, frothy, brittle shells. Many of the NE wall-crack flows have also been of the heavy glassy variety, while the flows which welled up at the Postal Rift have been very massive but not especially smooth. In general it may be said that the character of the pahoehoe is not related to the geographical situation of the vent, but rather to the manner of its outpouring. In general cascades from wall-cracks and cones are heavy and glassy; overflows of lakes are apt to be frothy and break down as thin shells.

The overflowing of the S wall-crack was repeated in the evening at 6:30 ,p.m.

During the night August 5-6 the N flow was puffing at the source and glowing brightly at its fronts. Its progress was mainly over the upper part of the former Postal Rift flow on the W side of Pele's Kitchen.

About 3:30 p.m. the N lake again overflowed voluminously and in the afternoon it was very high and fountaining brilliantly. It had built up its ramparts with large dome grottoes.

On this day R. H. Finch, assistant at the Observatory, took part in the tide measurements at the N lake. These measurements continue from the new station and already the building of grotto domes cuts off the view of portions of the liquid lake. During the present uplift both the N and W stations have again been upheaved and the arching of the N part of Halemaumau dome has already cut off the view of the lantern box, station No. 4, from the W station whence its changing location was to have been triangulated. All of these movements increasingly complicate the location of the stations used for tide measurement . NW station now used for locating No. 4.

T A J

JOURNAL

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

Day Thursday Date August 7, 1919
Friday " 8, "

August 7. In the morning, 9 to 10 o'clock, there were extensive overflows of old bank NW and E from N lake. Roberts at the tent found it necessary to remove the sleeping tent to a new position farther N as the overflow came near the guy ropes. This E overflow extended 200 feet NE down slope to the very steep margin of the uplifted bench magma just SE of old N station. Here there is a steep downward bend leading to the flat 1918 fill of the old 1894 bench region, back of which the wall remnant still shows one to three feet high. The bench magma uplift here rose as an arcuate bend in the crust of magma itself, but did not exert a crushing pressure to make a pressure rim. S of the NE pond locality a distinct pressure rim and this very high all around SE, S and SW. The NW semicircle of Halemaumau wall, however, outside of the rim, has gone up and tilted back out to the N flow source at least. The thrust, therefore, has taken hold deeper down.

Main lake depressed within its cup, E end rising steeply into ragged crags, course of cascade tunnel from NE cove to N lake breaking down into a continuous chasm.

August 8. Note great eastward extension of Postal Rift flow (new N flow). The glistening glassy pahoehoe flow of S ridge has spread in numerous lobes and built up a heap around S wall-crack cone, the lobes covering all upper part of trail from auto terminus. Main trend eastward; flows hot and making toes but can be crossed.

Main lake notably down with reference to margins; high (15 feet) inner bench S side. Probably rise of the margins. A clinging horizontally bedded bench all around 15 to 20 feet high in places; higher S and E than on the N side (10 feet).

N lake brimming high at 1 p.m., up and down during afternoon. Strong avalanches making new gulch SE wall of lake 5 to 6 p.m.

In evening S wall flow seen pushing across trail.

T A J

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

JOURNAL

Day Saturday Date August 9, 1919
Sunday " 10, "

August 9. Lakes very bright at night a.m. N lake with brilliant fountain domes that could be seen from H.V.O. N flow Kilauea floor bright and advancing mostly W side, some on E. Glow in S wall flow. Rising of bench magma has continued as measured from H.V.O. Avalanching S wall of N lake began in evening and continued in hight, making a new gulch in direction of central pot on E side of central block of crevassed area, as well as extending the older S chasm gulch of S corner of N lake.

N lake quite high from 6 to 7 a,m. Breakdown of rampart domes has been general, the only large remaining ones being NW and W.

Main lake has bright lines and eastward streaming; banks 10 to 15 feet high. Grotto active E. E cone glows and fumes. Continuous steep upgrade now from E brink Halemaumau at NE end of SE pressure ridge, up to edge of main lake and E cone lies on a wide crevasse in the upswollen slope, the outline of E pond no longer distinguishable.

The general lift has brought the Hut increasingly into view and from the N station escarpment there is a steep slope down to the field of Postal Rift flows. This field now greatly swollen and spread out far to the E.

Night p.m. N lake low, rising of bench magma less. Collapse of entire SW rampart under wall took place slowly just before midnight accompanied by a sudden tilt of ground southward at transit tent. Lake very low remainder of night. N flow quiet. Possibly one or two small quakes felt at sleeping tent.

August 10.

6 a.m. N lake rising slightly. SE chasm increasing by rock slides.

6:30 a.m. Main lake found streaming strongly <u>westward</u> through the narrows leading through central pond and SW lake reversing the grade of surface which up to now has made rapids flowing eastward. Fumes slightly increased.

6 p.m. Main lake again streaming eastward.

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

JOURNAL

Hawaiian Volcano Observatory

Day Monday Date August 11, 1919
Tuesday " 12, "

August 11. Strong revival of new Postal Rift vent. At 3 p.m. a fountaining gush of flowing there reported. In evening a cone developed which spurted high jets of spray and a new flow heap all around it on surface of former flow for several hundred feet around cone.

Occasional slips of rock. N lake low, rising somewhat towards midnight.

August 12. At 6:30 a.m. main lake streaming E; also at 7 p.m. Streaming from SW lake through narrows to main lake continues. Fresh driblet trickles through gap in S pressure ridge from S wall crack. Strong lift of bench magma has made great widening of central gulches and hot cracks N of N lake; made a new mound of ground W of transit shelter on N side of N lake, cutting off view of transit from NW station; and lifted farther the ground around N station and 1994 spires. North B.M. now tilts N 10°. Great increase in ENE pressure ridge and in steepness of slope up to edge of main lake from E cone. Cliffs E and S of main lake 20 feet high. Block of ground between the two gulches extending S from N lake is stationary and flat and perhaps subsiding. Noon overflow SW of SW lake.

At 4:30 p.m. sudden marked general rise of lake magma with overflow NW and E of N lake and torrent in triple cascade from S wall-crack making a rapid flow S around Hal. S station, with broken pahoehoe slabs and aa tendency, toes of heavier lava, but not the glassy lava of the other cascades. As the cascade flowed it was mottled with black and fell in crumbly fashion with the background shown through the interstices of the falling melt. Started with standing fountain at S wall-crack cone. Flowed for 45 minutes more or less.

Postal Rift cone hissing and toes flowing. Flow has entered and broken down the seismograph cavern (Pele's Reception Room). Cone 8 feet high with gas spiracles.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date August 13, 1919

6 a.m. to noon. S flows quiet. Main lake streaming E. NE gulch full of tumbled rock, continuous through to SE gulch of N lake. 30 to 50 feet wide. Beyond N lake extends a gulch 20 feet wide narrowing to chasms under N wall of Halemaumau. This gulch trends to S charm of N lake. All these gulches have yawned open with the swelling up of Halemaumau dome; began as glowing cracks. As they cross the N lake, this seems additional proof that the lake is shallow and the several lakes are mere openings in the top of chasms.

New Postal Rift cone puffing continuously and new swollen flow around it. N lake rose high about 8:30 a.m.; was brimming, then sank again.

The uplift has raised the transit shelter so much that Pele's Kitchen is again in view, where it was entirely cut off by the new flow two days ago.

In the evening, 5:30 p.m., another rise of N lake to slight overflowing, then deep sinking during night with inner wall of rampart 15 feet high. Dense puffing fume from gulch between SW wall of N lake and NE cove of main lake; some avalanching in this gulch during night.

Postal Rift cone spurting at midnight and flow all around it alive and glowing. Main lake still streams eastward. Central pomd region very bright at night.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date August 14, 1919

SE crag had greatly sunken in morning as seen from H.V.O. N lake recovering and near top. Postal Rift cone a high spire and puffing. About midnight a.m. earthquake shock felt H.V.O. View from H.V.O. shows SE crag gone from the profile; W central crag very high; dome where tents are N of N lake very pronounced, its curve continuous past N station to Postal Rift flow.

6 p.m. The sinking of SE crag block took place about 3 a.m. this morning in that a rift broke open in north-south direction on E side of block allowing the uptilted summit surface to fall back to horizontal and leaving the block a square island-like mass 25 feet high standing midway between S arm pond and main lake with a channel now on each side of it. Flag pole on top destroyed. The movement was rapid and seen by visitors; small earthquake shocks felt in immediate vicinity. No disturbance was noted at the transit tent. The crack which opened is virtually a southern continuation of the fissure line which extends from the NE cove N and S. The main lake now found streaming eastward through the central channel like a river with cliffs 15 to 30 feet high, current flaring out in NE cove and SE shore, latter shut off from S arm. Large dome grotto is developing on SW side of E pool. Standing on E brink of lake one can look S through the new gap to S arm pond and see the immense dome grotto there, inactive, 20 feet high and 40 feet broad.

N lake now (6 p.m.) high and dribbling over. Fresh flow from Postal Rift source eastward, flow cone glowing and puffing mildly all night. Toward midnight N lake sank low and grotto ramparts fell in SW and SE. Rising and falling now is less spasmodic than at the end of July, the changes coming more frequently and lake surface more continuously broken up.

Bench magma dome today shows first pronounced subsidence of one foot or more since yesterday. Flows around Postal Rift cone source have spread and are pushing some distance toward SW as well as toward NE.

Smart earthquake reported in Hilo about noon.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date August 15, 1919

6 a.m. Main lake continues streaming and flaring eastward, ramparts 6 to 12 feet high, long grotto dome SW, region W side SE island has almost completely flooded over the former sunken crag there which in June broke away from S flank of dome. S arm pond still shut off though lake brims close to level of the two crusted isthmuses E and W of the SE island. N lake rose high at 4 a.m. and Finch suggests that these risings recently have been close to the observed transit of the moon across the meridian of this place, these being full-moon nights.

At noon the pit was very quiet , the N lake rather low, the main lake streaming eastward, the Postal Rift cone hissing very slightly. Ground around this cone swollen into schollendomes, the cone itself occupying a hollow in these swellings and being about 8 feet high above its own base.

During the afternoon the angles at transit station indicated a swelling of the humped ground N of N lake so that the transit was tilted northward while at the same time the center of Halemaumau also rose. This tumescence culminated at 6 p.m. in a rapid rise of the lakes, so that the N lake overflowed quickly and voluminously and sent long streams both eastward and northwestward . The E stream poured in a torrent down the slope to the 1894 bench region and beyond, filling a tract of ground on the E side of the old N station/ The flow lasted about a half hour. At the same time the main lake was very full, its E end only about 6 feet down and making gigantic spraying fountains. The streaming as usual was vigorous through the channel from the SW lake to the E pool. The E cone which had recently built a heap of gas spiracles alongside of the former cone had now become entirely quiet. The S wall-crack cone was hissing and flaming.

In the evening the Postal Rift area was nearly dark. A voluminous long flow poured S from pressure ridge.

The evidence from occasions like this one seems to indicate that each pronounced spell of localized overflowing is preceded by a rapid localized tumescence at the point where the overflow is to take place. If this generalization is verified it will have an important bearing on the whole question of the relationship between gas effervescence, bench magma and lake magma.

T A J

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

JOURNAL

Day Saturday Date August 16, 1919

During night a.m. some bright glow at Postal Rift cone and glow spots at S wall flow. Main lake fountains visible from H.V.O. Glow over S wall-crack. N lake fountains brilliant in evening (15th) but less so later.

At 6 a.m. no visible flow but much heat from flow beneath S wall-crack. Main lake streaming E and S. Large dome in S arm pond again active, fountaining within. N lake with 6-foot wall of rampart. Postal Rift flow greatly swollen into dome tumuli. Last evening's flow E from N lake about 600 feet long, now solid. During morning bench magma rising. Postal Rift cone hissing.

The transit shack and cot within it have been tilted E strongly in two weeks. The cot tent has been tilted NE.

A strong flow formed two new cone vents about 3 p.m. 100 yards W of new Postal Rift Cone (the inflated flow area around latter collapsed to glowing caverns) and a voluminous liquid flow rushed in streams and delta lobes all the way to W wall of Kilauea and filled there all night. Much the most rapid and voluminous flow to date. Flow spectacular and streaming all night. Immediately the N lake sank rapidly until it had walls 30 feet high below the overflow bench. Many tumbles from the ramparts and the two S gulches. Main lake also low, streaming still E and NE, open arch to S arm pond on E side of SE island.

During last twenty-four hours much tumbling from S pressure ridge. Cracks around transit tent yawning open and growing hotter.

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JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Sunday Date August 17, 1919

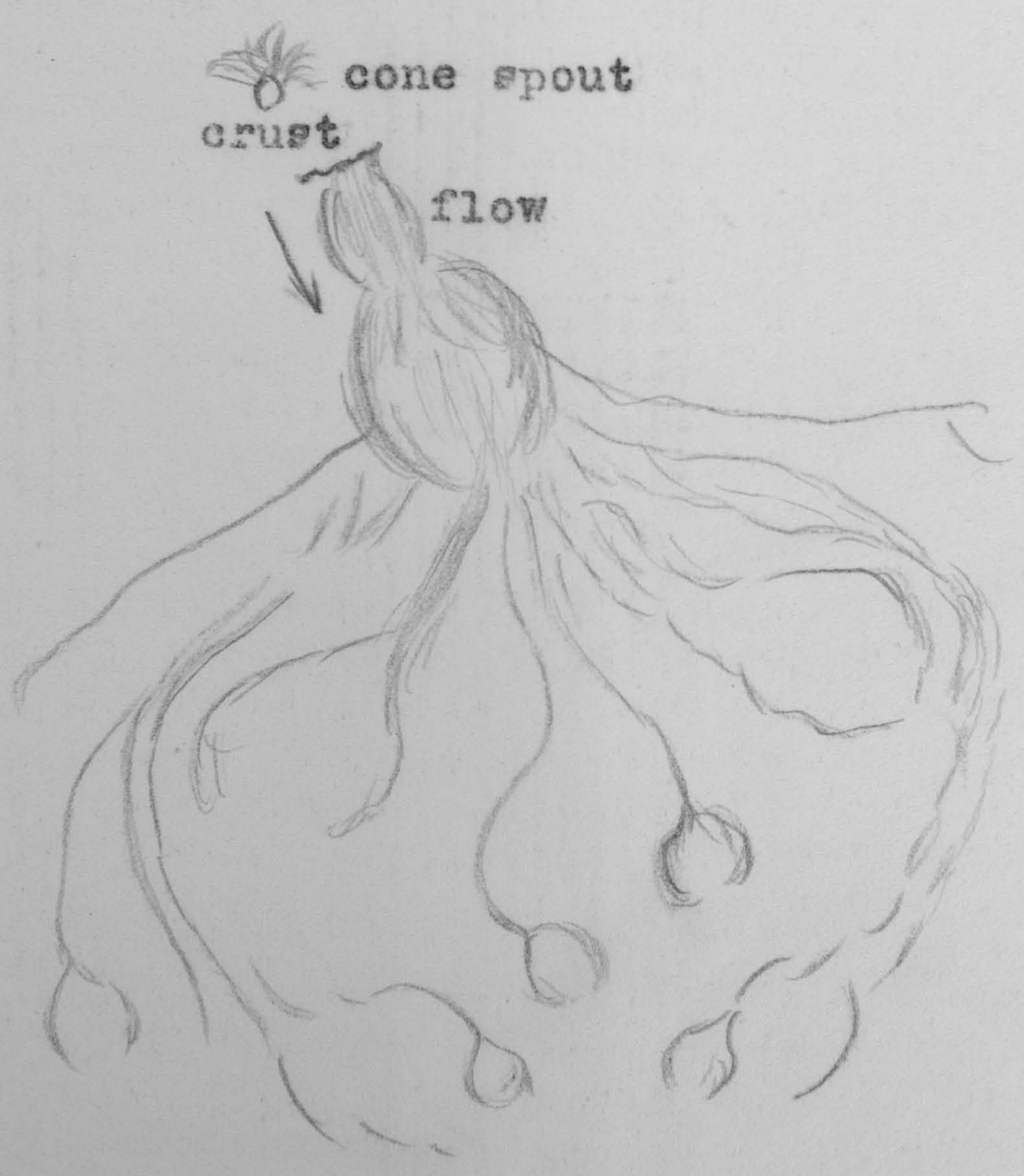
Lakes remained low with some recovery and some spectacular fountaining. New N flow source pouring all day, intense revival about 5 p.m. and new flow with stem and delta front pouring W on top of former flow all night, very brilliant from Uwekahuna. Note tendency to lobster-claw form in plan of the flow, seen both in the large and small units.

Main lake streaming E; N lake streaming out from a tube under the S chasm and bubbling continuously in front of the SE gulch; bright-line pattern and no hard crusting.

Bench magma much lower since the rapid N flow started yesterday. The sinking of center of Halemaumau dome shown by tilt S of upper mark of rampart wall around N lake. Also in main lake, E bench high, center benches much lower.

In very early morning an immense fall of SE rampart of N lake, making a high puff from lake.

Diagram of lobster-claw tendency in flows:-



T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Sunday Date August 17, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
2 p.m.	Transit	shelter looking SW	1	W P	8x	f/11	½	P
	Ditto	to E side N lake	2	"	"	"	"	"
	Ditto	to sleeping tent and new flows and Pele's Kitchen	3	"	"	"	"	"
		Transit shelter interior 25 feet away	4	"	"	"	"	"
		Near view N flow sources	5	"	"	"	"	"
N		new flow (moved)	6	"	"	"	"	"

T A J

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1919, Aug



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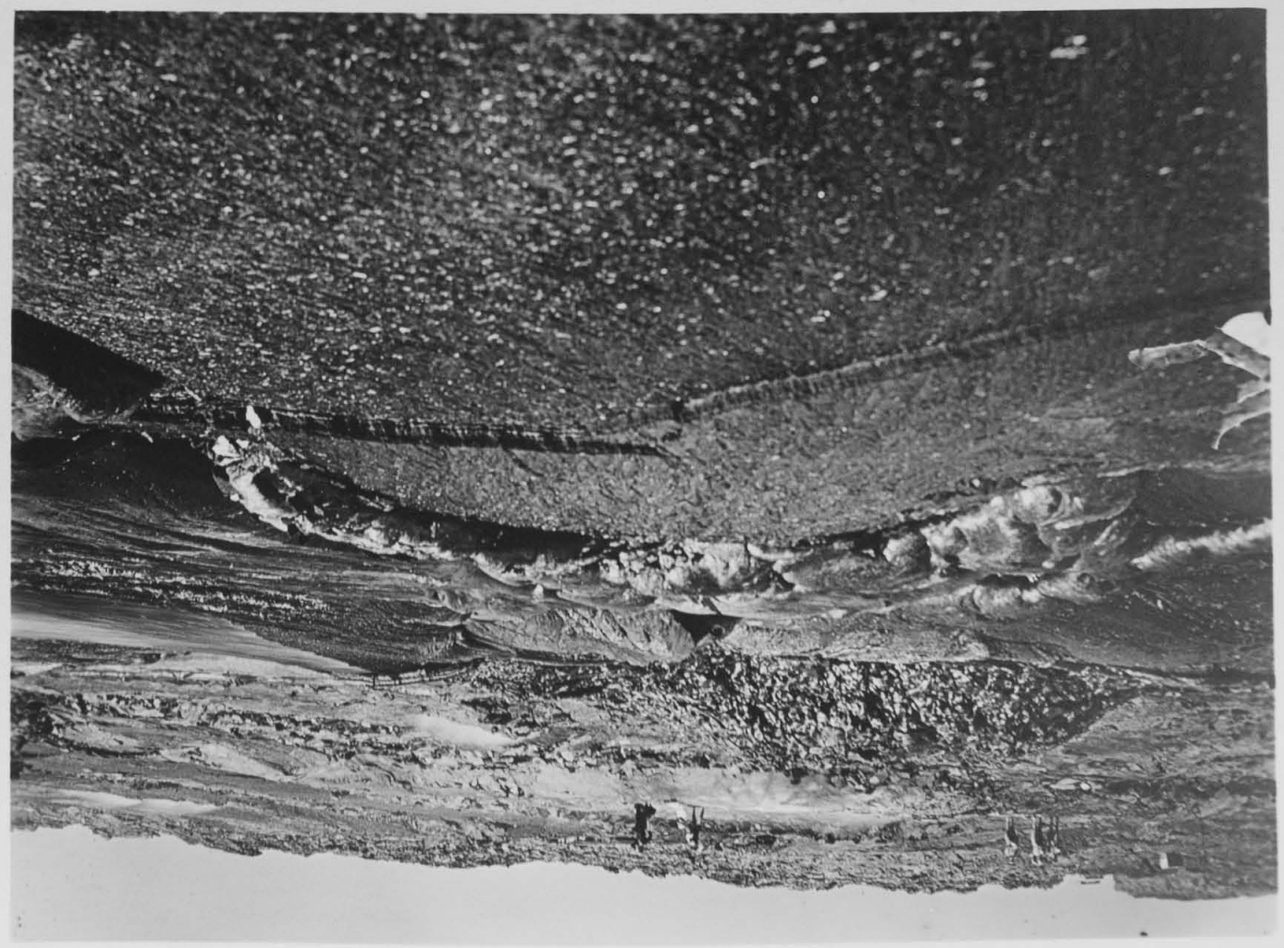

1919, Aug. 17

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JOURNAL

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

Day: Monday Date: August 18, 1919

About 6 a.m. the main lake appeared very low, the E rampart wall about 30 feet high or more, and the cliff blocks N and S had slumped considerably. The streaming was still to the E with fountaining activity at the E and in the SW grotto.

That pronounced subsidence of the bench magma had taken place was shown by the fact that the whole of W station including concrete platform was now in view from the lantern box No. 4, whereas three days ago only the extreme top of the signal pole above the station could be seen from this point across the high cliffs of the W side of the N lake.

The N lake continued to be very low with walls of rampart 15 to 30 feet high. The W wall at 5:45 a.m. was in process of tumbling in strong avalanches leaving the raw cliff of bedded flows on the W. There was a cavern just W of S gulch from which a steady stream poured out into the lake apparently from the direction of the SW lake. Fume was thin at the summit crevasses.

The N flow vent had become a hissing cone and the flow from it was crusted over. In the evening at 8 p.m., however, a new brilliant glowing flow was streaming westward.

During the morning up to 11:40 a.m. there was some rising in the N lake. The main lake, however, at 3 p.m. appeared very low relative to its banks.

At 11:40 a.m. the last watch in the series of transit observations every twenty minutes for twenty-eight days from the tent shelter on the side of the N lake was concluded and the camp was dismantled and abandoned. The work from July 21 to August 6 was done by Jaggar, Roberts, Thorndike and Emerson; from August 6 to August 13 by these with Finch added; from August 13 to August 18 by Jaggar, Finch and Emerson. The only lapse was the afternoon of August 4 during the hours necessary for moving the tent. The record constitutes a complete measurement for a lunar month of the tidal movements in both bench magma and lake magma. The period selected has coincided with a continuously rising column with strong overflows from July 21 to August 13, and on August 14 strong subsidence of bench magma set in, followed, however, by voluminous lava flow flooding the floor of Kilauea crater. This combination was still in progress when the tide measurements ended.

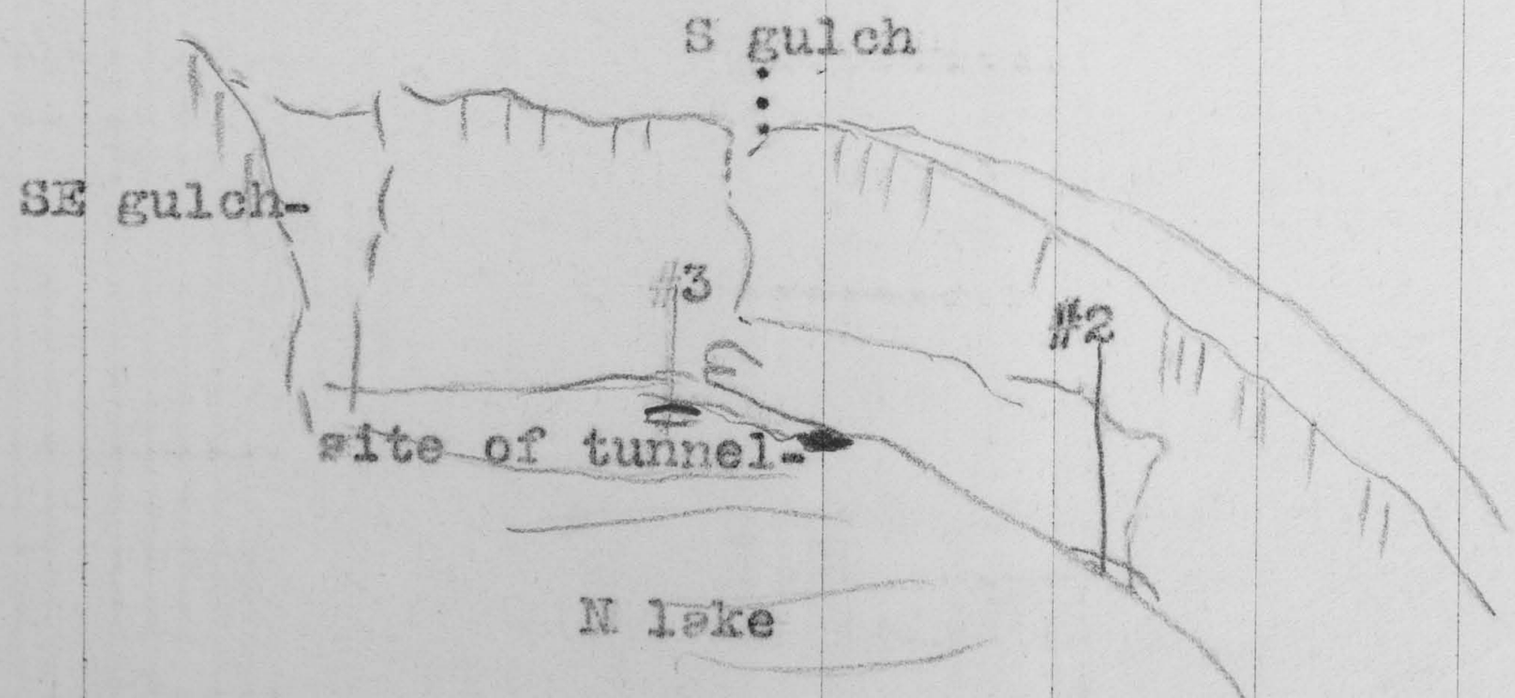
T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date August 18, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
7:30a	#4	Transit tent	1	W P	8x	f/9	½	P
8:10a	N	" "	2	"	"	f/11	"	"
8:30a	NE station(summit old NE half-dome) to Transit tent. Camera tilted slightly right. Hor. line is from base of N sta. flag to base front poles of tent. Shows N slope of Hale. dome.		3	"	"	"	"	"
9 a.m.	Transit tent to Edge N lake between #2 and #3		4	"	"	"	"	"
9:10a	W	Transit tent (Both N and #4 cut off from view by swollen domes of Hale. center and North).	5	"	"	"	"	"

Sketch for Photo No. 4. Shows location #2 and #3 points of survey.



#2 - horizontal angle from W station 34° 00'
3 " " " " " 52° 00'

T A J

1919, Aug. 18.









1919, Aug 18



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JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date August 19, 1919
Wednesday " 20, "

August 19.
3 p.m.

The bench magma measurements show lowering and the N flow to W wall of Kilauea continues. Made circuit of pit by E and N and found little change. Main lake streaming E with rampart wall 40 feet at E end. N lake 20 feet below rampart edge with sluggish activity. N flow cone hissing and flow crusted in afternoon but broke out in a bright stream with spouting at 6 p.m.

Noticed at W station that the entire W rim of Halemaumau is now mashed up in pressure ridge fashion, the width of the zone bent upward being here narrow and widening in the direction of the NW station. The W station platform stands on an uptilted escarpment, the back slope of which is not more than 50 feet wide ending in a marked angle to flatter ground. This pressure ridge extends southward with crushing effects exhibited where the new SW flows cross the old rim and joins with the S pressure ridge beyond. This northward extension of pressure ridge on the W is the exact equivalent of the similar new one on the E. Both widen out into a flatter dome-swelling as they are followed northward, ending in the Postal Rift flows where the pressure ridge arch extends back from the old rim of Halemaumau 700 to 800 feet. The entire W niche area on the W, and the 1894 bench area on the NE are tilted somewhat away from the center of Halemaumau.

The SW lake showed little change and poured in a rushing cascade through the narrows to the central pool. The two flags on the E and W sides of the block E of the SW lake were still in place, this surface being tilted westward so that the western flag now stands only a few feet above the lake. The rampart edge was mostly 15 to 20 feet above the lake and the lake had enlarged considerably in its S bay. There was smoke from the W pond area.

August 20.

Bench magma slightly down or stationary. Lakes in afternoon rising strongly and Postal Rift flow gushing westward. Large grotto of S arm pond active. Fume rather thin.

In evening pit bright and western flow extensively glowing without any special bright streams.

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JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date August 21, 1919
Friday " 22, "

August 21.
6 p.m. Fountaining cone N flow making new pool and flows. Large flow W.

N lake higher. SW and main lakes high and current slower. Fountaining in large dome S arm pond. New overflows of isthmuses between main lake and S arm . Cracking and foundering at intervals in N lake. Spatter bench remnant now higher in S corner of N lake than in NW corner. NE fountain to bank in N lake at intervals and no special bubbling SE and S. Flaming crevasse at NW corner. In main lake streaming is E.

Walked across fresh flow at N cone while red hot and flowing. The incandescent substance of a flow is stiff.

August 22. Bench magma slightly higher. Flow again gushing and streaming at source from 6 to 9 p.m. Lakes all very bright, N lake fountains high and brilliant 6 to 8 p.m. Recovery of lakes after outbreak of a flow perhaps pari passu with volume damming of latter.

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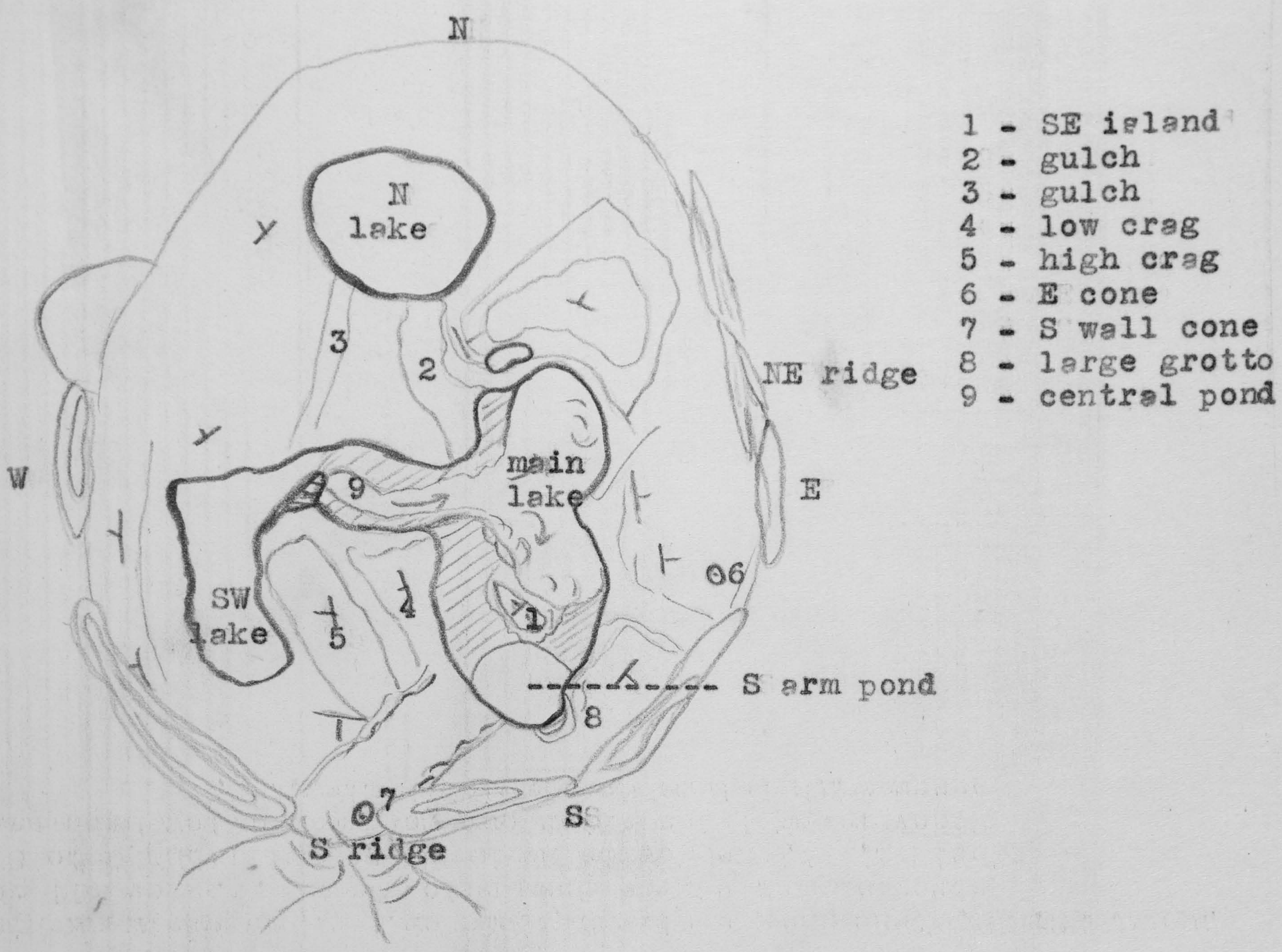
U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

 Day Saturday Date August 23, 1919

9:45 a.m.



Main lake spatter building E and S. Bright-line streaming E. New spatter margins and the lake level with them. Occasional fountaining SE releasing gas and lowering lake. Channel W of central pond appears partly crusted across. E bank 15 feet high and cliffs mostly 15 to 20 feet high. SW cliff higher, perhaps 30 feet. Lake brimming and hot against the isthmus plains separating it from S arm pond. Large dome grotto in latter active. High gas pressure.

Owing to mass uplift and pressure back of E pressure-rim, the slope down to E cone is much less steep than it was.

Small crusted lava pond in gulch extension of NE cove. This gulch a tumbled canyon through to N lake. The two E "pipe" station localities of June are again in view of hut by uplift. S arm pond round and crusted, occasionally breaking up, big curtained dome S.

Went around Halemaumau inside of S pressure ridge. Found inner slope slight and ridge easily climbed; in some places the plateau inside was level with top of ridge, as at cascade saddle. Two large crevasse gulches to S ridge from

JOURNAL

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

- 2 - Day Saturday Date August 23, 1919

S arm pond bay, on each side of S wall-crack cone. Latter in four lumps 3 to 4 feet high with a pot between, hissing inside and fuming but no live lava visible.

West of here flat surface to SW lake. Latter with spells of breaking up and slight sinking and violent spraying fountaining. SW lake very high with new flood-plain around it; has buried the western flag which crowned the ledge over it on its E side, formerly called the "SW scarp". The Halemaumau rim cliff around it on W side now only 6 to 8 feet above lake. The W pond flat has no cone or pond, merely flows. Looking at SW lake from N side saw it streaming through narrows slowly E, no sign of rush.

N lake 8 to 10 feet below rampart, spatter building in places S, E and NW. Postal Rift cone spurting from small orifice and flow making toes.

Everything indicates strong gas pressure and high liquid lave; measurement shows some rising of bench magma.

6 to 9 p.m. In the evening the lakes were bright and another very long and bright surface flow was pouring W from Postal Rift. This new flow now covers the whole floor of Kilauea crater NW of Halemaumau and under the two SW Kilauea rim stations S of Uwekahuna; and there have been spurts in this flow every evening for a week which show no sign of diminishing. The Postal Rift flow of April also had surface spurts at first. The spurts show the river and delta pattern on top of the former sheets. The whole area around the source cones is an extensive plateau, falling off to the SW, W and NW.

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

Day Sunday Date August 24, 1919
Monday " 25, "
Tuesday " 26, "

August 24.
6 to 7 p.m. Bench magma stationary. Main lake high, streaming eastward, fountaining at SW grotto and under E bank. E bank about 12 feet above liquid. No special changes observed.

N lake 6 or 8 feet below bank. Occasional breakings up of surface with bubble fountaining. Active fountains at E end, flaming curtained grottoes at NW end.

N flow area flaming, puffing and making toes. No strong flowing on this night though the flowing was very brilliant the night before.

In general lava column adjusted to the new conditions of flowing at the Postal Rift and lakes holding stationary.

Secretary of the Navy Josephus Daniels visits pit with party.

August 25. Bench magma continues stationary. Considerable flow towards the W from Postal Rift source; glowing in the evening without any special bright streams. N and main lakes both fountaining above their banks occasionally as seen from H.V.O.

August 26. No special change. Lake fountains still show occasionally and in the evening the flow to the W was making some brilliant gushing vents at points considerably to the W of the source cones. The arm flowing was on the N side of the new flow area.

Strong earthquake felt in Hilo and registered on seismogram at about 2:20 a.m. Felt also in Kona.

T A J

JOURNAL

360 U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date August 27, 1919
Thursday " 28, "
Friday " 29, "

August 27. Fume somewhat denser. Bench magma stationary. Flow had bright spell of increase at 10 p.m., some gushing places W of source and at N lobes

August 28.
10 to 11 a.m. Very little change in Halemaumau. S wall cone and cascade lava unchanged. Measurement makes central and N parts of lava dome and N station a little higher. Cones at source of flow hissing and making gas spiracles; and the top of lava plateau W of the cones shows sweeping flat stream lines over tunnels beneath headed W and NW. Some hissing through the heavy crusts and some hot newly welled up puddles over cracks.

Main lake about 12 feet down at E end; 5-foot rim around it built in; S arm glowing at night; streaming sluggish to E.

N lake about the same. Blowing balloons, moderate fountains, rampart edge 8 or 10 feet high.

SW lake has bench 10 feet high on W pond side showing a tunnel beneath with slow flow out of it from W pond area. The streaming in lake sluggish, partly to main lake channel and partly to S, to the S arm of SW lake and fountaining grotto at S end.

General situation stationary.

At night a new glowing N lobe of flow. Flow appears to have settled down to tunnel flow like the April outbreak. Note that the migration from the April source to the July source, and then to the August source, all in Postal Rift area, somewhat resembles, especially the last two, the supposed migration of activity in Hawaii from Kohala volcano to Mauna Kea, and thence to Kilauea, Hualalai and Mauna Loa. Each vent formed a low dome, and then the new vent was near the periphery of former dome. In the July and August vents, the outbreak in August clearly drained and extinguished the July dome, previously swollen up.

August 29. Lakes bright and flow streams far to west in the evening. No change in general situation.

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date August 30, ,1919
Sunday " 31, "

August 30.
2 to 3:30 p.m. Bench magma slightly down.
No changes at S wall and at S cone. Some sulphur fume at E cone.
Main lake streaming E and appears low: 30-foot rampart E, 12-foot inner rampart S. N lake also low: 15-foot inner wall; large fountain to bank NE. Bright lines in both main and N lakes. SW lake high relative to ramparts at 3 p.m.: 5- or 6-foot rampart; sluggish streaming E through narrows.
N flow cone hissing. Occasional toe flows and pooled area under W wall of Kilauea. The ash section at base of this wall nearly covered up. A slow flow on top of flow heap near flow cones on S side. Heavy shower made dense steam, most of it in W part of flow.

Evening. Increase of flow both at source cone and farther W. N lake fountain much whiter than main lake; perhaps due to SE wind and fume before main lake, but looks as though different.

T A J

August 31.
3 to 4 p.m. Brisk fountaining in main and N lakes, unusually high and voluminous in latter -- 12 to 15 feet. Currents slight except in small S pond. The current in this pond came through a tunnel from main lake and bore many large pieces of crust. This small pond was bright red over the quarter nearest the tunnel in which portion innumerable small fountains about a foot high played continuously. The N lake was about 20 feet below the N bank.
Fumes were thick.

R H F

Stationary conditions continue. In the evening the flow was making bright streams both near the source cone and along SW wall of Kilauea crater in a long lobe moving northward.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date September 1, 1919
Tuesday " 2, "

September 1.
11 a.m. to
12:30 p.m.

Stationary conditions continue. Main lake 25 feet down below E bank and about 8 feet below its inner rampart, this being the level of the flats separating main lake from S arm pond. Streaming E through channel, large fountains near E bank occasionally, bright lines and ballooning skins. No specially marked border fountaining. Occasional subsidence by gas release after a spell of central fountaining.

N lake shows a tilt of the plane of the upper rampart bank from SE to NW in relation to the lake level. The eastern bank is 15 feet high and the northwestern bank 8 feet high at most. The southeastern cliff above the N lake appears as though it were arched higher than the W bank of the lake. Lake exhibits alternations of spells of central fountains and spells of quiet, and there are four or five border fountains suggesting considerable gas pressure around the northern shores.

Four or five large central fountains seen in action at once in N lake, producing subsidence of about two feet and revealing tunnel under S gulch. Some tendency to ballooning skins. Not much streaming but what there is trends to N and NE.

N flow cones hissing and stained, and sulphur patches developed SE of them. Flow making slender arms northward along base of Uwekahuna cliff. Ash locality at base of this cliff appears almost completely buried.

Examined April flow cone and tunnel. Wind blowing into tunnel and much white vapor arising from cone. Lower stretches of tunnels NW and W obliterated by new flow from the recent vents. Find in one part of tunnel mammillar stalactites each with white tip of soluable salts and dripping saline water. The salts taste brackish and puckery like sal-ammoniac and alum. This part of cavern perfectly cold. At the cone vent of July 27 there is a large collapsed dome area with much hot air rising; no glow or activity. Between these two earlier cone areas the Postal Rift fume from the cracks beneath is reasserting itself, staining the ground and making the old familiar odor.

September 2. Rainy. Lakes as before. Flow in evening shows reflections on cliff SW, as well as N arm in motion.

T A J

JOURNAL

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

Day Wednesday Date September 3, 1919
Thursday " 4, "
Friday " 5, "

September 3.
3 to 5 p.m. In afternoon there was increase of water vapor and summit fume.

Climbed lava cascade S to S cone vent; lava heard bubbling beneath. S dome of S arm pond still large and pond 10 feet below fluid but not much fountaining.

E wall over main lake 40 feet high, inner bench 10 feet high N side, 20 feet high S side. Lake crusted. Streaming under bank SE and NE.

N lake appears higher and numerous fountains N. NE fountain near bank. Walls of bench over lake 10 to 20 feet high.

Postal Rift flow cone hissing from one orifice only, quite loud. Flow vigorous in evening to NW and N.

SW lake like main lake, rather low. Smoking pile of crusts at W pond locality. SW lake crusted. Bridge across channel to central pond and 10-foot cavern under it hung with stalactites. Benches around lake 10 to 30 feet high.

General situation implies some sinking and slackening in flow. New smoke hole ENE pressure ridge.

September 4. Measurement shows a lowering of bench magma two or three feet in last few days. More smoke especially at central gulches.

September 5. No notable change. Flow bright in evening and continues to spread northward in two or more lobes parallel to each other along the base of Uwekahuna bluff, the foot of flow now reaching beyond the trig station as seen from the Observatory.

T A J

JOURNAL

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

Day Saturday Date September 6, 1919
Sunday " 7, "
Monday " 8, "

September 6. Main lake streaming E. Quiet surface. Rising type of activity. Considerable smoke around margins and from central crevasses. New acrid smoke from ENE pressure rim at wall-crack.

N lake high and overflowing its inner rampart at NW corner. Several border fountains. Inflated surface.

Postal Rift cone hissing and flows progressing under Uwekahuna bluff. Much sulphur around the live Postal Rift cones.

September 7.
3 to 5 p.m. With Professor D. Campbell of Stanford (botanist). At algae locality discovered second specimen yet found there of Ophiuglossum (Adder's Tongue)

Nothing new at Halemaumau. Measurement shows it slightly lower. Main lake appears much as before. Much smoke central gulches. Streaming E, not much fountaining. Some activity SW grotto.

N lake has been high, building grottoes NW corner. Mostly quiet. Some fountaining E.

Flow cone hissing small spiracle. Flow progressing under Uwekahuna.

SW lake streaming to tunnel of central channel. Rather low. Rhythmic fountain bursting against wall S side of tunnel. Depression smoking at W pond.

Smoke at S cone.

September 8.
2:30 p.m. Main lake streaming W from SE corner (from tunnel leading from S arm pond) to the SW grotto. Another current from central canyon to NE and against N bank. NE cove stagnant. Some recent falling of banks central channel so that a crag protrudes and overhangs the channel on S side. Lake rather low, 15-foot inner benches and 30-foot wall E.

N lake crusted. Fountain NE. Spatter domes NW. Crusts heaving and lines of flames from beneath. E wall overhangs and 15 feet high.

Flow as before.

T A J

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

PHOTOGRAPH RECORD

Hawaiian Volcano Observatory

Day Saturday Date September 6, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
11 a.m. to noon		NE bank main lake to S island	1	W P	8x	f/11	½	P
	ditto	to central channel	2	"	"	"	"	"
	ditto	to NE cove	3	"	"	"	"	"
	N lake	looking NW	4	"	"	"	"	"
Eastern	spire	1894 to overturned western spire	5	"	"	"	"	"

T A J

1919, Sept.



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1919, Sept.



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

JOURNAL

Day Tuesday and Wednesday Date September 9 & 10, 1919
Thursday " 11, 1919

September 9 & 10. No marked changes, slight lowering. Flow bright in evenings. Increase in fume, partly due to rainy weather.

The flow now pushing N of Uwekahuna mark, and another part under SW wall of Kilauea.

The overhanging crag S of central pool fell away some time during this period. Falls reported evening of September 10.

September 11.
10:30 a.m. Inrush re-established at NE cove as in June; two tunnels; current 10 miles per hour. Streaming from W. Rampart wall of main lake 40 feet E, 30 feet NE, 15 feet S, 10 feet under N cliff. S island 40 feet above lake, SE crag 50 feet, W cliff 60 feet, cliffs over NE gulch 50 feet, cliffs S of S arm pond 50 feet. Lake covered with skins and bright lines. S arm pond blowing.

N lake also streaming under bank steadily, beneath SE gulch, both lakes feeding a sinkhole somewhere along this gulch, which connects through from NE gulch of main lake. N lake otherwise has three active border grottoes NW with streaming towards them; a quiet tunnel under S gulch; crust E and NE. E bank 18 feet high, NW rampart 4 feet high, N bank 15 feet high, S cliffs 50 feet high. The streaming into SE tunnel not accompanied by fountaining, but is a definite drainway.

N flow cone hissing. Flow continues both NW and SW of Halemaumau. Three sulphur patches near source cones.

T A J

PHOTOGRAPH RECORD

Hawaiian Volcano Observatory

Day Thursday Date September 11, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
10:30 a		Lower trail to pressure ridge W	1	W P	8x	f/11	½	P
		ditto to pressure ridge E	2	"	"	"	"	"
		High knob of NE heap to E cone	3	"	"	"	"	"
		High dome E bank of lake to inrush NE cove	4	"	"	f/16	1	"
		Inrush from N lake into same gulch	5	"	"	"	"	"

T A J

1919, Sept. 11



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1919, Sept

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JOURNAL

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

Day Friday Date September 12, 1919
Saturday " 13, "
Sunday " 14, "

September 12.
6:30 p.m. After considerable rain, the new smoke hole at ENE wall crack is bubbling noisily with deep thudding, much smoke, some sulphur odor, no glow.

At main lake the torrent NE has stopped. Lake appears higher by 5 feet and has quiet ballooning skin and eastward streaming in a curve from central channel to SW grotto. Central pons crusted. S arm pond fountaining. Two flaming and rumbling and blowing pots in debris of NE cove gulch.

SW lake occasionally very bright. N lake has six fountains NW and N borders; large NE central fountains; cracking and foundering crusts; lava 3 or 4 feet higher than before.

Postal Rift flow continues bright along various portions of base of Uwekahuna wall. Great quantities of fume in afternoon (vapor) over the whole of April, July and August-September flows, at a maximum in the last.

Calm in morning with dense vapor from Halemaumau dome, thinner above in long column, cumulus still higher at cloud level

September 13. At 8 a.m. note a very smooth patch in flow between flow source and Uwekahuna; appears flat like a cracked and foundered pool area.

T A J

September 14.
9:30 to 10:10 p.m. (After strong quake at 5:20 p.m.)

All lakes fell rapidly to the extent of 10 feet or more, leaving bright red scar. The fall was followed by many landslides and caving in of ramparts. New flow increased considerably. Considerable gas action in the gap between main and N lakes near NE cove.

R H F

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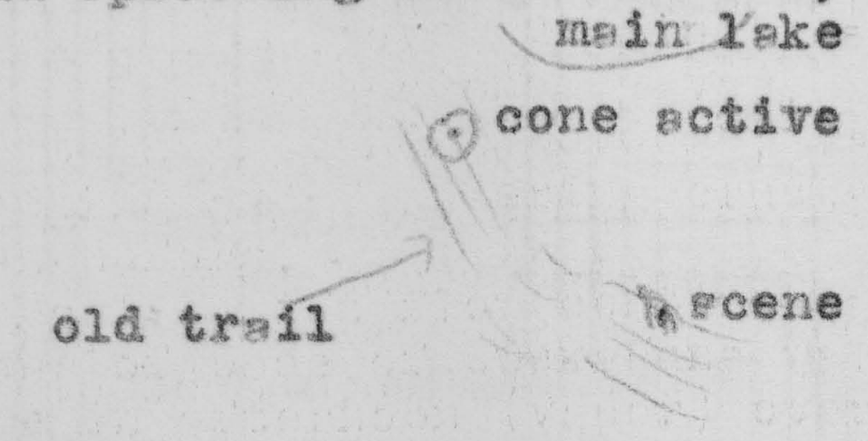
U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date September 15, 1919

4 to 5 p.m. Lakes higher than on afternoon and night of 14th. Fumes very dense and coming from widely scattered origins.

S ridge inactive except for developing of cracks near cone that caused cascade and flow toward auto road. This cone has shifted its position several feet to the W. Activity in crack near E cone and also activity in cone in southern portion of ridge to the NE of E cone. Rumbling and splashing under surface, much smoke. Smoke was



issuing from several places in and near NE ridge.

There were practically no fountains in the main lake though a sluggish streaming toward the E was persistent which caused the crust to have parallel wrinkles. S pond continuously active, current was flowing through tunnel from main lake. Conditions in the NE cove were undeterminable because of dense fumes. The level of the lake was about 24 feet below eastern ramparts.

The banks of the N lake have sunk and rise gradually from the edge of the liquid for several feet back. The walls of the N lake on the N and NW sides are in several places only 4 feet above the lake. The two fountains in the N lake were persistently active.

The source cones of the Postal Rift flow were noisy and emitting much smoke. The flow showed in several bright patches under Uwekahuna at 8:30 p.m.

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

Day	Date		
Tuesday	September	16,	1919
Wednesday	"	17,	"
Thursday	"	18,	"

September 16.
2:40 to 3:30 p.m. Less smoke than on the 15th.
Lakes about 4 or 5 feet lower than yesterday. Main lake 28 feet more or less below eastern rampart. N lake 8 or 9 feet below NW bank. Smoke from several sources S ridge. The E cone and one to the NE both active, rumbling, smoking and hissing; splashes could be heard but do not reach surface. Rapid streaming toward E in main lake. Molten lava in gap by NE cove. S pond crusted over and quiet. Fountains to bank in main lake. Two fountains continuously in N lake. One cone source of Postal Rift flow active with hissing and fumes. Fumes and hissing from red hot crack to S of active cone.

September 17.
3:45 p.m. Lakes higher. Fumes moderate. E cone smoking with deep rumbling; splashing could be heard distinctly; small spatters occasionally rise above the crack opening. Rumbling and fumes accompany activity of the cone to the E. S pond crusted over and quiet save for gas hissing near wall next main lake. Sluggish streaming toward E in main lake. One fountain in narrows main lake side. Main lake about 22 feet below eastern rampart. Four fountains in N lake which is about 4 feet below NW bank. SW lake crusted over and quiet. Postal Rift cone and crack to the S active. Causing much noise and emitting much smoke.
7:30 p.m. Flow over surface near source flow continues.

September 18.
3:55 to 4:35 p.m. Main lake lower. Ground shifting between eastern end of S ridge and S pond. Smoke from several places on S ridge. E cone smoking and rumbling, as also source to the eastward, though less violent. Main lake quiet, the streaming toward the E barely perceptible. One fountain to left bank in the narrows. Lake about 25 feet below E rampart. One grotto active in S arm pond. NE cove smoky. N lake crusted, higher on S side than on N. Four grottoes active NE, N and NW about 4 feet below NW bank. The crack to SE of new flow cone hissing loudly.

R H F

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date September 19, 1919
Saturday " 20, "

September 19.
1:45 to 2:15 p.m. Lakes higher, Smoke moderate. E cone and cone to the NE rumbling and smoking.

Main lake about 20 feet below E rampart, and quiet, only one fountain. S pond active and high, large fountains to bank. N lake 5 or 6 feet higher than yesterday; over the bank to the NW. The location of two grottoes that were active yesterday were covered with lava. Two fountains in center and three at edges.

Portal Rift flow source active at the cone and crack to the SE. The new flow continues and is increasing.

September 20.
11:00 a.m. All lakes higher; fumes lighter. E cone very active, splashes come nearly to surface. The cone to the E in NE ridge more quiet, very little smoke.

Main lake lava about 15 feet from lower eastern ledge. About 5 feet higher than yesterday. Current to the E; two large fountains.

Mixed current in S pond. No fountains. N lake overspreading the gentle slope back of its bank to the NW. Six fountains all along the NW, W and SW edges. A cone has formed over crack near the cone sourde of new flow. The new flow continues to spread to the S, now reaching the aa flow NE of center of main crater.

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

JOURNAL

Day Sunday Date September 21, 1919
Monday " 22, "

September 21.
5 to 7 p.m.

S pressure ridge, seen after a week of absence, appears the same or slightly lower. Opening on S side of E cone flaming and bubbling noisily. ENE wall crack fuming and stained. E end main lake appears about as before; lake quiet and crusted. Glow in S grotto of S arm pond and a bright glow chimney on cliff W of S arm pond. N lake cracking and foundering, occasional NE fountains, some small border fountains, no change in general height. Margins 10 or 15 feet high at E end, 4 or 5 feet high at W.

Postal Rift cones show greatly increased blowing, flaming and glowing, with cracks flaming both N and S sides of the northernmost of the two active cones. Flow very extensive and all alive from midway between Uwekahuna and Military Camp to a point under the southwestern cliffs of Kilauea. An eastern arm of the flow making out in the direction of Volcano House trail.

SW lake and W pond pot both bright; former quiet, rising and crusted at time of visit; latter flaming brightly. Level of lake slightly higher than previous week.

September 22.
11:00 a.m.

Went around pit by S and W. In SW lake active grotto at SE corner, lake appears somewhat lower, streaming southward in S cove.

Visited flows NW of Halemaumau making out northward from a cone half way between the source cones and the W wall of Kilauea. Found a broken down tube farther S with live gas spiracles and glow.

N lake dull, crusted and much as before. Main lake streaming slowly eastward from channel, not much fountaining. Dense smoke rising from summit crevasses at one point. E cone vent vigorous as before.

8:00 p.m.

Main lake dull, some streaming through central channel eastward from SW lake. S wall-crack chasm glowing and fuming. S arm pond streaming southward and rising and falling at intervals with vigorous fountaining and flaming under the large S grotto.

N lake fountains visible from Volcano House.

T A J

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

Day Wednesday Date September 24, 1919
Thursday " 25, "

September 24.
12:15 p.m.

Wind SE. Usual approaches to lakes very fumy. S arm pond low and streaming northwestward with violent fountaining under the NW bank and rumbling there. Some activity at S grotto also. Main lake streaming out from SE corner and thence westward to a line of continuous border fountains under the SW bank. Here there was noisy rumbling. The lake appeared somewhat lower with 28-foot wall at E end and 10-foot wall S. Some streaming under the bank in the NE cove. N lake could not be seen from its E brink on account of fume but very noisy rumbling fountains heard there. E cone vent lower and less bright than of late.

Postal Rift flows pushing far to the N along the base of Uwekahuna wall, the lengthening in that direction being very rapid in the last few days. The whole length of the flow glows brilliantly.

September 25.
3:30 p.m.

Much smoke from border cracks and central crevasses. General level of bench magma one to three feet lower in center of Halemaumau. Lakes appear high, especially N lake and S arm pond. Main lake streaming from central channel to SE corner and fountaining vigorously SW. E bank 22 feet high. S arm pond crusted, fountain puffing from under crust at S grotto. N lake crusted, fountaining NE, E bank 8 feet high, NW bank 2 feet high.

Postal Rift cone appears enlarged, with glowing slot in middle. The flow seen in plan looking down from N end of Uwekahuna bluff was extremely brilliant for its entire length, lying against the base of the bluff on its W side and on its E side sending out about 10 tongues from beginning as far S as the Postal Rift region and repeating these tongues all the way to the region under the Military Camp. The southern part of this great puddle of lava near the source cones appears quite as bright as the extreme northern front, the whole mass glowing through hundreds of cracks and making live toes from source to frontal lobes. In this respect this flow differs from the April flow and appears to have a higher pressure behind it.

T A J

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Hawaiian Volcano Observatory

PHOTOGRAPH RECORD

Day Wednesday Date September 24, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
12:15p	SSE ridge to S arm pond		1	W P	8x	f/11	½	P
	S pond from its E brink		2	"	"	"	"	"
	E bank main lake to NE cove		3	"	"	"	"	"
	Lower gravel flats to Halemaumau		4	"	"	f/16	"	"

T A J

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1919, Sept. 24



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JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date September 26, 1919

7:30 to 10 p.m. Very dense fume rising at summit crevasses in block between the S and SE gulches(N lake). N lake higher relative to banks; banks appear to have slumped. Large E-W crevasse N of N lake opened to 10 feet wide. E rampart bench of N lake broken and shows motion. S cliff of N lake 45 feet high. E bank 8 feet high. Fountains in view from H.V.O.

At Postal Rift source cones the S cone has broken in on the S side revealing the yellow hot interior cupola with lava boiling 15 feet below and streaming through tube southwestward. Banner of flame out of window. Other flaming cracks and hissing mouths at northern of the two cones.

Main lake streaming west from E bank, 20 feet down, six vigorous border fountains and fountaining strong in S pond. S bank only 6 feet high. E cone flaming strongly and ENE vent making dense acrid fumes.

At 10 p.m. a cone midway between Halemaumau and W wall of Kilauea renewed the surface flow brilliantly; and flow was very strong all night all the way to N wall of ,Kilauea.

T A J

8:15 to 9:45 p.m. Several grottoes active in each of the lakes. Tendency toward streaming to the W in the main lake. N lake about 3 feet below banks on N and NW sides. E cone rumbling and hissing. Rocks falling on NE ridge. Cone near source of new flow showed rapid current of lava toward the NW. The crack near above cone very active. Evidence of sinking to the NE and SW of the E cone. Flames and fountains were to be seen in the gap near NE cove.

R H F

JOURNAL

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

Day Sunday, Monday Date September 28, 1919; " 29, "

September 28. Kilauea activity continues. Fountains visible in N lake from H.V.O. Flow continues bright. Measurements show subsidence two feet or more per day for bench magma (rate decreasing Sunday).

Preparations complete for ascent of Mauna Loa tomorrow early, with two men from Ainahou (Dent's) Ranch, three pack mules, riding animals from Mackenzie. Jagger and Finch to go. Unless flow comes, plan is to go to Red Hill and Mokuaweoweo.

T A J

September 29.
3:30 p.m. E cone more cracked and driblet cones slumped out of sight of trail. One glow spot with gushing sounds from below.

Rock movement heard in NE pressure ridge. Hot area in ridge smoking voluminously, as was crevasse between main and N lakes.

Main lake high in its basin, banks from 3 to 4 feet high. Bench magma around it seems lower. Five grottoes splashing. Streaming from under crust from channel and from NE cove toward E.

N lake banks 4 to 5 feet above liquid which was streaming from SW to NE. Four grottoes built around margin. Fresh spatter on N bank which has slumped until slope toward lake is almost at same angle as it was away from lake when the spectacular overflow here of August took place. Blowing flaming red-hot chimney among old slabs of floor on E side of N lake

5:45 p.m. (Mauna Loa) Telephone message from Robert Mc Wayne: just returned from mauka, flow headed for Alika (wood camp), rate of three miles per hour,; if continues will reach government road in three hours. Glowing smoke column plainly visible from H.V.O at 6 p.m.

6:00 p.m. Glow in some one of the source cones of the Postal Rift flow in Kilauea.

I P J

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

JOURNAL

Day Tuesday Date September 30, 1919

2:45 p.m. Allen reports no changes in afternoon. Streaming in main lake to E. N lake crusted, with two fountains playing. E cone still bubbling. Some splashing in large grotto S arm pond.

Evening Postal Rift flow showed some toes at front but was very much decreased in vigor.

11 p.m. (Mauna Loa) Illuminated smoke column of Mauna Loa outbreak plainly visible but much less high.

I P J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

JOURNAL

Day Wednesday Date October 1, 1919
Thursday " 2, "

October 1.
4:00 p.m.

Allen reports main lake risen, lowest banks about a foot or two high. One large fountain at N margin, the rest quiet and crusted. S arm pond smoky. N lake higher being 2 or 3 feet below lowest banks. Large grotto on NE side, two on W side. Streaming to NE gtotto. A new crack about 40 feet long has developed three feet from margin of N lake.

E cone more sunken; noise inside continues.

Postal Rift flow about the same.

October 2.
1:30 a.m.

Lakes high as seen from Kau road, fountains in N lake visible. Postal Rift flow about the same as last two nights.

3:30 p.m.

E cone still making splashing sound below and a little glow showing on side toward main lake. Ground S of cone between bank of main lake and S pressure ridge more depressed; as is that at foot of E ridge. A deep valley forming in latter locality. Once a tinkle of rock moving heard. Bench magma in general more cracked.

Main lake lower. Banks 6 to 8 feet high. Main current rather rapid fron NW to SE where vigorous and noisy fountaining along bank was going on. Some streaming eastward from channel.

Smoke from crevasse and hole in E pressure ridge continues dense. S wall crack also smoking strongly.

N lake lower, banks 10 to 12,feet high. Six splashing grottoes around margins, one at foot of S crevasse with wall about 10 feet high above it. Below E crevasse just sheer wall 10 to 12 feet high. Flaming and rumbling chimney in broken edge of floor E now cold and quiet. N bank of lake more depressed than on Monday, September 29. Crust heavy, no visible surface streaming, except when central fountains break through and migrate to adjacent grotto.

Postal Rift flow still showing glow spots,in three localities, at night from H.V.O.

From H.V.O. central bench magma of Halemaumau appears to be slowly subsiding.

Mauna Loa.

Smoke and steam from flow very clearly visible morning and evening. Brilliant after dark on this date. Obscured by clouds on morning of Friday, October 3.

I P J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date October 4, 1919

Find principal changes in Halemaumau during Mauna Loa eruption have consisted in border slumping of the bench magma 10 to 15 feet S and E, SE and N, some collapse of the central region and lakes rather high relative to their banks E and N, but low SW and W. The Postal Rift flow continues with some slakening of vigor, greatly increased sulphur deposit around source cones and principal area of live flowing under N end of Uwekahuna bluff.

There has been slipping of stones on S pressure ridge and on the inner face of NE ridge. A distinct wall valley has developed on the W side of the E cone extending from there both N and S and reaching a depth of perhaps 30 feet under the NE ridge.

S pond crusted, some break-up along N margin, S dome grotto very large with flaming chimney in its face.

Main lake shows sluggish eastward streaming, continuous fountains SE and NE and a steady stream into the end of the NE cove about four miles per hour suggesting the former cascade. New spatter ramparts built around the lake. Block N of main lake shows slumping into an island-like mass similar to the S island. Cliffs around lake 20 to 30 feet high.

Bubbling noises still audible under E cone and disagreeable fume from there and from NE wall crack.

N lake shows two or three border fountains, its S wall 30 to 40 feet high. The block between the two southern gulches has slumped and the old rim remnant above the lake on the W side shows tilting southward toward the center of the pit. Some flaming chimney action above the grottoes. Ground N and E of lake appears lower so that lake is only 3 to 8 feet down below NW and NE banks.

W pond is again opened, 30 feet in diameter with streaming toward its SW bank. SW lake appears lower than W pond and 12 feet below W margin with bright lines and streaming to the SE a and NE and a revival of the rhythmic fountain bursting in large domes about once a minute or more under the bank on the S side of the tunnel leading to the central pond.

The two source cones of the Postal Rift flow were found both with open windows flaming, and a third cone group all covered with sulphur had been formed a short distance to the S. Through the window in the middle cone the lava could still be seen boiling up and rushing westward about 15 feet below the orifice. The area of yellow sulphur deposition had greatly increased and there was much smell of free sulphur.

At night the lakes were very bright and the flow breaking out and making surface streams at several places in its northern part.

Mauna Loa. The Mauna Loa fume column could be seen dimly in the afternoon and a light southwesterly breeze produced general haziness perhaps due to the drift of the Mauna Loa smoke. The sun was bright red at 4 p.m.

T A J

JOURNAL

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

Day Date October 5 & 6, 1919
Tuesday " 7, "
Wednesday " 8, "
Thursday " 9, "

October 5 & 6. Bench magma stationary. N lake fountains visible from H.V.O. Postal Rift flow continues. Thunder; calm to southerly weather. Mauna Loa obscured.

October 7. No fountains visible from H.V.O. Flow continues.

T A J

4:40-5:10 p.m. Two gas vents were active in the S pond. Crust breaking up in the main lake with a slight current to the E. Lake 20 to 30 feet below edge near NE cove. N lake quiet. Source cone showed current the level of which was lower than usual. Much fume from NE ridge. Further evidence of subsidence near E edges of N and main lakes.

October 8.
2:30-3:30 p.m. Fumes dense. Lakes lower than yesterday. One fountain in center of SW lake; current toward main lake and SE arm. Active fountains to bank in main and N lakes on all sides. Current to E in main lake with a pronounced current going under the bank in NE cove. Source cone and adjacent crack active.

October 9.
1:10-2:00 p.m. Fumes moderate, lakes lower. Two gas vents in S pond bank active. A wall crack near this lake is lower than the surface of lake. Current to E in main lake. Fountains to bank on all sides. Lake about 30 feet below edge near NE cove. Two gas vents about 20 feet from edge of NE cove hissing loudly and spattering slightly at times. N lake fell rapidly while watched to about 8 feet below bank. Small overflow to NW since yesterday.
Source cone and adjacent crack active. Lava higher under the cone window than yesterday.

8:00 p.m. Mauna Loa fume column very bright.

R H F

JOURNAL

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

Day Friday Date October 10, 1919
Saturday " 11, "
Sunday " 12, "

October 10.
1:05 to 1:35 p.m. Fumes moderate. Lakes higher. Two gas vents in S pond active. Current to E in main lake with one arm of current flowing under gap NE cove. Much noise from gas escape by NE cove. Lake crusted over and about 25 feet below NE wall. N lake bank full. A small lava flow to NW night before. Further evidence of the banks to N and NW sinking. Lava higher under source cone. Cones in NE ridge rumbling.

October 11.
10:45 to 11:15 a.m. Lakes lower than yesterday. Fumes moderate. Rocks falling in NE ridge. S pond quiet. Current to the E in main lake, its level about 30 feet below NE wall. Three grottoes active next to S pond. N lake about 4 feet below banks. Two grottoes active on SW side. Source cone and crack active.

R H F

Returned from Mauna Loa. During night light from Kahuku fountains bright.

Halemaumau appears unchanged. Fountains in N lake visible from H.V.O. Flow on N side of Kilauea and under Uwekahuna bright. The gypsum crystal locality N of the "laccolith" of Uwekahuna wall nearly submerged by new flows, which have made tongues eastward over the April flow.

October 12.
3:30 to 6 p.m. Mauna Loa smoky.

Walked to Halemaumau. N lake full. No changes remarkable. Some border fountains, central fountain and sinking spell, with a one-foot glowing margin. Flaming dome NE corner.

Two windows in the cones, source of Postal Rift flow: N side of N cone, S side of S cone. Much sulphur stain. Fume not dense. NE wall valley lower.

Main lake high, much as before, with eastward streaming. Recent inrush reported N cove.

E cone noisy.

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

JOURNAL

Day Date

Monday October 13, 1919

Tuesday " 14, "

October 13. Little change in appearance of Halemaumau. In the evening, however, the flow under Uwekahuna much increased in general brilliancy as though swollen and incandescent all over. Very bright under N corner of Kilauea.

Some fountains of N lake visible from H.V.O.

Mauna Loa smoky in evening, clearing during night.

October 14. In very early morning the fume column and source glow over Kahuku on Mauna Loa as bright and definite as ever.

In evening Halemaumau less luminous and flow far less active than on previous evening.

No change in appearance of height of Halemaumau dome.

T A J

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

JOURNAL

Day Wednesday Date October 15, 1919

11 a.m. Halemaumau since September 25 has shown a slight general lowering of bench magma and this slightly increased today. No marked movement, however, and gas pressure remains high.

E cone crevasses now wide and impassable and the rumbling and flaming activity has shifted along the cracks a few feet northward. No notable change in S pressure ridge.

Main lake about as before; four or five vigorous fountains around the E pool; surface hot with thin skins and streaming vigorous to the E. A considerable extension by collapse in the middle of the E bank has made a new cove there. The S island appears lower relative to lake. Inner bench around lake 4 feet high, cliff blocks 15 to 25 feet high. S arm pond bright at night.

N lake within two feet of overflow along its NW bank, surface crusted, with sluggish crecking and foundering. Sulphur stained dome of NE bank has lost its flaming gas pressure. The marginal bench around the N lake has slumped considerably E and N, showing a distinct downbend between the SE portion, which is still high, and the E. Back of the northern marginal bench the N floor block where the transit shelter was now makes a cliff about 12 feet high.

SW lake appears somewhat narrower, streams to the S and E, and has a grotto at N border. W margin 8 feet high, cliff blocks 15 to 30 feet high. General aspect unchanged. W pond crusted, shows two small inactive pots. All this region smoky.

Postal Rift source vents show the two windows as before and the fountaining and streaming lava 15 feet below. The cone at northern window seems smaller and a new spatter heap on N side of window indicates that the lava has been splashing out. Bright yellow and white sulphur and alum accumulations increasing.

Evening. The flow under Uwekahuna brighter and more in motion than on previous night. Lakes quite bright and fountains of N lake visible from H.V.O.

Mauna Loa. At 7 p.m. weather cleared up after rain and easterly wind blew away the smoke. Mauna Loa fume column revealed bright as ever with a band of light on the left of it equivalent to at least three or four miles of the rift line. A second puff of vapor seen in this bright zone quite removed from the fume column of the fountains.

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

JOURNAL

Day Thursday Date October 16, 1919
Friday " 17, "

October 16.
5:20 p.m.

Fumes heavy. S pond crusted over, gas vent in S bank active, whole crust moving up and down. Main lake crusted over with sluggish current to E. Fountains to bank on all sides. Current under gap near NE cove. N lake falling, 7 feet below banks. Grottoes and fountains to banks on all sides. Source cone active, flames from nearby crack fully 8 feet high. Loud rumbling and hissing in the two active vents of NE ridge.

R H F

In evening Postal Rift flow swelling with glowing puddles on top, moderately rapid. Fume rather increased.

Mauna Loa. Glow dull in evening.

T A J

October 17. Report in Hilo that Kilauea Iki active utterly unfounded.

9 to 11 a.m. Halemaumau fume rather dense. No motion in slopes. Visit S pond, which is circular with heaving crust; strong flaming and hissing at large S grotto. S wall crack at cone locality broken open, steaming and inside half down.

Main lake streaming E, four foot inner rampart, building spatter dome SE. E cone glowing, flaming and rumbling. Inner ring of bench magma at E cone and farther around to the S has sunk 10 to 15 feet in last three weeks.

N lake high, 3 feet below E rampart. NE dome again flaming and blowing, large active grotto inside. Border fountains, central skin, good gas pressure.

Postal Rift cones as before, great flame banner through window last night.

SW lake has recently overflowed its W bench and is streaming to grotto at tunnel leading to central pond. W pond small and round and violently hissing gas jet under wall W of it.

General condition shows high gas pressure and rise of liquid. Flow under Uwekahuna strong in evening. Glow of lakes bright at night.

Mauna Loa. Too smoky to see glow this night, but reported bright from Kau district. Some quakes on seismograms of wide amplitude, not felt at Honomalino.

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

JOURNAL

Hawaiian Volcano Observatory

Day Saturday Date October 18, ,1919
Day Sunday Date " 19, "

October 18. Bench magma at Halemaumau higher by 2 to 4 feet in the morning and lava fountains of N lake in full view in the evening. Lakes described as fountaining vigorously and strong gas pressure at the Postal Rift flow source. Fume abundant.

In evening the Postal Rift flow very brilliant and flow very evidently strongly increased with bright surface stream pouring to the W, seen in profile from the Observatory. This spurt of increased flow follows upon spurt of uplift of bench magma as usual.

October 19. Halemaumau shows increased smoke and stationary bench magma. Very bright glare in evening from lakes. Flow more sluggish than night before and this change of decreased flowing was noticeable in early morning hours today.

Mauna Loa. Glow seen very dimly near midnight from here and fume column over brow of mountain early this morning. Those arriving by SS "Kilauea" via Honuapo report bright glow over fountains seen off S point of island.

Two or three local shocks of large amplitude daily now in contrast to first days of eruption when earthquakes were few and small. Some of these felt at Hilea. No special earthquakes noted at Honomalino.

T A J

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

JOURNAL

Day Monday Date October 20, 1919

2:30 to 4:30 p.m. S pond built new grotto dome NW side and activity strong; stalactite curtains both there and at large S grotto. Pond one foot below marginal bench. Sinking spell with central fountains to three feet below bench.

Main lake with festooning skins and river-like stream eastward from central channel. Heavy elephant hide crusts in NE cove, bench three feet high showing fresh construction all around lake. Lake 15 feet below cliff at E end.

Gulch N side of SE crag appears more sunken, extending from S island region to E cone region. Live vents of E cone crevasses flaming and rumbling and wall crack vent ENE rumbling and smoking excessively.

N lake found with large continuous central fountain and four large border fountains, flaming cone on N side, fresh spatter ramparts and evidence of fresh overflow N and NW. Central crevasses fuming strongly.

Windows in Postal Rift source cone continue their bright flaming, the northern one over noisy fountains which appear higher and nearer the surface than before. The southern one shows steady streaming toward the SW. Flowers of bright yellow sulphur clustered about strands of Pele's hair and spatter fragments near the N window and greatly increased sulphur patches all around this source region and one strongly fuming sulphur patch between source region and Halemaumau. Much smell of sulphur vapor.

Postal Rift flow in evening moderately bright and fountains of N lake visible from H.V.O.

Mauna Loa. Clouds and rain mist obscure mountain.

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

JOURNAL

Hawaiian Volcano Observatory

Day Wednesday Date October 22, 1919
Thursday " 23, "
Friday " 24, "
Saturday " 25, "

October 22.
3:30 to 4:10 p.m. Lakes high; fumes moderately thick. Two grottoes active in S arm pond. Rapid streaming to the E in main lake, all of the current deflecting and going into NE cove. N lake crusted over and quiet, about 3 feet below bank. Source cone and crack very active.

October 23.
1:10 to 1:50 p.m. Lakes lower; fumes thick. (Lake fell just prior to beginning of observations, so Alex reports.) Fountains to bank at four places in SW lake. Rocks falling on inside of S ridge. Three vents in ridge between S ridge and NE ridge rumbling. Main large quiet, except for activity of three grottoes. N lake about 7 feet below bank. Source cone and crack active. The cone in S ridge near the cascade place showed no signs of activity except for escape of steam.

October 24.
1 to 1:25 p.m. Fumes thick. Lakes about the same level as yesterday, though they were much higher during the night and lava flowed over the ledge between main lake and S pond forming an island of the middle higher crag for a time. Rocks were falling in the NE ridge. Three grottoes in main lake. N lake quiet except for activity in four grottoes. Source cone and crack very active.

October 25.
1 to 2 p.m. Fumes moderate. Lakes higher than yesterday and fluctuating rapidly. Small landslides in NE ridge. Main lake streaming to the E and going into NE cove. Three small fountains at bank. N lake about 2 feet below bank to N and NW. Further subsidence to the NW of N lake. SW lake quiet and crusted over.

R H F

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

JOURNAL

Day Monday Date October 27, 1919
Tuesday " 28, "
Wednesday " 29, "

October 27.
1 to 1:20 p.m. Fumes moderate. The vents in the beginning of the NE ridge very active. The lakes have been fluctuating very rapidly during the past week, frequently rising 4 or 5 feet or more and then sinking the same amount all within an hour. Current to E in main lake. N lake about 4 feet from bank. Source cone and fountain very active.

October 28.
12:50 to 1:25 p.m. Fumes thick. Some more rocks have fallen on the inside of SE ridge. Evidence of sinking in the vicinity of the bridge between SW and main lakes. Rapid streaming to E in the main lake; three fountains to bank. N lake about 2 feet from bank, four grottoes active. Considerable smoke issuing from NE ridge at several places besides the active vents near the S end of this ridge.

October 29.
12:55 to 1:20 p.m. Lakes much lower than yesterday. (All lakes the lowest all day that they have been for a week - Alex.)

S arm pond has decreased in size; quiet. Streaming to the E in main lake with pronounced current into NE cove. One fountain at bank. N lake quiet, 12 or 13 feet below bank. Source of flow active. Loud rumbling in three vents at beginning of NE ridge, S end.

R H F

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date October 31, 1919

5 to 6 p.m. Flow on Kilauea floor continues very voluminous with bright surface streams and toes all over northern and western parts of crater.

Glow in S wall crack. S arm very active and bright at night; flaming chimney W of it.

Main lake high, streaming E, grottoes SW and E, very little change in height of benches and cliffs around it. E cone crack continues bubbling noises and flaming. Vents along wall crack under NE ridge spreading northward so that hot and disagreeable fume comes up in trail which crosses ridge. Fume in general is dense and abundant and greatly increased in the sulphurous region around the Postal Rift source cone and W of there.

N lake high with much new rampart built. Surface only two or three feet below northern and eastern bench. Grottoes E, NE and N, the latter with flaming holes above. Streaming to NE bank. No special change in gulches on S side. General levels of bench magma mostly stationary for week past, some slight rising recently.

Open flaming windows of Postal Rift cones show lava boiling and streaming inside, somewhat higher than before, the westward streaming being slow, however, about 5 miles an hour, perhaps because the most rapid streaming is through some other tunnel.

General situation perfect adjustment at lakes and voluminous flowing greatly increased since Mauna Loa broke out.

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

JOURNAL

Day Saturday Date November 1, 1919
Sunday " 2, "
Monday " 3, "

November 1.
11 a.m. to 12 m. With Admiral Jellicoe and party, to N lake and Portal Rift source cone. Conditions unchanged. NE fountain principal activity of N lake. Much sulphur around Portal Rift source. Flow moving strongly toward Volcano House trail.

Mauna Loa. Fume unchanged.

November 2. Halemaumau as before. Portal Rift flow shows new opening, making bright glow on the abundant fumes about a quarter of a mile NW of source cones. Surface flows showing stems and fingering delta fronts and great brilliancy N part of Kilauea crater and along base of cliffs under sulphur banks.

Mauna Loa. Fume column and glow visible last night.

November 3. Halemaumau continues brilliant and also making much fume. Brilliancy of flow continues including opening NW of source and one long tongue with fingering front making out toward Volcano House trail so that front is E of the line joining Observatory with center of Halemaumau. This tongue about one-fifth of the distance from Observatory to Halemaumau.

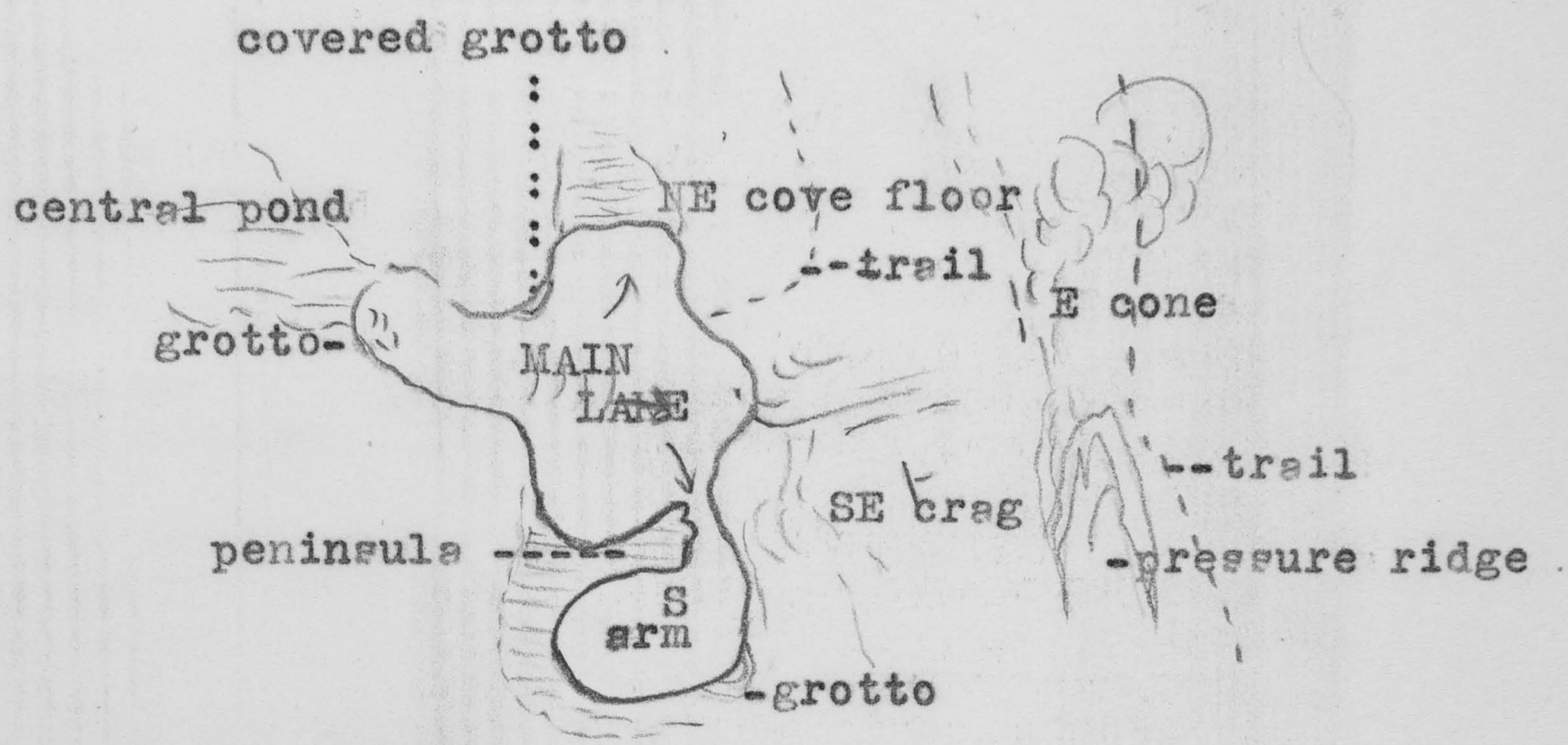
Mauna Loa. Fountains as bright as ever.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date November 4, 1919

11 a.m. to 12 m. On Sunday, November 2, strong overflowing of main lake reported and flooding of spaces between main lake and S arm pond. Island seen subsiding. Now the S island as an eminence is entirely gone, has subsided, and new crust covers the place, leaving a peninsula jutting from SW shore, and channel SE being open and restoring S arm as a part of main lake.



E cone bubbling and hissing as well as the wall crack adjacent.

N lake 10 feet below rampart, perpetual fountains and balloon skins under gulch SE of it, fountaining NE and curtained grotto with long stalactites N of it.

Fume somewhat thinner.

The sulphur patch S of the two source cones of Postal Rift flow now hissing and has built a ball of gas driblets and flaming mouths there.

Flow in the tube at S window of Postal Rift source cones rapid, 10 or 12 miles per hour. New pit 300 yards to the NW with 10-foot open windöw on NW side leading into side of the tube leading the flow N. Flow seen inside running 7 miles per hour, 15 feet wide, lines on its surface, bright orange, streaming to N.

Flow very brilliant in N part of Kilauea crater and progressing toward Volcano House trail.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date November 4, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Kodak lens F 7.7						
11-12a	E of N lake to NE ridge		1			f/8	1/50	Kodak Stereo No.1
ditto		S cliff of N lake	2			"	"	"
"		N rampart N lake	3			"	"	"
NE of		main lake to S island sunken	4			f/11	"	"
ditto		SE crag	5			"	"	"
E of main lake to central channel			6			"	"	"
N sta		new gas mouth sulphur patch S of P R flow source	7			f/16	1/25	"
		Near view gas mouth (15 feet)	8			f/8	"	"
		Near view northern window P R source (10 feet)	9			"	"	"

T A J

1919, Nov



1



2



3

Jag

1919, Nov. 4



4



5



6

Jap

1919, Nov. 4





7





8





9

Jog

JOURNAL

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

Day Date

Thursday November 5 & 6, 1919
" 6, 1919

November 5 & 6. Kilauea crater bright. Voluminous flows on N floor continually pooling and spreading. Two bright openings now in roof of tunnel NW from Postal Rift source.

Fountains of N lake visible from H.V.O. Fume slightly less over Halemaumau on November 6.

Mauna Loa. November 4-5 was last night when Mauna Loa fume was seen in moonlight. Glow very slight and fume column small.

T A J

November 6.
4:50-5:10 p;m. Fumes dense. Active gas vent at edge of S arm pond. Vents at S end of NE ridge rumbling heavily. Main lake quiet except for eight border fountains. N lake nearly bank full, five fountains at edge. There has been a landslide between NE cove and N lake since I last observed, also a slight subsidence near NE edge of N lake.

The crack and cone at source of Postal Rift flow active; the new cone that is nearer the N lake was hissing loudly. A good flow of lava, three or four miles an hour shows in two places where the roof of the tube has caved in.

R H F

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

JOURNAL

- 1 Day Friday Date November 7, 1919

9:30 to 12 a.m. Wind light SW. N lake fountains still in view from H.V.O.

Approach Halemaumau by S and W. SW lake very high, central blocks of bench magma low. Block E of SW lake with flag formerly over central pond, now so much inclined westward and sunk below SW lake that the flag appears to be on SW lake side. Fresh overflows of ramparts and into W pond depression. Streaming W from tunnel leading to central pond, to grotto W bank, and to SW bank grotto. Crust across channel leading to central pond and piled crusts around lake . Sinking spells of two feet seen.

W pond covered with piled circular lava upwellings with gas spiracles on top hissing loudly at intervals.

N lake high, has recently overflowed ramparts, pounding in NE grotto. The blocks between the two gulches S of N lake appears to have settled westward, enlarging SE gulch.

Smoke from central crevasses. E cone cracks flaming and bubbling as before. Main lake very high, streaming E, fresh building up of inner bench, cliffs around lake low, block N of lake appears more slumped on lake side, block NE of NE gulch appears to have settled and NE gulch has entrance trending first W then N farther inside. Central pond appears very full. Through central channel one can see through to SW lake.

S pond has overflowed to SE and the large S grotto dome is half buried under fresh bench. A chasm three feet wide extends S through cliff with the new bench built across it, so that the chasm opens down below lake level without being filled; probably there is a sloping trickle of lava solidified inside it.

The main lake so high it is in full view from E brink of Halemaumau. General situation seems to indicate pronounced rise of liquid lava in lake and disturbance of bench magma.

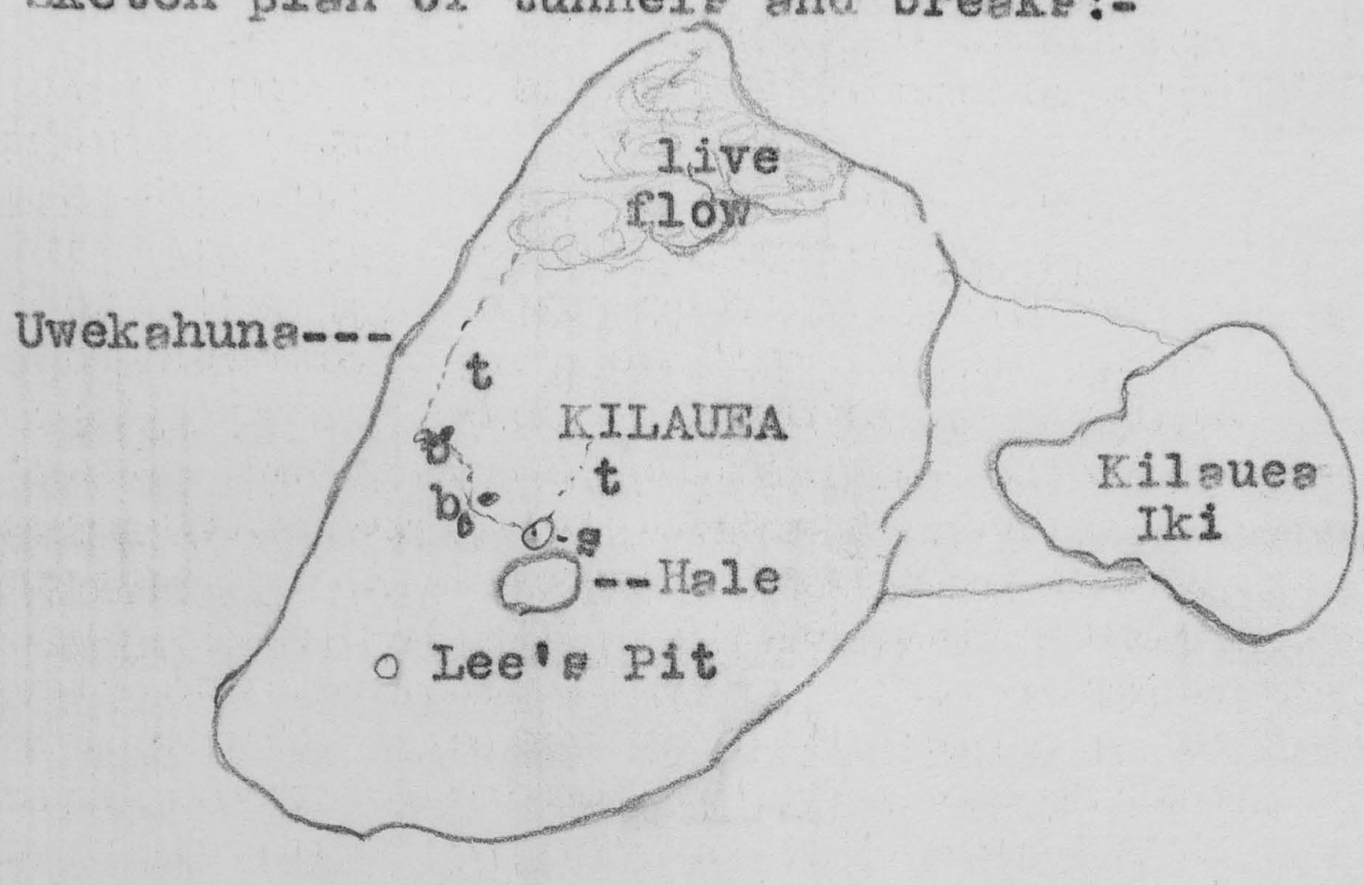
The new hissing cone of S sulphur patch of Postal Rift source has grown to 4 feet high and still hisses. The lava in source cones high and rapid. Could follow the tunnel NW on surface of flow heap far as eye could see by thin blue fume and hot stained cracks. The broken-in window in this direction supplemented by another break on its S side with opening westward showing whole stream 15 feet wide flowing 10 to 12 miles per hour under overhanging shell of cavern, here flowing N, cavern 10 feet high. Farther to NW near Uwekahuna another pit opening 6 feet across in roof of tunnel over an S-curve in plan of tunnel. Tunnel here 25 feet high, stream 20 feet wide, current 5 miles per hour, thin roof only eight inches thick where broken in; similar thin roof over the tunnel break farther E.

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
- 2 - Day Friday Date November 7, 1919

Seems as though these places fairly dangerous. Inbreaks may mean lowering of stream level inside tunnels, but no sign of abated activity of flow in N part of Kilauea crater which this tunnel feeds. Another tunnel appears from the source current and surface indications to go N directly from the source cones, as though they represented a divide pit draining in several directions like Peter Lee's pit to the SW.

Sketch plan of tunnels and breaks:-



b -- breaks over tunnel
t -- tunnels
s -- source cones

T A J

JOURNAL

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

Day Saturday Date November 8, 1919
Sunday " 9, "

November 8. Lakes in Halemaumau continue high. Little change in height of bench magma. Flow voluminous. In afternoon a long tongue making out very rapidly toward Volcano House trail, glowing and advancing all the evening toward the bridge over crevasse in trail.

Mauna Loa. In morning cloud over Kahuku source a large cumulus. This afternoon bright sun through clouds, but no red color, as seen from H.V.O.

10 p.m. Rock fall from cliffs Kilauea.

After midnight noisy blowing cone in Postal Rift flow under Uwekahuna spurting. Built two spires.

T A J

November 9.

9 a.m. In night a.m. the Postal Rift flow crossed trail just beyond the crevasse bridge and is now 100 feet or more E of the trail. This flow a long narrow arm 50 feet wide.

Halemaumau smoky and ground to W also. Bench magma little changed.

3 p.m. Went down Volcano House trail to floor of Kilauea and photographed flow crossing this trail. Strong foundery smell at flow but no sulphur. Flow a glassy pahoehoe, iridescent surfaces, bluish in color. Fragments seen falling into cracks. Tumblings and snaps heard.

Mauna Loa. No glow last night atnKahuku though the cumulus could be seen. At 6 p.m. today cumulus over Kahuku but no glow. Smoky place farther up slope about the 1916 locality of May 19.

T A J

4:20 to 5:10 p.m. Fumes at Halemaumau moderate. Lakes high. Lava flowing briskly under windows in tube. The crack near the Postal Rift source is now covered over with spatter. N lake 3 feet from bank, streaming to a grotto at the NE. Gas vents in this lake and main lake grottoes very active. Main lake streaming to the E with one sluggish branch to the NE cove and a very swift branch through the neck into S arm pond. Rocks falling on inside of NE ridge. Loud rumbling in S end of NE ridge and also in the middle near the trail across to main lake.

R H F

PHOTOGRAPH RECORD

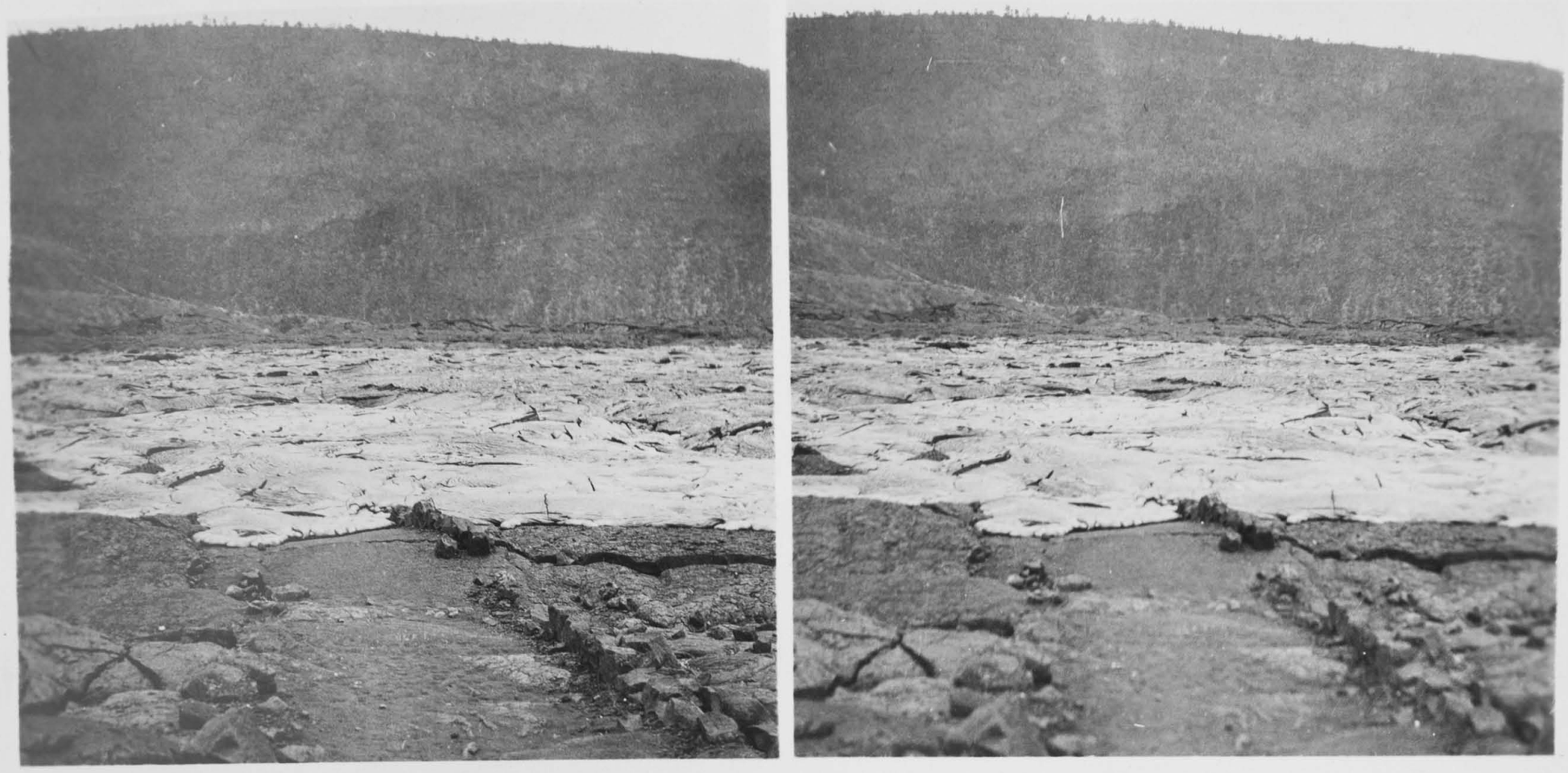
U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Sunday Date November 9, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		(Cloudy)						
3 p.m.	K.V.H.	trail across Kilauea to flow crossing S	1			f/22	1/5	Kodak stereo
	Same	trail to flow crossing N	2			f/8	1/25	"
	Spur	of trail to flow crossing	3			f/16	1/5	"

T A J

406

1919, Nov. 9



2



3

Tag

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date November 10, 1919
Tuesday " 11, "

November 10.
Mauna Loa. In early morning mountain perfectly clear, but no glow whatever discernible at Kahuku.

November 11.
Mauna Loa. Fine cumulus over Kahuku but little smokiness. Photographed it in daily series with Wollensak lens.

New arm of Kilauea flow nearing Byron's Ledge.

11:30 a.m. All lakes Halemaumau low. Rumble in E cone cracks not loud. Heat, fume and noise has extended to another group of cracks in middle of NE ridge.

Main lake 8 feet below its inner bench which overhangs at end of peninsula protruding between main lake and S pond. Hot current with thin skins and eastward streaming from tunnel under bench separating main lake from central pond, the current dividing N and S in E end of lake. NE cove has broken back into the depression N of it and increased in length in that direction.

N lake 5 feet below bench, general fountaining, not much current. Depression like a pit formed by collapse in bench E of N lake rampart and hot whitened cracks extending back from lake in this direction. Looking S at profile of cliffs S side of N lake the bench bends up sharply to the region of station No. 4 of the transit tide survey, but the surface falls off to a much lower level W of there.

The bench immediately E of the E cove extension of the main lake has slumped greatly, leaving wide cracks between it and the bench E of the NE cove.

SW lake also 5 feet below its inner bench, very smoky; also much smoke from W pond heap.

The long crack extending from NW station to Postal Rift is again opening just as it did in June so that it is a chasm two or three feet wide in places. Driblet spire of sulphur patch S of Postal Rift source continues hissing with much fume rising ground. Extensive deposit of a white salt in addition to sulphur on N side of Postal Rift source and over the Postal Rift area farther N. Postal source cones and the open pits of tunnel farther W remain as before with stream flowing rapidly but slightly more enclosed by crusts.

Pool area of flow N end of Kilauea crater slightly less bright yesterday and today but the Volcano House trail extension of the flow continues to make progress in numerous lobes towards Byron's Ledge and towards Waldron's Ledge. The flow has filled up and crossed parts of the great chasm of 1889. A second arm of the flow trends eastward from the pooled area farther to the S than the arm which crosses the trail.

Fume today slightly thinner than of late.

T A J

JOURNAL

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

Day Wednesday Date November 12, 1919
Thursday " 13, "

November 12.
8 p.m. N lake very high. All fountains in view from H.V.O. Flow brilliant and pushing east in middle and at trail arm.

In night early a.m., and late p.m. also, the cone on floor N of Uwekahuna gushing and incandescent; spouting occasionally. Cone growing.

Mauna Loa. No cumulus over Kahuku seen, in clear sky, either this day or next (13th). Glow wholly gone.

November 13. No marked changes in lakes. N lake 6 feet down. Main lake streaming E and current bends N and S to NE cove and to S arm. Some hot grottoes. Lake as before 8 feet or more below inner bench. E cone noisy as before. Much smoke.

Tunnel openings in Postal Rift flow bright. Flow progressing rapidly and widening, NE part of Kilauea crater.

(Swarm (10) feeble earthquakes 11th to 13th.)

T A J

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

SURVEY RECORD

Hawaiian Volcano Observatory

Day Thursday Date November 13,1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Sterling transit and stadia traverse. Index -- 00 unless otherwise shown. Stadia height on rod -- 5 feet.						
Morn'g	NE	Hut stone	0	-1 39	0			5 ft
	"	Trail monument top NE ridge	61 33	+5 50		202 inclined		
	T M	NE	0					
	"	Flag E of N lake	84 37	-2 46		483		
	"	Stones NE brink main lake	156 00	-0 44		220		
	"	NE	0					
	B M L	T M	0					
	"	E cone ridge	83 26	-1 36		208		
	"	Summit SE crag	123 04	+0 46		(Cannot see rod)		
	"	(intersection) to grotto end, W side, NE cove	229 26	-10 00	0			
	Sum. SE crag	Brink main lake	0					
	"	Grotto ditto	29 08	-5 51	+02			
		For locating SE crag:-						
	E cone ridge	Hut stone	0					
	"	1894 spire N	77 26					
	"	N station	87 28	+0 14	+01			
	"	Brink main lake	93 12					
	"	Grotto NE cove	113 04	-3 42	0			
	"	SE crag	176 43					

T M -- trail monument top NE ridge
B M L -- brink of main lake

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

JOURNAL

Hawaiian Volcano Observatory

Day Saturday Date November 15, 1919
Sunday " 16, "

November 15.
3:50 to 4:20 p.m.

Fumes light, vapor very dense.

Current to E in main lake with branches into NE cove and S arm pond. Gas vent in S arm pond active. Two fountains at bank. N lake 8 feet below bank, one fountain in center, and two grottoes active. The cracks in NE ridge have opened up more, rocks falling on this ridge. The wall between main and N lakes has crumbled a little more.

A window has opened in the lava tube about 80 feet from the old source cone that reveals the lava 3 or 4 feet below the surface. The Kilauea floor flow has been spreading and is now over the trail in two places. The lava is burning small trees where the trail strikes the Kilauea floor. Small explosions in the parts that are flowing can be plainly heard several hundred feet away.

R H F

November 16.
10:30 a.m. to
12:30 p.m.

E cone cracks rumbling. Slumping about central crevasses. Central block between main and N lakes lower. Lakes high. Main lake has recently overflowed to E, NE and S, and the floor through central pond appears high. Streaming E. Currents to S arm and NE cove very symmetrical. SW lake 4 feet below W bank and crusted W pond smoky. N lake has overflowed its NW cove extensively. New spatter heaps at E border main lake and N and E borders N lak lake.

General situation seems to indicate lower central bench magma and higher lakes.

Flow lava has risen in Postal Rift cones, sealing N orifice and flow 10 feet down rushing rapidly in S orifice. New opening a few feet E with stream rushing from under a crust into the cavern 12 miles an hour. The next two openings as before. Another new opening a pit 12 feet across farther NW, with 20-foot wide torrent and a cavity at one side full of tumbled stones all cherry-red hot. Still farther is the fifth opening, as before with broad stream at bend and pit leading to tunnel 20 feet high over liquid.

Visited the cones on NW side of Kilauea crater recently seen spurting at night. Three or four high domes of tumescence with driblet spires on top, highest 10 feet high with much spatter of wormy character indicating the lava thrown out was viscous and glassy. Down to this middle field of live lava the pahoehoe normal mostly and the odor of sulphur dominant. Live pahoehoe trickling flows on surface. Not the blue shark-skin type. All of this in contrast to area NE at V.H. trail where the lava glassy, bluish and shark-skin surface, and foundry odor.

T A J

JOURNAL

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

Day Mon.&Tues. Date Nov. 17 & 18, 1919
Wednesday November 19, "

Nov. 17 & 18. T.A.J. setting up Hilo seismograph.

N lake fountains almost continually in view. Kilauea never so brilliant at night. Five bright pits over flow tunnel, rather evenly spaced, on the right of Halemaumau. The latter bright. Whole foreground brilliant flow pudding glowing from Uwekahuna to Byron's Ledge.

Flow has returned on itself under Byron's Ledge and crossed trail this side of bridge, then flooded bridge and crevasse and piled against base of trail cliff.

T A J

November 19.

10:40-11:30 p.m. Fumes moderate. lakes rising.

Rapid streaming to E in main lake, with swift current into S arm pond and NE cove. One fountain to bank in S arm pond and one fountain at entrance to NE cove. Inner benches 4 to 6 feet high. A break in the crust in NE cove showed a rapid current toward the gap to the N lake. N lake about 7 feet below rampart and quiet save for two active grottoes.

The new cone near Postal Rift source built up both laterally and vertically during the activity at 5:30 p.m. November 18 and now stands over 7 feet high. A small flow poured from this cone into the depression toward the 1894 cones. The window in the old source cone is now closed up by spatter. A coffin shaped truncated cone was built up at the head of the first window in the lava tube. The sluggish current seen in this coffin cone joined with rapid currents on each side, cascading into a single tube at a lower level. The other windows showed the current to be of about the same order of magnitude and velocity as common. The third window locus shows two parallel currents. Rocks were falling on the NE ridge.

R H F

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

JOURNAL

Day Thursday Date November 20, 1919

11 a.m. Strong rise of lava lakes with overflows; now brimming full and hot; apparently took place this morning early.

S pond overflowed entire depression of SE wall valley between E cone and S wall cone.

Main lake overflowed entire E wall valley and cascaded thence to NE wall valley fill at lower level.

N lake overflowed E and NW. The E overflow filled entire NE wall valley destroying most of the trail and filling above tops of 4-foot trail monuments. NW it filled entire NW wall valley under NW station to brimming against Halemaumau wall between NW and N stations and brimming against 1918 fill of N side of W niche.

SW lake and W pond did not overflow, but central pond rose and flooded with new floor entire central region widening the channels and drowning base of cliffs.

Main lake very high with new spatter domes; eastward streaming and extensive new floor crusts penetrating far into gulch at NE cove. New crusted floods across peninsula separating lake from S pond and cliffs around lake only 10 to 15 feet high. The new fills are of pahoehoe with heavy shells which tend to collapse over frothy space below when the melt cools. Streaming in main lake to E, NE and SE. Central pond area appears largely crusted,

The N lake fountaining against a circle of new spatter domes and the new overflows hot and level with the lake margins but not at the moment apparently flowing.

The NE valley fill lies at a slightly lower level than the E wall valley fill made by the main lake so that the E valley fill spills over by a frozen cascade into the NE valley fill.

The Postal Rift flow source region actively flowing through the tunnels as before but the first break in the tunnel W of source cones has developed a black spatter cone and the gas spiracle vent of the sulphur patch to the S has become a large lava heap 10 feet high and 20 feet across with short radial flows extending out 40 to 50 feet.

The SW lake had built up large spatter domes and the W pond cone was hissing. There were bubbling noises in the S wall-crack cone and in the E and NE wall-crack vents. The large crevasses extending N from the NW station appear to be closing again as though mass rising were going on.

Evening. Inspection of the crater face of N part of Bryon's Ledge showed that the lava had burned the bushes up to the top of the cliff and the flow was still spreading with great rapidity over all that region, making new re-entrants of floor between the spurs where the Volcano House trail comes down. The surface floods in many parts of the flow surface all over the northern and northeastern parts of Kilauea crater were very bright in the evening and again the N lake fountains were seen brimming high and splashing over within their basin.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date November 21,1919

9+ a.m. Lakes down 2 to 3 feet and rather quiet; the valley fills have slumped as they cooled.

W pond hissing on SW side and it has a round sulphur-stained cone with a hole in the top.

SW lake about 3 feet down with recurrent noisy bubble fountain activity and large grottoes SE and NE

Main lake slightly down also; streaming E and fountaining in border grottoes as before.

Wall crack in NE ridge rumbling and smoking strongly, E cone vent less so.

N lake surrounded with rim 3 or 4 feet high containing four or five immense spatter domes. Very quiet and crusted at time of visit.

No hissing but much hot fuming in the Postal Rift cones and the tunnel break immediately to the W shows very rapid and voluminous torrent 17 feet wide and moving over 15 miles an hour. Three such torrents would be fully equal in volume to the main channel of the Alika flow on Mauna Loa and there may well be at least three in the tunnels feeding the Postal Rift flow.

The general situation appears to be a strong revival at Kilauea following the close of the Mauna Loa eruption with every sign of great increase of the Postal Rift flow and rising in the lava lakes.

The SW wind of the past night brought the foundry smell of the flow up the cliffs at the Observatory. Last night the new large cone of the Postal Rift source could be seen spouting.

Old wall crack NNE opening in chasms.

2 p.m. N lake overflowing.

T A J

SURVEY RECORD

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

Day Friday Date November 21, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9 a.m.	Hal S	Lower trail monument (5 ft. above base)	0	-4 43	+02			5 ft.
		Second trail monument (stadia)	34 13	-4 33	00	349		
		Poised block SE pressure ridge (rod half up outside slope)	108 27	+1 46	00	593		
		Top of same block		+3 13				
		Kilauea 3976' SE	L 6 17	-0 10	+02			
		Lava cascade S ridge (rod base of cascade)	135 57	3 45	00	341		
		Top of cone		+6 06				
		Point SW of SW lake	187 40	+1 55	-04	751		
New pt. SW of SW lake.		Hal S	0					
"		Hal W	L160 11	+ 04	00	561		
Hal W		Hal N	0	-0 49 (ground)	00			
		New monument W edge of W pond	R109 42	+0 49	00	277		
		Mon. NW edge W pond	101 51	+0 20	+02	142		
		W pond	96 23					
		Grotto SE side SW lake	83 43	-1 44	00			
		Promontory NW of SW "	73 47					
		" S of central pond narrows (old flag)	59 21					
		New mon. N of SW lake	52 01	+2 13	+01	340		
		Central, smoke	34 27					
		Transit sta. of Aug.	7 01					
		1894 spire	5 13					
		Old P.R. cone	L 5 41					
		New large cone	L15 57					
		July cone (steam)	L12 12					

SURVEY RECORD

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

Day Friday Date November 21, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
	Hal W	NW station	L 26 07					
		Tangent new wall valley pool	L 29 34					
		P.R. source cone (S cone vent window)	L 21 04					
		Heap middle of curve 1894 W niche rampart	L 74 41					
		Extreme S limit new flows under W wall Kilauea	L 99 52					

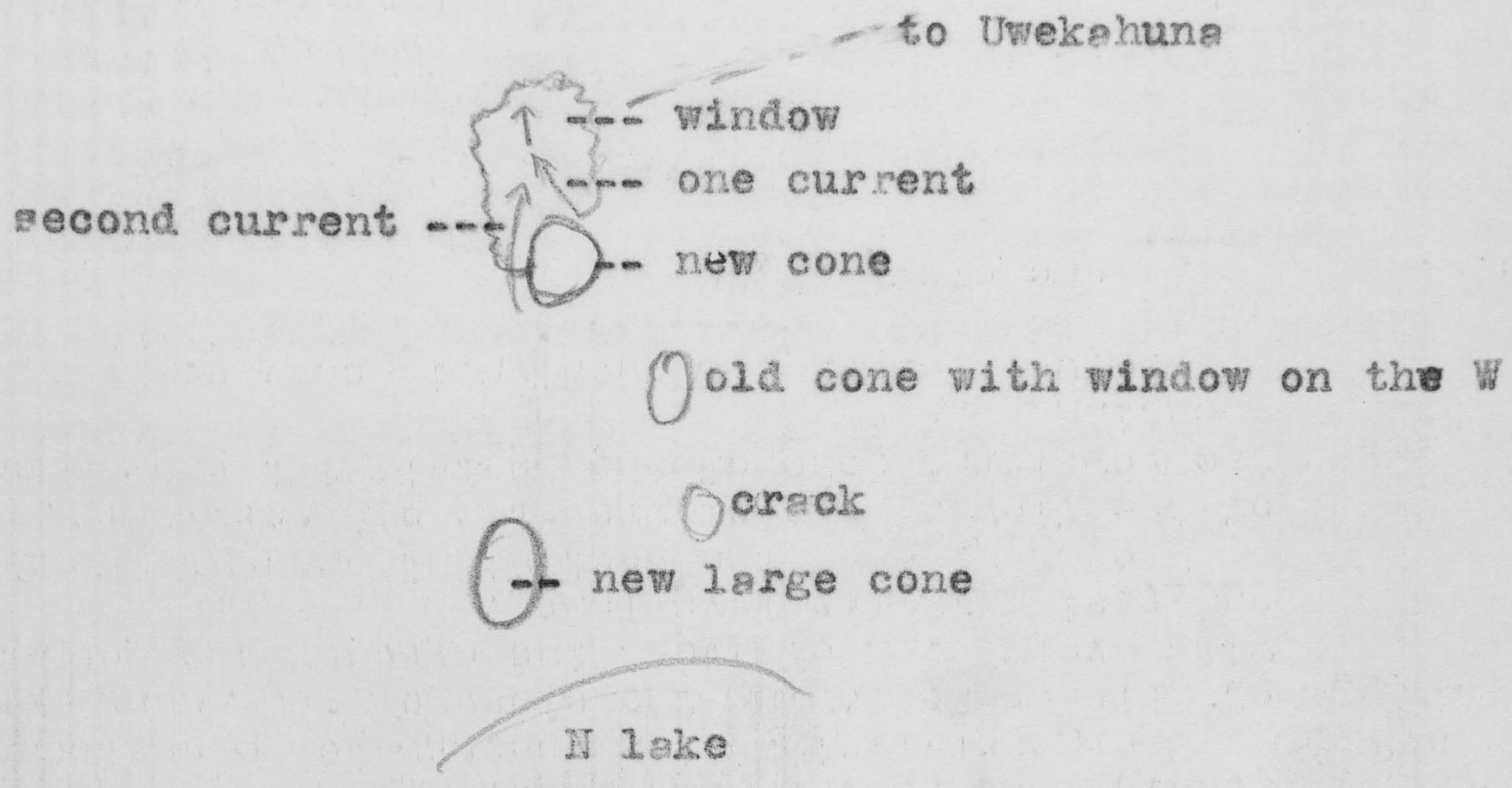
T A J

JOURNAL

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

Day Saturday Date November 22, 1919

3:30 to 4:30 p.m. Lakes low and falling. Fumes rather dense. Streaming to the E in main lake. NE cove full of smoke. Rumbling in a vent near the old trail across the NE ridge. N lake 10 feet below rampart. Two active grottoes at N bank. A large area in NW wall valley covered with new flow which did not get over the old wall. Source cones active. The two streams shown in the window nearest the source cone were both flowing rapidly.



The level of the stream in the second window locus lower than previuosly.

A gas vent at the W pond site was quite active. In the SW lake there was a gentle streaming to the SE into two tremendous grottoes.

The gas vent in the S ridge near the cascade site is active, with rumbling and glow.

R H F

JOURNAL

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

Day Sunday Date November 23, 1919
Monday " 24, "
Tuesday " 25, "

November 23.
5 p.m. This afternoon new development in S pond of Halemaumau. Pond 10 feet lower than main lake and cascade falling with a roar through channel from main lake to pond; channel 20 feet wide. Pond converted into a whirlpool; skins from main lake carried down over caswade. Lake slightly lowered by this action showing grotto caverns at central channel and NE cove. Streaming out from central channel and in at NE cove.

N lake about 8 feet below bank with much noisy fountaining.

Postal Rift flow source shows high gas pressure with hissing and flames coming up through cracks in the ground between the source cones and the first collapse orifice. In the latter two torrents pouring on both sides of the cone formed and joining in the tunnel beyond. Surface of torrents shows some granular black dots like the Mauna Loa flows. The new black cone flaming from many holes and lava outflow area from it larger.

Night. The cascade and whirlpool made Halemaumau especially bright at night and the flow was also very brilliant. After midnight the whirlpool stopped, the S pond rose and fountains could be seen both there and at the N lake.

Mauna Loa. About 4 p.m a cloud seen over Kahuku rift source which showed very hard edges and resembled the clouds of the eruptive period.

November 34. Flow unabated. N lake fountains high. Cascade and whirlpool not resumed in daytime but a bright light seen over S pond about 10 p.m. suggested possible renewal of process. Later in the night this bright light stopped.

Alex reports that third tunnel orifice of Postal Rift stream has broken wider open and shows a long stretch of flow with standing waves. The main flow surface in N part of Kilauea crater continues bright, especially toward the NE, the area of the N corner under the Militray Camp tended to grow more heavily crusted and darker. There are now extensive arms of the flow over the middle area between Halemaumau and the Observatory.

November 25. No notable changes observed in Halemaumau or the flow. Strong hissing can be heard from source cone region and flow continues bright.

T A J

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

JOURNAL

Day Wednesday Date November 26, 1919

10:20 a.m. S pond has open pot in summit large S dome, the dome standing back from the edge. Bank 5 feet high. Main lake sends stream through channel into S pond but not cascade. Streaming E, not much fountaining. Notice block fallen from S pressure ridge on fresh flow.

N lake 6 feet below bank, quiet ballooning crust, flaming grotto N, very large wide spatter dome E.

Postal Rift source cone shows high lava streaming rapidly. First opening shows the two streams on each side of cone with bubbles in surface and no sign of aa granulation. Flow about 6 miles per hour. Second openings show sluggish stream moving like molasses, dark red, considerably built in from the sides. Opening No. 4 shows two pits both with fairly rapid streams, the upper having much the quality of the cone pit adjacent to the source cones. Curtain of accumulation hanging down into the stream and the stream adding to it by splashing. The lower is the pit with the red hot bowlders just as before. Opening No. 5 shows no change. The large new cone has grown until it is 15 feet high and the short flows around it have grown. Cone hissing and flaming. Postal Rift flow continues to grow in area, and in evening new fingering flows piling on top of the flows already filling around the base of Byron's Ledge so that a new pooling accumulation is growing there widening towards Halemaumau. Nearly a quarter of the greater crater is covered with flows that have poured out since 1918.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date November 26, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
		Sterling transit. Vertical angle readings always on 5-foot mark of rod when rod is used. Stadia.						5 ft
10:20a	Hut stone	Uwekahuna (azimuth line)	0	Azimuth N 23° 40' W				
	"	NE sta.(1894 half dome). NE sta. 12.2 ft. above hut stone.	L 70 25	+1 20	0	520		
	NE	Hut stone	0					
	"	N	L 151 37	+0 36	+01	752		
	N	NE	0					
	"	NW	R 124 52	+1 03	+01	592		
	NW	N	0					
	"	W	R 294 01	+06	+01	452		
	Hut stone	Uwekahuna	0	(azimuth line)				
	"	E dome (E of E cone)	L 113 11	+1 46	00	641		
	E dome	Hut stone	0					
	"	Trail flag, top of 1st slope from road terminus.	R141 47	-2 14	00	627		
	Trail flag	E dome	0					
	"	End trail monument	R 171 03	-4 13	00	298		
	"	Hal S	R 227 57	+0 52	00	427		

T A J

JOURNAL

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

Day Friday Date November 28, 1919

Up to midnight prior to this day there was nothing notably new about the condition of Halemaumau. The main lake was streaming rapidly but not cascading into the S pond and NE cove and the Postal Rift source was pouring out its torrent as before. The flow was very bright, puddling and spreading as usual.

At 1:42 a.m. earthquakes began to be registered seismometrically and about 2 a.m. five or six pronounced quakes were felt in the course of five minutes and others thereafter, so that some seventy-five felt shocks occurred between 1:58 and 4 a.m. Over two hundred shocks were registered by the instruments, the first half-hour being practically continuous jarring of the ground.

At the very beginning (2 a.m.) Halemaumau seen from the Observatory became very bright especially toward the S pond end and at 2:05 a.m. the cliff profile of the central dome of bench magma on the S side of the N lake suddenly flattened cut in less than a minute indicating that the whole lava column was sinking quietly and very rapidly. This cliff crag was 30 feet high. Immediately afterwards the line of five openings in the flow tunnel NW of Halemaumau became less luminous as though the flow had ceased.

A few minutes after the central crags had slumped, dense avalanche clouds of dust went up from the pit and a continuous roaring noise could be heard. Some of this noise sounded as though it came from Uwekahuna Bluff, with avalanches started by the quaking. The pooled flow in the N part of Kilauea crater rather brightened than otherwise and within an hour was fountaining and spraying in small ponds towards the western and central parts where the crust broke in and some reaction in the liquid beneath due to the failure of the source supply caused fountaining. This process continued into the forenoon when a fountain of artesian character welling up continually was seen in a small oval pond in the floor between the Observatory and Halemaumau.

Proceeded to Halemaumau at once arriving there about 3:15 a.m. At the road terminus a continuous mild roar of avalanches in the pit could be heard. There was no evident change in the S pressure ridge, and the pointed trail monuments of neatly piled stones in pyramids about 4 feet high and 3 feet across the base had not been deranged by earthquake.

Approach to pit by E and N, with the light from the lava much less than of late, showed at the E end of the pressure ridge that the whole column filling the old circular pit of Halemaumau had gone down over 400 feet in an hour and a quarter. Probably the greater part of this happened in the first half-hour, for much of the subsidence was already in a state of adjustment. There was a vertical walled pit, with big taluses below, a small semi-crusted lava lake at the bottom with bubble fountains around the edge and a spurting vent through a

JOURNAL

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

 Day Friday Date November 28, 1919

crack in the crust in the middle. The upper edge of the pit was overhanging in places but no falls from the actual edge were seen during two hours spent at the crater. On the sides of the pit part way down there was much cracked glowing matter clinging, which fell away in fiery avalanches frequently and the talus below was bright yellow with incandescence along its upper edge and more or less red throughout. Some gas puffing was heard from the vents in the floor of the pit. The size of the new pit was quite like the former Halemaumau except for extensions to the N due to complete collapse of all the ground enclosed between the NW station, the Portal Rift source cones, and the 1894 cones. This triangle embraced and carried down the 1894 cones, the N and NW stations, the N bench mark and corral and the new black cone of the sulphur patch S of the Portal Rift source. The Portal Rift source cones themselves remained, close to the new edge of the pit.

At the time of this visit the manner of downgoing of the N region was revealed through the presence of two shelves beneath, one below the other, with ragged edges seen in profile against the glow and fume of the pit bottom. The upper one was a block sloping down from tumbled ground on the S side to a point perhaps 20 or 30 feet below the ground lying immediately N of the 1894 cones. The lower shelf was perhaps 75 feet farther down and seen dimly as a bench below.

The tunnel opening adjacent to the Portal Rift source was glowing brilliantly but entirely empty; the lava river had stopped. There was no hissing or flaming in the cones. The chamber beneath the cones could be seen glowing and empty. The river bed showed a shoreline bench standing about 4 feet above the bottom, indicating that the torrent at its highest was not more than 5 or 6 feet deep when seen rushing past the opening.

Occasional heavy avalanches sending up brown dust clouds were seen but they were not numerous. The roar was made by the small trickling slides from glowing bench magma clinging to the walls, and occasional sudden slips of the large taluses. There were some glowing cracks of considerable size in the N wall low down.

10:30 a.m. to 2 p.m.

Inspection and measurement of the pit by daylight shows the lava column already in nearly complete adjustment, the pit dusty but not very fumy and a small triangular lake 587 feet below the NE rim in the NE corner of the floor below the talus slides. This floor consisted of complete fragments, somewhat cracked, of the bench magma surfaces which had been parts of the floor above. There was possibly a trace of the original tumbled ground with its two crevasses which had extended S from the N lake, the triangular lake remnant appeared to correspond with the N lake, and at the other end of

the crevasses there was a depression perhaps corresponding to a piece of the main lake. All around were high talus slopes extending as much as a quarter of the way up in places and the wall above was veneered continuously over large surfaces with the material which had filled the wall crack all around the bench magma. This was a greenish brown sheet plastered on the wall following all the irregularities of the wall and showing every sign of being the mould of the other or inner wall of the fissure which it had filled, now completely fallen away. This veneer was of variable thickness but uniform in each place where seen, and where it was broken away it was in places as much as 4 or 5 feet thick. The exposed surfaces of this veneer were in many places streaked or scored vertically as though rubbed by the sinking bench magma in its downward progress. This remarkable structure followed the entire periphery of the old pit to depths of 300 to 400 feet and was doubtless the substance, seen glowing in the night visit, which clung to the wall with an occasional break where a powdery incandescent shower would pour out of it in an avalanche somewhat like as lava. This hollow cylinder or sheath of wall veneer was in fact a dyke consisting of the wall crack fill, and its extension down to depths 300 or 400 feet below the rim of the pit appears to prove that the bench magma as a hard interior substance extended down that far, for as for down as the veneer could be traced it had moulded itself to a hard substance on the inner side.

The lake was crusted, showed two or three sluggish fountains with cracking and foundering occasionally and some driblet cascades were pouring into it from a fissure heap on its W side. Farther W there was a puffing filagree cone from which trickle flows had poured out on an old bench magma surface coated with Pele's hair. There was evidently still gas pressure capable of making flows of lake magma in the bottom.

A remarkable feature of both the E and W walls of the pit, at points exactly opposite each other, was a pair of open cracks extending straight up and down trending NE and SW, the one on the E side and the other on the W side of the pit. They appeared to be the continuation of the same crack across the pit. This crack appeared wider open below than it was above and it narrowed, forked slightly and petered out above, rising some 400 feet from the bottom of the pit and apparently one to two feet wide. May not this crack correspond to the main fissure under Kilauea trending parallel with Uwekahuna Bluff and almost in line with the little dyke in the NE wall of Kilauea W of Volcano House on the one side and with the "1868 cracks" on the other?

Vapor is dense from the ring of 1893 cracks around Halemaumau. The Postal Rift flow continues to make blue fume. The earthquake swarming quite ceased after daylight.

JOURNAL

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

 Day Friday Date November 28, 1919

Much grit of reddish color fell about edges of pit both in the night and in daytime. This grit seemed to accumulate thickest in an eddy on S side of pit. Fume from W side new northern inner benches.

Earthquakes of 2 a.m. not felt in Hilo.

Postal Rift flow bright in evening, especially toward Byron's ledge.

T A J

SURVEY RECORD

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

Day Friday Date November 28, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
11:25a	NE	Hut stone	0					
		Pile of stones NNE L	156	10-0 52	0	263		
		Sum cone next W to P.R.	140	37				
		Crag edge of pit E of north	140	12				
		Lump NNE edge	145	32				
		Monument NE edge	216	35 +6 23	0	119		
		13.7 ft. above NE sta.						
		Lump NNE edge	145	32 +0 02	0	448		
		Crag edge of pit E of north	140	12 +0 01	0	632		
Crag E of N	NE		0					
		S cor. of △ lake base of cascades R	63	42 -41 50	0	651	582	
		NW cor. of lake	73	56				
		E " " "	58	54				
22 ft	beyond NE monument in line from NE station; edge of pit:							
From above point	Hut stone		0					
	S corner lake	R	171	53-47 31	+01	542	592	
	NW " "		181	36				
	E " "		182	51				

Average depth lake below NE rim 587 feet.
Lake a trinagle 120 to 160 feet on a side.
NE rim elevation 3727 feet.
Lake " 3136 " (down 591)

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date November 28, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Century lens						
10:30a	E side	of pit looking SW	1	W M	8x	f/11	1	Premo
	" "	" " " across	2	"	"	f/16	"	"
	" "	" " " down	2a	"	"	"	"	"
	" "	" " " N	3	"	"	"	"	"
	SW "	" " to W niche	4	"	"	"	"	"
	" "	" " " N side	5	"	"	"	"	"
3 p.m.	Obsvy	Halemaumau	6	Seed L Ortho	Seed orange correct-or	f/22.5	"	"
	"	Uwekahuna	7	W M	"	"	"	"

Negatives of Nos. 6 and 7 transferred to daily series.

T A J

1919, Nov. 28



1



3

Jag

427

1919, Nov. 2



2



2a

Jan

1919, Nov. 28.



4



5-

Fog

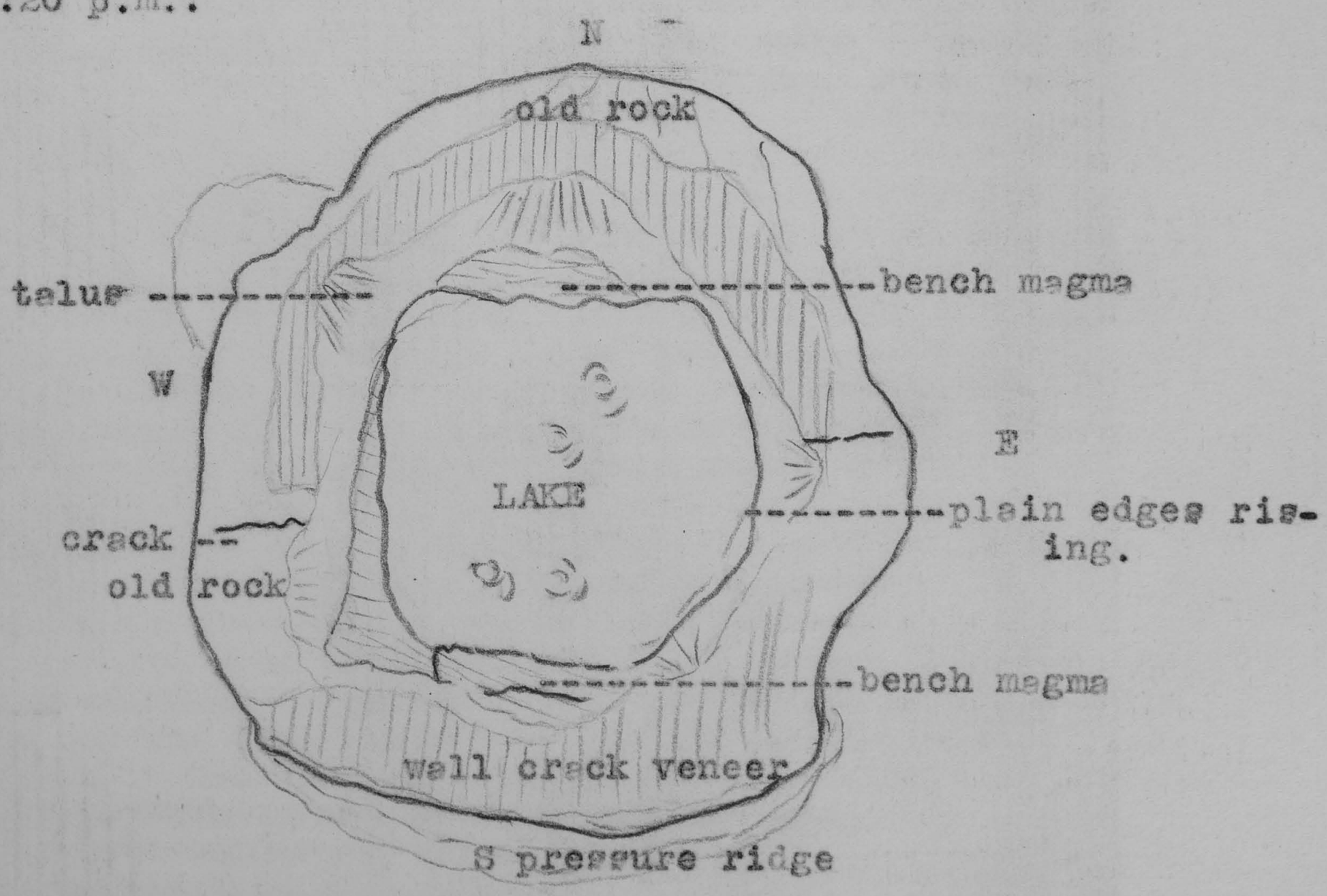
JOURNAL

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

 Day Saturday Date November 29, 1919

4 to 5:30 p.m. Halemaumau interior today almost entirely free from fume but vapor dense from outlying circle of cracks and especially so SW of pit. Inner walls still show remarkable veneer of wall crack fill. Pit marked by this veneer, clean-cut and circular, and appears to be very much the old Halemaumau, all the changes being chiefly in the upper hundred feet. These upper changes are: the layer sharply marked and about 20 feet thick of new overflow SW; the W niche fill; the N sunken shelves and flow section back of them; the NE heap flow section 30 or 40 feet thick above the old red scar of 1894 bench; and lastly the S pressure ridge and the new section below it. The W wall shows at least two, and possibly three, clean-cut unconformities marking previous edges of Halemaumau of 1893 and earlier. The only fume source in the pit is a slight stained solfatara at the top of the western talus.

4:20 p.m.:



The most striking change is the rise of the lake which has become a large pentagonal pool 500 feet in diameter and certainly over 50 feet higher than the little pond of yesterday. The lake is quiet, rising, abutts directly on the talus slopes without any ramparts, covered with black skins and with four or five central fountains breaking almost continuously. There is some cracking and foundering and a pattern of bright

lines. A surface of old bench magma, cracked and representing a remnant of the former floor, still bounds the lake on the S and the talus slopes elsewhere show some ledge rock. This rapid recovery of the lake again suggests June of 1916, but the recovery is as much more rapid as was the subsidence.

A portion of the eastern high edge of the pit which was poised and hanging out yesterday has fallen. A few small avalanches and dropping rocks were seen but they were trivial. The only outer noise was the fountaining. The rising was in progress last night, for the pit increased in brightness during the night.

Examined N bench but could see in the tumble no trace whatever of the old features. Cupola under Postal Rift source cone more broken in, a large dark chamber. Adjacent tunnel opening shows a well with red heat. The tunnel is dark. So are the next two openings to the NW. The fourth group of openings shows brilliant red heat and cherry red rocks of much the same color as when the lava was flowing. The fifth opening is brilliantly hot, quite as when the lava was flowing and the stream channel seen below wholly free from lava was at least 6 feet deep, making the entire height of the tunnel 26 feet. Going to leeward of opening found the hot blast which came out to be nothing but hot air. The extraordinary retention of heat in these large chambers which have access to the air is difficult to account for unless oxidation of either gas or of the iron in the rock is still in progress. Last night the glow in the flow diminished and this evening it is confined largely to the area under Byron's Ledge where there is actually fountain spurting of the lava through openings. This revival of fountaining in a lava field cut off from a source of supply strongly suggests chemical gas reactions favored by atmospheric oxidation.

At the base of Uwekahuna Bluff both N and S of the trig station large and small bowlders were seen resting on the fresh lava due to fall of debris from the bluff. This was probably dislodged during the earthquakes when noises were heard from this direction.

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

JOURNAL

 Day Sunday Date November 30, 1919

11:50 a.m. Visited fuming crack in new SW overflows about 300 feet SW of Halemaumau. This crack is a vertical one extending out radially from the pit toward 1868 cracks in Kilauea wall. The smoke is dense, blue, and sulphurous along 200 feet or more, staining the rocks, and with high temperature in the crack. Crack open six or eight inches, but appears to be deep seated cutting across all flows indiscriminately. This much the most densely smoking vent around Halemaumau at present. It corresponds in position and trend with the crack in opposite walls of interior of Halemaumau; latter however does not smoke at all today; some fume there yesterday top of talus SW side.

Halemaumau a little more smoky. Lake 40± feet higher. Wall-crack vents back of talus all along ENE and WNW sides. One of latter spurting. All cascading down into lake across talus. One such vent S. These are inside of the old wall-crack veneer. The taluses much encroached on by lake; none on E, low on W, higher N and S. But these N and S slopes are largely solid rock remnants of sunken bench magma blocks, with some slide-rock material on top of them.

The fissure on opposite walls of pit is of great interest on E wall in that it is one to three feet open, <u>crack-ing across the wall-crack veneer</u>, seeming thus to imply that it opened after latter solidified; i.e. after the early morning of November 28. On SW wall it cuts across the ancient bedded rocks.

Lake has a narrow beginning of a rampart shoreline of lava; i.e the formation of a thin shell of bench magma under its bottom and sides. Two main fountain areas, three to five fountains. Dome fountains with little fling, each fountain sends up a blue smoke ring as it bursts, lazy fountaining of the "Old Faithful" character of 1909. Two fountains in N central part of lake, two or three in SW central part. Cracking and foundering in rings around the fountains. Heavier crusts than yesterday. Wide cascade from accumulated wall crack lava pouring into lake E side.

Occasional avalanches, especially from under S pressure ridge. Rocks fall into and break up crust of lake.

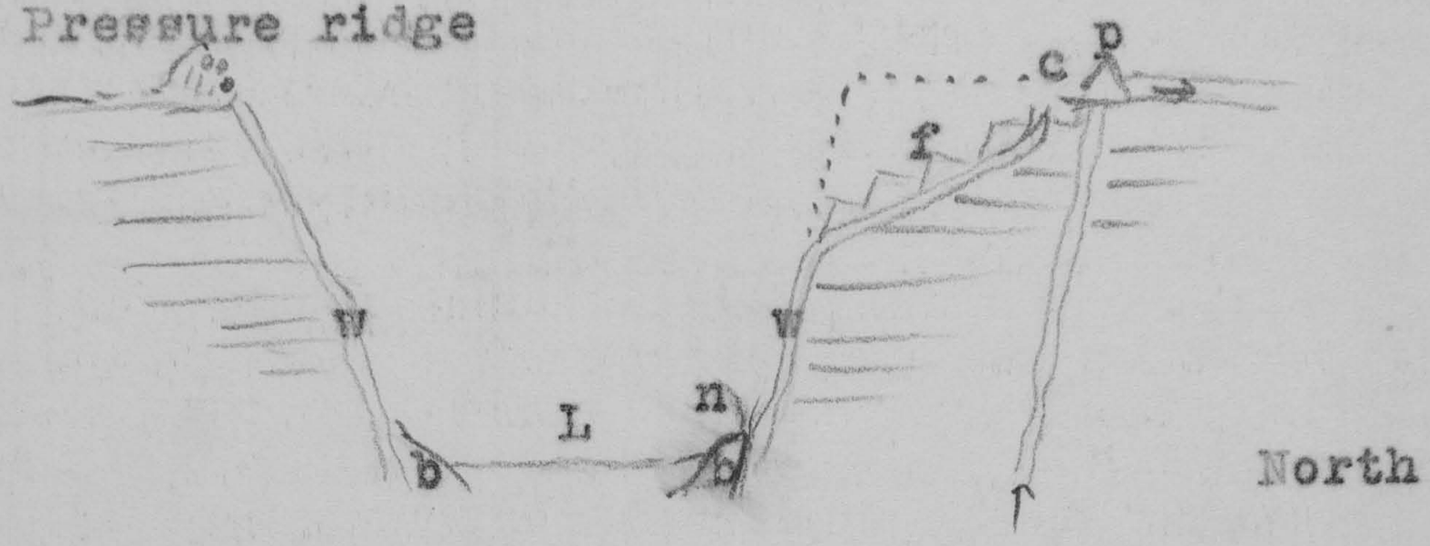
A study of the wall-crack veneer lining the pit and of the N station collapse suggests that the wall-crack fill, of lake magma, reached out through broken ground to the large black cone, now in ruins at the edge of the collapsed shelf, by way of the fissures at NW station and at 1894 bench (past 1894 cones). This whole broken region was undermined and inflated during the flow and fell in when the drop came. The other Postal Rift sources must have been similar cracks filled from below, perhaps by way of such cracks as the cross-fissure now revealed on opposite walls, this conveying the lava to the old 1893 wall crack.

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

JOURNAL

 Day Sunday Date November 30, 1919

Profile of pit:



W -- wall-crack veneer
L -- lake
b -- bench magma blocks and talus
n -- new wall-crack lava
c -- where black cone was
f -- fallen N station shelves
p -- Postal Rift source cones

Postal Rift source cone and tunnel more collapsed and no glow. Much smell of free sulphur vapor. No disagreeable fume from pit. Earthquakes have quite ceased. (Strong shock reported from Maui on the 26th).

In afternoon sunlight noted blue fume over flow, and rare spots of puffing red fume as though from a flame or different gas action.

This evening the front of Postal Rift flow under Byron's Ledge flowing in one place but luminous spots over flow now few.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Sunday Date November 30, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Century lens.						
11a.m.	H V O	Byron's Ledge	1	W M	8x	f/16	1	4x5
11:50a	SW of	Halemaumau to new solfatara crack	2	"	"	"	"	"
	SW edge	Crack in wall NE (cutting across veneer)	3	"	"	"	"	"
	Near old W sta.	W niche wall	4	"	"	"	"	"
	S side W niche	Lake S	5	"	"	"	"	"
	"	Lake NE	6	"	"	"	"	"
	5 & 6	panorama.						

T A J

433a

1919, Nov. 24



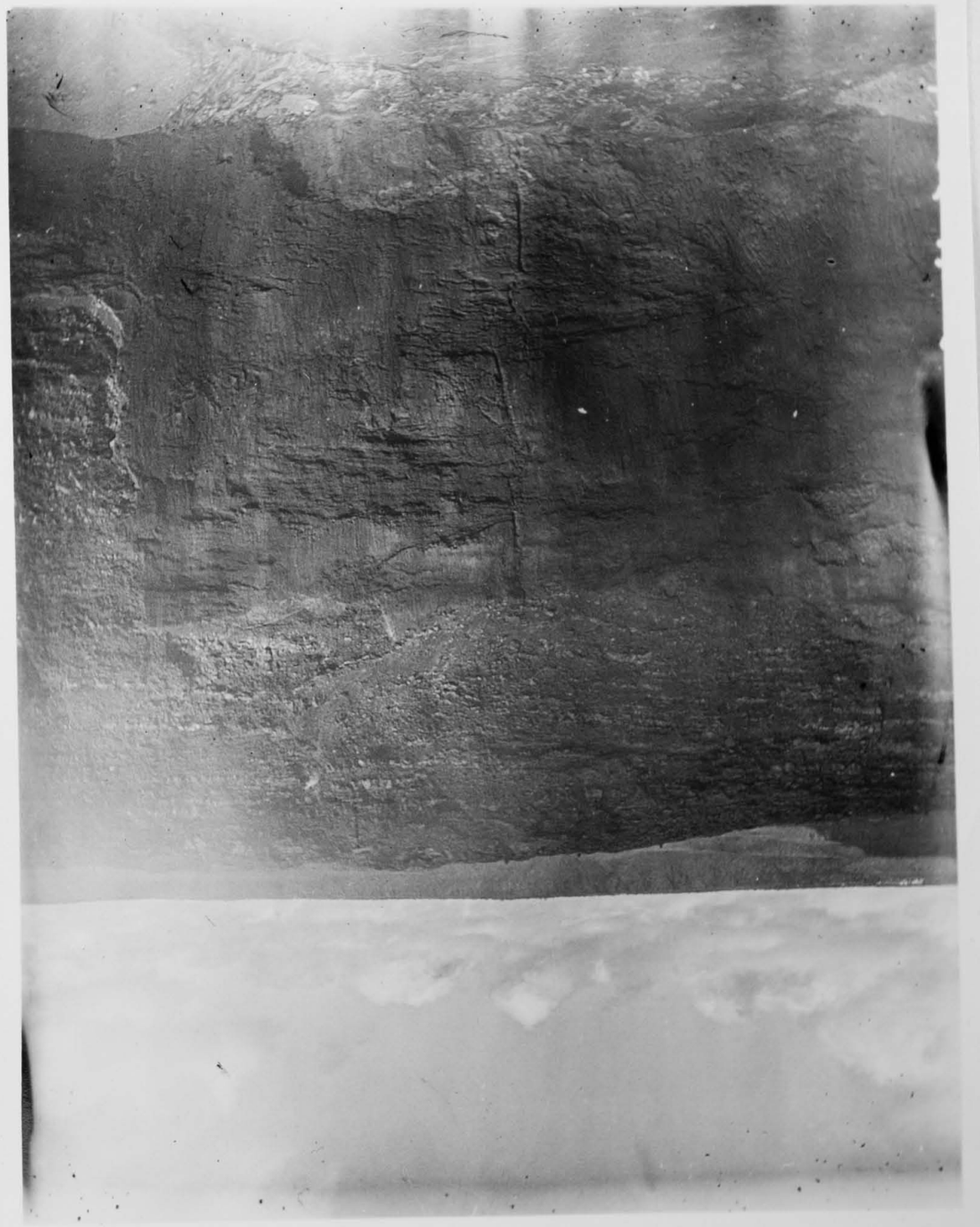
1



2

1919, Nov. 30.

4334





433c

1919, Nov. 3





JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date December 1, 1919

3:10 to 4:10 p.m. Fumes heavy. Lake appeared to be stationary. Five or ten feet lower in its basin than on November 30. Four fountains were playing continuously. Light smoke was issuing from a crack in the old lava a little to the NW of the hut and dense smoke from the cracks to the SW and from several places to the NE.

The lava tube at the farthest two window places seemed to be hotter than ever. Rocks were red hot within two inches from the surface in rather large openings. The bottom of the deepest opening was quite plastic and bright yellow hot in places (sun shining through clouds at the time). Glow in the new flow could be seen in several places, but no surface flow observed.

R H F

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date December 2, 1919

10:15 a.m. Find pronounced upward movement in ring of bench magma, wall-crack cascades broken up, talus slumped into wall crack all around. Ring of bench magma stands out from wall as knife edge ridge. Back of this ridge on NE side a wall-crack pool with continuous hot bubble fountaining. Inside of the ring the lake margin shows lifted bank in sloping terrace of black tampart material 15 feet high on NE side and 4 feet high on SW, indicating that the uplift was at a maximum NE. This is further evidenced by the presence of a triangular beach or shoal sloping to SW at flat angle on NE side of lake -- uplifted lake bottom, with one of the fountains at its margin puffing as though building a cone. Lake has two principal fountaining areas as before, quiet crusts, cracking and foundering surface.

Pit more smoky from N and S talus cracks. Glowing lava shows at nightfall in NW wall crack still. Small avalanches continue, noticed in morning especially from SW wall.

The line of openings in tunnel to NW wholly dark at first three localities; red at No. 4; orange at the deep pit No. 5 but distinctly darker than before, the rocks near orifice purple to cherry red. Threw in stones which bounwed on bottom of tunnel channel and took ten to fifteen minutes to become red hot color of bottom. Roaring noise of air through tube, or possibly of some oxidation reaction? Linings are red where cooled off.

The soluble salts of the region near source cones now taste very dittle, there are left white and yellow insoluble crystals, the soluble washed away by rain and no longer renewed. Sulphur vapor odor continues.

5:40 p.m. A prolonged light earthquake felt.

6:00 p.m. The lake rising, the NE shoal encroached upon by lake. Fountains small with viscous flings; bubble fountaining in two wall ponds NE very continuous and making disagreeable fume at E edge of pit. Fumes continue dense at solfatera SW of Halemaumau.

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

SURVEY RECORD

Hawaiian Volcano Observatory

- 1 - Day Tuesday Date December 2, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
10:15a		From 15 feet in direction of NE monument from NNE crag station (Sta. 1) to NE monument	0					
		NE edge (Sta. 2) to NE lump	0					
	1	W end N shelf	R126 15					
	2	same	L 19 02	5 42	0	826	-83	
	1	NW height	106 27					
	2	same	43 29	-0 03	-4	1086	0	
	1	W height	87 02					
	2	same	64 15	-0 20	0	1237	-8	
	1	SW height	72 17					
	2	same	80 55	+0 04	0	1164	-4	
	1	W lump pressure ridge	56 18					
	2	same	100 41	-0 44	0	1142	-14½	
	1	Middle notch S pressure ridge	31 36					
	2	same	128 55	+0 07	+03	796	0	
	1	SE platform	16 31					
	2	same	145 35	-1 39	+05	431	-13	
	1	Highest edge NE (10 ft back from edge)	3 56					
	2	same	168 24	+1 03	+04	107	+2	
	1	Yellow stain N edge N monument	145 28					
	2	same	14 39	-1 08	-05	962	-18	
	1	Edge E end upper N bench	166 40					
	2	same	3 45	-3 06	-07	782	-40	
	1	Edge E end lower N bench	119 35					
	2	same	3 29	-8 18	-04	620	+89	
	1	Bowlder middle bottom edge N shelf slope	105 28					
	2	same	23 53	-13 59	-06	731	-180	
	1	NW cor. lake top cascade	96 51					
	2	same	47 43	-21 15	-02	978	378	
	1	NW cor. lake top of bench	92 59					
	2	same	47 17	24 45	- 3	897	-413	
	1	NW cor, lake, lake level	89 02					
	2	same	49 44	-27 16	-01	869	-446	
	1	SW cor. lake, lake level	53 43					
	2	same	92 27	-27 25	+02	799	403	
	1	Corner lake SW, top of bench	53 43					
	2	same	94 05	26 42	+01	832	407	

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

SURVEY RECORD

 Day Tuesday Date December 2, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
	1	Top of highest talus S	50 59					
	2	same	105 12	17 44	+02	1031	568	
	1	Top of highest talus N	84 40					
	2	same	27 57	28 48	-06	633	349	
	1	Crook in bank N side of lake	46 09					
	2	same	50 11	45 46	-01	418		
	1	Edge of lake middle S bank	40 02					
	2	same	105 11	35 32	+05	811	576	
	1	Base of fissure top of talus SW wall	69 22					
	2	same	81 57	17 55	+02	1079	346	
	1	Top of fissure SW wall	69 44					
	2	same	83 06	-4 17	+03			
	1	Fountain edge of raised floor NE	52 30	-35 19	+02			
	1	Summit height back of W niche	100 10	+0 28	0			

T A J

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

JOURNAL

Day Thursday Date December 4, 1919

9:30 p.m. Southwesterly storm. Dense masses of vapor rising from floor of Kilauea especially over Postal Rift flow. Halemaumau shows increased brightness in temporary clearing spell 8:45 p.m. Some scattered glowing openings in Postal Rift flow.

Arrived at E edge of pit, find that ring of bench magma under talus at margin of lake has risen and moved inward strongly, so as to increase width of gulch between it and wall. This gulch occupied by elongate wall-crack ponds NE and W. The northeastern one boiling violently and continuously with the mottled pattern of bubble fountaining, very bright incandescence and streaming N and S from a middle skin, which occasionally breaks up. Beyond limits of N and S streaming the pond covered with crust through which at the S end there was some spitting of small vents. Beyond to the S the wall crack full of broken rock, but under the S pressure ridge this rock sliding into a smoke hole and grit rising. Some Pele's hair from the fountaining found on edge of pit. Western wall-crack pond quiet but with two or three fountains. Main lake has five fountaining centers; is generally crusted, the eastern fountain acting before exploding spasmodically, as though confined, and building a slight annular ridge or cone. The second fountain also exploding through very heavy crust and flinging up viscous lava. Explosions of these fountains throwing up spray 20 to 30 feet. There appears to be a flat of lifted matter E of the lake. Some small avalanches.

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date December 5, 1919

11 a.m. Storm continues. Pit smoky.

From NE the northeastern wall-crack pond seen to be 600 feet long and 50 or 60 feet wide with bubble fountaining as before, streaming in northwestward direction. Other fountaining vents in this pond at S end, and farther S in the wall-crack strong puffing noise where talus from time to time slips inward as though undermined by lava below.

Main lake still more heavily crusted with three sluggish fountaining vents, the eastern one throwing up umbrella flings of melt.

Western wall-crack pond as before in its northern part, but at its S end this crack overflowing in a cascade 25 feet wide. Other vents below in the slope on the lake side make a line of fountaining springs pouring down along with the cascade so as to flood the western crust of the lake with a fresh field of pahoehoe. The total fall of the large cascade is about 50 feet with 50 feet more of gentler slope to the lake surface.

The wall-crack on the N side now a gulch 200 feet wide at the top where the ring of bench magma has tilted in and its top stands up as a jagged crag all around the central lake. It is evident that but little of this material was talus, the most of it was marginal bench magma of the former topography thinly covered with talus. The present rise is taking effect by lifting the margins instead of the middle, as though the weight of the rapidly filled central lake had caused a displacement of the under plastic matter outward in all directions.

The intense effervescence of the lava in the wall-cracks, and its rise to heights much greater than the lake, appears to be evidence of pressure withdrawn from the peripheral zone by the above-mentioned process and presumably the bench magma paste is converted into lake magma as it reaches the region of pressure release.

Visited outside fume crack SW; found no change.

NW edge of Halemaumau now shows two scarps in profile as though a portion of N side of W niche fill had fallen away. Wall under S pressure ridge vertical nearly to top of ridge, the inner slope of debris on the ridge having mostly fallen away.

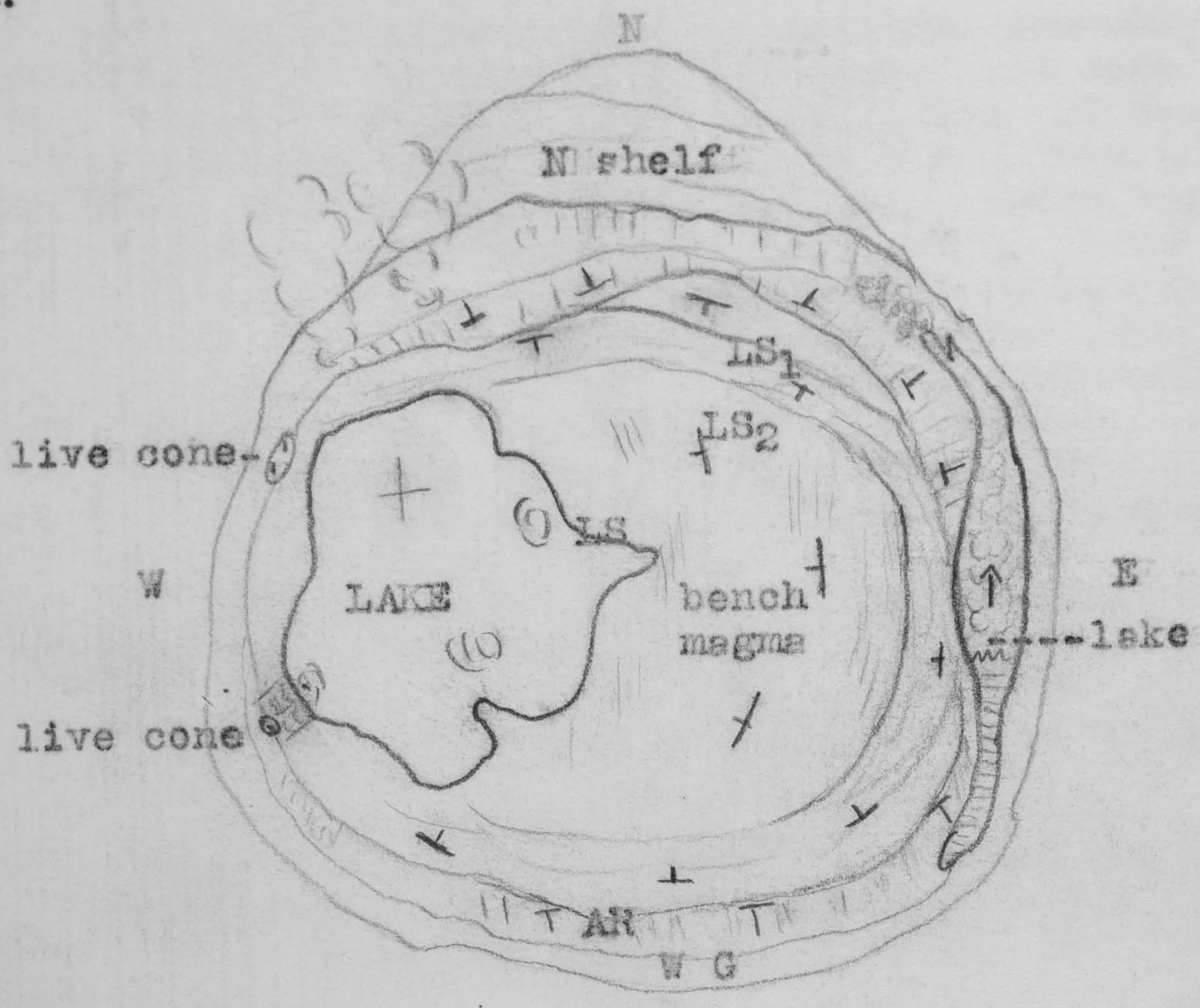
T A J

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

JOURNAL

Day Saturday Date December 6, 1919

4:30+ p.m.



AR -- annular ridge
WG -- wall-crack gulch
LS -- lake shore

Pit fumy but comprehensive view obtained from the S notch of the S pressure ridge. The features of change were:

(1) The increase in size of the E wall-crack pond, still covered with multiple fountains middle and N parts, crusted S. It was streaming mostly N but occasionally would bombard the walls E and W, when the bubbling was lessened. This was continued into a really profound gulch of wall crack N and S, the wall crack on the W being narrower and showing spurts through two cone vents. The reason for the narrower W gulch was

(2) Strong uplift of old bench magma on the E side, again following the lead of heavy weighting of western floor by the floods which had poured from the SW cascade. Consequently the whole lake had moved to W side and the whole E half was lifted up as a beach slope, cracked, and not showing any glow by daylight. This lift or tilt pivoted about the W wall-crack which was thus closed rather than opened. It is noticable, as shown, that the strong lift to form the two knife-edge ridges N and S must have tended to break in two by bending downward along an E-W axis the bench magma carapace of the sunken former topography, hence the opening of E-W fissures gaping downward, and the rise of liquid E, W and in center.

(3) The SW cascade was now frozen, with a hissing cone on top and a sputtering fountain at its base. There was another live fill in the NW wall crack with a cone glowing.

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

- 2 Day Saturday Date December 6, 1919

(4) The lake had dwindled in size, probably along with the increase in size of E wall-pond, and more than half of its E side was now raised floor. The old terrace scars (LS_1) still showed, separated on the E from the E wall-pond by only a narrow knife-edge ridge. Above these scars there was still a high annular ridge N and S. The three fountains in the lake were sluggish, spasmodic and explosive, through heavy crust. The northern fountain was seen to explode with a noisy report and a splash of melt. (The dip marks in the diagram show the flat ( ) and the steeper ( ) slopes.)

(5) Avalanches from the wall veneer were falling at the N end of the E pond as though undermining in that direction might be extending the pond.

(6) The whole floor appeared higher than before at its lowest part along the W wall.

The Postal Rift flow at night now showed only a few glow cracks.

During last few days, SW storm has produced much steam in Kilauea and snow on Mauna Loa and Mauna Kea. Last night a clear spell showed white cumulus over the Kahuku lava fields of recent Mauna Loa eruption, probably due to rain on hot lava.

T A J

JOURNAL

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

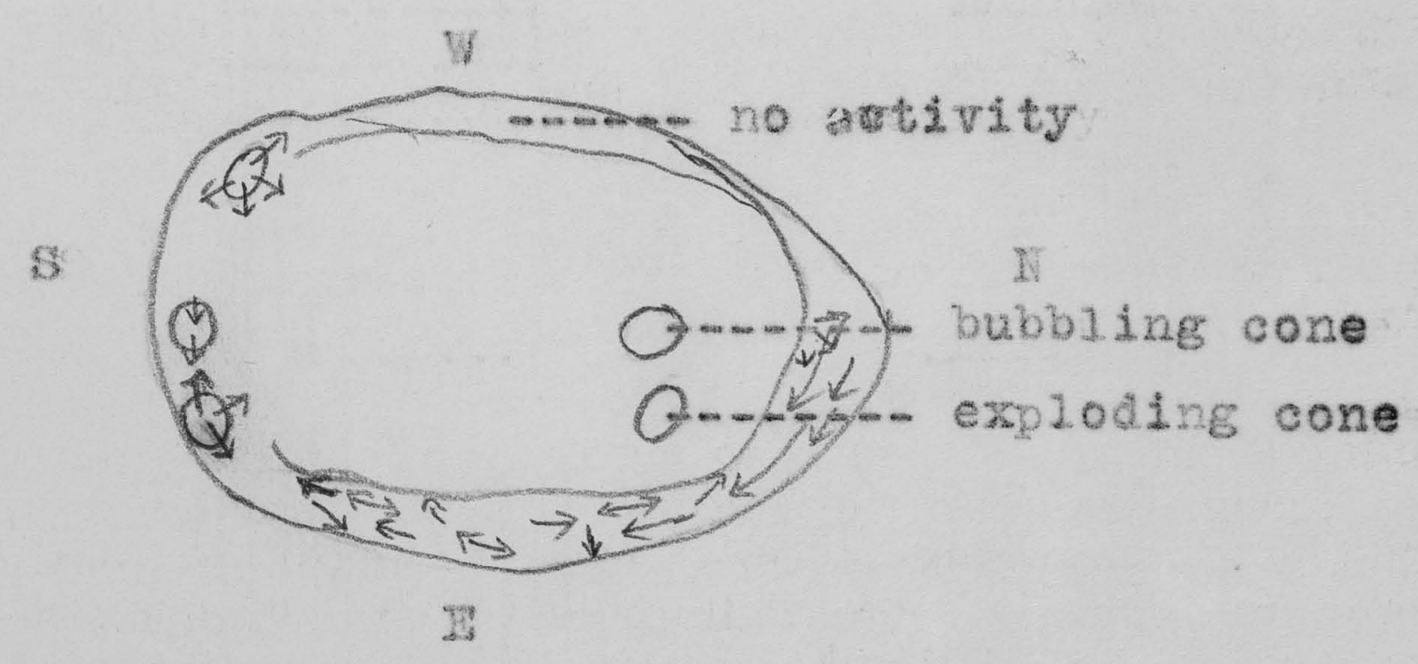
Day Sunday Date December 7, 1919
Monday " 8, "

December 7. Lengthening of wall-crack pond.

T A J

December 8.
11 to 11:45 a.m. Fumes dense in S end of crater; moderate elsewhere. No glow in tube in any of the vents though air was rushing out of the last two places.

Activity in the wall crack almost all the way around except on W side, in vicinity of wall crack. The middle seemed entirely dead except for two cones to the N. One was bubbling almost continuously and the other exploding with the sharpness of a pistol report at fortuitous intervals.



Hundreds of bubbling spots on the E side. Decided streaming on the N and NE side in direction indicated.

R H F

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

JOURNAL

 Day Tuesday Date December 9, 1919

9 to 12 a.m. Pit increasingly bright at night and with the fume cloud above in calm weather is very spectacular. Brightness due to great increase in size of bubble fountaining areas, along with pronounced rising.

Eastern wall-crack pool now extended around to the N side and the annular ridge on that side now lifted into a high peaked crag. Violent bubble fountaining in the N pool as well as in the E and rampart benches around all of this lake with some construction of crescent niches. Two pronounced capes or points built on the inner margin of the E pool. At the S a fountain welling up in artesian fashion at the extreme end of the crescent pool apparently a feeding source. The western wall-crack shows sputtering cones all along the base of the wall including some in a deeply depressed ravine NW.

The central lake is no longer a lake but a raised floor forming the bottom of the dish surrounded by the crags and this floor appears higher than the level of the crescent lake. The live part of the floor is a field of overlapping pahoehoe flows showing a sluggish fountain through crust at what was before the S central fountaining locality, while the northern locality is now a cone which belches explosively and noisily at intervals, making a great patter of falling fragments after each explosion.

There is still much smoke from the pit rising all along the W wall-crack and from parts of the S ring-crag. At the SW corner of the floor there is a cone at the site of the former cascade. The bubble fountaining of the eastern and northern parts of the crescent lake shows the same conflict of currents and an occasional violent travelling fountain which were so remarkable in 1912.

The general situation is a steady rapid rising of the lava column with transfer of the liquid from the center to the periphery -- incessant encroachment by this marginal lake upon the wall-crack talus. Meanwhile the central cylinder of bench magma is rising continuously in a fashion which amounts to a curling up of its edges so that the latter are becoming high crags with the maximum of this border uplift towards the N. The encircling lake bids fair completely to encircle the central prism and leave it standing as a huge island of dish shape with an annular lake all around it. An approach to this was formed by the crescent lake of the autumn of 1914.

8:45 a.m. Strong avalanche S wall.
9:00 a.m. Another.
10:00 a.m Another SW

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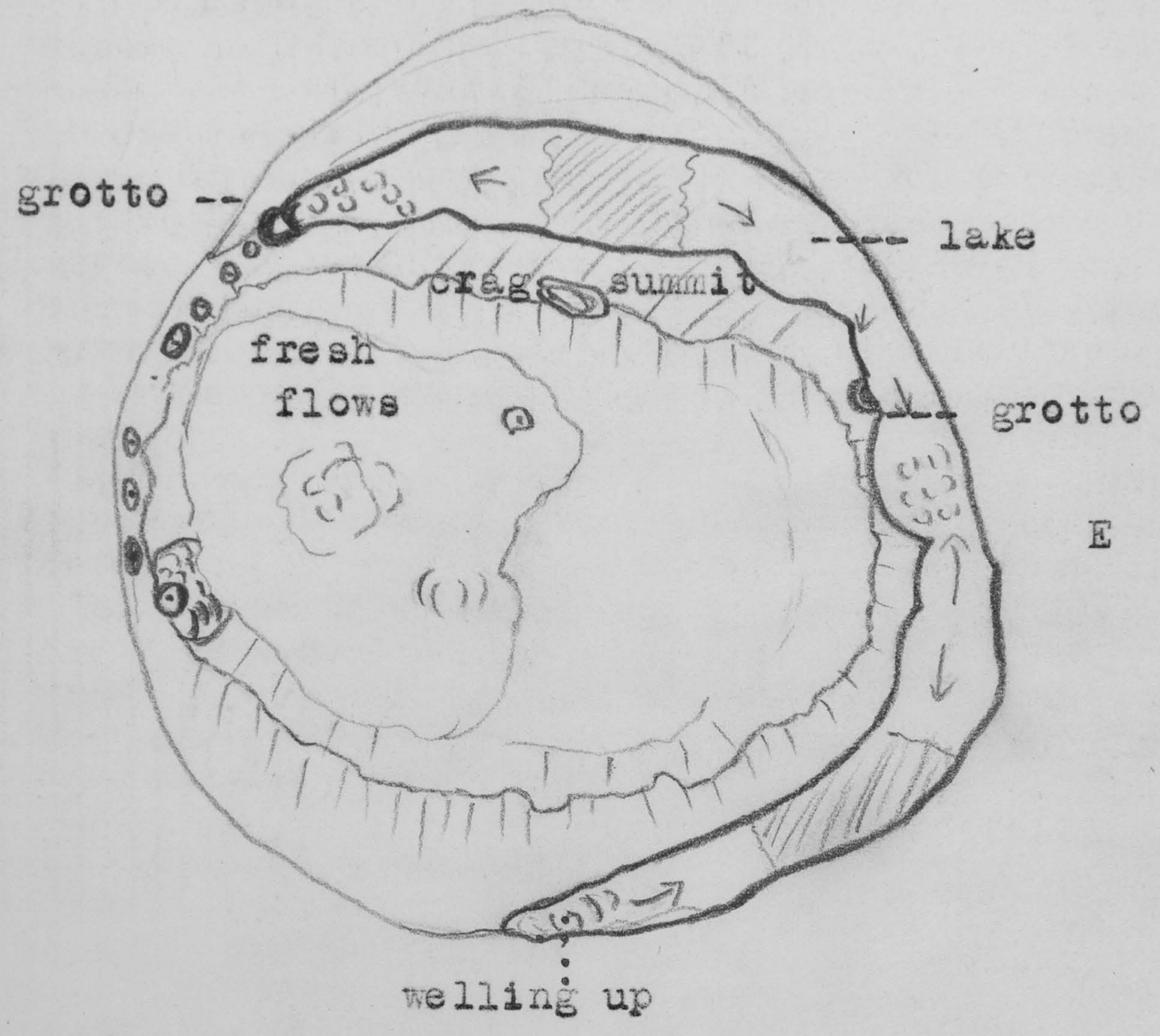
U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

- 2 - Day Tuesday Date December 9, 1919

Sketch map:



T A J

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

SURVEY RECORD

Hawaiian Volcano Observatory

Day Tuesday Date December 9,1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9:45a	#1	NE edge to NNE edge crag	0					
	2	4 ft. SW of NE sta. to NNE	0					
	3	15 ft. S of NNE to Hal NE	0					
	1	Wall base N (divisiom skin)	L 26	23-19 54	00	757	-275	.
	2	same	L 35	57				
	3	same	R116	20 ca				
	1	N base N crag (gives width annular lake)	31	48-22 04	00	638	-259	
	2	same	L 46	22				
	3	same	88	23				
	1	Top N crag	38	37-14 24	00	598	-154	
	3	same	83	51				
	1	N central blow cone	65	52-26 24	+01	558	-277	
	2	same	L 89	21				
	3	same	65	55				
	1	S central fountain	87	02-22 42	+01	632	-265	
	3	same	61	16				
	1	W wallcrack spurting cones	62	13-12 52	00	1115	-253	
	3	same	98	02				
	1	SW wall-crack smoke hole	84	19-12 11	00	1183	-241	
	3	same	79	08				
	1	S wall-crack fountain	114	47-16 20	+2	678	-260	
	3	same	48	06 ca				
	1	SE cor. floor flows (fresh)	103	40				
	3	same	58	00				
	1	SW cor. floor flows (cascade locality)	89	00				
	3	same	71	52				
	1	NW cor floor flows (the blow cone is at NE corner)	52	25				
	2	same	L 62	40				
	3	W cor. N end crescent lake (given the depression, v.a. will give distance)	114	18 24 14	00	595	-267	
	3	W side E pool crescent lake	29	58 19 44	00	747	-267	
	3	E side same	24	40 19 50	00	743	-267	
	3	Summit ring crag over W side E pool crescent lake (distance same as latter)	32	23 17 12	00	747	-231	
	3	Edge raised floor inside of E ring crag (distance same as last)	38	49 19 07	00	747	-258	

T A J

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

JOURNAL

 Day Wednesday Date December 10, 1919

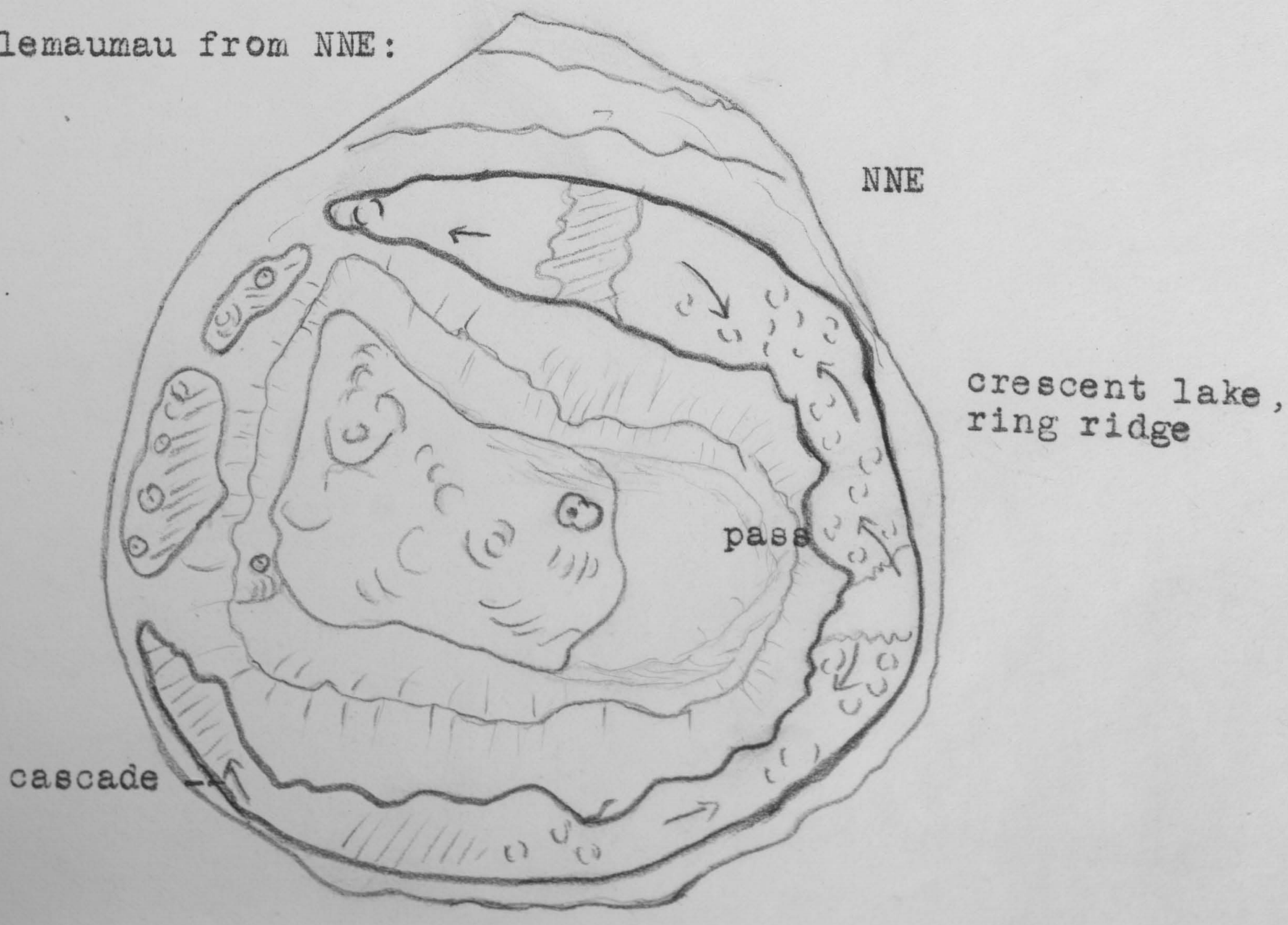
10:20 a.m. At SW fume crack gas still exessively hot; thin blue fume rising as though lava were near surface. No glow can be seen in the cfack.

S wall-crack seen from SW rim now occupied by large pool of lava continuous with the eastern pool and cascading down along the wall crack to a lower quiet crusted puddle in SW corner Along W wall crack are spurting cones and a crusted pool. In NW wall crack a live pool with spurting fountains in grottoes. The N pool larger than yesterday, streaming E and W and violently bombarding its S bank. This pool continuous with the E and S pools as a long ribbon lake from 10 to 50 feet wide, bubble fountaining violently in several places. The ring crag has continued to be uplifted with a high culminating summit at the N, and a low pass at the E has rather broken down athwart the crag as though the uplift N and S were breaking the dish in two. The opposite side of this break appears to be near the SW cascade and both are almost in line with the fissure in the wall which last now shows but little, if at all, owing to the uplift.

The central pool is larger than yesterday and at noon was giving vent to an artesian fountain in the center making a spread of radial flows. The northern blowing cone on the floor is larger than before exploding at intervals and sending up big gushes of melt.

The heat from the pit is greatly increased, the fume from the fountains strong and quantities of Pele's hair are strewn over the northern region outside of the pit. Avalanches continue here and there owing to the jostling occasioned by the internal movements. The S knife-edge ridge has been lowered by the undermining of the wall-crack pool and is now straight topped and about half as high as the N crag. The eastern and western sides are lower.

Noon. Halemaumau from NNE:



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

JOURNAL

 Day Wednesday Date December 10, 1919

The Postal Rift flow still shows four or five points of light and the tunnel openings are dark but very hot. The black cone of the first opening has fallen in.

T A J

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

PHOTOGRAPH RECORD

Hawaiian Volcano Observatory

Day Wednesday Date December 10,1919

t	sta	subject	no	pl	scr	stop	ex	cam
10:20a	From	Century lens. Keanakekoi bend to Mauna Loa (cloud over Kahuku source, stem at left)	1	W M	8x	f/22.5	1	4x5
	SSW edge	S wall crack	2	"	"	f/16	1	"
	NW edge	N wall-crack lake (N side W niche)	3	"	"	"	½	"
	N edge	W ring wall & lakes	4	"	"	"	"	"

T A J

1919, Dec. 10.



1



2

1919, Dec. 10.



3



4

Jaf

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

JOURNAL

Day Thursday Date December 11, 1919

9:40 a.m. Find great spurt of rising liquid in progress. Last night pit very brilliant. The welling-up N, S and W, (line of artesian fountains partly in cone remnants at W) all flooded by the new higher level of lake; central lake as well as wall-crack lake all one, united through western passages.

New situation makes of the crag ridge an island of crescent form. Level of lake only a few feet below E gap in ridge. Central region a pool of flows, little fountaining, watered-silk pattern, large areas fresh skin, some cracking and foundering.

In the ring lake the currents diverge from the three source wells and converge to three other points in between, the last shifting loci, the former more nearly fixed. Thousands of fountains large and small, much bombardment of banks, built up ramparts. Speed of streaming variable but high.

Avalanches notably from SE corner. Dark skins on ring lake form from time to time at the source loci. The main place of conflict of meeting currents is at the E and this place shifts N and S and against banks. The currents swiftest here. The ring pool increasing in width and strength of currents, fountains becoming larger and more scattered. Lake appears something over 200 feet down. Heat at edge of pit intense.

This whole episode of rapid rising recalls December 1911 and June 1912, the reaction spasms of a year of general subsidence. The fountaining and heat and rapid generation of liquid lava are greater than December 1918, though allowance must be made for the rising from a lower depth and smaller pit-bottom this year. Nevertheless the size of liquid lake enormously outclasses anything of 1918 or 1919, and the multiple fountaining of this class has not been seen since the spring of 1913.

5+ p.m. In the evening the same mechanism in action, lake a little higher, and a large dome fountain bursting about eight times to the minute in the N central region where the explosive cone had been. In the SSW ring channel violent bubbling, and in the N pool a mottled pattern of gold as of rising, rosettes of the zigzag bright-line pattern, with violent bombardment of the S side of pool. NNE against the base of ring crag a semicircle of dark skin against bank, from which streaming radiated. River of lava from W cones to N pool Great heat and brilliant illumination. Fume sulphurous as usual in smell, but it almost completely clear of visible fume all day today.

Notable that both today and yesterday forenoons a high white cumulus has piled up over Kahuku at the eruption locality, quite distinct from the softer normal clouds, appearing to have a trunk or stem. Top cauliflower moderately hard; no sign of fume.

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

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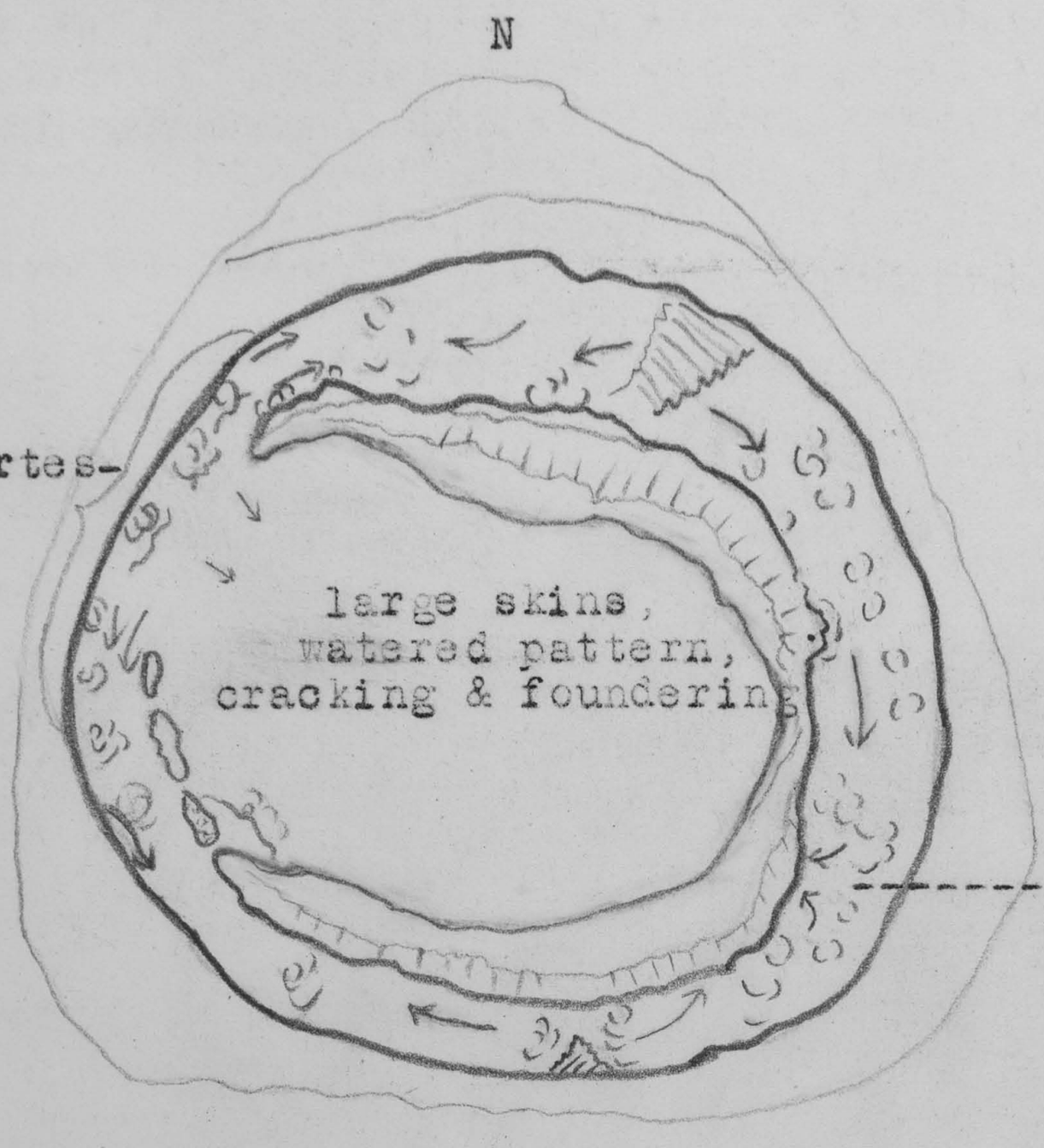
Day Thursday Date December 11, 1919

10:30 a.m. Sketch crescent ridge, ring lake:



T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date December 11, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
9:40a	S	pressure ridge gap to NE wall	1	W M	8x	f/16	1	4x5
	SE	platform to SW corner of pit	2	"	"	"	"	"
	NE height	N pool and crag	3	"	"	"	"	"
	"	S pool and wall	4	"	"	"	"	"
	Inclined	camera from N edge E side to W pool	5	"	"	f/22.5	1½	"
	From	same point (in panorama with #5) to E pool	6	"	"	"	"	"
	Very brilliant light for all above. Century lens used.							
5:30p	NNE	N pool	1e	W M	lend Tes.	f/6.3	1	4x6
	"	NW corner	2e	"	Woll.	f/3.8	snap	4x5
	"	Fountaining rampart N side N crag	3e	"	"	"	"	"
	Edge E of N	E pool	4e	"	"	"	"	"
	"	NW corner	5e	"	"	"	"	"
	"	Dark skin where currents part NNE of crag	6e	"	"	"	1	"
	"	Across pit to SW wall	7e	"	"	"	5	"
	"	Fountain E pool	8e	W P	Tes.	f/6.3	1/20	3¼x5½
	"	E side) panorama	9e	W M	"	"	1	4x6
	"	W ")	10e	"	"	"	"	"
	NNE	N pool	11e	W P	"	"	"	3¼x5½
	"	" " , gold pattern	12e	"	"	"	1/5	"

T A J

1919, Dec. 11.

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1919, Dec. 11.



1



2

1919, Dec. 11



3



4

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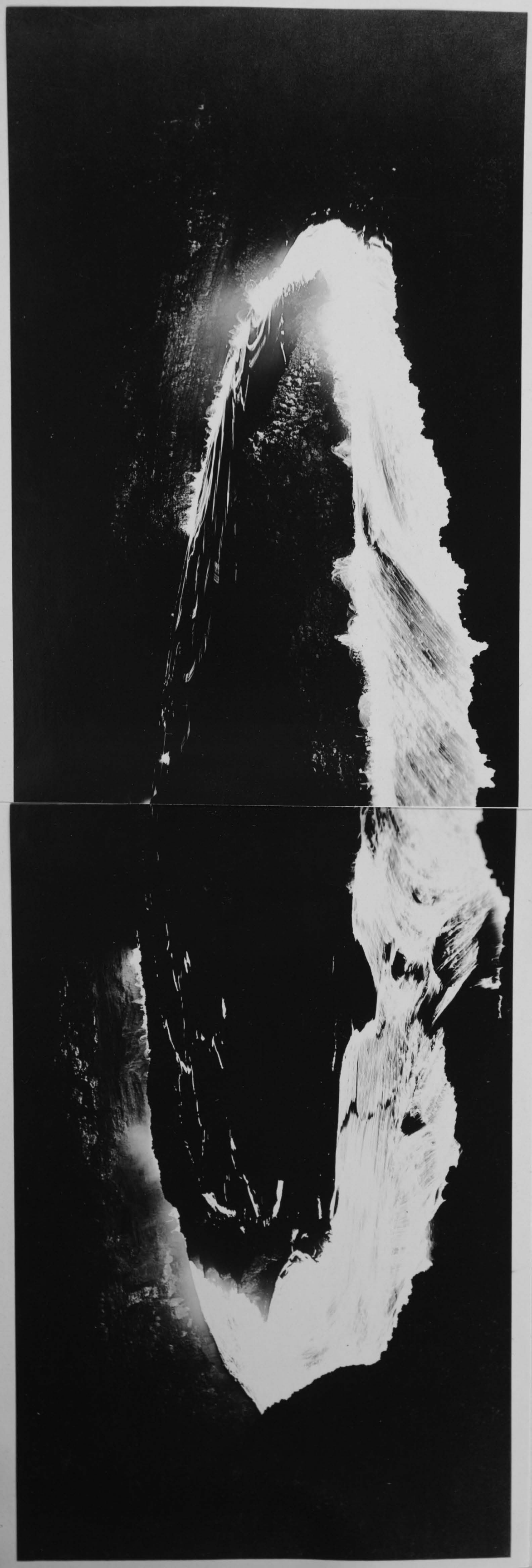
1919, Dec. 11.



10e

9e

1919, Dec. 11



1e



7e

Jag



28



29



30

1919, Dec. 11.



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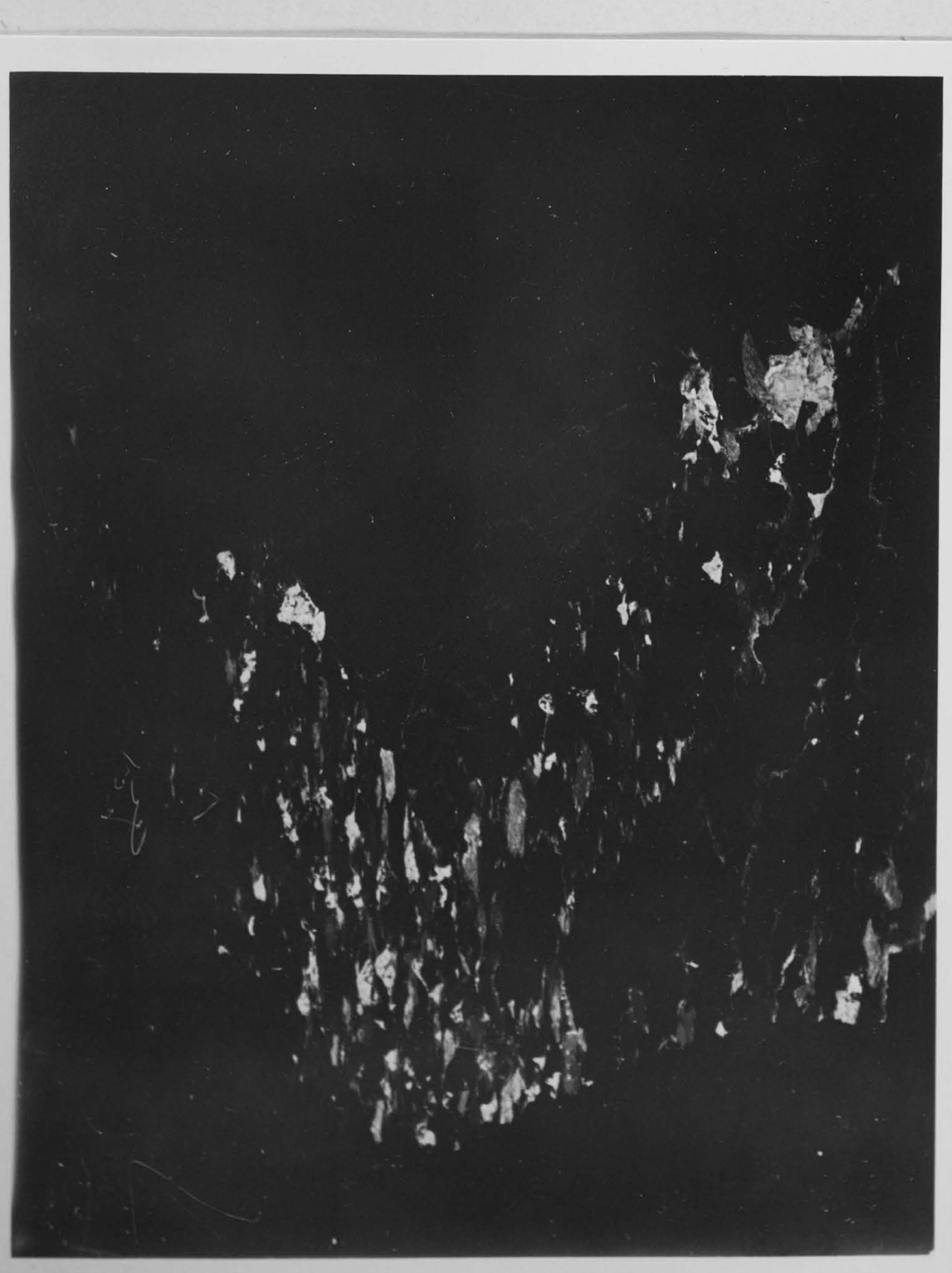

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1919, Dec. 11



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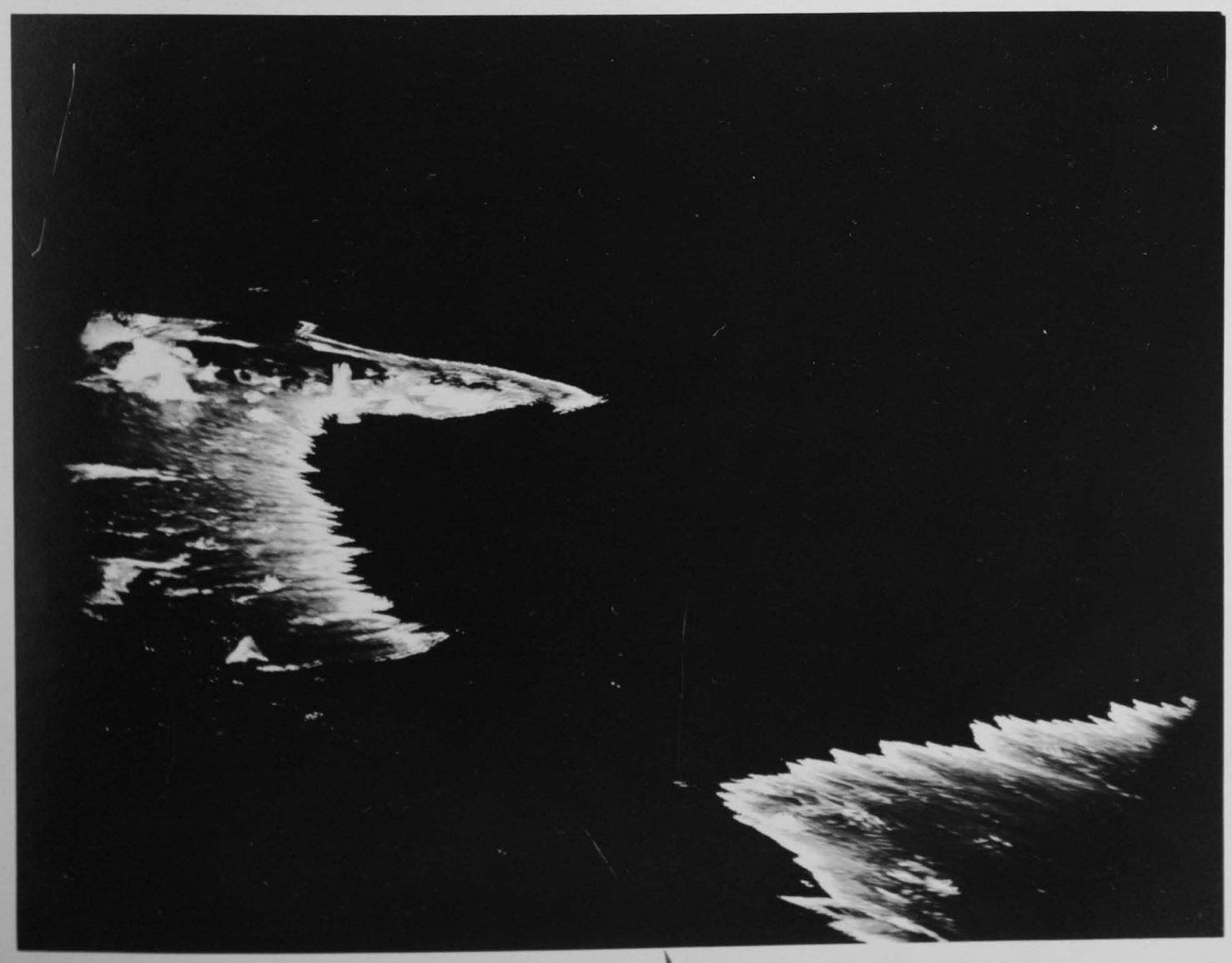

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

JOURNAL

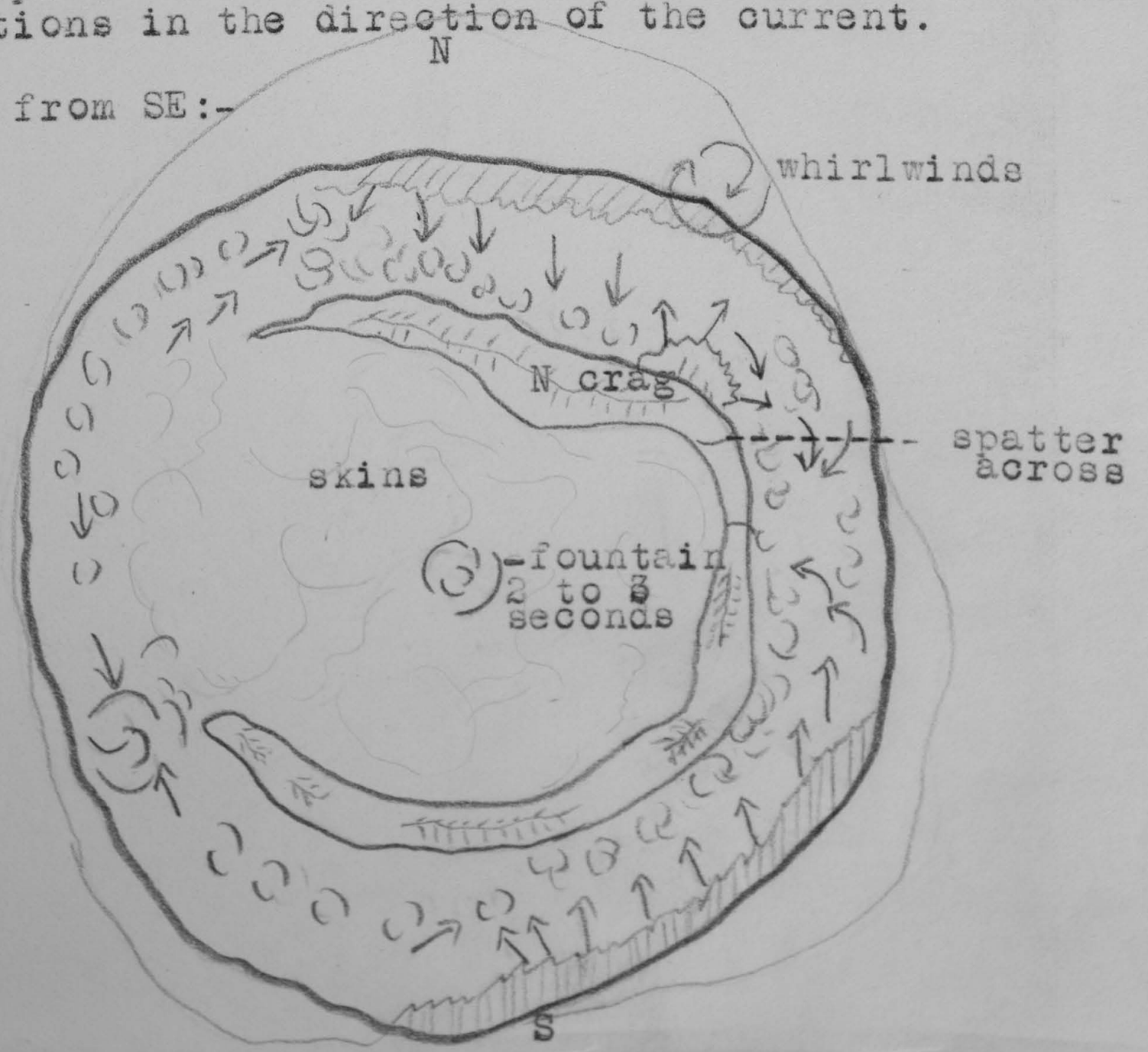
 Day Friday Date December 12, 1919

10:00 a.m. Increase of fountaining activity, heat and luminosity continue and the rising melt is now gaining strongly on the crag ring, making the ridge narrower and its relief above the lake less. The general character of the interior of the pit same as last night but the fountaining is much stronger and the streaming of the outer ring lake is largely inward from the outer walls toward the ring crag. This produces tremendous bombardment on the outer face of the ring crag especially N, E and SE. The central pool as before is covered with quiet skins slightly cracking and foundering with only one dome fountain, which has shifted its position to a point which appears to be exactly in the center of the pit; the fountain bursting every two to three seconds The western quarter of the ring is as before a line of upwelling fountains in a row; but everywhere else in the outer ring the fountaining is furiously tumultuous and of the same order of magnitude as July 14, 1912. The heat on the rim is intolerable and the depression of the lake is less than in July 1912.

Occasionally the border fountaining on the S side of the N pool would start whirlwinds full of fume and Pele's hair which migrated over to the NNE edge of Halemaumau and made disagreeable showers of sand and pebbles so that it was necessary to crouch down and hold the transit tripod firmly until the tornado passed. There was much more fume than before rising from the places of bombardment along the ring ridge.

The lake had broken through the eastern gap and built a spatter platform between the east and central pools. There were some narrow crusts with zigzag edges at the outer border of the ring lake whence the centripetal currents departed. This border crust in the N pool had even striations in the direction of the current.

11:00 a.m. Sketch map from SE:-



There were some avalanches from the S wall. The weather was calm and the roar in the morning could be heard at the Observatory.

The lake is now gaining on the crag and if this goes on, will separate the northern and southern halves of the ring crag and leave two slender islands. The depression is only 147 feet below the NE rim station (elevation 3727 feet) at the N pool and the summit of the N crag is 75 feet below this station.

The rising of the fortnight ending today breaks all records since the Observatory was established and amounts to an average of 31.7 feet for fourteen days, a total of 444 feet between November 28 and December 12. In every way the present situation recalls the events of December 1911 and of June-July 1912.

12:10 p.m. Two strong avalanches S.

At noon and in early afternoon rapidly boiling cumulus clouds of water vapor formed high over the hot Halemaumau gas column, the cumulus showing a brown fringe and the gas being transparent, bluish in reflected light and brown in transmitted. At sundown the fume column showed no cumulus at all and the thin veil extended far off to the SW as a red stratum, very tenuous and wholly different from the clouds over Pahala. After sundown there was abundant floor vapor in Kilauea and at the steam cracks around Volcano House, and shreds of water vapor condensed irregularly through and around the Halemaumau gas column. Later a considerable umbrella-shaped cloud formed above and there was tendency to the formation of steam spouts in the outlying vapor jets of the Postal Rift. At this same time a bank of fog poured over Uwekahuna bluff like a waterfall and down towards the Kilauea floor marking the indraught of cooler air due to the Halemaumau convection.

Evening. In the evening the pit was more brilliant than at any time since 1912. One or two points of glow can still be seen in the Postal Rift flow, notably in the N pooled area.

T A J

SURVEY RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date December 12, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
9:50a	NE edge	NNE monument	0					
	NNE mon.	NE "	0					
	NE	Lake N side N crag	L 32	58-14	06 00	587	-147	
	NNE	same	R 71	18-21	14 00	341	133	
	NE	Summit N crag	39	11 -6	16 00	684	- 75	
	NNE	same	79	37 -7	10 00	434	- 55	
	NE	W end N crag mass	46	45				
	NNE	same	97	25				
	NE	E gap in ridge	45	00				
	NNE	Same	26	02				
	NE	E summit ridge	104	24-26	30 00			
	NNE	same	21	53				
	NE	SE summit ridge	120	19-11	27 00			
	NNE	same	30	29				
	NE	SW end ridge	91	51				
	NNE	same	60	08				
	NE	SE base ridge	127	23				
	NNE	same	20	31				
	NE	Opposite side ridge SE	117	22				
	NNE	same	26	50				

The bowlder at bottom N shelf slope is submerged (see last survey)

T A J

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Saturday Date December 13, 1919
Sunday " 14, "

December 13.
11:30 a.m. Rise steady and continuous. At noon crag in view above edge of pit from H.V.O. Rising more than a foot an hour.

Alec reports that at 9 a.m. appearance as though lake were down 3 or 4 feet. At 11:30 a.m. this seen to be due to occasional spasms of rising of crag-mass faster than lake. Both keeping pace however.

Fountains larger and not quite so much multiple fountaining. Growth of large ramparts on island shores facing outer wall. Contact of lake with walls of pit quiet overlap, no sinking at all there, steady rising; no ramparts on wall side.

Currents now rushing N in ring channel SW, rushing S in ring channel NW. These two meet and blend in middle W, with bend out into quiet central pool. Rise of crag-mass island so as to keep lake from joining through at E gap, where there is a high rampart on outer side. Streaming centripetal S, E and N, some currents from N and S to middle of E side but not so much as before.

Crag-mass summit appears only 10 to 15 feet below rim. No special fountaining in center, some cracking and foundering. Occasional slides SW Lake up to lower N shelf, less than 100 feet down.

Brilliancy at night excessive. Still one glow spot seen from H.V.O. in N part Postal Rift flow.

December 14.
3:00 p.m. Crag well above rim. Fume slight. SW wind. Made circuit of pit E and N. Much sulphurous acid fume E side. Fountains again furious, bubbling in large domes. Centripetal streaming. Lake less than 50 feet below NW and NNE rims; up to upper N shelf and gaining on crag mass.

Very swift currents from N and S on W side of pit rushing out into center, N current making whirlpool there occasionally. Immense ramparts on crag mass; SW end of crag mass buried under rampart lava. Spatter blobs on W cliff tops 60 or more feet above lake, fountains spraying higher than this. Dense black glass. Noise of crater audible yesterday from H.V.O and today most of time. Noise at automobile terminus like the sea. Dome fountain in central pool again.

Rise of both lake and crag-mass continues same rate. Luminosity intense. Smoke from stones where ramparts invade. SW crack outside of pit a little wider but still making only thin blue fume, and much heat. Avalanches slight. As usual the motion of crag-mass upward imperceptible although the speed of it is fastest yet recorded. A pasty flow.

Evening. The boiling and rising continues unabated and marvellously brilliant.

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

PHOTOGRAPH RECORD

Day Saturday Date December 13, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
11:30a		Century lens.						
	NE rim	N crag	1	W M	8x	f/16	½	4x5
	"	N shelf	2	"	"	"	"	"
	"	S side pit	3	"	"	"	"	"
	W niche (S side)	S	4	"	"	"	"	"
	"	E panorama	5	"	"	"	"	"
	"	N	6	"	"	"	"	"

T A J

1919, Dec. 13.



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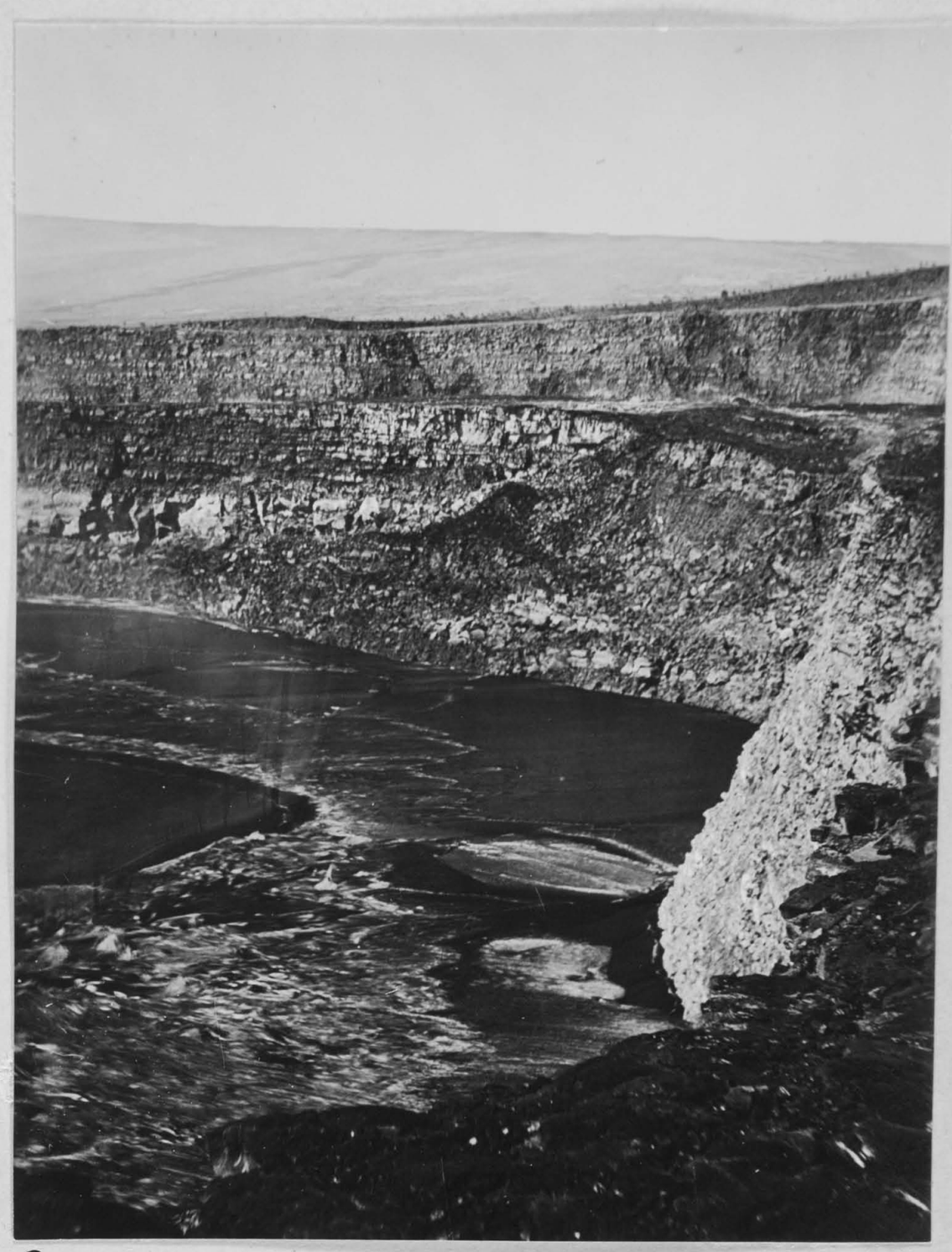

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1919, Dec. 15.



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

JOURNAL

 Day Monday Date December 15, 1919

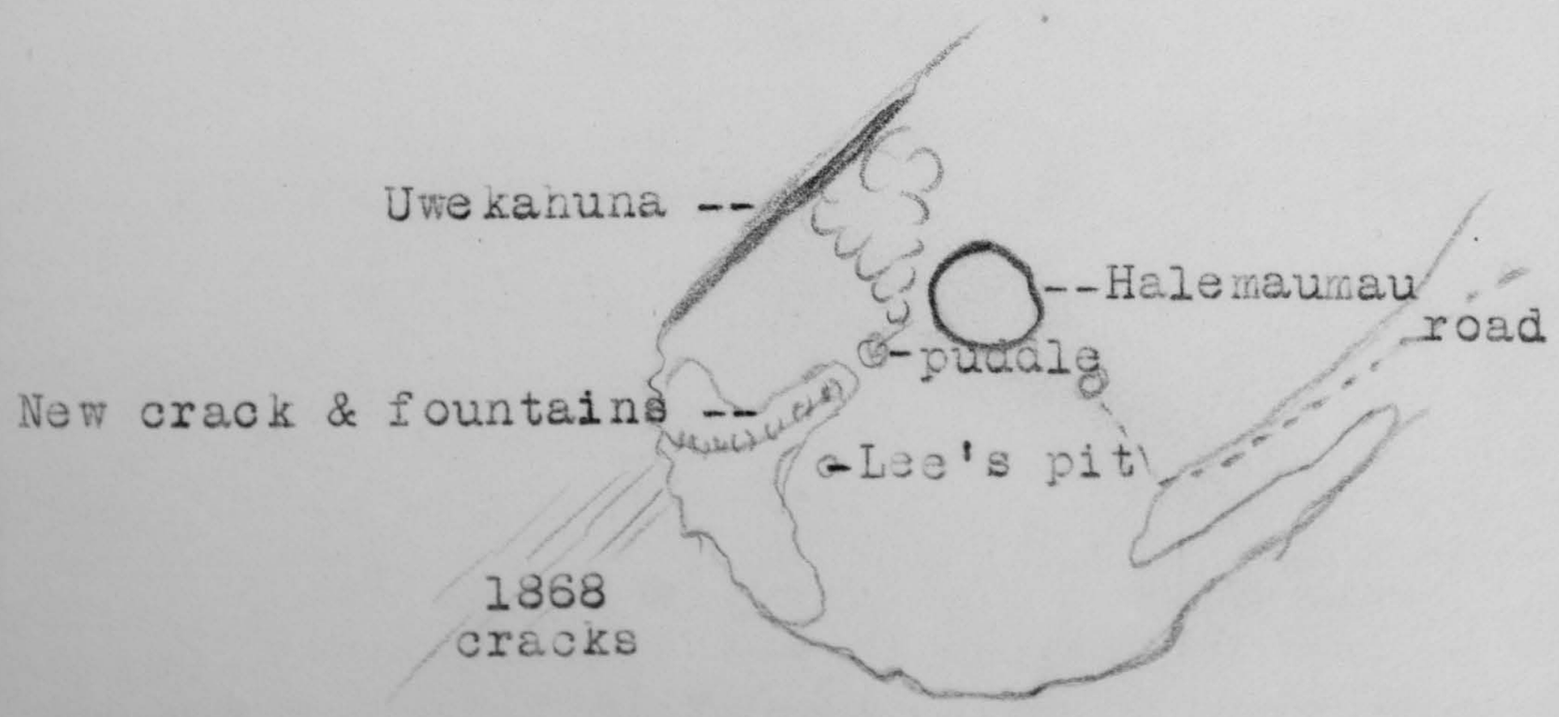
Yesterday crag well above rim. Today whole crag 60 or more feet high above rim and fountains visible this side of crag from H.V.O. Steady rise all night, high fountains all around, roar continuous.

10:30 a.m. Arrived pit and from S saw everything high; crag 40 feet or more above rim; lake about 20 feet below SW rim; strong boiling in ring channel. Very large occasional N central dome fountains in center lake and large ramparts on island all around. Streaming S on W side, inward on S and E sides, some S streaming on NE side. Lake ribbon much wider. Little fume. Large fountains. Lake only 15 feet down NNE and up to upper shelf N. Great heat.

10:50 a.m. Find SW crack with a bulged puddle of crusted new lava 50 feet across.

10:54 a.m. Shock on SW pressure ridge felt and rock slid down. Other small shocks could be felt underfloot along W edge of pit from 11 to 12 a.m. The SW crack flow was below principal smoke hole and where the crack had been found gaping 600 feet more or less from edge of Halemaumau. At 11:15 crossed the hot cracks below flow. Several gaping cracks, sulphurous fume, cracks 3 inches to 18 inches across. Here noticed that these cracks were creaking open visibly and audibly, fragments falling in and ground groaning under upward pressure of straining lava below.

Went to W niche to make photograph. At 11:25 a.m. noticed a puff of dust and fume off to SW near edge Kilauea crater under 1868 cracks. Then saw that a whole line of about 200 standing fountains was suddenly and quietly welling up, very liquid, along a curved extension of the SW radial crack, across a half mile of low ground from the base of the shoulder under the upper puddle-flow to the small aa patch at 1868 cracks in wall of Kilauea.



Lava could be seen flowing in upper crack 15 feet below surface. The flow around the new crack spread into a pool a mile long of very shelly lava, quickly stopped within an hour.

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

JOURNAL Day Monday Date December 15, 1919

The seismometric record showed swarm of quakes in afternoon after 2 p.m., probably an adjustment in Mauna Loa system.

At moment of outbreak the lake and crag-mass in Halemaumau both went down steadily and slowly; bombardment W wall; center lake kept its level against island; marginal black ledge vertical plaster left against wall of pit all around. After ten minutes (11:35) outer ring lake had sunk 5 feet; at 12:10 the lake and crag-mass down 25 feet.

The continued opening of the rift caused a spalling off of Kilauea wall at 1868 cracks showing that cracks were opening under and outside of the Kilauea fill.

4 to 6 p.m. Several avalanches and fume from face of wall. In afternoon walked across desert to Cone Crater region and found all the cracks opened, line of steam jets $1\frac{1}{2}$ miles SW of Kilauea from the cracks, the large chasms yawning and the dirt dropping in. Some creaking heard. Many small fresh breaks revealed by the dirt surface. One chasm 80 feet deep and 5 feet wide at surface. Several down to black depths. Vapor steamy, acid and sulphurous; temperature 100° F more or less. Yawning peters out beyond pile of stones quarter mile E side of S end of large mound of Cone Crater.

In afternoon blue fume and flame from line of fountaining crack, white vapor from the steeper slope toward Halemaumau (above the liquid level), dense white and brown fume from the smoke hole higher.

Data about lake level:-

10:50 a.m. Lake 20 feet below edge SW.
11:35 " Outer edge rimg lake has sunk 5 feet. Inner lake hardly at all on crag shore. (Crag-mass slowly sinking, approximately same rate.)
12:10 p.m. Lake and crag-mass down 25 feet (total 45 feet)
3:30 " Lake down 90 feet (total 110 feet).
6:30 " Lake down 105 feet (total 135 feet).

At 2 p.m. the crag-mass as seen from H.V.O. disappeared from view above the rim of Halemaumau.

6:30 p.m. Lake rising around island and overflowing into central basin E and S, rising from dark crust at edge SE; meeting of currents and line of bubbling W. E and S parts of island tend to be drowned. Island apparently still subsiding and lake coming up. Usual intense multiple fountaining and currents right and left from points in N pool and SW corner; major place of departure of currents SE. All around there was an even bench one to two feet wide with horizontal shoreline marks, plastered black against wall, level top, about 105 feet over lake level. One big fountain in N central part of middle basin seen in course of twenty minutes.

T A J

PHOTOGRAPH RECORD

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

Day Monday Date December 15, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Tessar lens.						
10:50a	SW end of pressure ridge to S channel		1	W M		f/6.3	½	4x6
		Near view swelling cracks and flow SW	3	W P	8x	f/16	"	3¼x5½
	S side W niche	Crag	4	"	"	"	"	"
	SW outer slope Hale. to new flow; crack in wall Kilauea		5	"	"	"	"	"
		#1 overexposed.						
							T	A J

1919, Dec. 15





4

Jog

1919, Dec. 15.



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5

Jog

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date December 16, 1919

11 a.m. Dense fume from upper SW rift, blue fume from lower part of same, vapor jets from 1868 cracks in desert. No more flowing.

Lake appears same as last evening. Liquid has encroached on S half of island and crag peak relatively lower. Intense fountaining. Streaming out from N, SE and SW. Occasional dome fountain N central part of center lake. Crack up SW wall shows one foot open, cutting the black ledge veneer of Halemaumau.

N shelf vacated by recent fill of high level shows patches of pahoehoe but mostly aa.

Lake appears as though rising. A little of black ledge has scaled off.

4:30 p.m. From Uwekahuna see five jets of vapor in 1868 fissures, four of them near Kilauea ,one near Cone Crater. Twleve jets of fume along SW crack in Kilauea, the upper one dense.

Fountains in view in three parts of ring pool on SW side, as seen from Uwekahuna; very bright.

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

SURVEY RECORD

Hawaiian Volcano Observatory

Day Tuesday Date December 16, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
11a.m.	NNE mon.	Crag summit		-10 33		435	-81	
	"	Lake base of crag N		-23 30		341	-148	
								T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date December 16, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Century lens.						
11a.m.	E gravel flat	Halemaumau and steam in 1868 cracks	1	W M	8x	f/16	½	4x5
	E of N	N shelf aa	2	"	"	"	"	"
	"	E side pit)	3	"	"	"	"	"
	"	Middle ") pan.	4	"	"	"	"	"
	"	W side ")	5	"	"	"	"	"
								T A J

1919, Dec. 16.



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1919, Dec. 16

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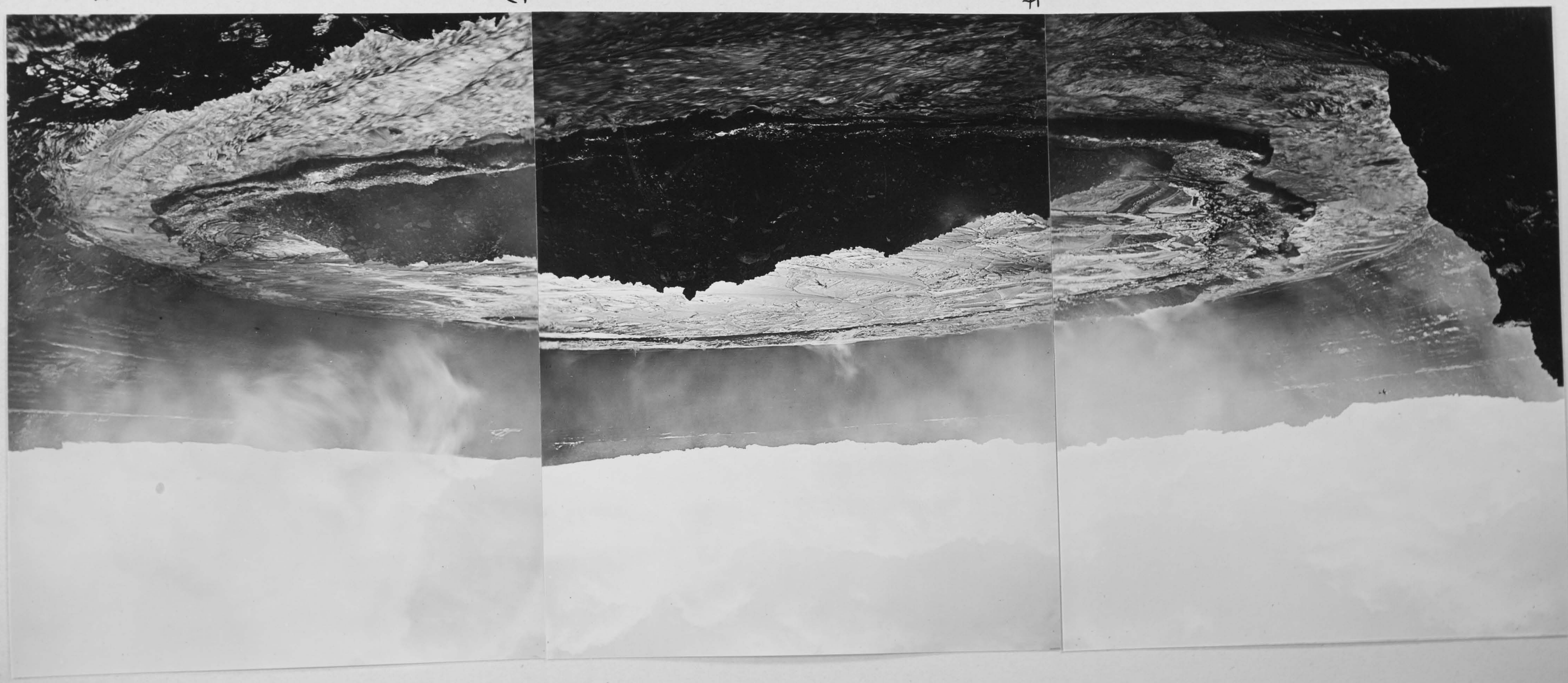


U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory

JOURNAL

Day Wednesday Date December 17, 1919

10 a.m. Visited four craters on Cockett's Trail and found no changes there.

11:30 a.m. Action in Halemaumau the same though fountains bigger, quite like July 1912. Centers of radial streaming from wall NNE, SE and SW. More overflowing of S half of island, still going on; only a small ramnant of crag and bowlders there. N crag more surrounded by fresh platforms. Crag mass also rising, resembles an atoll. Uplift of island appears to be most at N.

Torrent pouring S again around W end of N crag. Conflict of currents W, S and E. Large dome fountains N central part of center lake break every one to two minutes. Some more scaling off of black ledge. Grotto SW side of center lake.

Apparently rising has set in again, lake about 80 feet down. One avalanche seen.

7:40 p.m. Two thunder-like rumbles heard. (Lightning?) This generally seen and heard. (Meteor?)

8:00 p.m. Fountains plainly visible from Uwekahuna. No glow in SW or 1868 cracks. Top of crag shows. Pit excessively bright.

Four glow cones still in Postal Rift flow; two in N area, two under Uwekahuna.

Rumble from crater fountains continuous at H.V.O.

T A J

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

JOURNAL

Day Thursday Date December 18, 1919

The detonation and light at 7:40 last night now generally believed to be a meteorite. Puu Oo described it as passing from over Mauna Kea towards Puna. Persons on shipboard ("Mauna Kea" from Honolulu) described it, seen from twenty miles N of Hawaii, as a meteor moving from E to W. Probably it was from NE to SW, as the streak of light seen at Volcano House and at Pahala moved from E to W. Generally the noise described as an explosion and a concussion. Kona and Kaalualu did not experience it.

Noon. Halemaumau much as yesterday. Island more submerged but lake little if any higher, (70 feet down). Strong boiling, thousands of fountains NNE, S and SW. Streaming from dark skins at bank N, SW and SE. Ring channel wide S and N, narrow W. Some spatter lumps W marking border of central lake dish. SW the border of dish marked by two large spatter lumps, one of them a grotto. Central lake increasing in size at expense of S half of island. Latter still shows a patch of crag bowlders and appears rising on the E side while W and SW it goes down.

Overflowing from ring lake inward WNW, W, SW, SSW and S across rampart which separates it from center lake. N central dome fountain at rare intervals.

Visited SW crack. Smoking moderately near Halemaumau, and a little midway between Halemaumau and 1868 cracks. Rest of crack giving very hot air. Crack split open across the upper fresh flow puddle. Some sulphur staining. Lower part of crack lined with splash lava on crack walls; bubble lava bells stand over isolated outliers of the crack, the interiors lined with brown-red stalactitic glazes, and hot air is rising. This line has openings about a foot in diameter, greater in some places; recalls the crack at the balloon-lava locality in ENE part of Kilauea floor. Bubbling noise in upper part of crack.

T A J

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

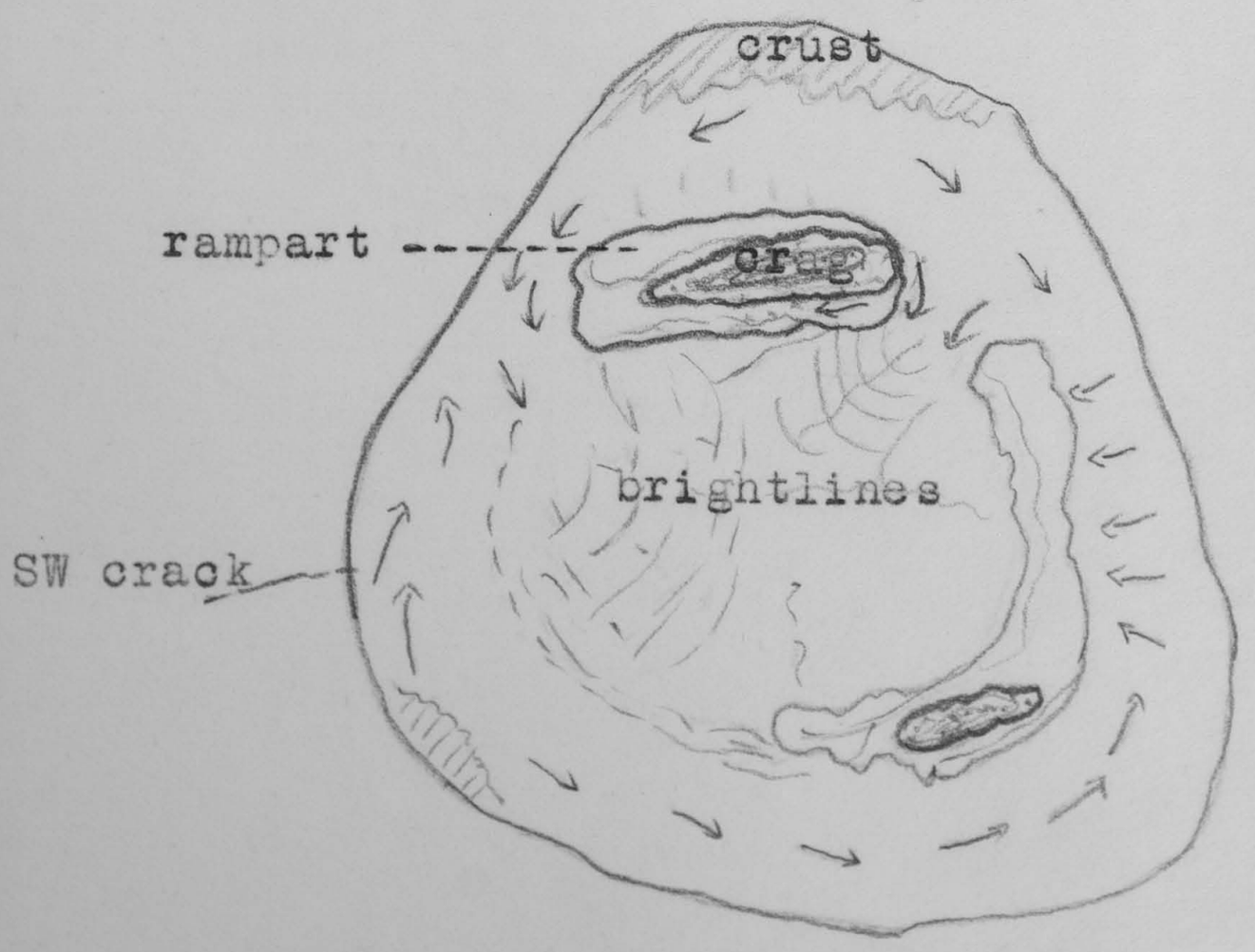
JOURNAL

Day Friday Date December 19, 1919

6:50 a.m. Earthquake felt.

5:30 p.m. About 4:45 p.m. the SW crack in Kilauea floor again broke out in lower part, same place as before, and now was found with flow puddle right and left along Kilauea wall for three quarters of a mile, spreading rapidly, one large geyser fountain seven feet high in middle of flow flow area. Other spurting cones along crack, three or four of them, on side toward Halemaumau, but all below the steep shoulder in the flat near Lee's pit. The upper smoke hole making very thin fume and the upper crack one to two feet wide; was crossed without difficulty. This region a zone of cracks about 60 feet wide. The flowing continued steadily while under observation for forty minutes and the lake in Halemaumau did not go down.

Lake about 40 to 60 feet down, evidently filling SW crack, which in wall of Halemaumau gapes one foot to eighteen inches. Island more submerged especially SW, S and W. Stream pours across E gap from ring lake. No central fountain seen. Many hundreds of border-lake fountains as before, torrential streaming from SW around by S to E and to N, and from N around by NW to W, and by NE to E. N crag about 35 feet above liquid and 15 to 25 feet below rim of pit Center lake a flood with bright lines and very bright pattern of them on W side. Still some crag remnant SSE. Broad platform bordering center lake on N side. Ramparts are burying the N crag. Noise from pit resembles that of waterfall.



Fume thin and roar audible at H.V.O. Pit brilliant at night.

It should be noted that the pinnacle so long poised near E end S pressure ridge fell during first week in December. It fell during the rising.

T A J

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

JOURNAL

Day Saturday Date December 20, 1919

Conditions in Halemaumau remain much the same. Slight rising of lava. The fountain in SW floor of Kilauea building up a broad flat-topped slag heap with a fountaining pool on top, extending from near Lee's pit to the S end of Uwekahuna wall.

Crag summit in evening rose into view from Observatory.

The flow SW near the 1868 cracks, in Kilauea crater shows over the profile of Halemaumau on right side as seen from Observatory.

T A J

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

JOURNAL Day Sunday Date December 21, 1919

11 a.m. Halemaumau same general condition; crag about 10 feet below rim; lake about 35 feet down. Multiple fountainings in pit as before. Much roaring and great heat. S side of island completely covered with rampart material.

SW slag heap building continuously; three or four standing fountains on top. These fountains 5 or 6 feet high. The heap is much like the NE heap of the interior of Halemaumau in December 1918. SW crevasse near smoke hole 3 to 4 feet wide with hissing spiracles inside.

Observed smoke beyond first line of jets in desert. Explored the whole line. Found lava flowing from crack 6 miles to SW about three quarters of a mile W of Puu Koae.

Beginning at cracks at Kilauea edge, found these open network of gaping fissures, with the largest a chasm 15 feet wide; sand slipping on inner slopes showing motion in progress. Vapor in isolated vents not numerous and not from largest fissures. Some of this strong with SO_2. Second group of vents puffing dense white vapor midway between edge Kilauea and Cone Peak. In a crack here saw lava welling up 50 feet down, making sluggish pahoehoe toes inside cracks and crackling noise. No fume where lava occurs. This crack 4 feet wide.

Continuing SW found another zone of steaming cracks offset to the W side of Cone Peak and continuing down the mountain. The entire rift zone something over a quarter mile wide and places of breaking in ground occur irregularly, some small breaks in gravel oblique and transverse to rift. In general the steaming cracks one to two feet wide and very continuous. Two main cracks, one E of Cone Peak and one W. In S hill of Cone Peak ridge a crack through slope has broken down and engulfed the pumice, making a small pit 10 feet across.

Find lava visible in western crack 4½ miles from Kilauea and this comes nearer surface as crack is followed a half mile further, heavy black pahoehoe with hissing spires, flames and small round heaving puddles. Crack in motion; occasional deep detonation. At point 5 miles from Kilauea this lava overflowing the crack in two small pahoehoe puddles spread out on sand and old pahoehoe with which all this country is surfaced. In addition to these puddles, which are steadily oozing out in incandescent toes around margins, there is a line of driblet cones along the crack. These spitting and spurting, ten or fifteen in number; one of them 4 feet high, a narrow erect spire. This crack narrows and becomes inconspicuous below this point. Where the lava is most lively, there is least visible vapor, but at intervals there are steam jets along the live line.

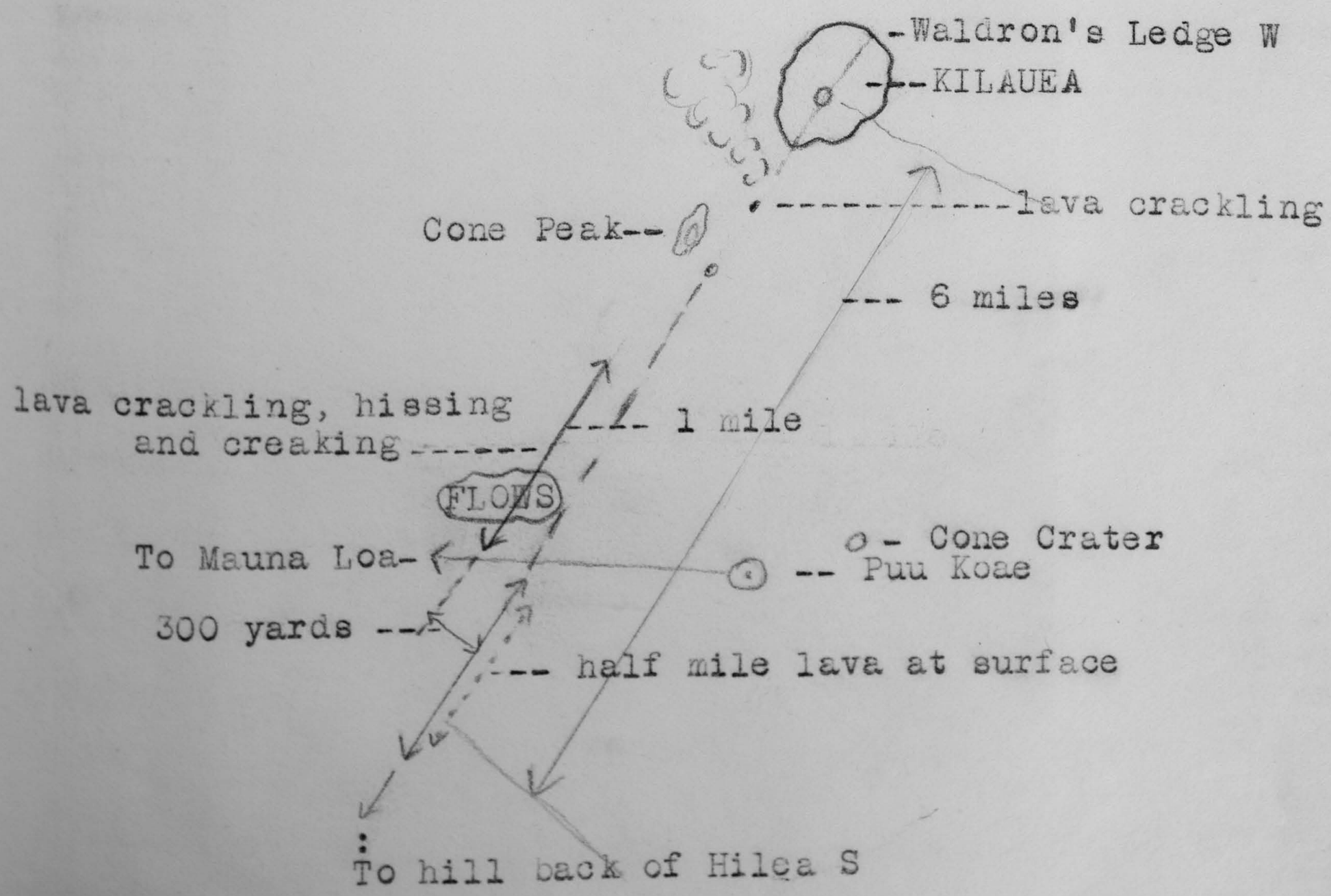
JOURNAL

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

 Day Sunday Date December 21, 1919

From here for another half mile the lava activity is taken up by the eastern crack beginning at a point about half a mile due W of Puu Koae and extending thence for half a mile farther SW. Here the crack is fuming very densely with a bluish brown vapor similar to the old Postal Card crack, smelling of steam and SO_2. The crack is full of lava all along the line with spires, spiracles and heaving pudding vents, the activity appearing to have slowed down from something greater a day or two ago. Probably this place is stagnating while the western crack takes up the action today. The ground adjacent to this eastern crack which is a chasm 2 to 4 feet wide, shows much spatter from the cones in the crack, some of it stained with sulphur. The cones are hissing and flaming but not at present throwing up spatter. Some of them are three or four spires altogether inside the chasm, their tops below the surface of the ground; others are curled driblet spiracles where the gas escapes through a hole in a fold of the heavy snaky pahoehoe which fills the rift and many of these are level with the surface. None has here actually overwelled the lip of the chasm. The crack peters out a half to three-quarters of a mile below Puu Koae.

The line of this entire rift system extends from the northwestern edge of Halemaumau through the Cone Peak in the direction of the lower southern hill of Mohokea crater. The active crack appears to be two to three miles E of the government road where the latter crosses the aa flow of Kapapala.



T A J

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

JOURNAL

Day Monday Date December 22, 1919

Left car at water tank on Pahala road in aa flow 9 miles from H.V.O. Walked E half a mile in aa, one hour in pahoehoe , and reached flow at rift. The flowing puddles had increased slightly in size, the largest 400 feet in diameter. The pressure had ceased in this part and there was little hissing and no flowing seen. The crack had continued to expand, breaking open cones and flows already solidified. In several places the actual surface breaking of ground was guided by ohia roots which had penetrated older fissures. No change observed at the densely smoking locality of the easternmost crack nearer to Puu Koae but along this line there were new openings two miles farther down hill extending the live crack to 8 miles from Kilauea. Visited these lower steaming places and found the crack newly opening with sand falling in fissures and occasional deep thudding noises, but no lava. Several vents giving thick white sulphurous vapor.

The crack appears extending itself in the direction of the 1868 crack well to the W of Kamakaia.

Found numerous horseshoe shaped mounds of stone left by the natives as camp grounds. One flock of five goats seen.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date December 22, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
11:45a		Kau Desert Flow.						
		Century lens.						
		Looking up rift full of lava; and arch	1	W M	8x	f/16	1	4x5
		Two driblet spires, one split open	2	"	"	"	"	"
		Crack in ground passing through tree root	3	"	"	f/22.5	2	"
		General view flow and steam jets, down the rift	4	"	"	f/16	1	"
		Small flow from rift, looking W	5	"	"	"	"	"
		Spire in crack	6	"	"	"	"	"
		Freshly broken steam cracks 2 miles below Puu Koae	7	"	"	"	"	"
5 p.m.	H.V.O.	Sun and Halemaumau fume column	8	"	"	f/22.5	3	"

T A J

1919, Dec. 2

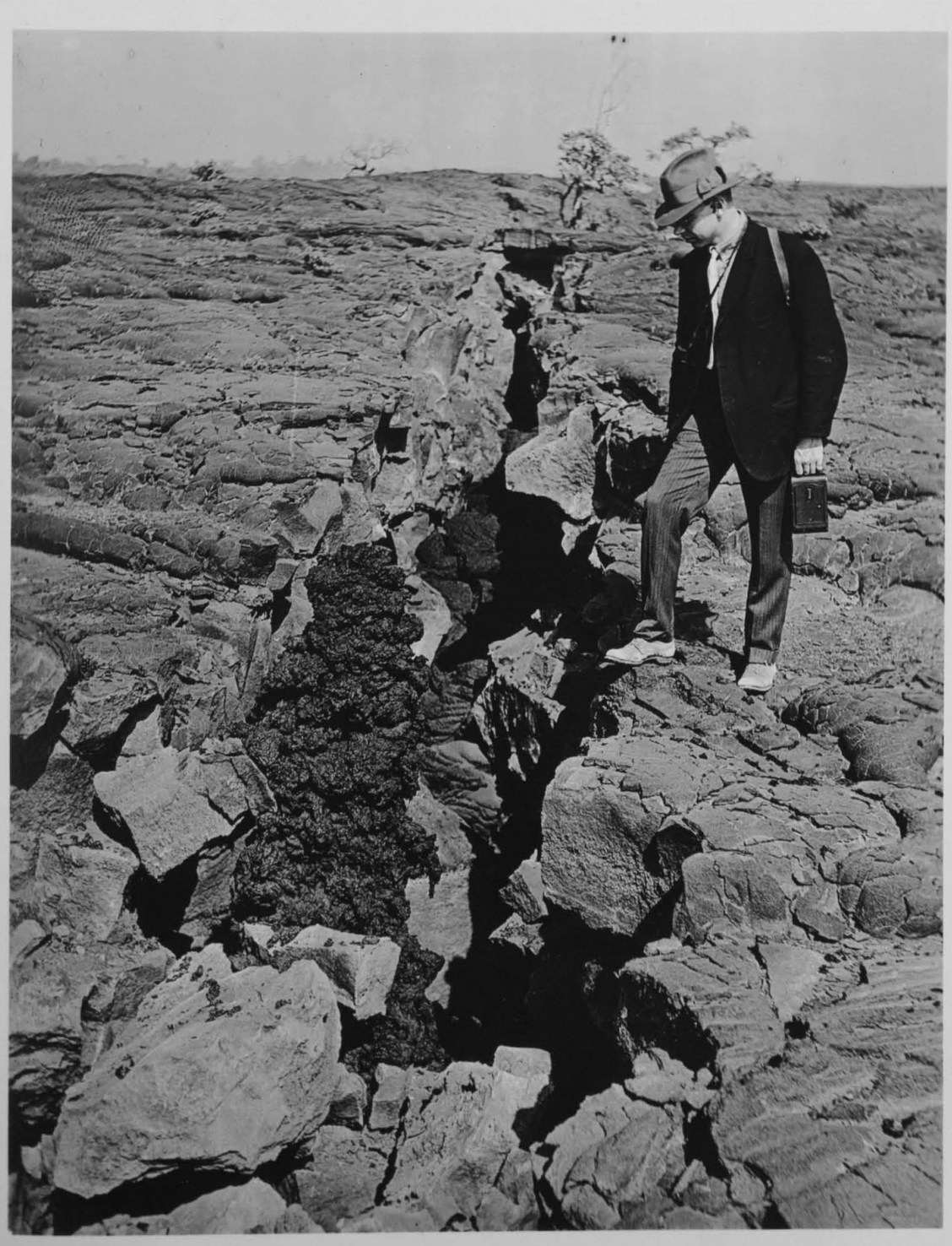




3



2



6

Tag

1919, Dec. 22



4



5

1919, Dec. 22.



7



8

Fog

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Monday Date December 22, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Kau Desert Flow						
		Crack and upwelled lava small upper flow	1f					Kodak
		Crack above the small upper flow, looking toward Halemaumau	2f					"
		Upper small flow, looking up the crack line	3f					"
		Cracks just below upper small flow	4f					"
		Crack showing through veneer of sand, below upper small flow	5f					"
		Looking down the crack line near site of the upper slag heap about a day before its beginning	6f					"

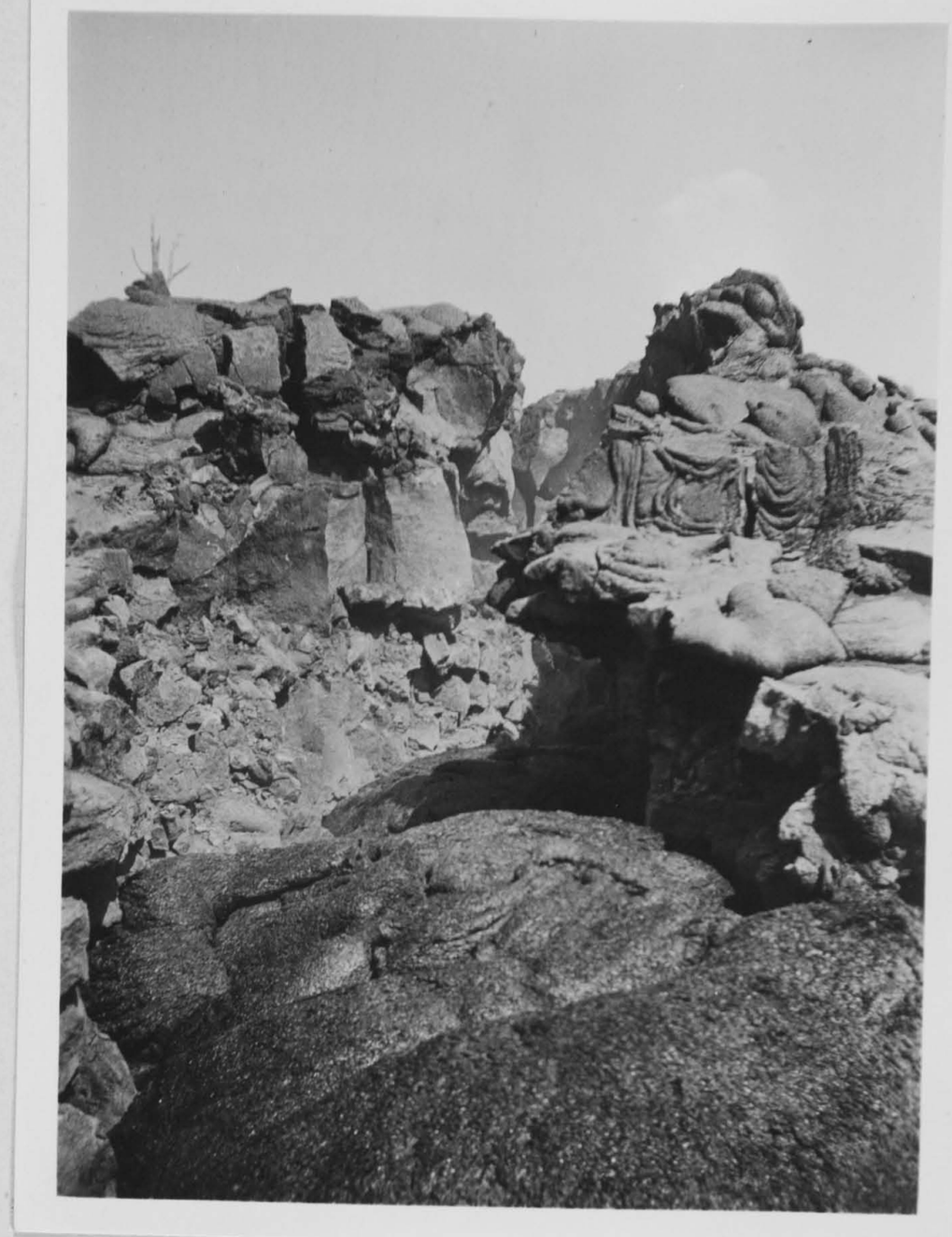
R H F

492

1919, Dec 22



1f



2f



6f

RHF

1919, Dec. 22



3f



4f



5f

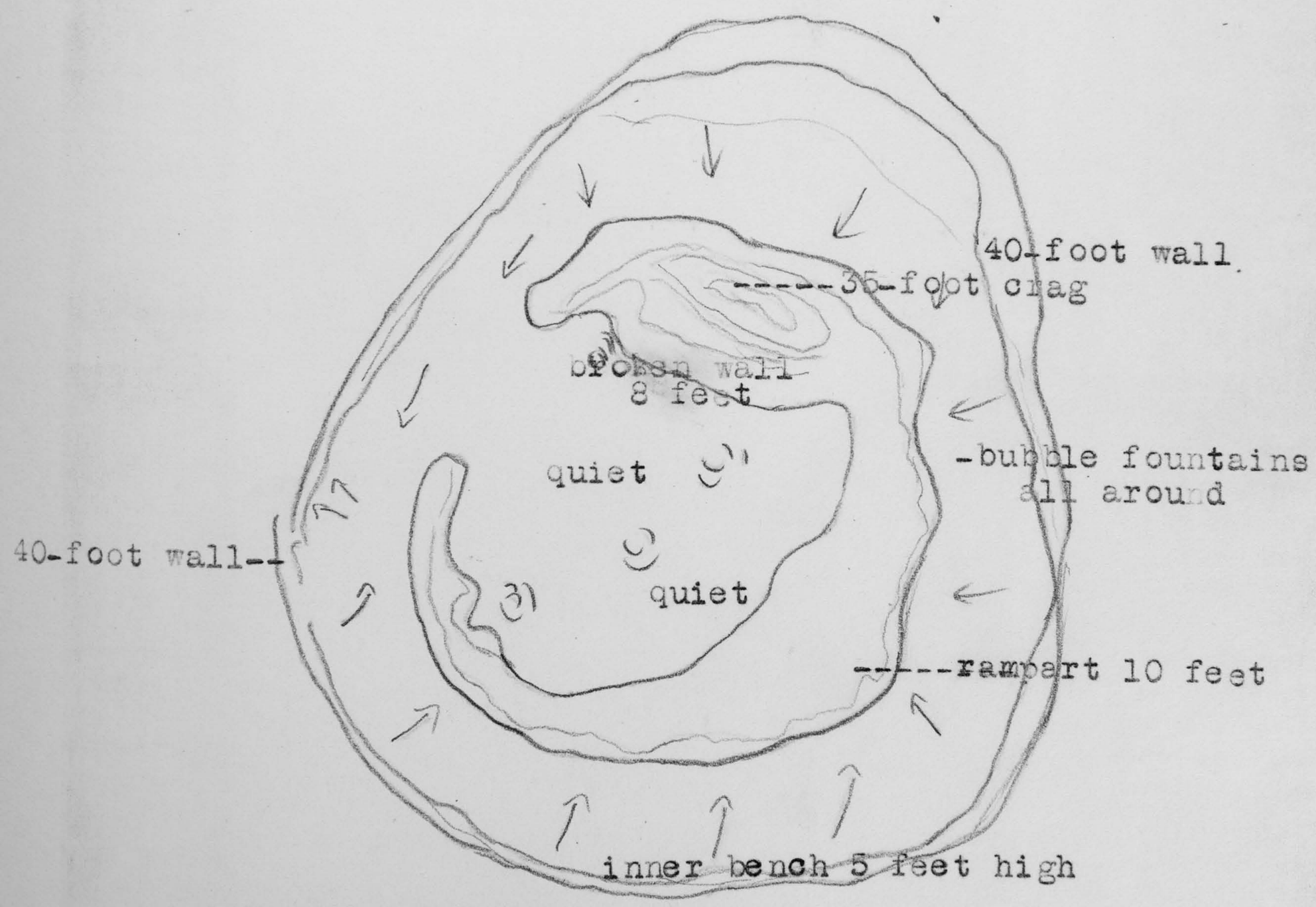
RHF

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date December 23, 1919

10:45 a.m. SW fountain in slag heap still in action with cone built around it. This slag heap three-quarters of a mile long built against SW wall of Kilauea and sloping down to lower ground N,E and W.

Pit today shows ring pool evenly boiling all around with inward streaming. Island higher and complete outline restored, 8 to 10 feet above lake; N crag 35 feet above. Three fountains seen in lagoon, occasional breaking crust. Spatter margin outside of ring pool five feet high, making a second inner black ledge under the ledge of December 15 which is 20 feet high. The lake about 40 feet down, was 10 feet higher yesterday. Alex describes heavy tornado whirls yesterday.



Older black ledge 20 feet high, inner black ledge 5 feet high all around.

T A J

495

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Tuesday Date December 23, 1919

t	sta	subject	no	pl	scr	stop	ex	cam	
10:45a	E rim Hale.	N crag	1	W M	8x	f/8	1/5	4x5	
	"	S side island	2	"	"	"	"	"	
								T A J	

1919, Dec. 23





JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date December 24, 1919

Report from Pahala states that desert flow was seen before daylight.

9 a.m. Inspection from Uwekahuna showed gleam of a flow in desert below Puu Koae about 8 miles from Kilauea crater.

At this time Halemaumau lake 75 feet down, two marked black ledges, and island high above lake. Crag summit below rim and not visible from Observatory. Large dome grotto SW side inner lagoon. Fountaining in ring lake as before and noise plainly heard; some fountains large. Fume slightly increased.

The fountain pit of SW heap no longer active; is now caved in and sending up dense vapor.

10:30 a.m. Went to Kapapala bull-pen and from there crossed pahoehoe and one narrow aa flow, made easy by covering of sand. Only thirty minutes walk to toe of new lava flow. This flow moving steadily and slowly along top of rift with rift fountains along its middle. Flow 1½ miles long. Two interruptions in upper part of flow where rift may be crossed with live flows above and below. Some places over rift lines of fountains, other places spitting cones in midst of flow area. Widest area one-eighth of a mile near lower end, a flat-topped slag heap with steam down the middle in rift direction, borders spilling over more to W than to E. A rough surfaced pahoehoe as before. Invasion of trees and bushes in some places with flaring up and burning of wood and some detonations of exploding gas in caverns.

Below flow on rift found a place where ground was groaning and heaving up, with sulphur vapor from many small cracks. Sitting quietly one could feel slight shocks and hear the rock snap and creak below, while pebbles and sand fell in the crevices. Further down the rift large sand dumes with timber, the sand blown from Kamakaia hills. Found live rift cutting through deep banks of sand to rock below and could see incandescent lava 50 feet down, slowly welling up and crackling.

The flow is progressing by a splitting forward of the rift, each upwelling more voluminous than the next preceding.

T A J

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Wednesday Date December 24, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Kau Desert Flow.						
12:30		Front of flow	1		8x	f/16	1	4x5 Century
to		Up E side flow	2		"	"	"	"
1:50 p.m.		Bush burning	3		"	"	"	"
		Small fountain in flow	4		"	"	"	"
		Trees in flow	5		"	"	"	"
		Looking down flow	6		"	"	"	"
								T A J
		Looking along upper slag heap site from old dome at its lower end	1f					Kodak
		Upper slag heap site from the SE	2f					"
		Looking across upper slag heap from the SE; burning trees at the foot of a terrace	3f					"
		Upper slag heap beginning, taken from E	4f					"
		Lava upwelling through crack midway between upper and lower heaps	5f					"
		Below upper heap, looking toward Hale. from about half way between upper and lower heaps	6f					"
		Crack in sand dune a few feet from first upwelling of lower heap looking up the crack	7f					"
								R H F

499

1919, Dec. 24



1



2

Jog

500

1919, Dec. 24



4

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1919, Dec. 24



5



6

Jan

1919, Dec. 24



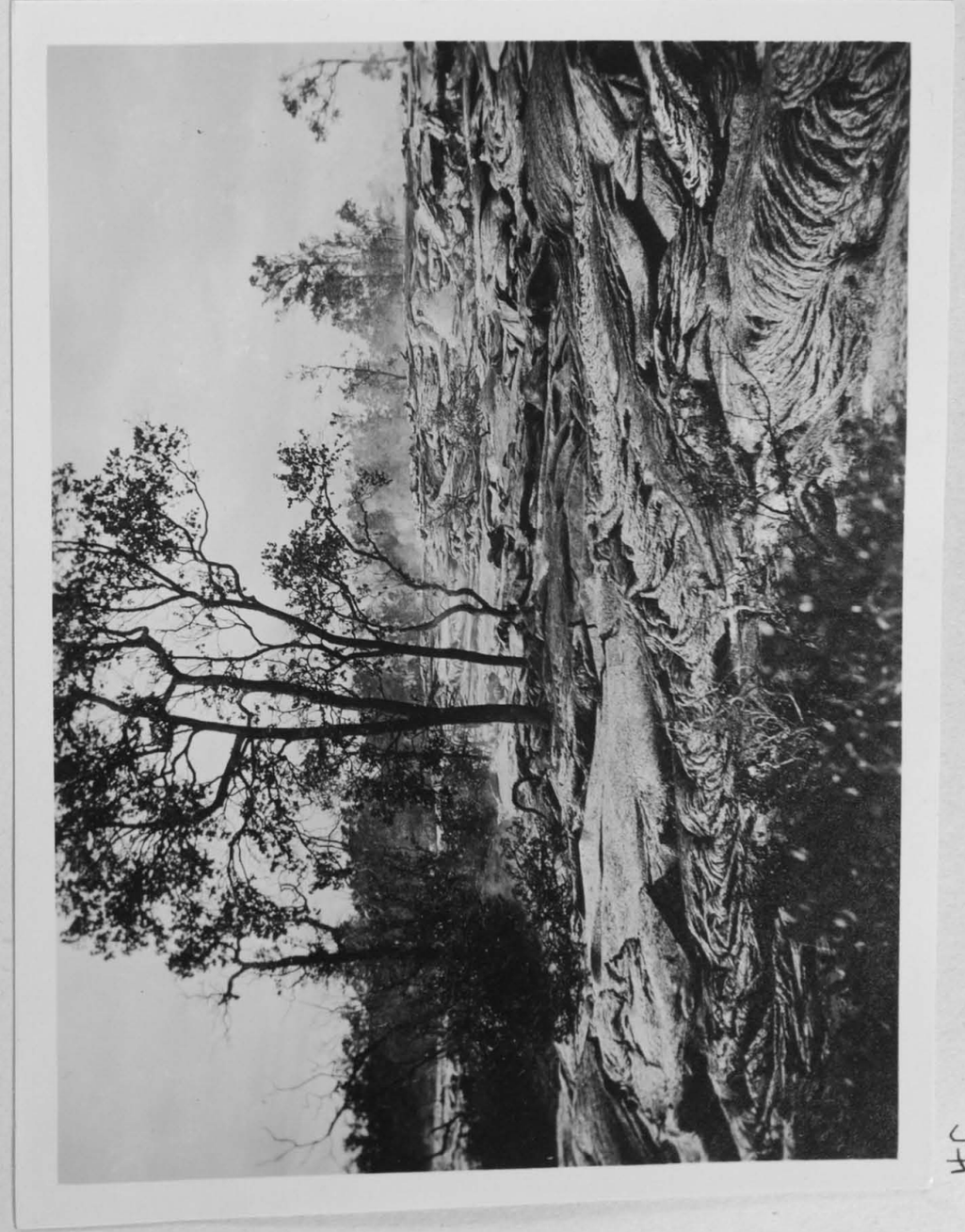
2f



5f

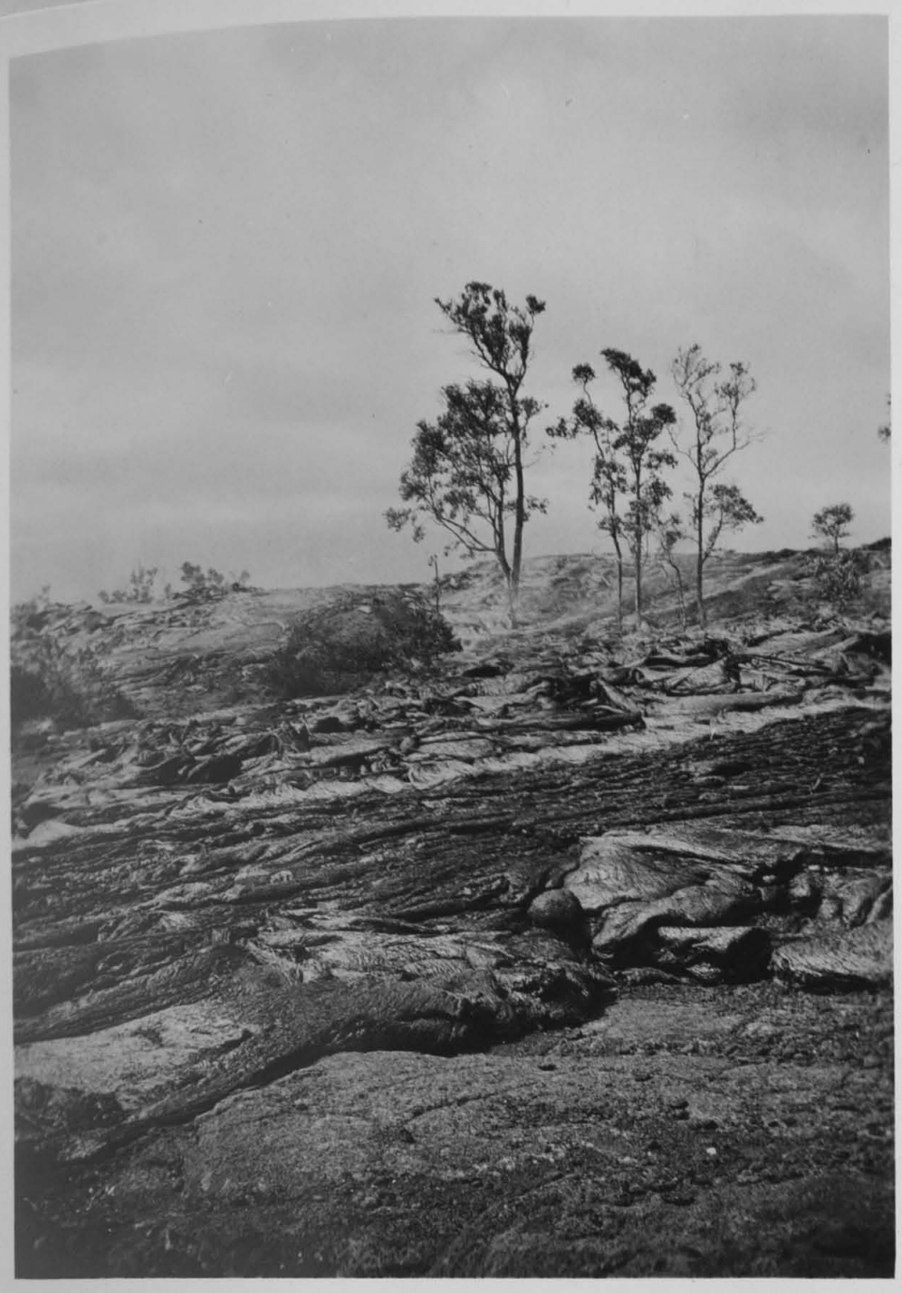


1f



4f

1919, Dec. 24



3f



6f



7f

RHF

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Thursday Date December 25, 1919

Lake in Halemaumau 110 feet down and crag peak just visible from Uwekahuna Dense vapor from SW heap and increased fume from pit.

In forenoon continue exploration of flow in desert. Leave car at site of old Halfway House, cross pahoehoe, aa and wide chasms with graben floors. The first of these is the upper end of 1868 crack with black pahoehoe heaps which welled up the crack in places. Several wide deep chasms.

Beginning of rift zone found within 20 minutes walking of road. After one hour and fifty minutes reached Kamakaia summit, at trig station on southern cone. These cones surmount high lava heap with pahoehoe dome even in upper part of cone. Cinder heap in addition. Remarkable flinty porous lava with "wood bark" surface at foot of cone. Summit commands extensive view showing fume lines of live rift in four symmetrically spaced places from Kilauea down for eleven miles to the forested sand dunes. Upper one half a mile, second five miles, third nine miles, fourth eleven miles from Halemaumau. This last shows a new flow in the sand dune forest burning the timber and making rapid progress, at the place where lava was seen down crack yesterday.

Visited this flow and at upper end found rift in deep sand slipping and rumbling. Several cones along rift and then wide flat flow surface 4 or 5 feet high with streams making out laterally and streaming on top with fountaining in the direction down the rift (SSW). Marked increase of sharp explosions in old caverns at front of flow suggesting that these explosions are favored by CO from burning vegetation Much more smell of burnt organic matter than of sulphur. in places where flow is most active, sulphur being dominant in the steaming cracks and blow cones of first outbreak. The new flow half a mile long and from a few yards to an eighth of a mile wide. Trees burning and falling; and many trees standing in midst of flow. Flow at fronts only one to two feet thick, whereas the flow of yesterday, next nearer Kilauea, was three to six feet thick. The pahoehoe pushing into forest quite like photographs of 1881 flow at Hilo. Some aa at source cones on their crests and in cracks of pahoehoe.

Live crack below flow extends only 100 yards and no motion observed in it; some white vapor. A second steaming crack found a half mile W at E base of aa flow. (This aa W of sand dunes on Kapapala map.)

T A J

505

PHOTOGRAPH RECORD

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

Day Thursday Date December 25, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Kau Desert Flow						
		Looking across lower slag heap near its upper end, from the SE	1					Kodak
		At the edge of lower slag heap	2					"
		Explosion site at lower end of lower slag heap	3					"
								R H F

1919, Dec. 25.



1



2



3

RHJ

JOURNAL

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Friday Date December 26, 1919

11:40 a.m. Lake appears about 150 or more feet down. "Atoll" island high. Large dome grotto SW side of it open to lagoon. Three fountains in middle every few seconds. Very intense multiple fountaining all around in large domes. Streaming from SW? SE and N. SE part of island an uplifted flat sloping inward. Rampart N side N crag three-fifths as high as crag. No such uplifted rampart E and S. Lagoon has three to four feet of uplifted rampart and broken bank. Horizontal spatter lines of black ledge one to two feet apart rather closer below than above. Heat and light intense, fume transparent amd mostly from island.

Fume is reported from Honolulu and elsewhere from this period of activity. Makes hanging red strata in air.

Crack in Halemaumau wall SW not open below, but covered with spatter drip different from the layers each side. Black ledge one to three feet thick. Flat platform of pahoehoe, sloping drip-marked terraces below, at lower N shelf -- about 50 feet below rim.

T A J

Kau Desert Flow:-

Lava flow but little farther down in the wooded lot than on December 25th. The crack ahead of the flow very small and no steaming. Fountains continue vigorous over the crack in the large lava field. The lava is spreading in the direction of the road more than on other side.

A vigorous flow was observed at the first place of December 24 above the sand dune country. Some from burning forest observed farther down the mountain apparently at the toe of the aa flow. Farther up along the recently formed wide crack leading to the above flow there is a new small flow. Explosions diminished.

R H F

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

SURVEY RECORD

Day Friday Date December 26, 1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
11:40a	NNE	NE monument (3714 feet above sea level)	0					
	"	Summit crag	R 70 36	-12 10	00	400	87	
	"	Lake N base crag	63 42	-22 10	00	336	137	
								T A J

509

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

PHOTOGRAPH RECORD

Hawaiian Volcano Observatory

Day Friday Date December 26, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Lower slag heap from above Kau Desert flow	1					Kodak R H F

1919, Dec. 26



RHF

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

JOURNAL

Day Saturday Date December 27, 1919
Sunday " 28, "

December 27.
2:40 p.m.

Lake continues even subsidence, lake apparently faster than island. Outer ramparts of island have slumped, making a steep wall, and cracks show tendency to further slumping. Fountaining not so strong. Under N niche spatter lines like terraces and elsewhere continuous all around. Fume thin, mostly from island; much vapor SW heap.

Reports from desert that flows of middle zone are specially active and are piling up lava. From Uwekahuna flow appears like bed of coals.

December 28.
10:20 a.m.

Visited middle zone of flows from Kapapala bull-pen. Found lower end of this flow heap no farther down mountain than on December 24, but the several outflow areas above had piled up a series of six slag heaps in overlapping terraces each 25 to 30 feet high, all spilling over their margins in sluggish streams and all having flat pools on top showing lines of fountaining along the rift. Each terrace about a third of a mile long and a quarter of a mile wide, the whole series making a tabular ridge extending two miles up the mountain. Its upper end somewhat below Puu Koae.

The lower flow heap in the sand dunes had piled up a still higher flat-topped slag heap of similar extent, the summit pool showing numerous fountains about 40 feet above the general level. The surface seen by climbing high sand dune. Outflow on upper side not conspicuous and only a few burning trees seen. Small driblet flows from rift above this locality. The beginning of slag heap very abrupt. Slag heap source rift appears offset to the E from source rift of the upper heap.

Very little smoke from the flow heaps. Small patch of aa on W side of second terrace in middle zone.

Halemaumau glow and rumble lessening. The fume very brown and smoky about edges of cumulus above and athwart the sunset. The excessive gas of the multiple fountaining appears to induce a distant fume like the Mauna Loa eruption, for volcanic smoke is reported from Kohala, Honolulu and the other islands.

T A J

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

SURVEY RECORD

Day Saturday Date December 27,1919

t	sta	pt		hor	vert	lev	dist	elev	h. i.
2:40p	NNE mon.	NE monument		0					
		NE edge (15 feet from monument to NNE mon.		0					
	" "	Top crag	L	38 19	-11 32	00	597	-120	
	NNE mon.	same	R	70 52	-15 03	00	398	-107	
	NE edge	Lake N of crag		32 24	-16 21	00	583	-171	
	NNE mon.	same		70 43	-25 22	00	333	-158	

NNE 3714 feet above sea level
NE 3727 " " " "

T A J

513

PHOTOGRAPH RECORD

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU
Hawaiian Volcano Observatory
Day Sunday Date December 28,1919

t	sta	subject	no	lens	scr	stop	ex	cam
		Kau Desert Flow.						
10:20a		Middle flow heap looking NE. Same view as Dec.24 (bush in foreground)	1	Tes	8x	f/16	1	3¼x5½
		From hill looking N at terraces	2	"	"	"	"	"
		Same looking W	4	"	"	"	"	4x5
		Looking S at slag heap in woods from sand dune	5	"	"	"	"	"
		Small flow from crack W of sand dune locality	6	"	"	"	"	3¼x5½
								T A J

514

1919, Dec. 28



1



2



6

388

515

1919, Dec. 28



4



5

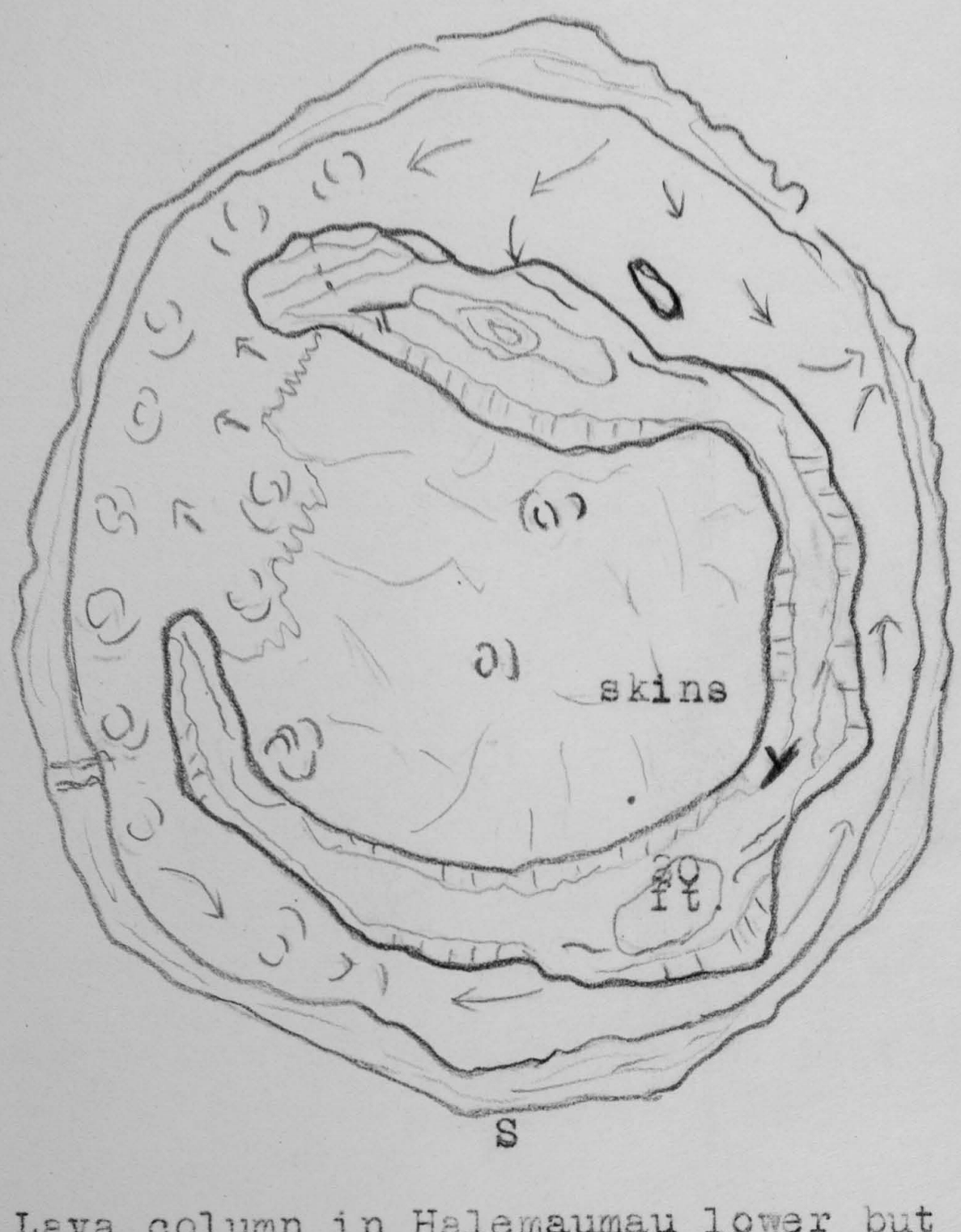
Jan

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

JOURNAL

Day Monday Date December 29, 1919

3:00 p.m. Halemaumau:



Lava column in Halemaumau lower but not so much lower as hitherto. Extraordinary layer on layer slope of spatter rims under N shelf and similar pattern on vertical walls elsewhere. Island high, same steep outer slope due to sloughing off of ramparts. Block of high N rampart seen to fall under N crag and cracks back of ramparts as before. Small islet at base of rampart N side of N crag made by block slipped down or block revealed by excess of subsidence of lake. Crack in SW wall marked by spatter line all the way down and shows double glow crack at bottom. Two fountaining areas in central lagoon near middle and others near W border where the streaming is outward from the lagoon. Dome grotto against island SW side of lagoon continues active Multiple fountaining less intense than before but continues at a maximum along the base of the E wall.

Dense smoke in two places along crack through SW heap.

Kau Desert Flow.

This morning visitors at flow saw increased aa in patches on upper part of E side upper slag-heap. I saw small aa patch there yesterday in midst of pahoehoe.

T A J

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

SURVEY RECORD

Day Monday Date December 29,1919

t	sta	pt	hor	vert	lev	dist	elev	h. i.
3p.m.	Edge S of NNE	NE monument	0					
	"	Summit crag	R 72 30	-19 41	00	393	141	
	"	Lake	69 07	-31 27	00	325	199	
		NNE -- elevation 3714 feet						

T A J

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Hawaiian Volcano Observatory

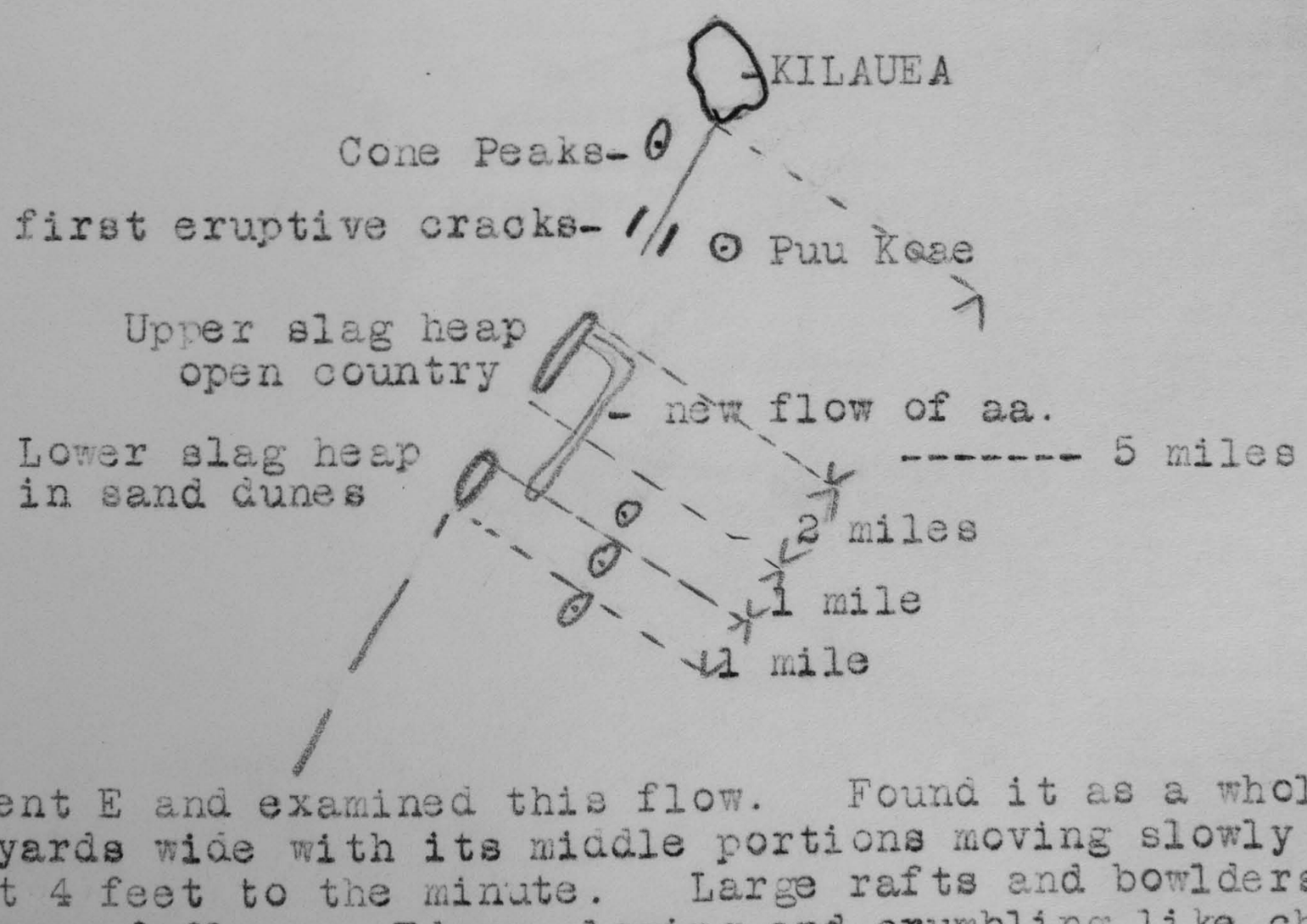
JOURNAL

 Day Tuesday Date December 30, 1919

Visited Kau Desert flows and found new aa flow 3 miles long moving SSW on E side of former flows.

Entered country from road one mile below old Halfway House site. Passed around lower aa flow at its front opposite Kamakaia. No fresh cracks or smoke found in lower country. Went up to the foot of the sand-dune flow locality. Here found the flows at front had spread lengthy arms into forest and buried up the extension of rift cracks in this direction. Going up W side of this active area, found it 1½ miles long and one-eighth to one quarter mile wide, piled up at the head into a slag heap 60 feet high with three or four fountains on top in a stagnant crusty pool which was overflowing the edge of the heap around its northern margins. These flows were pushing into the sand dunes and occasionally burning trees.

Climbed high sand dune N of this active locality and discovered a new aa flow a half mile to the E. This flow took its origin at the upper end of the terraced upper series of slag heaps where it burst out from the E side of the line of terraces and flowed for a half mile to the E before bending in a right angle to the SSW. Some more aa not apparently active had broken out from the middle of the lower terrace of this upper series.



Went E and examined this flow. Found it as a whole 100 yards wide with its middle portions moving slowly about 4 feet to the minute. Large rafts and bowlders on surface of flow. Edges glowing and crumbling like cheese, fragments falling with a tinkle, rock reddish purple and intensely oxidized. Slabs of pahoehoe scattered over surface of flow. Front of flow found a quarter mile below entering chasm channel made by down-faulted block 100 feet wide between two lateral rifts. Trees were growing in this channel. The flow increased its speed in the constricted area estimated 100 feet in six minutes. Set fire to trees and saw one ohia a foot in diameter and 35 feet high pushed slowly over, set on fire and then swallowed by the flow The progress of front here if this speed continued would have covered 4 miles per day.

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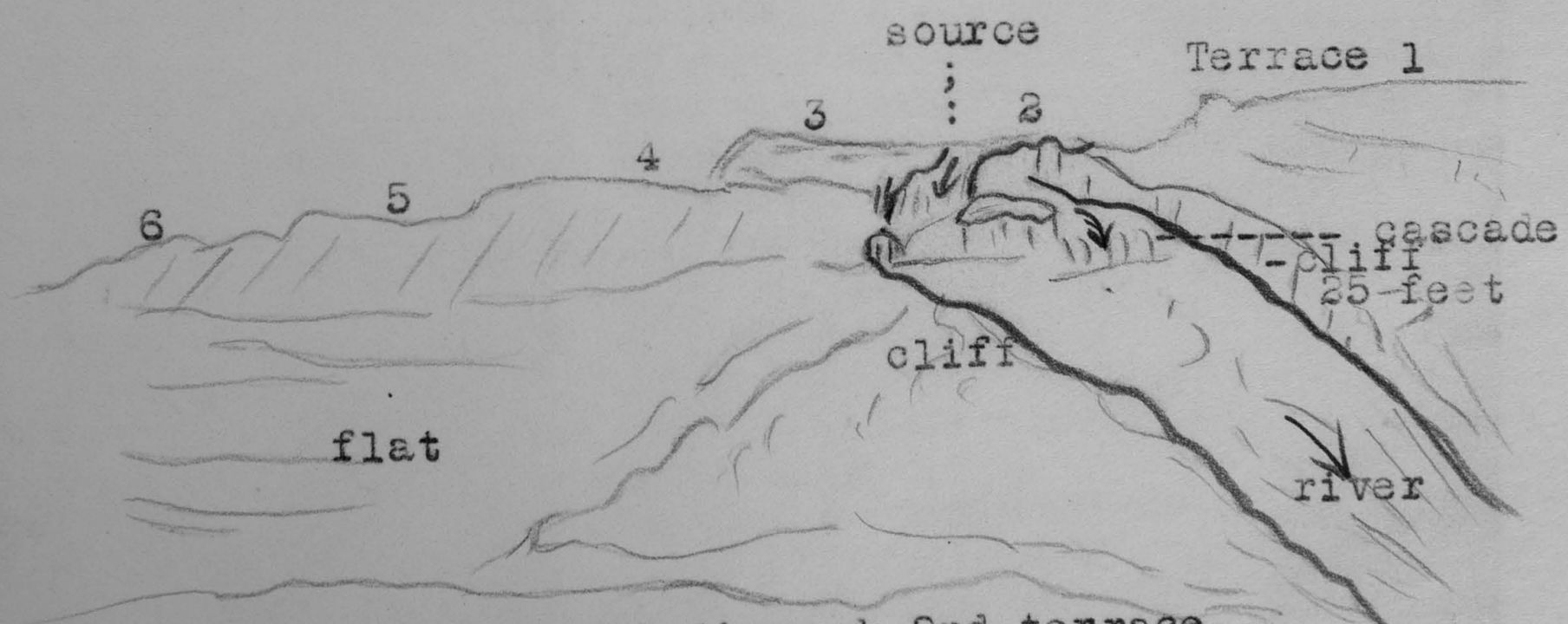
Hawaiian Volcano Observatory

Following up W side of flow found pahoehoe increasing in middle zone, first as broken crusts, then as folded skins until there was a middle stream of festooned pahoehoe travelling two to three miles per hour with aa on each side. This stream 40 to 60 feet wide. Still higher up around the bend going W toward the slag heap source the stream and its marginal accumulations became entirely pahoehoe. One small aa tongue or branch found extending a quarter mile S from above the bend.

From dome hill obtained view of stream emerging from slag heap. The E side of second terrace of the heap had slumped and broken down into a ravine with 25-foot walls and 75 yards wide. The liquid lava had eroded out a channel through this ravine, making a cascade in one place over tumbled debris of the former rampart. Here there was a large angular bowlder of broken rampart material 20 feet long. Still farther in interior of ravine the source of the liquid was seen to be another cascade coming from the N out of the side of the ravine at its head. The river in this upper region was running 8 miles per hour, the liquid part 60 to 70 feet wide and the margins making a ribbon 100 yards wide. The dome hill where I stood was opposite the middle of the slag heap on its E side and just S of the E flowing river. Between this hill and the slag heap the river by its overflow had made a tumbled fill which, however, had not progressed far. No fountains could now be seen on top of the lower slag-heap terraces of this series. The breach in the slag heap where the river came out was just where aa had been seen December 28 and 29.



Lava river breach through 2nd terrace.

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

JOURNAL - 1 - Day Wednesday Date December 31, 1919

Halemaumau remains very bright and fume mostly from SW heap.

Visited Kau Desert flow from above. Left car at upper contact of aa flow and road. Struck off towards Puu Koae Good walking. Passed the first lava cracks, found little fume and no flowing. Head of the upper slag heap a series of lava piles, all pahoehoe, inactive; this two miles or more below Puu Koae.

Climbed E face of second terrace and found plateau on top of slightly slumped crusts. Did this again next height to the S and found similar plateau with good walking out to the edge of depression where the lava river was flowing. Was standing on the edge of a 25-foot cliff with a similar cliff opposite to the S,75 yards away, these bounding the amphitheatre or breach in the slag heap which had given vent to the flow. This depression was bounded by a similar tumbled cliff at the W. Across the bottom from W to E flowed the lava river swiftly, with rippies and rapids 100 feet wide in places, and this swept off to the E in a long straight course, the river flush with a bank of its own overflooding which sloped away on either side so as to leave the stream raised 10 or 15 feet above the general level of the country. The whole accumulation, banks and river, thus constituted a low ridge 100 yards wide with the river advancing along its middle. The speed in the upper depression was perhaps 12 or 15 miles per hour.

Walking westward across the upper flat the source of the stream was found to be simply a round opening,about 15 feet in diameter with a driblet rim of pahoehoe,up which the lava welled continuously in a low standing fountain similar to those which have repeatedly formed at Kilauea. The column did not rise more than two or three feet, but bent at once into a cascade feeding the river. The surface of the lava so emerging was full of coarse drawn-out vesicles and had the appearance of ordinary pahoehoe. It made no noise and showed no gas spurting or blowing. There were some few small bubble fountains in the upper part of the torrent below but it also was very quiet and there was no noise to the whole mechanism other than the swish of a rippling, running liquid.

Keeping on the windward or eastern side we followed the flow to its toe. This was a distance of about 5 miles. There was the same gradual transition noted yesterday from pahoehoe above to complete aa below. At many places the river was spilling over and the margins of the aa ridge oozing forward. Climbing up to the edge of the river over pahoehoe slope in upper part of course, found the stream brimming level with the confining frozen margin, the inner currents progressing at different rates in separate bands or ribbons lengthwide, with here and there a clogging island emerging through the surface suggesting that

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

the stream was very shallow, flowing over shoals of consolidation below.

Found a place where aa was flowing forward and forming with the usual cheesy crumbling and breaking away of red hot faces like coke. It was possible to approach this material and thrust a stick into it. The feel of the material was again like stiff cheese and not at all like the elastic gas inflated bulbs of pahoehoe toes. The aa shows little surface vesiculation and is much stiffer and hotter than pahoehoe. The radiation of heat from the aa is much greater.

Found front of flow about opposite lower Kamakaia hill (the trig station). The flow was still following the graben depression along the old rift W of Kamakaia. Here and there a sluggish river showed glowing amid granular lumps on its surface and confined within definite channels which forked about ledges making islands in the flow. The lower end lay across a bushy meadow and was thrusting its extreme tip into a chasm depression where trees grew, the cheesy substance falling crumblingly into the chasm and piling around and setting fire to the trees. Except on some of the larger rafts there were practically no traces left of pahoehoe slabs.

In the middle course of the flow noticed a group of rafts with the flow partly pahoehoe streaming around them, and on close inspection these rafts were seen to be moving with an exceedingly slow creep barely discernible in the downstream direction. They were evidently attached to and part of the bench magma bottom of the stream which was slowly creeping forward and outward while the more liquid medial zone ran over its surface.

Walked up the E side of the lower slag heap in the sand dune country. Found abundant trickling flows from upper part of heap, some of these making a line of slender cascades over a low cliff. From N sand dune could still see fountains playing on top of slag heap, the summit of which now stood about 80 feet above general level with a low cone of spatter on top in the middle of the flat plateau there. At the southern end of the upper slag heap terraces a small aa flow was oozing out and glowing.

At 9 p.m. from Uwekahuna the flow and its source could be plainly seen, the fume lighted above the fountain well, trickle flows on the source slag heap, the long bright line of the flow itself and the fountain on top of the lower slag heap showing above and beyond the stream.

T A J

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

Hawaiian Volcano Observatory

PHOTOGRAPH RECORD

Day Wednesday Date December 31, 1919

t	sta	subject	no	pl	scr	stop	ex	cam
		Kau Desert Flow						
		Looking down on source fountain of river that broke out on Dec. 30 from upper slag heap	1					Kodak
		Source fountain of same river	2					"
		Lava river taken from source, Kamakaia in background. (Nearly in panorama with #2)	3					"
		Lava river a short way from its source. (Camera nearly level with river and at the very edge)	4					"
		Rafts in river going down cascade to the left (see 6), just below upper slag heap	5					"
		River below upper heap, (Nearly panorama #5)	6					"
		Front of one arm of aa flow looking across moving front toward E	7					"
		Aa river below lower slag heap, upper Kamakaia in background	8					"

R H F



1



2



4



3

RHS



5



7



6



8