The Volcano Letter

377

Two dollars per year **Ten cents per copy**

No. 377—Weekly | Hawaiian Volcano Observatory, National Park, Hawaii | March 17, 1932

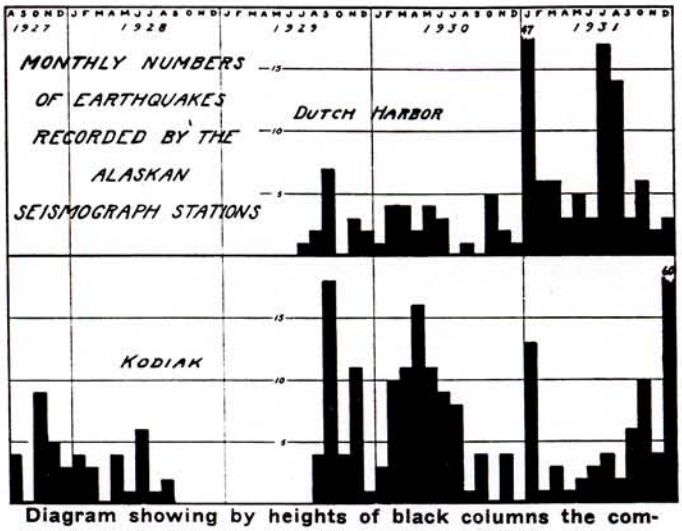


Diagram showing by heights of black columns the comparative frequency of Aleutian earthquakes, by numbers of shocks, per month, at Kodiak and Dutch Harbor (Unalaska) seismograph stations of the Section of Volcanology, U. S. Geological Survey. A. E. Jones.

EARTHQUAKES RECORDED AT THE KODIAK AND DUTCH HARBOR STATIONS

The United States Geological Survey is interested in the seismic activity of the Alaskan volcanoes. Towards that end the Section of Volcanology has placed two seismograph stations at strategic positions. As these places are more than 600 miles apart, neither records the smaller earthquakes local to the other. To facilitate a study of these records, a map of the Alaskan Peninsula and the Aleutian Islands has been prepared which is shown on Pages Two-Three. On this map circles of successive 50-mile distances have been scribed about the two stations. These 50-mile zones aid in the rough location of the earthquakes. With better earthquake reception, or more stations, closer positions could be given. These records are for the purpose of reconnaissance only.

Kodiak Earthquake Registration

The seismograph at Kodiak, Alaska, was put into operation early in August 1927 and was kept in operation until September 1928. It is at the former Agricultural Experiment Station on the hill back of Kodiak village. During this period of 13 months, 35 earthquakes were recorded. The majority of these were local to the Alaskan Peninsula. Fourteen of these quakes originated at distances of 100, 115, and 127 miles and could be attributed to either the nearer active volcanoes of the Aleutian Range or to the steeper part of the ocean bottom. There was one of 520 miles distance, reported from the Yakutat Bay region. Fifteen were teleseisms that were outside the North Pacific area. The remaining 20 shocks were at unassignable distances, but show by the quick period of the long waves that they were local to that area. Probably the 200-mile circle would include them all. Lacking an attendant the station was discontinued for a year.

The next series of records of the Kodiak station begins in the middle of August 1929. During the five months of 1929, six earthquakes were recorded from distances of 20 to 60 miles, two of which were felt by many persons. Thirty-one shocks were recorded that were not teleseisms but show distances of origin otherwise indefinite, but are probably not farther away than 200 miles. There are no teleseisms listed for that period.

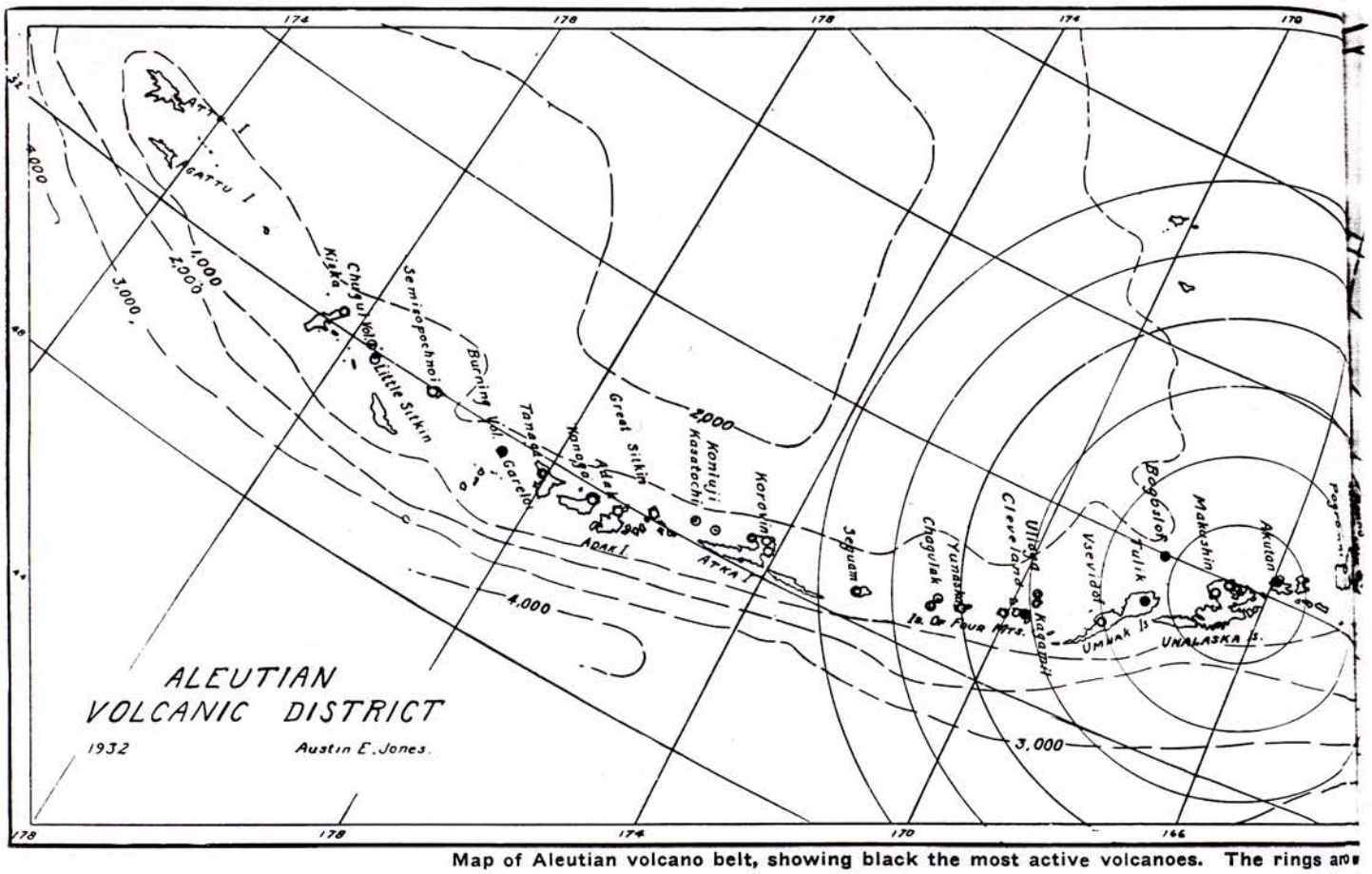
During 1930, 25 shocks came from distances of 20 to 70 miles away. One of these was strong enough to be felt generally; it dismantled the seismograph. Fifty-one local shocks of unknown distances of origin were recorded, and only one of 83 miles distance, that could have originated near Kukak Volcano. Six local earthquakes were apparently strong enough to have been felt, but were not so reported. Only one teleseism is listed for the year.

Time used is Kodiak Standard (K.S.T.), 10 hours slower than Greenwich.

Earthquakes recorded at Kodiak, Alaska

Lat. 57° 48′ 40″ N; long. 152° 24′ 20″ W; elev. 300 ft minus
Two Hawaiian-type horizontal pendulums weighing about 70 kg. set up in N-S and E-W directions. Static magnification 135 times with critical oil damping.

1931		Character	K S. T. h.	m.		Distance Miles	Remarks
Jan.	1	Tremor	0	30	a.m.		
	2	Feeble	7	40	p.m.	157	
	4	15 Tremors			p.m.	75-115	Two indicate distance.
	7	Tremor	0	30	a.m.		
	7	Very feeble	3	00	a.m.	20	
	8	Very feeble	11	30	p.m.	83	
	9	Very feeble	1	40	p.m.	20	
	9	Very feeble	8	20	p.m.	143	
	11	Very feeble	3	15	p.m.	50	NE-SW.
	11	Tremor	4	30	p.m.		
	14	Teleseism	5		p.m.		Long waves.
	25	Tremor	6	37	a.m.	110	
	27	Feeble	6	35	a.m.	215	or over. Begins in hour mark. Felt in Seward and Anchorage. Epicenter 61° N 150° W.
	27	Teleseism	11		a.m.		Part of a distant earthquake. Epicenter 31° N 108° E.
Feb.	2	Tremor	6		p.m.	100	



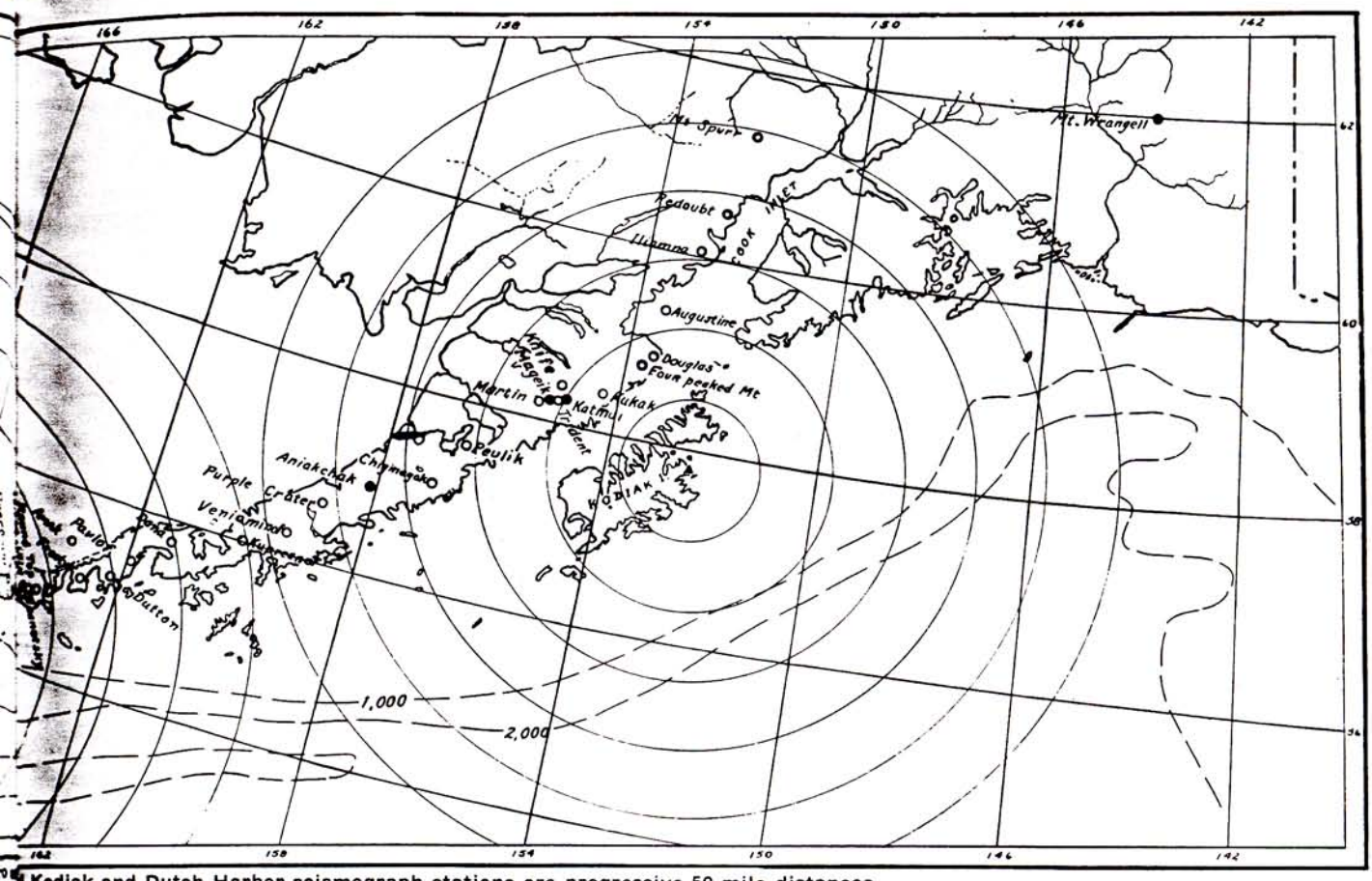
Map of Aleutian volcano belt, showing black the most active volcanoes. The rings are
Soundings in Bering Sea at the north and Pacific

Mar.	18	Very feeble	5	05 p.m.	100	
	21	Tremor		p.m.	32 or over.	
	22	Tremor		a.m.		
Apr.	22	Tremor		p.m.		
May	16	Feeble	10	45 p.m.	147	
	28	Feeble	6?	15 p.m.	320	Epicenter 58° N 158° W.
June	14	Very feeble	7	30 p.m.	32	NW-SE.
	16	Tremor	7	00 p.m.	74	
	27	Very feeble	7	35 p.m.	18	NW-SE.
July	5	Tremor	2	00 a.m.	30 or over.	
	26	Tremor	10	17 a.m.	64?	
	26	Tremor	2	15 p.m.	110	
Aug.	1	Tremor	7	15 p.m.		
	22	Tremor	3	00 p.m.		
	27	Teleseism	6	20 a.m.		Long waves, part of earthquake. Epicenter in Baluchistan 30° N 67° E.
Sept.	1	Teleseism	3	50 p.m.	600 or greater—felt locally.	
	9	Tremor				
	10	Tremor				
	10	Very feeble	12	00 p.m.	55	NE-SW.
	25	Very feeble	1	30 p.m.	60	
	26	Very feeble	5	00 a.m.	55	NE-SW.
	29	Very feeble	0	55 a.m.	160 or greater.	
Oct.	3	Teleseism	10	a.m.		Part of Solomon Islands earthquake, epicenter 10° S 161.°4 E.
	12	Very feeble	3	35 a.m.	46	NE-SW.
	16	Very feeble	3	20 p.m.	64	
	17	Feeble	2	50 a.m.	172	NE-SW.
	18	Feeble	2	15 p.m.	50	NW-SE.
	25	Tremor		p.m.	108	
	25	Tremor		p.m.		
	26	Slight	1	00 a.m.	55	NE-SW.
	29	Feeble	9	45 p.m.	32	NE-SW.
	31	Tremor	2	00 a.m.		
Nov.	17	Tremor	2	40 p.m.		
	20	Very feeble	0	55 a.m.	267	NW-SE.
	20	Tremor	1	25 a.m.		
	25	Feeble	9	50 p.m.	74	NW SE.
Dec.	7	Very feeble	2	50 p.m.	78	
	9	Very feeble	2	30 a.m.	106	Over 30 similar earthquakes having no recognizable P phase between Dec 8 11 p. m. and Dec. 9 7 a. m.
	11	Very feeble	8	30 a.m.	305	20 to 25 tremors during 7:30 to 9:30 a. m.; no distances assignable.

In the above record there were 19 local quakes that originated at distances of 20 to 80 miles. Four of these came from 74 to 78 miles away and could have originated under the near side of the volcanic Aleutian Range. Seventeen occurred at places from 80 to 320 miles away, and it can be estimated that a fair percentage of these were from near volcanoes. There were 13 shocks, mostly graded as tremors, as well as three swarms of 13, 30, and 20, to which there could be assigned no epicentral distance other than that they were not farther away than about 200 miles. Parts of five teleseisms were recorded.

Dutch Harbor Earthquake Registration

The Dutch Harbor seismograph was installed July 1929 and has been run continuously. During the last half of



Kodiak and Dutch Harbor seismograph stations are progressive 50 mile distances. ean at the south are in fathoms. A. E. Jones.

that year one shock was recorded from a distance of 37 miles. Akutan Volcano, about 30 miles to the east, was in eruption during the late summer and autumn, and it is more likely that this earthquake occurred there than under the slope of the ocean deep to the south. Eight shocks occurred in the next zone and can be assigned either to the volcanic island Umnak or to the slope of the deep. Six other local quakes of unknown distances were recorded and one teleseism. No earthquakes were reported as felt.

During 1930 four shocks were definitely from within the first zone. One on November 6, 1930, at 3:20 a. m. local time, was felt very strongly at Dutch Harbor and originated 46 miles away. Six more shocks were from the second zone and two occurred at greater distances. There were also 15 local quakes from unknown distances. Only one teleseism was recorded during the year.

Time used is Pacific Standard Time, (P.S.T.) 8 hours slower than Greenwich.

Earthquakes Recorded at Dutch Harbor

Lat. 53° 53′ 09″ N; long. 166° 32′ 05″ W; elev. 15 ft.

Two Hawaiian-type horizontal pendulums weighing about 70 kg., set up in N-S and E-W directions. Static magnification 135 times with critical oil damping.

1931		Character	P. S. T. h. m.		Distance Miles	Remarks
Jan.	2	Tremor	8	25 a.m.	69	
	3	Tremor	11	00 a.m.		
	6	Tremor	8	35 p.m.	60	
	9	Very feeble				
	11	Tremor	6	45 p.m.	42	
	23	Tremor	4	30 p.m.		
	28	5 tremors		p.m.		
	30	35 tremors		p.m.		23-28-32-37-51 59; one at each distance.
	31	Tremor	5	02 p.m.		
Feb.	1	Tremor	5	30 a.m.	57	
	3	Tremor	2	00 p.m.	23	
	10	Tremor	5	30 p.m.		64 or 92; according to interpretation of phases.
	11	Tremor	9	25 a.m.		
	13	Tremor	4	10 p.m.		
	15	Tremor	7	30 a.m.		
Mar.	2	Very feeble	7	30 a.m.	120	
	2	Tremor	11	35 a.m.	46	
	27	Tremor	5	40 a.m.	147	
	29	Feeble ePEN	9	26 28 a.m.		Felt in Dutch Harbor.
		iSE	9	27 01	106	ESE.
	29	Slight ePN	11	13 36 a.m.		Felt in Dutch Harbor.
		iSE	11	14 08	147	
	29	Tremor	0	52 p.m.	120 or over.	
Apr.	3	Tremor	7	25 a.m.	111	
	5	Tremor	4	15 a.m.	64	
	18	Tremor	8	30 p.m.	140 or over.	
May	4	Tremor	10	55 a.m.	51	
	5	Tremor	2	15 a.m.	147?	
	9	Tremor	7	00 a.m.		
	20	Tremor		a.m.		
	20	Tremor	0	10 p.m.	23?	
June	19	Tremor		a.m.		
	27	Very feeble	0	50 a.m.	46	NW-SE?
	27	Tremor		p.m.		
July	12	Tremor	5	30 p.m.	46	
	13	Tremor	1	45 p.m.	50?	
	18	*Teleseism	3	20 a.m.		

* The Jesuit Seismological Association lists the following 1931 distant earthquakes from this region: May 27, Lat. 56° N Long. 168° E, Commander Islands off Kamchatka; May 29, 58° N, 158° W, Bristol Bay west of Katmai; May 30, 52° N, 177° E, near Kiska and disastrous at Attu; July 18, 58° N, 169° E, west of Kamchatka. The May 29 shock was registered at Kodiak, and that of July 18 at Dutch Harbor.

1170

	19	Very feeble	0	05 p.m.	100-200	
	24	6 tremors		p.m.		
	24	Tremor	8	20 p.m.	83	
	29	8 tremors	11	a.m. to		
			12	m.	18	Distance of one only.
Aug.	2	Tremor	0	10 a.m.	46	
	5	Tremor	2	05 p.m.	500?	Part of a distant quake.
	8	Very feeble	4	45 a.m.	97	
	8	Tremor	5	15 p.m.		Part of a distant quake.
	9	3 tremors		p.m.		
	11	Very feeble	6	40 a.m.	88	
	11	Tremor	8	00 a.m.		
	11	14 tremors	4	00 p.m. to		
			8	30 p.m.		
	14	Feeble		a.m.	110	
	14	Tremor	6	00 p.m.	97	
	15	Tremor	4	40 a.m.	120	
	19	Tremor	6	10 a.m.	360?	
	19	Tremor	6	50 p.m.	130	
	24	Tremor	3	30 a.m.	330?	
	31	Tremor	6	00 a.m.	115	
Sept.	2	Very feeble		p.m.	110	
	8	Tremor	8	30 a.m.	42	
	18	Very feeble		a.m.	55	
Oct.	2	Very feeble	4	50 p.m.	100	NE-SW?
	10	Teleseism				
	10	Tremor				
	10	Tremor	6	40 p.m.	37	
	14	Feeble	2	00 a.m.	115	
	17	Tremor	6	35 a.m.		
	17	Very feeble	8	35 p.m.	55	NE-SW
Nov.	22	Tremor		a.m.	64?	
	23	Very feeble		a.m.	60	NE-SW.
Dec.	1	Very feeble		p.m.	125	ENE-WSW.
	6	Moderate	11	10 p.m.	46	NE-SW. Felt by all. Seismographs dismantled; dishes rattled.
	14	Feeble		a.m.	125	ENE-WSW.
	23	Teleseism	9	45 a.m.	900?	

In the above table 13 earthquakes originated in the first zone about Dutch Harbor, while 17 were in the second zone, 11 in the third zone, possibly two in the fourth zone, two outside the zones at 330 and 360 miles, and two more occurred at the probable distances of 500 and 900 miles away. Four teleseisms were recorded completely or in part. One from the Kamchatka region was remarkable for its large single S period. At least 70 local earthquakes were recorded in such small amplitudes that no distance could be determined. During the summer of 1931 there were over 200 artificial disturbances. probably caused by workmen. There were three earthquakes reported felt at Dutch Harbor. The accuracy of the location of earthquakes in these zones is largely dependent on the depth of focus of the earthquake.

During the years 1929-30 the Kodiak station recorded about 2½ times as many earthquakes as the Dutch Harbor station, while in 1931 the Dutch Harbor station recorded 37 per cent more. This would seem for seismicity to parallel Petroff's statement for volcanicity, that when the volcanoes in one part of the Aleutian chain become quiet, others in some other part of the chain become active. This relative localized shift of seismicity also shows in the graph.

Tremors

The numbers of tremors in the tables stand out. Three times as many were recorded by the Dutch Harbor seismograph as were recorded by the Kodiak seismograph, probably because Dutch Harbor is much nearer the subterranean volcanic rift line. They are seismic in character, representing sizable shocks when originating at a distance. They probably could have been felt by any one over, or near, their origin. After having traveled 50 or 100 miles, the earthquake waves have so decreased in size that they are barely registered as tremors on the receiving seismograph. The Kodiak station recorded 36 of these tremors, only 10 being pronounced enough to show distance by the S-P interval. They fall into groups of 30, 70, and 105 miles. The Dutch Harbor station recorded 105 tremors, 35 indicating distance. Most of these originated at distances from 20 to 150 miles away.

The volcanic magma underground on the Alaskan Peninsula near Kodiak may be about as active as that near Dutch Harbor if seismic distance is considered. The latter station is at about 8 and the former at 80 miles distance from part of the Aleutian volcanic rift. If we compare the tremors received at Kodiak from 100 to 115 miles, with those received at Dutch Harbor from approximately the same distance, there are five in each case received on instruments of nearly equal sensitivity. Referring to the map, there are volcanoes at those ranges from each station.

While there are only two indicated 100 miles on each side of Dutch Harbor, there are other smaller craters unlocated, near both Vsevidof and Pogromni, and both Unimak and Umnak islands have produced recent eruptions. The Katmai group is 100 miles from the Kodiak station. (See Volcano Letter No. 375.) A.E.J.

KILAUEA REPORT No. 1051

WEEK ENDING MARCH 13, 1932

Section of Volcanology, U. S. Geological Survey
T. A. Jaggar, Volcanologist in Charge.

On March 7 fume from near the foot of the southwest talus was as strong as on previous days. The fuming spot under the west wall was inactive. Cracks were measured and showed little change. Two new measuring points were established on the northeast rim back of the area which avalanched last week. A slide occurred from the NE wall at 10:32 a. m. The seismograph at Halemaumau registered sudden tilt in the morning, without tremor, to the east, and a gradual tilt to south. Two glowing cracks reported last week were plainly visible in the evening.

Dust from an avalanche was seen March 8 at 1:13 p. m. from the Observatory. A small quake was felt at Halemaumau at 2:07 p. m. A few rocks were heard falling.

Nothing new was observed during a circuit of the pit on March 9 in the forenoon.

Much dust from big slides was seen about 1 p. m. March 10.

On March 11 much fume was visible from the Volcano House, rising in concentrated puffs during the forenoon. At 10:08 a. m. there was a small slide from the northwest wall. Sulphur stain slowly increases about the fume spots. A slight widening of cracks was noted northeast. The glow from one of the cracks has nearly disappeared. The crack southwest of this continues to be visible at night, but not so bright as formerly.

On the evening of March 12 one glow-crack remained visible. On March 13 fume activity showed no change. A quake at 8:26 a. m. registered stronger on the Halemaumau seismograph than at the Observatory. Moderate tilt to the east was registered during a quake at 1:15 a. m.

The seismographs at the Observatory recorded 41 tremors, 12 very feeble seisms, and one feeble seism at 11:04 p. m. March 8 felt in Hilo. A very feeble seism at 1:15 p. m. March 11 was also reported felt in Hilo. Distance phases of most of the disturbances indicate origins near Kilauea. Microseismic motion was moderate for the first three days of the week, followed by two days of strong microseisms, and decreased to light at the close of the week. Average tilt for the week was strong SSE.

THE VOLCANO LETTER

The Volcano Letter combines the earlier weekly of that name, with the former monthly Bulletin of the Hawaiian Volcano Observatory. It is published weekly, on Thursdays, by the Hawaiian Volcano Research Association, on behalf of the section of volcanology, U. S. Geological Survey. It promotes experimental recording of earth processes.

Readers are requested to send articles, photographs, publications and clippings about volcano and earthquake events, instruments and investigations, especially around the Pacific.

Subcription for non-members two dollars per year of 52 numbers. Address the Observatory.