ART. XXVII.—*Kilauea in April*, 1892; by Rev. SERENO E. BISHOP.

[Communication to J. D. Dana, dated Honolulu, April, 30, 1892.]

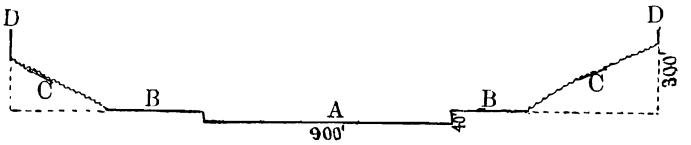
ON a visit, a little over a fortnight since to the volcano of Kilauea, the condition of Halemaumau crater was found to be greatly changed from that in 1887, as described in your "Characteristics of Volcanoes," and which I had the satisfaction of observing in your company. It also differs so greatly from what has been hitherto put upon record, that I venture to send you the particulars, with some illustrations for such use as you may choose.

At the collapse of the crater on March 5, 1891, precisely five years after the previous collapse in 1886, a deep open pit was left as before. The great mound* had entirely disappeared into the volcanic depths. The lava speedily reappeared without apparent obstruction, and has since then risen to within about 300 feet of the upper rim of Halemaumau, where it formed a floor of remarkable smoothness. Perhaps two months

*The mound referred to is the "debris-cone" which occupied the interior of Halemaumau, the pit in the southwest part of Kilauea.

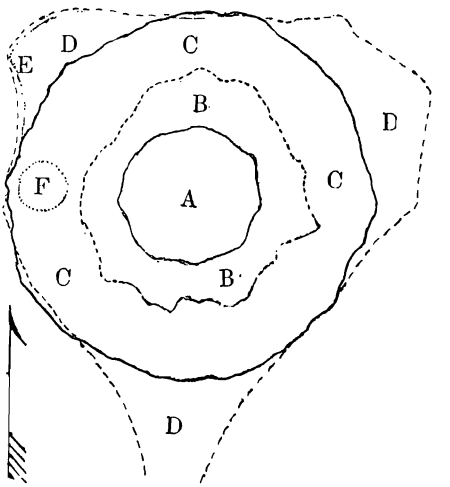
ago it began to subside, and when I last saw it, it was 40 feet below the level of the floor, having sunk about ten feet during five days. The diameter of the molten lake is just about 900 feet, and that of the floor around it averages 1500 feet.

1.



Vertical Section of Halemaumau, April 13, 1892.

2.



Ground-plan of Halemaumau in the southwest part of Kilauea.

Fig. 1 is a ground plan of Halemaumau, and 2, a section of it, as it existed April 13, 1892. In each, A is the Fire-lake of that date 900 feet in diameter; BB, the level floor of blackish lava around the lake, about 40 feet above the surface of the lake, and 1500 feet in diameter; CC, the talus-slope making the chief part of the sides of the pit; D, section of the outer rim of Halemaumau. In the ground-plan, fig. 2, the outer dotted line, is the outline of 1886, as given in Dodge's map; DDD, depressed areas of the pit of that date, filled up by overflows of 1889, 1890, 40 feet above the former level; E, section of former margin of the pit still visible above recent overflows; F, former position of Dana Lake.

The activity of the lake, relatively to its area, is somewhat less than that of Dana Lake as you witnessed it, although

actually several times as great, and exhibiting larger single areas of violent activity. It differs materially from Dana Lake in the distribution of its action. The general movement of the thin crust is steadily from the periphery toward the center, where there is the greatest action. Long seams (fiery cracks) open near the outer edge, and draw inward, crinkling up as they progress, until they become interlaced. An open area of perhaps two acres at the center is occupied by a strong current pouring westward, filled with fragments of crust and exhibiting sparkles of fire with a multitude of small jets and sprays. This current disappears under the crust that extends out from the west side. Near the eastern edge of this central area there is a powerful fountain which did not intermit its action a single minute during several visits from the 8th to the 13th. Its movement was pulsating; about every twenty seconds it welled up in a round billow varying in diameter from 30 to 50 feet, and from 20 to 35 feet high. There was no explosive action, or spray, except what was caused by the falling back of the upheaved fluid.

A similar but smaller fountain played nearer the bank at the south. This, however, at my last visit, had exchanged its action for a more violent but intermittent one. Occasionally, and once for twenty minutes continuously, an area of 150×40 feet was occupied by a violently tossing mass of surges, from 15 to 25 feet high, the entire summit of which was feathery with spray. A similar but smaller area was several times in like action northwest of the center.

The great regurgitating and explosive fountains under the little cliffs, which made the chief displays in Dana Lake, were scarcely to be found here. A slight occasional action of that sort was noticed at two points at the northwest edge.

The remarkable fact is here to be noted, that *no vapor* could be distinguished without careful scrutiny. From the Volcano House, a column of very faint blue haze could be observed ascending, having the diameter of the lake. In the night, this column of vapor, illuminated by the fires, was more discernible. But from the edge of the crater, close at hand, it could barely be distinguished, even by night. I spent many hours on different sides of the crater, once walking around it, but never even perceived any odor of fumes when at the edge, although at some distance from it and all over the floor of Kilauea many crevices were emitting sulphurous fumes. At the present time, the lava seems to have no contact with old rocks near the surface, while the ducts below are doubtless heavily glazed, like those we saw at the bottom of "New Lake" in '87.

The top of Halemaumau crater has been found by aneroid measurement to be from 30 to 50 feet higher than in 1886.

There is every appearance that extensive overflows have taken place over every part of the rim since you were there, and there can be no doubt of a great accumulation of material. The "New Lake" and the intervening depression are totally obliterated. The high promontory west of "New Lake" is lost beneath the flood. The great depression at the south is also filled, though not quite to the general level. The conical form of Halemaumau has become very distinct, and is strongly appreciated in the ascent to it on nearly every side.

The volcano will soon be very accessible for tourists. The Hilo road is perfectly graded and rolled, and will probably be completed in a few months, when the drive to Kilauea will be one wholly of pleasure. The new hotel is a superior one, with lodgings for 70 guests. Plans are in progress for improving the walk over the lava. The whole is now in the hands of an active and enterprising corporation.