

RADCLIFFE COLLEGE has received from Mrs. Martha T. Fiske Collard a bequest amounting to about \$100,000.

DR. HANS MEYER, of Leipzig, has given 150,000 Marks to the University of Berlin, to establish a chair of colonial geography.

THE new administration building of Throop Polytechnic Institute at Pasadena, California, was recently completed at a cost of \$160,000, contributed by Pasadena citizens.

THE new buildings of the department of practical mechanics, of Purdue University, was dedicated on November 12. These buildings provide facilities for instruction in mechanical drawing, descriptive geometry and shop work. Ground was broken on July 22, 1909, and the completed structure turned over to the university on June 15, 1910. The main building contains 25,000 square feet of floor space; can accommodate at one time 400 students in drawing, and has locker accommodations for 1,200 students. The lecture room seats 300 and there are two class rooms, each having a capacity of 60 students. The shops cover 43,000 square feet of ground and are capable of accommodating a group of 350 students at one time.

DISCUSSION AND CORRESPONDENCE

ERUPTIONS OF KILAUEA

TO THE EDITOR OF SCIENCE: In your issue of September 2, 1910, Professor C. H. Hitchcock says, in his interesting review of Brigham's "Kilauea and Mauna Loa," "It is impossible to learn whether the activities of 1849, 1855 and 1879 in Kilauea were to be regarded as true eruptions. An opinion on this point would be a great help."

On July 2-5, 1855, with one companion, Mr. Rufus A. Lyman, I made my sixteenth and latest (I hope not last) trip to Kilauea. I took full notes on the way, and from these, soon afterward, drew up a somewhat minute account of the tour. That account lies before me, and it thus happens that I can give some information as to the activities of Pele in 1855. I venture to transcribe a part of it,

hoping that it may have interest as a matter of careful record—in spite of the observer's youth, and of the fact that he carried no instrument of precision but a magnetic compass. The journal, with some few emendations and a few additions (in brackets) runs as follows:

On the road, July 3, 1855—less than half a mile from the brink of Kilauea. The magnificent cloud which hung over the volcano was now in sight. We noticed that a thin layer of the cloud on the windward side was separated from the main body, and steadily borne a short distance into the teeth of the wind. After this evolution it returned to its own cloud. . . . Before us were the steam-cracks close to the volcano; they emitted scarcely any vapor. At 12 M. we came suddenly upon the brink of the crater. I sat down under a sheltering rock and made these notes: Volcanic action apparently confined to the southwest end of the crater and to its sides (the former position of the Black Ledge). Fresh lava apparently poured over the bottom near the sides. Numerous cones and sources of smoke near the flow of 1832 and near the outer southeast side of the rough basaltic ridge on the southeast side of the crater; also further, toward the large volcanic cone or mound in the southwest end of the crater [Halemaumau] and behind it, where appears to be the chief point of action. The smoke in this locality rises almost entirely from the west side of the large mound, from ten small lateral cones. On the north and northwest sides of the crater, at a long distance from the mounds, are several sources of smoke, but hardly so numerous or so active as on the east and opposite sides. The whole central part of the crater appears to consist of the old lava of many years solidity, and to be entirely cool and unaffected by the action that surrounds it. These notes, penciled in view of the scene, were verified by observations made next day in the crater. The action was apparently and actually more violent than it had been for several years.

The night was bitter cold. Kilauea was magnificent; from the half-ruined hut of the Volcano House sixty fires were visible.

July 4. With two additions to our party, Messrs. F. Macomber and T. Irwin, we went to the sulphur-banks, a quarter mile to the north, and collected a few specimens of sulphur crystals. The "banks" consist of a ridge of clayey earth, about thirty feet high, and twice as broad at the top. From every part of this bank the sulphurous gas arises, leaving its crystallizations in the sides

of the cracks and holes whence it issues. [Descending the cliff in front of the Volcano House] we then set out to visit the crater . . . and soon stood before the lava which forms its floor. Where the lava met the sandy slope of the crater's side it was heaped up in a great roll, as if repelled from it, somewhat resembling a billow on the sea-beach just before it begins to comb over and break. We marched on the lava, and found it so hot that one's hand could not be held on it for more than a second or two. This heat is very unusual at this northeast end of the crater floor. The center of activity, from time immemorial, has been at the opposite end of the crater.

Passing cautiously onward a few rods, and sounding the lava with our sticks as we walked upon the glassy, speckled, metallic crust, we reached a crack three or four inches wide, through which the red-hot lava was seen below as a fiery line. This did not bode well for our reaching the southwest end of the crater, but we held on westward toward a high, rugged ridge of basaltic rocks about half a mile away, proving every step with strokes of our staffs. In spite of precaution, however, some of us slumped in occasionally through the brittle, bubbly crust, and brought up on the more solid lava a foot or two below. We reached the ridge of rocks. It appeared as though it had never been melted—at least it bore small resemblance to the lava of the crater, and seemed as if upheaved by some force which had left it untouched by fire. Crossing the ridge, we now landed on the old lava of the central part of the crater floor, and walked by the side of the ridge for a quarter mile; ascended it again, to look at the action on the eastern side, then descended it, walked again by its side a little way, ascended and descended it a third time; and then struck off over the lava floor. As we went, a white object to the westward attracted our attention. Going to it we found it to be a stick of hau (*Hibiscus*) probably left there by a small party of fire worshipers whom we had met on the road a day or two before; and near it were one or two ohelo bushes from which we plucked three bunches of fruit, one of them of excellent quality. Returning still again to the summit of the ridge, we saw below us, on the southeast, and within a stone's throw (we proved it by trial) a lake of liquid lava, tossing and splashing. The whole surface was not in action at one time. A crust of hardened lava covered the fusion below, except at the ends and a few places at the sides of the lake. Here the lava was in violent ebullition: surging

backwards and forwards, splashing against the confining walls and throwing its red spray into the air. We descended toward the lake, but very cautiously, for the ridge was a pile of loosely laid rocks, and a footstep would suffice to loosen a large fragment and send it crashing down. We went as near to the edge of the lake as the suffocating gases would permit. At intervals when the wind bore them away, we would rush to the brink and bring away specimens of fresh lava still too hot to handle.

Recrossing the ridge, we pushed on to the southwest over the crater floor, noticing small ferns growing in numbers in the crevices. We approached Halemaumau; the lava became more friable and slumpy as we went, but showed no marks of recent volcanic action. We heard a loud hissing and blowing to the left, but could not see whence it came. We found a trail on the lava and followed it, passing a large cone that smoked copiously, showing, however, no fire within. But where was Halemaumau?

Still following the trail, we ascended the gentle slope of a great cone [wrote *cone*, but it was a mound, not a cone]. The smoke from the cone we had just passed came sweeping over us now and then. Then, advancing a few rods on the top of the mound, we stood at last upon the brink of Halemaumau—a sea of melted lava in a pit whose dimensions I judged to be 400 feet long, 250 wide and 50 deep. Its sides, especially at the northeast or windward end, were tufted with Pele's hair, which was perpetually being formed from the lava projected into the air. The heat where we stood, upon the east bank, was so intense that we could not look at the lava without shielding our faces. The violent action was confined to the northeast end of the pit, where the walls were highest, and to the middle. At the northeast end there seemed to be a cavity in the wall, its roof but little elevated above the lake. Into this cavity every two or three minutes a red surge would dash, roaring and hissing, and the lava thus hurled into a contracted space, would splash back again with tremendous violence, at almost every dash flinging fragments of the fusion as high as our own level, and sometimes twice as high, or even entirely across the lake. Through the crust of hardened lava upon it we could see the red beneath, and about every five or ten minutes near the center of the lake this crust or film would grow thinner, split, and rapidly draw apart, leaving an open space, fire-red, from ten to eighteen feet across. Here the lava would

heave up and down for a few seconds and then burst into a fountain, which would shoot up twenty or thirty feet, play a few seconds, and then fall back into the lake below. A similar process would go on at the same time in a nearby spot, and two fountains would invariably play within a few seconds of each other. Then, as they fell, the crust would cool over the place that had been so furiously active, and after a few minutes of quiescence the same action would be repeated. Two islands of lava stood unmelted in the northwest side of the lake. We heard a furious hissing and blowing on the southeast, but did not go that way to examine. A tropic bird, *Phaëton*, came sailing over the fire lake, paused a moment near us, and flew away to the east.

I took these bearings from Halemaumau: highest bluffs of Kilauea crater, N. 33° W.; flow of 1832, N. 65° E. We found some *ti* leaves (*Dracæna*) scattered about, evidences of recent visits; left the place at about noon and returned by a nearly straight course to the place of our descent into the crater. The next morning, at 4:30, as I left Kilauea, the fires of Pele, sixty in number, gleamed spectrally through a driving rain.

This account, in spite of its imperfections, shows, I think, that the activity at Kilauea in July, 1855, was not to be reckoned as a true eruption. The great dome of Halemaumau disappeared a few months later, whether coincidentally or not with the great eruption from Mauna Loa, beginning in September, it would be interesting to know. That eruption, which lasted fifteen months, threatening the village and bay of Hilo, was fully and vividly described, by my father, Titus Coan—"The Bishop of the Volcano," as the Hawaiians loved to call him.

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SCIENTIFIC BOOKS

Der Begriff des Instinktes einst und jetzt: eine Studie über die Geschichte und die Grundlagen der Tierpsychologie. Von Dr. HEINRICH ERNST ZIEGLER. Zweite, verbesserte und vermehrte Auflage. Mit einem Anhang: Die Gehirne der Bienen und Ameisen. Jena, Gustav Fischer. 1910. Pp. vi + 112.

The first edition of this monograph was published in the Weismann Festschrift (*Zool-*

ogische Jahrbücher, Supplement VII., 1904). In the present edition the historical sections have been amplified, and account has been taken of some of the more recent literature on the subject. As no review of the first edition seems to have appeared in this journal, it will be best to discuss the essay as a whole.

Its introductory sections, on the history of the concept of instinct, bring out more clearly than the reviewer remembers to have seen done elsewhere, the fact that the opposition between the tendency to humanize animals and the tendency to regard them as separated from man by an impassible gulf has been more or less continuously evident through the whole history of thought. Ziegler's own notion of instinct is, as is well known, that of a thorough-going Neo-Darwinian: the "inherited habit" theory he emphatically rejects. To the Lamarckianism of Semon's recent attempt to make heredity a form of memory he objects that heredity, as an affair of the single cell, can have nothing in common with memory, which demands a nervous system: this objection evidently involves a difference of definition. Ziegler offers nothing essentially new on the question as to the distinguishing marks of an instinctive action: it is action based on inherited nervous connections.

As for the problem of consciousness in animals, he declares it to be insoluble. Animal psychology, he thinks, should not be based on this problem. "This view is not in accord with the opinion of those psychologists who regard consciousness as the essential mark of the psychic. Such psychologists are, however, not in a position to further animal psychology." Nevertheless, he has a good deal to say on the insoluble problem. Where the nervous system of an animal is very unlike that of man, Ziegler thinks consciousness, even in the form of pleasure and pain, very improbable. He quotes from von Uexküll Norman's observation on the earthworm, the head end of which, when the animal is cut in two, crawls away undisturbed, while the squirming movements are confined to the hinder end. One meets this observation so often serving as actual disproof of the existence of pain, indeed