

A VISIT TO THE VOLCANO POAS.

BY ALBERT RUDIN.

About twenty-five miles to the northwest of the city of San José, the capital of Costa Rica, is the remarkable volcano of Poas. This is one of the numerous volcanic mountains of the Central Chain, and while not the highest among them, is beyond question one of the most interesting, picturesque, and easily accessible. The degree of activity of the volcano varies from time to time, but since last April the frequency and violence of the eruptions have largely increased, and numbers of them have been clearly observed in San José. Although the writer had visited Poas on several previous occasions, the recent extreme activity of the mountain induced him to make the expedition upon which the accompanying photographs were taken.

The journey, starting from Alajuela, can be made on foot or on horseback. While the first method is much the better thoroughly to enjoy the trip, it will be found very trying to those unaccustomed to long jaunts of this character, as the way is neither short nor easy. In fact, it takes about ten hours to climb the mountain. For several hours the path to the crater leads through cultivated fields, and when the end of these is reached a further journey of about an hour and a half through a forest brings the traveler to the *potrero*, a large clearing in a hollow, 8,160 feet above sea level. This is in all probability an old crater, which in the course of time has gradually become filled in. A small stream of water possessing a slightly sulphurous taste issues from a chain of ponds and takes a course to the south through the forest. The quantity of sulphur in the water, which is quite harmless as a beverage, is not too great for the existence of animal life, and a species of small toad is often found in it.

After crossing the *potrero* toward the north, the road traverses a second section of the forest. In this the humidity is excessive and constant the year around, and it contains a great number of muddy pools from which a considerable quantity of sulphureted hydrogen gas (H_2S) is constantly rising. It is a peculiar fact that the presence of this gas is limited exclusively to the described locality, and at no other place, not even in the crater itself, has its unmistakable odor been noted. At an altitude of 8,360 feet, a second *potrero* is crossed, and this is succeeded by a short ascent through underbrush. At the end of this short, comparatively open climb, the traveler suddenly and quite unexpectedly reaches the lip of the crater, and with an indefinable sensation of awe and wonder finds himself at the very brink of a vast perpendicular-sided pit of seemingly recent origin, at the bottom of which lies a motionless pool of yellowish water. The sense of deadly stillness and desolation is undisturbed by any indication of life. The almost vertical walls are devoid of even a vestige of plant creation; not a bird wings its way through the air; the surface of the pool is without a ripple, and even the human voice sounds strange and incongruous. Suddenly the silence is broken by a great and startling underground rumbling,

and a huge column of a dark-colored liquid is thrown to a vast height from a spot near the center of the lake. The column ordinarily rises to a height varying from 250 to 500 feet. Almost instantly a vast cloud of vapor is evolved which surrounds the column and rises to an immense height.

The crater, which is conical in form, has an extreme altitude of 8,500 feet above sea level. Its upper diameter is about 3,200 feet, and its depth about 1,000, while the diameter of the lake approximates 1,600. From time to time small columns of vapor curl upward from various points of its surface, and sometimes the frequency of these is so great that the entire lake resembles a boiling caldron. The walls of the crater are less steep at the south side, the point at which the traveler

and it is impossible to see for any distance. Among other gases, sulphur dioxide (SO_2) is present in considerable quantities, and at times the smell becomes almost unbearable. Sulphur is found in numbers of places and the "sand" of the beach is composed almost entirely of rounded bits of this substance. At close range the water is grayish in color, and it is so acid that it almost burns the tongue when tasted. Any dark cloth moistened with the liquid instantly becomes red, and is ultimately destroyed. Chemical analysis of the water reveals large percentages of sulphurous and sulphuric acids, sulphate of lime, and other substances, and it contains besides a considerable deposit of volcanic ash. The temperature at the shore, while varying considerably, ranges around 115 deg. F. During his last visit the writer witnessed some of the largest eruptions ever recorded. During one of these the tremendous column of dark liquid rose to an estimated height of 2,000 feet, and was about 300 feet in diameter. The waves produced on the lake by such an outburst are formidable, and long after the eruption has ceased the roar as they break against the rocky sides of the crater is plainly heard from the edge above. Provided care is taken to select a spot beyond reach of the incoming waves, there is little danger in viewing an eruption from below, and the sight is one that the observer, thrilled with fear and excitement, will never forget.

The eruptions do not succeed one another at regular intervals. Sometimes the outburst does not take place for several hours, while at others as many as three or four will occur within an hour. To the writer it appears that the more violent eruptions take place in the early morning, even before sunrise, and that the intensity of the convulsion decreases as the day advances. There is a popular belief that any unusual noise produced in the vicinity of the crater will cause an eruption, but tests with the combined voices of a number of persons, and the discharge of firearms, carried out by the writer's party, usually proved futile.

Considerable difference of opinion has arisen as to the manner in which the volcanic ashes which sometimes fall on the surrounding cone are thrown from the crater. Various observers believe that there

are openings on the east side of the giant pit, and that the ashes are ejected from these. On the last expedition, the writer's party observed a fall of ash after every large eruption, and this seemed to come directly from the puff of steam or vapor. A possible explanation is that a large quantity of the water comes out during an eruption at a temperature much above the boiling point, evaporates, and leaves dry the ashes which it contained, to be scattered by the wind.

At a distance of some hundreds of yards from the edge of the crater, and separated from it by a small elevation, is found a natural curiosity in the shape of a most charming little blue lake which, with its luxuriantly green shores, presents a remarkable contrast to the scene of desolation the observer has just left. This lake, 8,600 feet above sea level, is about 1,200 feet in diameter.



The Column of Black Liquid Begins to Make Its Way Upward.

has approached it, and only from here is the descent to the bottom possible. Even from this point the undertaking is difficult and even hazardous, and should not be attempted without a guide. By a strange optical illusion, the distance to the lake from the rim of the crater appears vastly less than it in reality is, and a full hour of fairly rapid scrambling is required to make the descent. The scarcely defined path is at times dangerous, running around boulders and along overhanging precipices, and frequently offering the poorest kind of foothold because of its covering of loose and slippery volcanic ash. About half way down is the "*juro del macho*," a small stream of delicious sweet water.

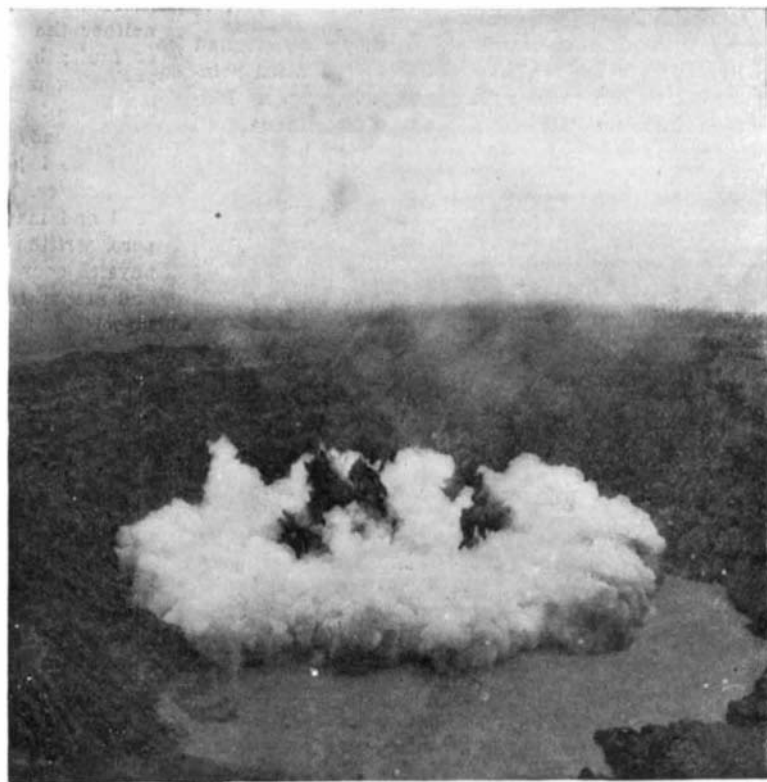
When the bottom is attained the traveler will find it to his advantage to move about with the exercise of considerable care because of numerous concealed holes

filled with a slimy substance, consisting mainly of sulphate of lime with a large excess of sulphuric acid. This hardens in a few moments when exposed to the air, and consequently the pits are covered with a slight shell that renders it almost impossible to distinguish between them and solid ground. If a foot goes through this thin crust, aside from the resulting inconvenience at the moment, it will be found that in a few days the shoe will be destroyed, as the seams cannot resist the acid action.

The lake at closer view is found to be covered with clouds of vapor



The Rise of the Vapor Which Accompanies the Column.



A Curious Form of Eruption.

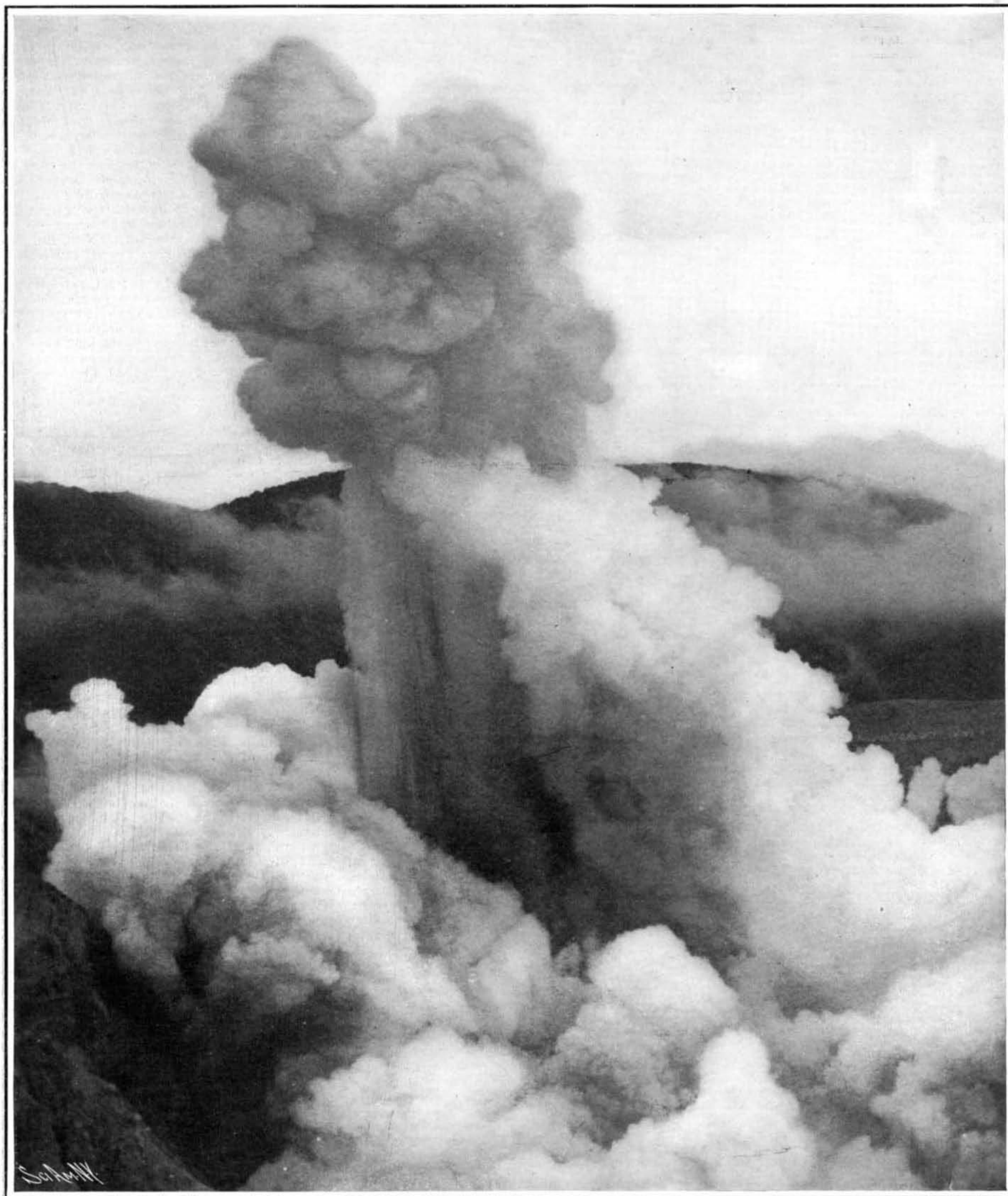
SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class Matter. Copyright, 1905, by Munn & Co.]

Vol. XCIII.—No. 21.
ESTABLISHED 1845.

NEW YORK, NOVEMBER 18, 1905.

[10 CENTS A COPY.
\$3.00 A YEAR.]



ONE OF THE RECENT GREAT ERUPTIONS OF THE POAS CRATER OF COSTA RICA.—[See page 400.]