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RECENT ERUPTIONS OF POÁS VOLCANO IN COSTA RICA.

The Poás Volcano situated in the Central Volcanic Chain of the Costa Rican Republic and at an elevation of 2678 mts. above sea level, has shown some activity from the last months of 1914 up to this date. This activity consists of frequent and sometimes violent eruptions of mud accompanied by tall columns of steam, visible from very distant places of the country. As the Poás volcano is more active than the other two semiactive volcanoes of the same chain, the Irazú and Turrialba, and besides presents the singular phenomenon of the eruptions, like an immense Geyser, general attention is directed towards it, especially as an hotel has been constructed in an old crater at about 20 minutes walk from the active crater, and the number of visitors have been some hundreds.

On the 22nd of January 1914 it was visited by Mr. Ricardo Fernández Peralta. A photo taken by Mr. Peralta shows the hot water lake at a very high level and without any eruption. It was seen and photographed also in the same state by Mr. Rodolfo Castaing on the 5th of March, and this gentleman, like others, did not see any eruption. In the beginning of April, Mr. Amando Céspedes went to the Poás in order to take moving picture photos of the eruptions, but did not meet with very good success, as he was able only to take a picture of a very small eruption. All this information and some other which I obtained from several tourists shows that the lake was full of water at the beginning of 1914 and that eruptions were neither very frequent nor very high. However, on the 30th of May, at 8:30 a. m. an eruption occurred which could be seen from San José. Then I did not hear of any more eruptions until after a period of four months. If any occurred they were few and small. On the 8th of October at 7:40 a. m. the volcano surprised us with a formidable eruption that rose very high. The picture Fig. 2. was taken some minutes afterwards by Mr. Modesto Rodríguez from Sarchí, some kilometers distant. During this eruption the morning was very clear and the mountains were not covered with clouds. The enormous cloud of steam rose slowly, throwing the sediments

of the lake up to a great height. These particles of volcanic substances fell down at a great distance from the crater and formed what is called here: "Lluvia de ceniza" — (ash-rain). At the same time the summit of the volcano became covered with clouds and a big shower of rain came down immediately after which lasted several minutes. After some time this phenomenon disappeared and the sun shone as brilliant as before.

Mr. Fernández Peralta went to the crater again on the next day and noted that the activity of the volcano had increased, as in a short time he was able to see 7 eruptions, in three of which the columns of mud rose to a height of some 50 meters.

The eruptions continued on the following days. On the 22nd and 26th of October in the morning big eruptions were seen from San José. Other big eruptions were also noted on the 5th of Nov. at 8 p. m. and also on the 9th and 15th of the same month. And finally there was another large one on the 19th of Dec. The activity of the volcano continued during January 1915 and on the 12th of that month there were two big eruptions in the morning. On the 19th of January Mr. Fernández Peralta and some other gentlemen made another excursion to the volcano; these gentlemen saw 14 eruptions between 8 and 11:30 a. m., of one of which (the biggest), Mr. Fernandez Peralta took a snapshot, meeting with very good success. The depth of the crater is 275 meters. Mr. Fernandez Peralta's photo was taken from the south edge of the crater, and as seen in the photo, the straight columns of mud rise above the north edge. As this edge is lower than the place from where the photo was taken, these columns rise to a height of some 150 to 175 meters (Fig. 3 and 4). This photo is, moreover, very interesting, because it shows three columns of mud at the same time, a phenomenon which is not very usual. Knowing of this strong activity I made an excursion to the volcano in order to take some notes of these eruptions. I started from San José on the 4th of February accompanied by Mr. Ricardo Fernández Peralta and the young botanist Mr. Otton Jiménez. The trip does not now present any difficulty and may be accomplished in from 5 to 6 hours, from the City of Alajuela passing through the village of "San Pedro de Poás". On the 5th we started very early from the hotel, going to the crater, which we found without any clouds and very beautiful; it seemed to be covered with snow, so intense was its white-

ness on account of a thick layer of sediments that contain large quantities of gypsum and which had been thrown out upon its walls by the frequent eruptions. As our principal object was to study the eruptions, we took our positions on the south edge of the crater with our Kodaks, in order to take notes of any phenomenon that might present itself. We stayed all day and the notes I took are contained in the following summary :

| Num- ber | Time | Size of eruption | Observations |
|-------------|----------------|------------------|---|
| 1. | 7 h. 16 a. m. | Small. | The columns of steam took a vertical direction. |
| 2. | 7 h. 20 a. m. | Small. | Was immediately followed by a greater one. |
| 3. | 7 h. 36 a. m. | Medium. | The steam spread into an enormous cone. |
| 4. | 7 h. 45 a. m. | Small. | |
| 5. | 7 h. 50 a. m. | Very small. | |
| 6. | 7 h. 58 a. m. | Small. | No mud was thrown out. Only a small column of steam which quickly disappeared. (Fig. 8.) |
| 7. | 8 h. 08 a. m. | Large. | Sudden apparition of a mud cone which soon was wrapped in steam and changed into a large white cloud. (Fig. 9 – 12.) |
| 8. | 8 h. 27 a. m. | Medium. | |
| 9. | 8 h. 33 a. m. | Small. | |
| 10. | 8 h. 41 a. m. | Medium. | |
| 11. | 8 h. 50 a. m. | Very great. | |
| 12. | 9 h. 15 a. m. | Medium. | |
| 13. | 9 h. 21 a. m. | Very small. | Immediately after a pistol shot. |
| 14. | 9 h. 29 a. m. | Very small. | |
| 15. | 9 h. 44 a. m. | Medium. | |
| 16. | 10 h. 04 a. m. | Very small. | |
| 17. | 10 h. 25 a. m. | Medium. | This eruption was remarkable. At first a small eruption was seen, then a much larger one during which, mud was thrown out with considerable velocity for about one minute and a half. Soon the activity increased, the steam rose more and more and ended in two columns which reached a greater height than the preceding columns. |

| Num- ber | Time | Size of eruption | Observations |
|-------------|----------------|------------------|---|
| 18. | 10 h. 51 a. m. | Small. | |
| 19. | 11 h. 01 a. m. | Large. | |
| 20. | 11 h. 18 a. m. | Medium. | |
| 21. | 11 h. 30 a. m. | Large. | Two eruptions in quick succession. The first was small and lasted quite a long time without apparent increase or decrease. Then it was followed by the second eruption which threw columns of mud at some 200 meters. The cloudy mass assumed a queer shape. |
| 22. | 11 h. 34 a. m. | Small. | With this eruption the crater became so clouded that in about one minute every thing was out of sight. |
| 23. | ? | Small? | |
| 24. | ? | Small. | The lower part of the crater is somewhat more visible. |
| 25. | 11 h. 45 a. m. | Medium. | The lower part of the crater is visible. |
| 26 . | 12 h. 10 p. m. | Medium. | Idem. |
| 27. | 12 h. 32 p. m. | Great. | The mud columns are divergent. |
| 28. | 1 h. 10 p. m. | Small. | A motionless cloud hangs over the upper part of the crater. |
| 29. | 2 h. 20 p. m. | Small. | |
| 30. | 2 h. 47 p. m. | Very small. | The crater is filled with dense clouds. No wind is felt; air seems completely still. |
| 31. | 2 h. 52 p. m. | | The dim and prolonged noise of an eruption is heard. The mist is moved to and fro and the steam can be seen, although with some difficulty. Then comes the strong noise of another eruption which lasts about three minutes. 35 seconds later another eruption occurs, lasting about 4 minutes. Another prolonged noise follows. As it is impossible to see anything the other eruptions are estimated by the noise only. |
| 32. | 2 h. 59 p. m. | | |
| 33. | 3 h. 10 p. m. | | |

| Num- ber | Time | Size of eruption | Observations |
|-------------|--------------|------------------|---|
| 34. | 3 h. 21 p.m. | Small. | |
| 35. | 3 h. 25 p.m. | Medium. | |
| 36. | 3 h. 33 p.m. | Large. | The noise was distinctly perceived for about 2 minutes. |
| 37. | 3 h. 54 p.m. | Small. | The mist in the lower part of the crater clears away somewhat and the rocks can be seen confusedly. No wind. The mist remains stationary in the midst of a complete silence. |
| 38. | 3 h. 58 p.m. | | Lower part of the crater again cloudy. The very strong noise of another eruption can be heard during seven minutes. The gray clouds assume a giratory motion and the steam arising from the eruption can be seen and soon vanishes. |
| 39. | 4 h. 17 p.m. | | Another eruption is heard. The noise lasts for 7 minutes, 30". |
| 40. | 4 h. 22 p.m. | | Noise heard during 6 minutes, 40". |
| 41. | 4 h. 56 p.m. | | This eruption was probably the largest of the day if it be measured by the intensity of the noise, which was heard during 8 minutes and 10 seconds. |

When we left the edge of the crater at about 5 p. m. the fog (mist) was so dense that we could hardly see farther than at a distance of about 2 meters. The next day we made up our minds to go to the bottom of the crater. The weather was as fine as the day before. Going down is a little difficult, because there are some places where it is necessary to descend straight down. The last part of the descent is the most difficult, as one has to go down a real cañon (Fig. 13) to the small shore of the lake which has extended very much on account of the level of the water having sunk considerably. At the bottom of this cañon we found sure signs of the level of the lake having been much more elevated some time before, because there were fresh sediments on the walls of the cañon up to a considerable height. The level of the lake had gone down about two meters. We noted a strong smell of sulphuric gases H_2S and

SO₂, but it was not strong enough to prevent our staying there. When we were in front of the large lake a few vapours rose from its surface; the sky looked as if seen from the bottom of a pit and the quietness was so absolute that it seemed to be the "Silence of death". In an elevated place and at a distance of about 4 meters from the edge of the crater lake we placed our Kodaks and some minutes afterwards we observed an eruption, the height of which we calculated at 75 meters. This really consisted of two eruptions as there was a smaller one at first which was immediately followed by a stronger and larger one. The photo we took represents the second of these eruptions (Fig. 14). The noise is very loud and intense and the calm which reigned before has disappeared. The waves that come from the center of the lake (the height of which I calculated to be about 0.75 m.), beat furiously against the rocks, or break softly on the small shore. The vapor extends above the lake in the form of whirlpools here and there, and for a moment hides the opposite wall; in a few minutes everything remains as before. I desire to add that I saw seven species of butterflies flying over the lake and a green Hemipteran on the rocks of the bottom. It is not possible, of course, to draw conclusions from only one day of observations, but what I observed accords with notes I took many years ago (April 13th. 1906). There are no fixed periods between one eruption and another. The shortest time that has been observed corresponds to about 4 to 9 minutes, and then the eruptions are more frequent; the longest time observed was from 12 to 26 minutes. Respecting the intensity observed on February 5th., there was a maximum at 8:80 a. m. and another at 8:50 and also at 11 and 11:30. The eruptions of the afternoon were more violent than those of the morning. This intensity, however, is very changeable, as on some days the columns rise above the crater, and on others they do not rise higher than 6 to 7 meters.

None of the eruptions we observed were sufficiently high so that the sediments might rise above the crater or fall outside of it, still I noticed that the leaves of some bushes that grow around the crater at a distance of about 400 meters were sprinkled with sediments. The night before there had been an enormous eruption as the sediments were still damp, however, during the following night they were completely washed away by the rain or the dew. This same phenomenon has also been observed by various tourists, who in

other periods of relative quietness of the volcano have noticed the sediments left on the leaves of the bushes, but they did not see any eruption afterwards. It might be, that in those times the larger eruptions only occurred from time to time.

The shapes of the eruptions are very capricious, but the escape of the mud presents two characteristic forms. Sometimes it comes up in the form of bubbles, something like boiling water, and remains in that state for a long time; at others, it jumps up suddenly in a radiated form, more or less vertical, and in such cases the pillars rise to great heights. The person who is near the edge of the crater after a large eruption may hear loud and prolonged noises that constitute the so-called roarings that some persons assure us they have heard at great distances.

The eruptions continued with great force during all the month of March. On the 10th of April at 9 a. m. another large eruption that lasted more than half an hour was seen from San José. A great mass of black smoke was first seen hanging over the mountain from out of which a column of white vapor came afterwards, but which was soon broken into many fragments by the winds.

Between the 15th and 19th there were also frequent and large eruptions, especially that of the 19th at 7 p. m., on which occasion ashes fell at a long distance from the crater, after a sudden and heavy shower of rain. After this eruption the level of the lake went down still more.

There are no photographs to be found of these large eruptions, neither are there any serious persons who can give me any concise and exact information about them; I have heard many descriptions of them, but they are so fantastic and so much at variance with each other that it is impossible to accept them as true.

San José — COSTA-RICA, 15th. May. 1915.

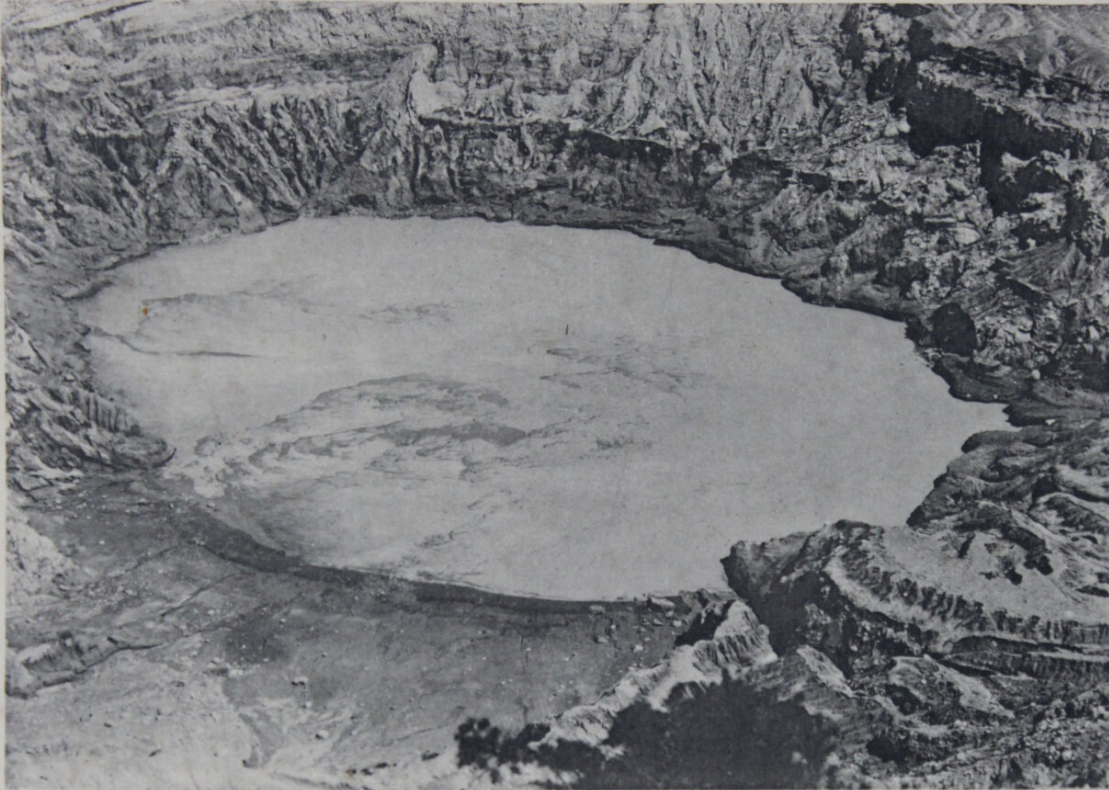


Fig. 1. Crater of Poás Volcano in quiet state.
Photo J. Fid. Tristan. 5th Febr. 1915.



Fig. 8. Small column of steam.
Photo 5th Febr. 1915, 7h 56 a. m.

Zum Beitrag: J. Fid. Tristan, Eruption of Poás Volcano.



Fig. 2. Eruption of mud and steam 8th of October 1914, 7h 40 a. m.
Photo from „Sarchi“ by Modesto Rodriguez.

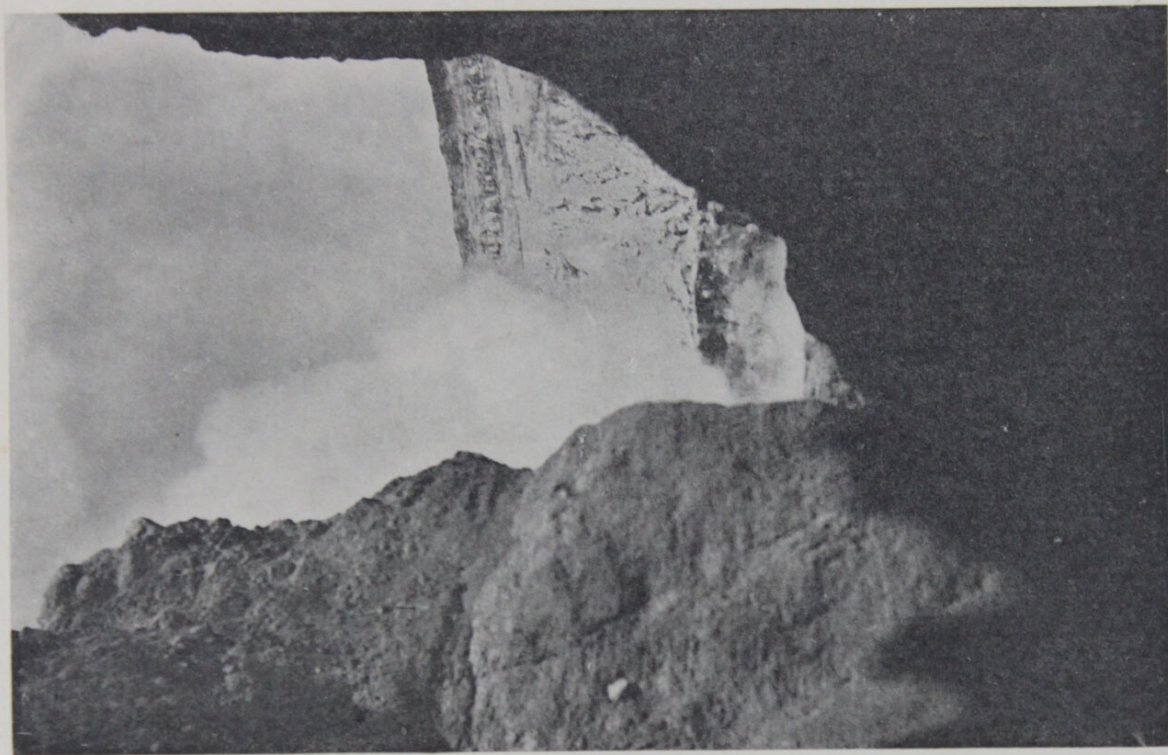


Fig. 13. The Canon at the bottom of the crater.
The steam of an eruption is seen.

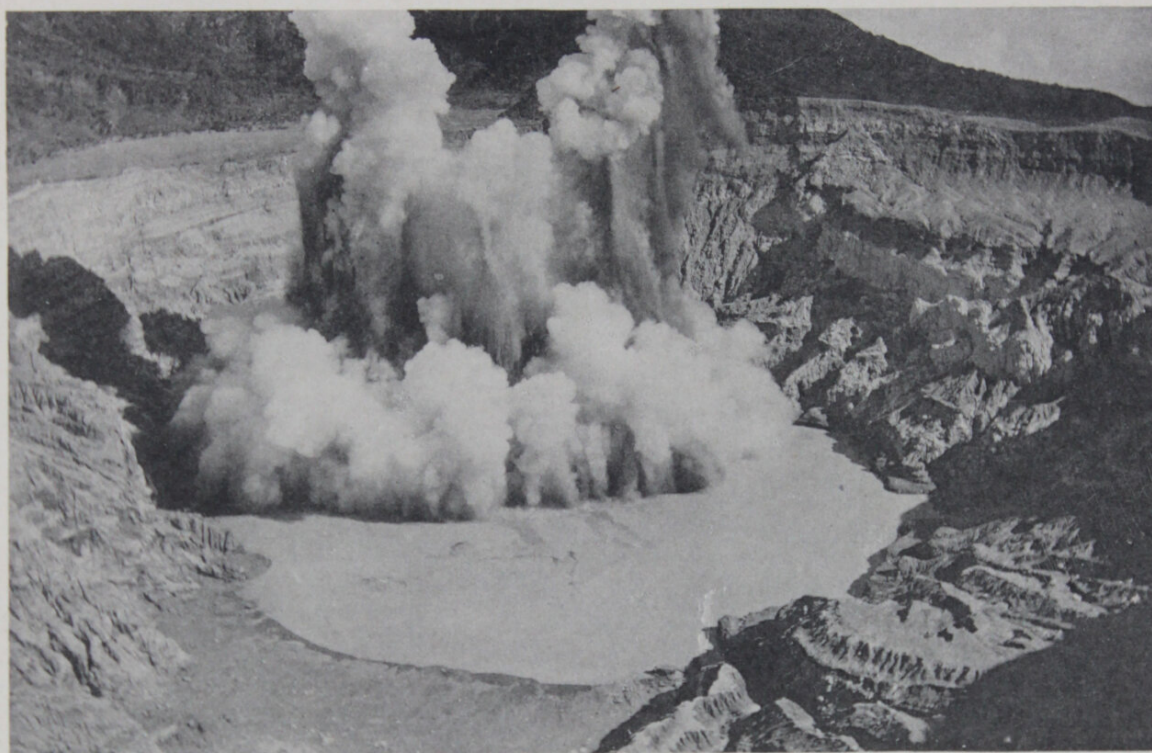


Fig. 3.

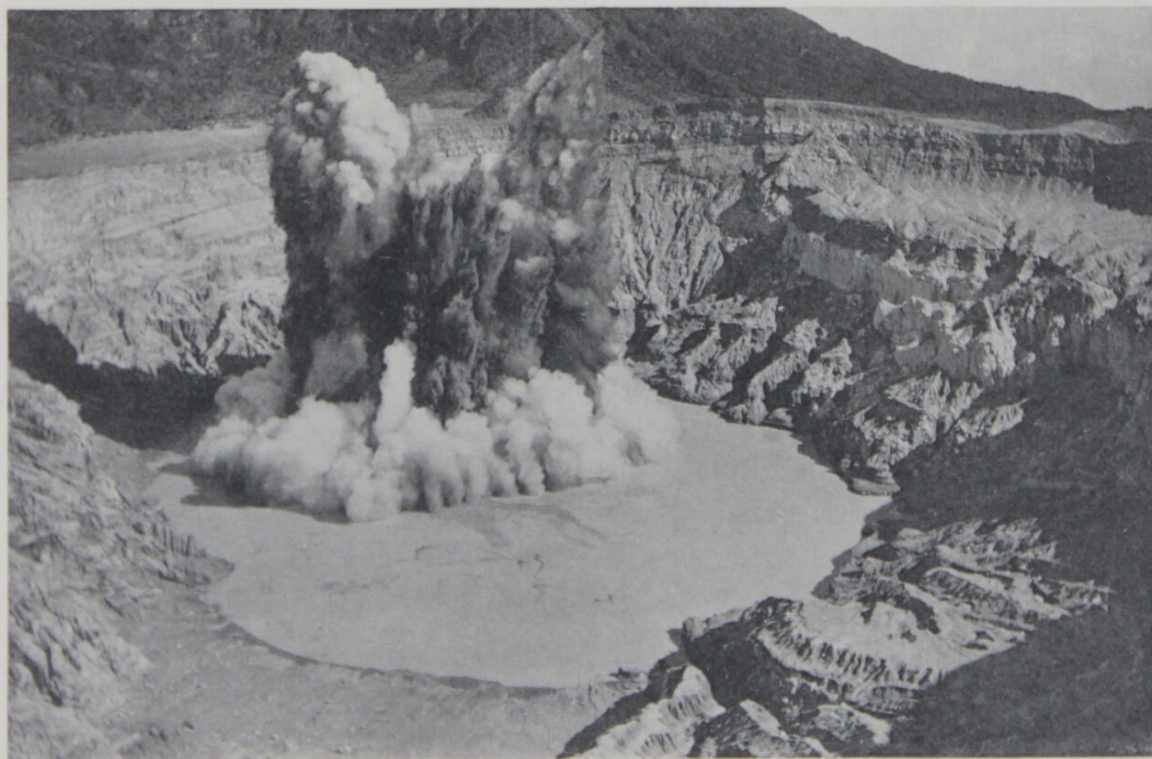


Fig. 4.

Fig. 3 and 4. Big eruption of mud. Height of the pillars 150–175 m.
Photos by Ricardo Fernandez Peralta 19th. Jan. 1915.

Zum Beitrag: J. Fid. Tristan, Eruption of Poás Volcano.

Fig. 5.



Fig. 6.

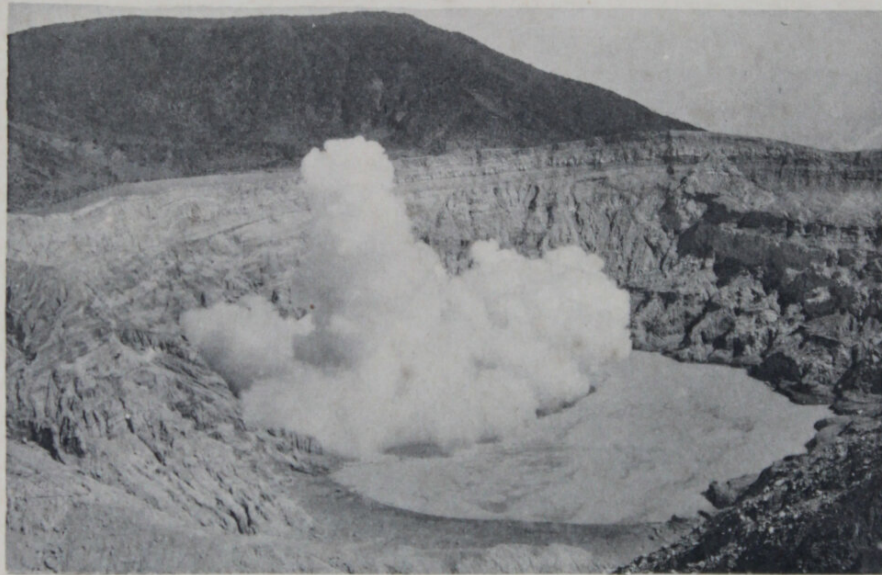


Fig. 7.



Fig. 5, 6, 7. Different phases of mud eruption.
Photos by Karl Federspield. Jan. 1915.



Fig. 9.

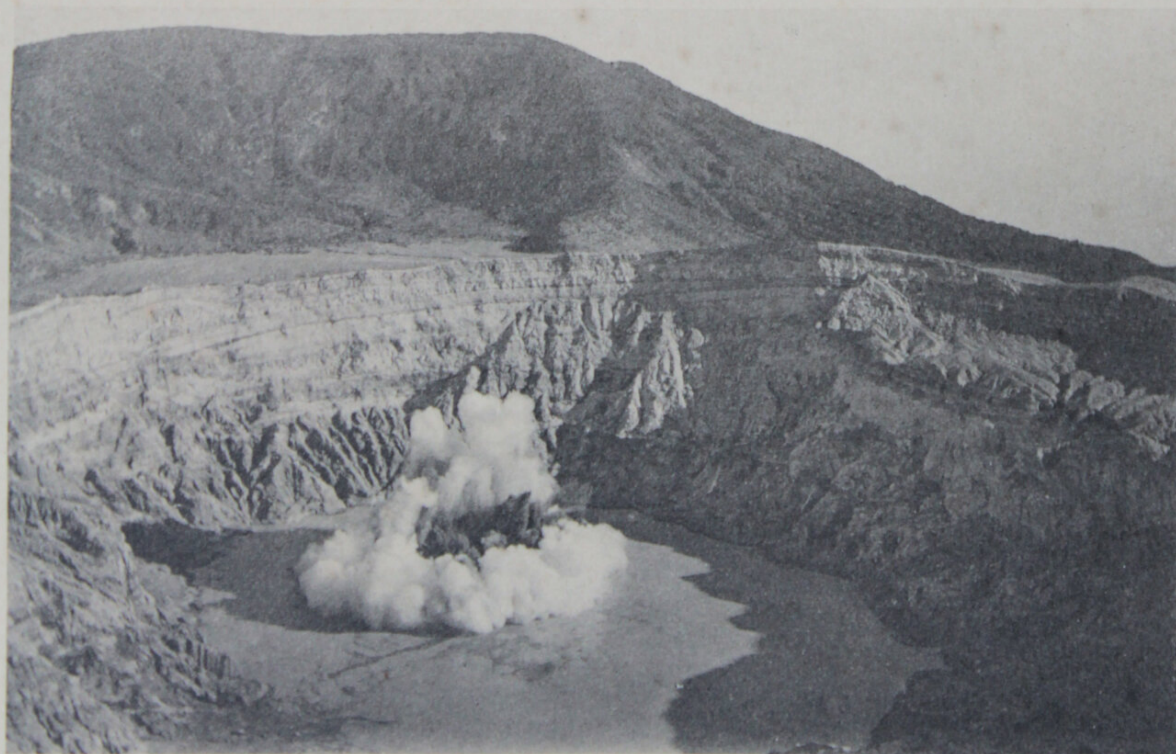


Fig. 10.

Fig. 9—12. Different phases of mud eruptions.

Zum Beitrag: J. Fid. Tristan, E.

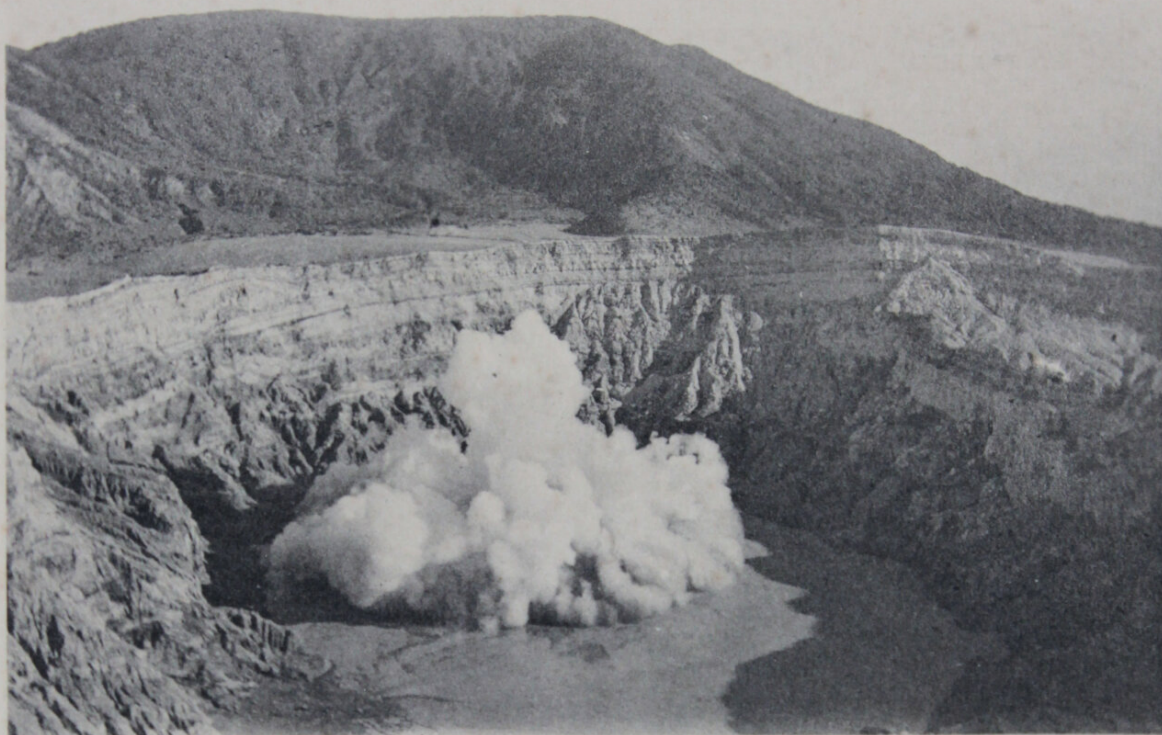


Fig 11.

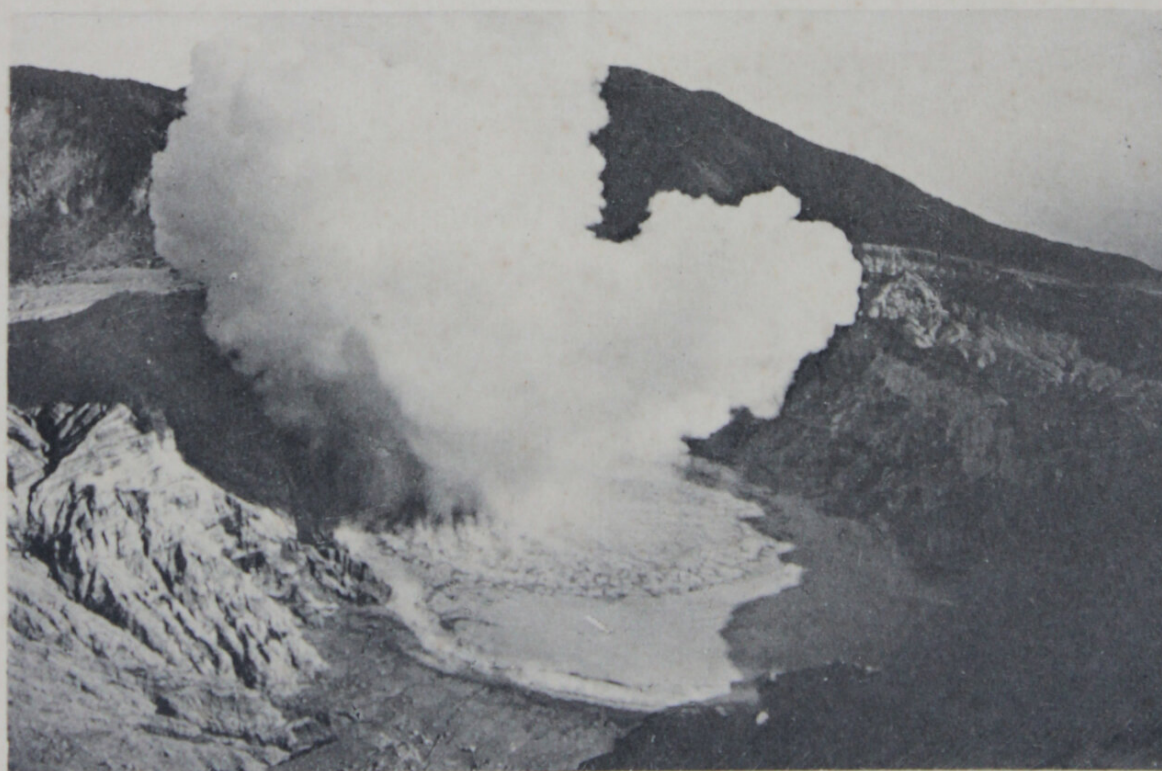


Fig. 12.

eruption 6th Febr. 1915, 8h 08 a. m.

n, Eruption of Poás Volcano.

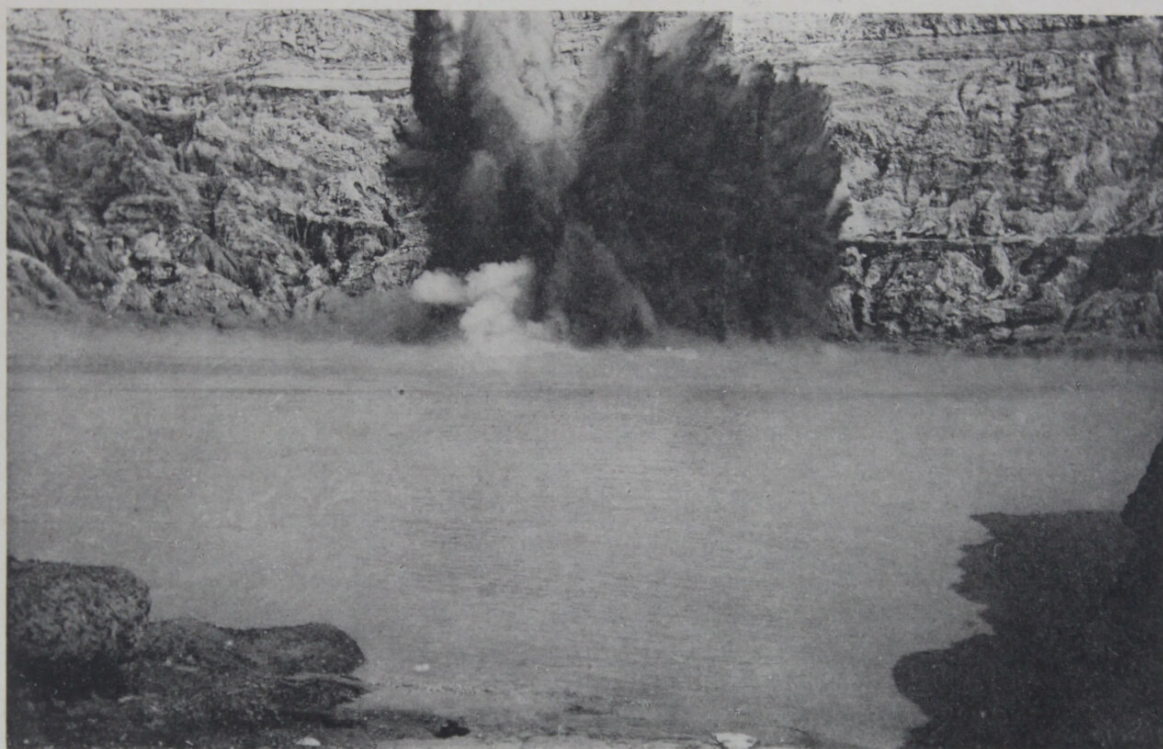


Fig. 14. Eruption of mud seen from the bottom of the crater 6th Febr. 1915.



Fig. 15. Mud eruption of Poás Volcano Febr. 1915.
Photo by José María Arrea.