

The activity of the Volcano Irazu.  
About the explications of the activity of the  
Volcano Irazu, in Costa Rica, they have published  
in important books certain facts that it  
is necessary to study and to state in a clear  
manner, with the object of determining with  
preciseness its exactness or inaccuracy.

In the year 1881 H. Fruchs published in his  
book "Les volcans et les tremblements de terre  
page 253," that the Irazu had had eruptions  
in 1723, 1726, 1821 and 1847.

Monteasus de Ballore (Earthquakes and Volcanic  
Eruptions in Central America, San Salvador 1884)  
was the one, who for the first time tried to <sup>(gather)</sup> collect  
all the facts referring to earthquakes and  
volcanic eruptions in the region of Central  
America. Naturally his collection of facts remain-  
ed very incomplete because many old infor-  
mations remained buried in the archives or  
in other documents that had not been  
studied. It is very probable that Mr.  
Ballore may also have received informa-  
tions that are not entirely exact. In  
respect to the Irazu he indicates the follow-



ing years of activity 1723, 1726, 1821, 1844, 1847,  
1882.

The <sup>indications (facts)</sup> ~~facts~~ of Mr. de Ballore were reproduced by  
Mr. H. Pithier in the Annals of the Physical + Geographical  
Institute of Costa Rica, without any indication in  
respect to its authenticity. He says, however,  
that the said list is erroneous in several points.  
G. Mercalli in 1907 (Vulcani attivi della terra)  
and Karl Snieder in 1911 (Die vulcanischen  
Erscheinungen der Erde) indicates (points out)  
the same dates of activity of the Irazu as those  
indicated by Mr. de Ballore and aggregates  
besides the year 1885:

Cleto Gonzalez Viquez, who has studied a  
great quantity of historical documents,  
published in 1910 a chronological report  
(account) of the earthquakes, inundations  
and volcanic eruptions in Costa Rica from  
the year 1608 to 1910.

Mr. Gonzalez Viquez points out that some  
of the indicated years are lacking of  
old documents which refer (mention) to  
eruptions.

In the recent work of Karl (Carl) (Sejpeker)



Sapper: Katalog der ges chuchlichen Vulkanaustruiche, Strassburg 1917, you can observe a better and more exact knowledge (understanding) of the condition (state) of the Irazu in the indicated years, with observations very well conjectured upon the very probable origin of the improperly called eruptions of the Irazu.

Founded (based) on the facts which I actually dispose of, I have believed it necessary to leave here consigned what is really known of these eruptions of the Irazu, with the object of avoiding that in future publications they will repeat some of the errors in which they have incurred: 1723. Of this year Sapper says with great reason, that it has been the only important eruption of the Irazu in Historical times.

There really exists a valuable document, that a Spanish governor left, Don Diego de la Haya Fernández. This document has been published in Spanish several times and Sapper himself has published also the most prominent facts (acts) of this eruption.



It is known that the following year, the river "Reventado" which rises near the Crater had a big swell which half destroyed a house and filled it with sand. Two years afterwards in 1725, another river overflowed the River El Paz and inundated the village of Yarraz. Mr. Gonzalez Viquez believes that this inundation was produced by some earthquake. In my several journeys <sup>(trips)</sup> to Mount Irazu, I have seen in several places <sup>on the</sup> <sup>south</sup> slope a thick layer of gravel, at several depths and in the main crater towards the S. E. side, great quantities of bombs. That ~~sand~~ <sup>gravel</sup> as well as these bombs, are I believe from the eruption of 1723.

1726. Mr. de Ballon says that according to Fuchs, Humboldt and Rochetron, the Irazu had in that year ~~(an~~ <sup>is</sup> ~~had)~~ "a big eruption of dross". (pocoras)

Gonzalez Viquez says that he does not know of any document which refers to this incident. Neither does Bishop Thiel say anything about this eruption in his "Chronological facts



nor in other documents which I have consulted. We must therefore, suppose this eruption of dross as very doubtful of having existed; may it not have been the continuation of the great activity of 1873?

1821 (Again) Mr. Ballou says <sup>again</sup> that according to Humboldt, there was in the month of May of this year an eruption of dross, (scoria) from the Irazu. Sapper says that this eruption is doubtful (uncertain) and that it has not been confirmed (proved) by official documents. He is not mistaken. On the 10<sup>th</sup> of April of this year there was a strong earthquake but nothing is said of eruptions. <sup>at day break of the 4<sup>th</sup> of May</sup> On the following year in 1822 there was a very strong earthquake which caused great havoc and for this reason the Volcano Irazu was examined, it was at that time called the Volcano of Cartago, according to what is stated in the <sup>published</sup> records of that year of the city of Cartago, nothing remarkable was found, only many crevices on the ground. This strong earthquake was more violent



towards the South of Costa Rica and according to a copy of a document <sup>not published</sup> which I possess, and that refers to this strong earthquake, it is believed that it may be of some volcano of the Escudo de Veragua".

Well then, from the year 1821 there doesn't exist any document which mentions eruptions and from the year 1822, it appears in the stated record that the volcano did not present any thing remarkable. It is very probable that in consequence of the severe earthquake of 1822, it will be thought that the Irazu had entered in activity and that the date was changed (altered) afterwards for that of 1826.

1842 - P. R. Gutierrez mentions an eruption of dross (scoria) from the Irazu, but this fact is not confirmed in any document.

1844 According<sup>to</sup> Squier's observation (note) they speak<sup>4</sup> (mention) of an extraordinary activity of the Irazu in the book of Montessus de Ballore, Lapper supposes that there has not been anything more <sup>than</sup> ~~than~~ manifestations of the fulminoles.



I have not found any document ~~that~~ mentions this "extraordinary activity". On the contrary Dunlop who visited it, that year says, that he only ~~hardly~~ saw a column of smoke.

1847 According to Humboldt, Fuchs and ~~Rockstroh~~ <sup>in this year</sup> mentioned by Mr. de Ballore they speak again, of eruptions of dross (scoria) from the Irazu. We must remember that in this year, in the months of January and February, the Irazu was visited by the <sup>Danish</sup> naturalist Anders Sandoe Versted and that in his book Central America, he says that in the bottom of the Crater there are three deep holes, one of which throws up (vomits up) constantly sulphurous vapors. That is all which is known of that year. I have not found any document which refers to eruptions of dross (scorias). Doctor Alexander Frantzius visited the Irazu in 1859 and he says nothing about this eruption. Owing to the sagacity and penetrating observation of Dr. Frantzius, this condition (state) of the Irazu, that hardly would have (been ~~confirmed~~ <sup>accomplished</sup>) <sup>taken place</sup> 12 years before his visit, he would not have left ~~going to investigating~~ and ~~he~~ mention<sup>ing</sup> it if it had existed.



No old man from Cartago remembers anything of this eruption. By the information that I was able to obtain in 1896 from some of those persons, the mouth which threw up sulphurous vapors when Cersted visited the Crater, corresponds to the Crater G. of the map of Sapper.

1882. Mr. de Ballore says: great activity of the Irazu and speaking of earthquakes, he says that they were attributed, as well as four others in the month of May to the Irazu, then, in complete activity. In this year (at that time) there was in San José Costa Rica a Meteorological department (office) ~~that~~ <sup>and volcanic</sup> noted down also the seismic ~~phenomena~~ <sup>phenomena</sup> which occurred. Nothing of this activity is evident (certain) nor does Mr. Gonzalez Diquez make any reference to it.

1885 Neither in this year does any document exist which mentions (speaks about) the activity of the Irazu, nor does any person make the slightest reference to it.

The different travellers who have visited the Irazu since 1840 do not tell us anything about eruptions



(8) The last manifestations (signs) of activity in the big crater had already ended in 1889. A fact made evident (proved) by Pittier and when I visited the Crater for the first time in 1894. all the detachments of vapors had disappeared and in certain places there was already some vegetation very dense which evidently demonstrated (showed) a prolonged quietness (tranquility).

(~~From~~ (the year) 1886 existed)

Of 1886 exists a communication from the Governor of Cartago Don José M<sup>a</sup> Alfaro ~~that~~<sup>who</sup> refers to the part of the Irazu which had preserved (kept) some activity <sup>activity</sup> (There is remaining) <sup>remains</sup> that part on the N. E slope and it is known since that time by the name of New Volcano.

For many years all the visitors of ~~the visitors~~ the Irazu after having crossed on horseback the bottom of the Crater, (they) arrived to the opposite border, from where you could see in the depths the slow detachments of the fumaroles, whose sulphurous emanations (~~were~~) affected you sometimes.



9.  
It was in this condition when it was visited by Dr. Sapper. 1899. The sketch of Dr. Sapper which figures on page ... of ... is very exact and the nomenclature (dictionary or catalogue) of the various craters used by him, is the one which I shall follow in the description of the phenomena which I will afterwards describe.

The year 1910 was the most notable seismic activity in Costa Rica. January 25<sup>th</sup> at 4-45 p. m. (a quarter to five P.M.) the Volcan Poas made a formidable eruption of ashes, the biggest, that one can remember. The 13<sup>th</sup> of April at 12<sup>and</sup> 37 minutes <sup>A.M.</sup> (37 minutes to one) a severe earthquake was felt in the Central part of Costa Rica, which was followed by another at 17-5 minutes A. M. that took the characters <sup>(forms)</sup> of a very severe earthquake. A long series of earthquakes (that) with more or less ~~in~~ intensity concluded (ended) with a frightful (terrible) earthquake that caused the destruction of Cartago with many victims.

From the beginning of this seismic commotion all eyes (gazes, glances) were directed ~~to~~ the Irazu, ~~and they attributed all the damages to it~~ { and all damages, { were attributed to it.



The idea of an intimate relation between severe earthquakes and volcanic eruptions is so deeply rooted ~~amongst~~ (among) certain persons, that constantly (<sup>made</sup> references) references were made through (by) the newspapers about fantastical eruptions of the Volcano Irazu. Some visitors brought the information that on the exterior (outward) part of the old crater on the north side, a new crater had been formed, which roused (excited) the anxiety of the people. For this reason I visited the Irazu accompanied by Professor Rudia. The old crater (<sup>was permanent</sup> remained) in its habitual quietness (tranquility) and what was supposed to be a new crater, consisted in a landslide upon a solfataria of the new volcano situated at the direct base of the wall of the crater on the N. side.

The measures that Sapper gives us of Crater G. are sufficiently exact. The <sup>I</sup> measured the depth with a <sup>plumb</sup> ~~line~~ <sup>line</sup>, and it was 75 meters and the diameter was calculated by measuring the fourth part, a quarter of the superior border, which



approximated most to the circumference.  
It resulted in 62 meters.

In one of my visits I ventured to go down. The descent was not very difficult thanks, to the inclined (plane) surface that ~~at~~ existed <sup>at</sup> the north, and to the loose stones and dross (scoriae) which served as a support. At about 50 meters of depth there was a small terrace upon which there were a few plants.

(Vaccinium?) and upon the stones mosses and lichens. When I raised my eyes and I saw in front of me, the <sup>(high)</sup> elevated and completely perpendicular <sup>side</sup> wall of the south side, I felt a giddiness (vertigo), <sup>but</sup> after I recovered I continued going down (descending) (till I reached <sup>as far</sup> a projecting rock placed 15 meters lower further down).

{ In spite of the depth notwithstanding the depth there was sufficient (enough) light <sup>and</sup> and I could see that in the very bottom, there was an enormous quantity of large loose stones, but that there was also an irregular cavity which entered by the vertical wall through



From the place in which I was, I threw some stones in this cavity and observed that they fell into the water! Encouraged by this I descended (went down) a little more and I could ascertain that there was actually water (really water) at the bottom and that several of the stones which I threw made the water rebound and the thick drops wet the stones and neighboring rocks. Some time after, this fact (incident) was ascertained <sup>(proved)</sup> also by Engineer Fernandez Peralta.

The going up (ascension) was excessively laborious (distressing).

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The crater "H" contained a great deal of rubbish and upon some of them you could see large plants growing with luxuriance. The rest (other) of the craters had their bottoms filled with sand and lapile. A large gramineous grew in them and in some places towards the N. W. of the Crater a numerous quantity of woody bushes (shrubs) with thick trunks had <sup>(grown)</sup> (developed) there. A small bird (fowl) (*Zonotrichia dulciani*) collected and described by Boucard in 1878, <sup>made its nest</sup> in these same places, ~~it made its nest in the~~ in the cavities of the vertical walls of the craters G + H. and <sup>(made its nest)</sup>



you could see ~~(the)~~ it fly over them from one point to ~~another~~. Amongst the rubbish you could see ~~beetles~~ and ~~some~~ small coleoptera and I have seen flying butterflies and flies, likewise a small (hymenoptera) hymenoptera.

The tranquility (quietness) of these places was absolute (complete) and it seemed that all the crateric appearance <sup>(aspect)</sup> would disappear <sup>in</sup> with time, under a thick coat (cloak) of vegetation, when one day, on the 27<sup>th</sup> of September of 1917 some country people, men and women went for a walk, <sup>to the craters</sup> and on passing by the crater <sup>(G.)</sup> they saw it smoking! And on seeing those craters, which they had always seen extinct, <sup>(was)</sup> now emitting thick columns of smoke, so terrified (frightened) them that they precipitately returned. The news was made notorious (public) in San Jose, and owing to a letter which I received confirming it, I prepared an excursion with Engineer Fernandez Peralta and other gentlemen. As the weather was very favorable we arrived the same day <sup>at</sup> the crater, but to our great disappointment (disillusionment) the crater had (was covered by) a dense mist!

old crater -



Nevertheless we undertook the descent and although nothing could be seen, we smelt (felt) very strong sulphurous emanations. Now I noticed (observed) that from the bottom of crater "H" issued abundant vapor (steam) but only on the East side. From the crater G also issued with great violence (force) a column of smoke which occupied all the space of said crater. Now towards the South of the border (<sup>brim</sup>margin, edge) you could see that large portions of conglomerates and rocks had fallen into the abyss, and from the bottom issued a dull <sup>intense</sup> sound (noise) so <sup>deafening</sup> (deafening)

accompanied by a peculiar hiss (whistle). (~~For our good luck~~ <sup>Luckily</sup> good fortune) the crater became clear and we were greatly surprised on seeing all the craters smoking! One by one we surveyed (examined) them all and in all the walls the escaping of vapors was very active and the  $SO_2$  was so abundant that breathing became very difficult. On the following <sup>day</sup> we returned very early, as we <sup>had</sup> passed the night in a neighboring farm and



having found <sup>all</sup> the summit clear, I could observe (notice) that the zone of activity is formed by the craters E, D a and H. and especially where these have a tendency to join. (unite). In these places of detachments <sup>escaping,</sup> the thermometer marked 82 C and 87 C.

Nearly every where you saw (observed) crystallized sulphur (brimstone) and the detachment <sup>escaping,</sup> (loosening) of  $H_2S$  and  $SO_2$  became so insupportable (unbearable) that we had to go away (to leave)

On the 4<sup>th</sup> of November Engineer Fernandez Peraltá returned and observed that from crater "G" a big column of smoke was <sup>issuing</sup> (coming out) and being near the said crater he heard ~~felt~~ a great resounding. (noise)

The 17<sup>th</sup> of December the activity increased (augmented) much more. (a great deal more)

{ That day for the first time was seen from San José at 8 o'clock in the morning the column of smoke rising. This produced some alarm among the people (public)

which augmented (increased) the following day with the shower of ashes, that however, did not reach as far as

{ That day the column of smoke was seen rising from San José at 8 o'clock in the <sup>for the first time</sup> morning }



San José. (I also went to the Irazu on the 20<sup>th</sup> of Dec)

Also on the 20<sup>th</sup> of December I went again to the Irazu with Engineer Fernandez Peralta who has always been an excellent companion in all my trips. The same day we arrived at the crater but we also decided to return also on the following day. Here is a summary of what was observed. The crater B had augmented (increased) in size and through it rose the very high column of smoke which <sup>was</sup> had been seen from San José. { <sup>The whole of the half of the</sup> All of the half, northern part of the principal crater, was now covered by a thick layer of ashes and the vegetation was <sup>injured</sup> (all - treated). The activity had disappeared from all the <sup>rest of the</sup> craters with the exception of H, from where <sup>slowly</sup> issued vapors. When we were going over (we were examining) the N.E. <sup>(rim)</sup> ~~brim~~ of the principal crater, I noticed that the land <sup>(ground)</sup> was completely bombarded. There were holes (gaps, pits) everywhere and great quantity of stones of all sizes, covered with gray mud were distributed profusely. Besides a thick layer of ashes, <sup>had</sup> made all the irregularities of the ground disappear. { All of } The whole half of the northern part of the principal crater was now covered.



## Lagoon

and a large (lake) that had been formed, had greenish water and at the bottom it was of a milky color. The brim <sup>(rim)</sup> had also in its upper (superior) part numerous marks (signs) of having suffered from the bombardment of stones - Passing the brim <sup>(rim) (border)</sup> and going down towards the New Volcano, the disasters that we observed there, were greater. Not only had stones of a large size fallen as far as here but the vegetation was much destroyed (was rather destroyed). Large shrubs with its branches detached; on the ground, fragments of branches and leaves pulled out and in certain places <sup>(spots)</sup> there were signs where the stones had opened real (true) furrows. On a small isolated tree there were six bruises in its trunk <sup>and branches</sup> made by the stones and one side was nearly deprived of leaves. This place had experienced a colossal shower of stones, some so heavy that evidently the force of <sup>(violence)</sup> the explosion must have been extraordinary to reach so long a distance, perhaps 150 meters from crater C. Having left the crater we continued the exploration in the direction W a westerly direction.



for a long distance until we <sup>(reached the)</sup> <sup>(brims)</sup> borders  
(margins) of the very old crater of the Reventado.  
In all this distance (traject) a considerable  
quantity of mud had fallen. The trees had  
their branches bent and large portions of this  
wet (moist, damp) mud could still be seen  
everywhere. At a distance <sup>the</sup> vegetation had  
a yellowish <sup>(coloring)</sup> color. According to all the facts  
(indications) that I was able to obtain, this first ~~and~~  
big eruption of the Irazu took place at day  
break the 17<sup>th</sup> of December. It issued from crater  
"G" and separated (divided) in two parts: the  
first formed of heavier materials was thrown  
with violence (was flung) towards the N. E. and  
formed the already mentioned shower of stones  
and the second formed by mud was thrown  
in a straight line to a great height and in  
the shape of a spout ~~and~~ <sup>which</sup> covered an extensive  
region with mud. The ashes of this eruption  
reached as far as Curridabat which is very  
near to San José. This eruption can have  
the following explanation (explication).  
The bottom of crater "G" was full of stones  
and with the materials that had



already fallen since the activity began, it formed a colossal plug of mud and stones which was afterwards thrown (flung) <sup>in</sup> to the space with the results which I have superficially described. The study of the ashes gathered in Curridabat and <sup>(tampered)</sup> examined by Dr. G. Inchaud revealed that the mud has no other composition which is different <sup>from</sup> ~~the~~ <sup>rose</sup> ~~the~~ <sup>(ingredients)</sup> substances that already existed in the crater before this activity.

On the following days there were rains in the Irazu, and on some days, eruptions were seen which were rather large and frequent. In all the surroundings of the Volcano on the western slope ~~(the)~~ ashes had fallen in great quantity and some potato plantations were <sup>ruined</sup> lost. Also the cattle from the neighboring farms suffered very much because all the pastures were covered (full) <sup>(were full of ashes)</sup> with ashes.

On the sixth of January of 1908 you could observe that the activity was very strong and that there was a dense veil (curtain) of ashes. At 8 o'clock at night ruined



everybody who ~~was~~<sup>were</sup> hearing the music in  
{Central Park} of the city were surprised  
{ " Plaza } (at)  
(were astonished) by a strong (severe) shower of  
ashes. At the same time you could smell  
everywhere a strong sulphurous odor. At 6.30  
P.M. of this day a colossal eruption extremely  
violent had been produced (had taken place)  
by the already mentioned crater (G) G

The ashes fell in such a considerable  
quantity that in the streets of the city  
a thick layer was formed. The space  
that this shower of ashes covered was very  
large. (considerable) The quantity of ashes which fell in  
a square meter of surface was weighed. In one  
place it was 16 Gr by <sup>(square meter)</sup>  $m^2$ , in the center of the  
city 26 Gr and in <sup>an</sup> other place to the E of the  
city it was also 36 Gr (in the eastern part of the <sup>city</sup>)

On the 7<sup>th</sup> of January at seven  
o'clock in the morning there was another  
large eruption which left a dense veil  
(curtain) of ashes. The eruptions continued  
on the following days with great violence.  
On the 20<sup>th</sup> of January it had diminished  
 $m^2$  - square meter



somewhat more. In the following months  
it continued with a moderate (regular)  
activity. The eruptions were at times very  
strong and accompanied by (with)  
resoundings and some showers of ashes.  
On the 25<sup>th</sup> of July greater activity was  
remarked (observed). The eruptions began  
again to be violent (severe) and in great  
succession. On the 2<sup>nd</sup> of August I returned  
to the Irazu. The detachment (loosening of the earth)  
(eggappings) ~~on the side~~ of crater "C" was extraordinary and  
(constant) ~~continued~~ <sup>had</sup> now the whole of the principal  
crater <sup>almost</sup> changed in appearance. Covered  
with ashes and in the center, the straight  
colossal column of smoke which issued  
extremely compact, in order to extend itself  
further up in capricious whirlwinds.  
The photographs ~~that~~ <sup>of</sup> Engineer Fernandez  
Peralta will give a better idea. The showers  
of ashes were very frequent. During the  
months of August, September and October  
the eruptions were very, very frequent and  
extremely large (big) During several days  
it did not cease (one moment) vomiting  
(continuous)  
(constant) one moment of



(throwing up) smoke, which formed <sup>some</sup> at times very ~~long~~ plumes of feathers and ashes also fell for several days.

On the 20<sup>th</sup> of October one of my scholars Mr. John J. Montegregio went to the Irazu and brought like the photographer Hernández some very good photographs. Now the crater had undergone a remarkable (notable) change! Towards the E side of the crater D which had remained full of sand and volcanic rubbish a new point (valve) of escape <sup>for the</sup> vapors (steam) <sup>had been</sup> formed. When the three men, that were mentioned took their photographs, this new crater had regular dimensions and through it issued smoke in abundance and eruptions <sup>from time to time</sup> of an explosive character. This same day at 8.20 ~~there~~ there was a large eruption by this new crater that <sup>which</sup> was seen very well in San José.

(1) The crater G <sup>also</sup> continued smoking and vomiting (throwing up) its accustomed column of smoke.

{ I was able to see on the 22<sup>nd</sup> of October from San José, very distinctly the two columns of smoke; the one which issued  
{ I was able to see very distinctly from San José on the 22<sup>nd</sup> of October, the two columns of smoke.



from the crater recently formed was much more active. I had informations some time after that the new crater was widening (enlarging) <sup>every</sup> each time more and that the crater "G" was on the contrary diminishing <sup>its</sup> activity.

According to my daily annotations, the activity had gone down a good deal on the 27<sup>th</sup>, 28<sup>th</sup> and 29<sup>th</sup> of November. { The 30<sup>th</sup> of November, <sup>about</sup> approximately at 1-30 P.M. the most formidable eruption <sup>occurred</sup> (was made) on that day by the Irazu. Details about it, in the crater are lacking completely.

Some country people heard <sup>the</sup> frightful noise like a distant storm (tempest) at about 5 Kilometers from the Crater at the stated hour.

At 10 minutes past 2 a very interesting photograph of this eruption was taken from "Las Conchas" a place situated at a distance of several kilometers, by Mr. C. H. Lankester. In San José was noted (was felt) <sup>the penetrating odor</sup> a very marked (strong) odor of  $H_2S$ .

The ridges (chains) of the N, ~~the~~ were hidden by a dense veil (curtain) of ashes and the sun also <sup>was hidden</sup> (was hidden). At 4 o'clock in the afternoon the odor of the sulphur.  
{ The most formidable eruption that the Irazu <sup>ever</sup> made occurred the 30<sup>th</sup> of Nov. about 1.30 P.M. }



10.

gases was very strong and a very fine shower of ashes fell.

The eruption rose so high that it was dragged by the upper (superior) winds.

The ashes reached as far as the Gulf of Nicoya. This time the Irazu clearly (plainly) (evidently) threw into the air, many cubic meters of volcanic substances (materials) reduced to sand. The first of December the activity continued but on the following days it lessened (abated) to begin again manifesting eruptions more or less violent. Early in the morning of the last day of the year there was another eruption which left traces (~~marks~~) of a very fine floating ashes until the 14<sup>th</sup> of February it was impossible for me to make another ascension to the crater. This time we made the journey at night and very early in the morning we were at the summit. When we arrived at the brim (border, <sup>rim</sup> edge) I was greatly surprised to see the enormous changes which had taken place! There was no longer any sign of vegetation and



the whole (entire) bare crater had a marked appearance of uniformity similar to a colossal funnel?

The greater part (<sup>in</sup> a great part) of the craters D and E had disappeared and in its place there was only a single crater of about 50 meters in diameter through which slowly issued white vapors. <sup>(at 6 am)</sup> While I was examining attentively the places {where in other occasions I had been} an eruption suddenly issued. It consisted in black pillars of mud that came out from that cavity one after the other wrapped in <sup>dense</sup> smoke, extremely black. Together with these pillars issued simultaneously an enormous quantity of stones, that when they separated from the pillars, they traced (delimited) an open passage <sup>and</sup> in order to <sup>fall</sup> in the brims (borders) of holes, through which they had issued to roll again (anew) into the abyss.

Sometimes the quantity of stones which came out was enormous and when they fell they looked like a shower of rain, (and their fall was similar (resembled) to a shower) {where I had been in other occasions}



While I was examining attentively the  
places where I had been in other occasions  
an eruption suddenly issued.



We calculated the height that it reached from 100 to 150 meters. The noise was very peculiar, besides the one that ~~was~~ made by the issuing of the vapors <sup>(steam)</sup> it was accompanied also by <sup>the</sup> dull strokes (smart strokes, (dull blows) of the stones striking against each other. The abundance of extremely black & smoke which <sup>it</sup> issued, scattered, sometimes about the crater, when it did not ascend (rise) in ~~an~~ almost <sup>a</sup> straight line, in order to divide in fragments of varied portions (pieces). This smoke <sup>issues</sup> ~~issues~~ sometimes (in the direction) towards the highest point of Mount Irazu, called the culminating point. (Zenith) where the wind raises it, leaving a large quantity of sand fall, which has already formed terraces (terreplesins, mounds) and destroyed a large part of the vegetation which existed there.

Other persons who have seen those big eruptions, have assured me, that the stones have reached a point (a spot, place) called Hermosa Playa (Beautiful Beach).



<sup>2</sup>  
I believe this to be veridical, because on another excursion I found several small stones upon the layer of ashes which covered the already mentioned place, (Hermos) Playa Hermosa (Beautiful Beach). These eruptions of mud and stones were repeated from time to time, leaving some days of quietness (tranquility). The spectacle for many persons that went <sup>there</sup> (who were there) was terrifying (appalling) and almost without admiring it, they returned precipitately (hastily). In the company of the

English geologist Mr. David Sutherland and also Mr. F. Peraltá we visited the Irazu the 16<sup>th</sup> of March. (We had a day of quietness (tranquility)) We were favored with a day of tranquility! The descent to "Playa Hermosa" (Beautiful Beach) was made without any difficulty. We were at the very border of the crater. The new crater <sup>only</sup> emitted vapors with great slowness, amongst them some which were bluish (azure) and formed a contrast with the others which were whitish. (and formed a contrast with the whitish ones.)



Owing to the quietness in which it was, we decided to go down and to arrive (reach) to the very border (brim) of the new crater. The thick layer of ashes permitted a very comfortable descent. Now in the vicinity (near) of this crater we noticed the great quantity of stones of all sizes which had formed holes in the layer of ashes. Walking slowly we reached the very border! A cylindrical <sup>hole</sup> of more than 80 meters in diameter, with its walls formed by a series of layers. ~~At~~ the bottom, at about thirty meters, a soft (doughy) mass, of a black color and from its surface rises the bluish vapors. On following the border (brim) a violent gust of wind deviated the bluish column towards us and we were wrapped in it! It was a sensation of great uneasiness; the bluish smoke was sulphuric acid! This situation was not however, of such a nature that we could not go to other parts of the crater. The Crater "G" had now lost its activity. The wall S was almost



completely destroyed and its bottom full of mud. In the same condition was the bottom of Crater H. (The bottom of Crater ~~H~~ was likewise in the same condition). On our return when we were contemplating for the last time by the light of a splendid (splendid) sun, all the panorama which we had in front of us, we saw detaching (loosening) a great part of the <sup>cylindrical</sup> wall of the new crater, precisely on the opposite side of the place, where we had <sup>been</sup> a few moments before. This mass on falling produced a slight rumbling noise and immediately issued a very dense, black smoke, that diminished little by little, <sup>until</sup> it remained in its former tranquility. This new crater was denominated with the letter M. g-h All the materials, like the one we saw fall to the bottom <sup>and</sup> are again (anew) thrown into the space by the eruptions in the form (shape) of very small fragments which constitute the so often mentioned ashes of the Irazu. On the following the 17<sup>th</sup> of March at 4 P.M. there was a violent eruption which produced an abundant shower of ashes which was observed most towards the N.E. of the city,