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978-1-107-67042-6 - Jorullo: The History of the Volcano of Jorullo and the Reclamation of the Devastated District by Animals and Plants

Hans Gadow

Excerpt

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Chapter I

THE STORY OF THE WHOLE DRAMA

THE story of the whole drama may be rendered as follows.

Towards the end of the month of June, in the year A.D. 1759, the people living at Jorullo were alarmed by subterraneous noises and knocks which off and on repeated themselves until September 17th, when the noises sounded like the discharge of cannon, and the earth trembled to such an extent that the chapel of the main hacienda was badly cracked. These disturbances kept on with scarcely any intermission until the 27th. This and the following day passed quietly, but when some labourers returned from gathering guava fruit, ripe at this time, they caused astonishment because their sombreros were covered with dust or ashes. Unless this little episode is a fiction, some crack in the ground must have opened and have exhaled this dust quietly without attracting attention.

On September 29th at 3 a.m. were felt several sharp tremors, and from the bottom of a ravine about half a mile to the south-east from the hacienda broke out dense and dark steam, soon followed by roaring flames, and there arose into the sky a thick and dark cloud. The discharged superheated steam condensed, and fell down in the shape of rain, which, mixing and carrying with it the likewise expelled sandy cinders and ashes, soon covered the neighbourhood with mud. This must have happened soon after the first outburst, as the people on

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leaving the chapel, into which they had been summoned to hear Mass, found the buildings already loaded with mud. By the end of the day the farm buildings were laid low and the whole farm was entirely spoiled by the falling masses of mud, namely the rain mixed with the ashes. For two days the newborn volcano thundered and threw up sand and fire without one minute's interruption.

On October 1st two new things happened. First, from the foot of a hill, a little to the south of the volcano, burst forth a current of muddy water, voluminous enough to prevent one crossing it. Second, a mass of sand rose to the outlet of the volcano, which at that time was little more than a cleft, and flowed into the bed of the Cuitinga brook; but this sand was dry and so hot that it set on fire everything in its path; having followed and filled up the brook for about half a mile, the water underneath exploded at several places, throwing torn sods high into the air.

During the night of October 2nd happened a serious earthquake, followed by fiercer outbursts of ashes which by the 4th smothered the western part of the district to a distance of 5 miles and even beyond, so that by October 6th the whole population of La Guacana (about 5 miles to the west of the volcano) had to retire on to the neighbouring hills. Things were aggravated by a new kind of danger. The little stream from the Jorullo to La Guacana became so swollen, and apparently blocked with the masses of sand and ashes which it gathered in its course, that all the lower parts of the valley, the present Playa, the now level stretch to the west of it, and thence extending towards La Guacana,

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were transformed into a lake. It is worth noting that this inundation was caused not only by the water which fell as rain, but to a much greater extent by many new streams which burst from the neighbouring hills, now swelling suddenly into regular spates and then again suddenly running dry. It has been suggested that it was all rain water, real rain, and that tropical thunderstorms caused these torrents to come from the slopes of the wide amphitheatre of the whole district; but by the beginning of October the rainy season is practically over. It begins with regular downpours in June, reaches its maximum in July or August and in the following month tails off into occasional smart showers. The whole annual rainfall in this part of Michoacan is not at all 'tropical', amounting perhaps to 1 metre. The eruption may have changed all this, but against it is to be noted that the careful diary of the gentleman who witnessed the phenomenon does not contain a single reference to thunderstorms except on and after November 8th—at that time of year something very exceptional and therefore duly mentioned.

Incessant falls of ashes seem to have continued until October 8th, when a new phase began, the volcano throwing up stones, very brittle, as if overbaked and glassy, and these fell to a distance of a mile from its mouth; the ashes had of course been carried much farther, by the wind—for more than 50 miles.

During the night of October 9th were felt strange shocks, accompanied by great noise, and during the following two days there fell again great masses of ashes and rain from the globular cloud, but in addition to these the volcano threw out many incandescent bombs, some of the size of the trunk of an ox.

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On October 12th, at 1 p.m., 600 yards from the main crater, a new mouth opened which extended over the whole gorge to the west; out of this came a thick cloud of steam together with such a volume of hot water that it flowed for two hours like a spate, whereupon the gap closed and the water ceased.

On October 15th things were quiet enough to allow the Administrator with his labourers to go to the chapel and rescue the holy images and save the bells from the tower. The same kind of rescue work was undertaken some 10 days later by the priest at La Guacana.

From October 14th a gradual improvement began; the volcano no longer threw out steam, but only dry ashes together with mighty flames of fire which roared like billows, the noise changing to thunder during the occasional discharges of stones. But there was no longer any rain of 'mud' and the springs of water had run dry, and on November 1st the sun came out, soon to be drowned again by renewed showers of ashes. From November 9th to November 12th the darkness was worse than ever, accompanied by furious earthquakes and several hurricanes with thunder, lightning and downpour of rain all over the neighbourhood.

November 13th was quiet. The whole of the more fertile slopes and plains was thickly covered, and partly levelled, with the fallen ashes and sand, so that all the old brooks were running on the top of the new level and quite clear. The volcano had piled itself up to a height of more than 300 varas (about 250 metres or 820 feet) with a circular crater. The careful recorder, Administrator Sáyago, had even taken the trouble of making a sketch in black and red of the volcano as it appeared on

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October 8th. Orozco, who saw this most interesting document in 1854, dismissed it with the withering remark that it was executed with little care and scarcely served to convey an approximate idea of the object! This is the criticism of a person who had never visited the Jorullo, who therefore could compare the sketch only with those published by Humboldt or Schleiden. Of course the sketch of October 8th, 1759, cannot bear any but a slight resemblance to the later features, because not only has the volcano become much higher but there was not yet, in 1759, that enormous outflow of lava, which formed the Malpais and has thereby changed completely the aspect of the whole district.

After the Administrator Sáyago had dispatched his report of November 13th to the Governor of Michoacan, we hear no more of him. Naturally not; since he had done his duty and the ruined farms had to be abandoned, he left the district. There is a letter by the Viceroy Amarillas to the Minister of the Indian department in Madrid, dated Cuernavaca, November 21st, 1759, in which the Viceroy reports that he has given orders to the authorities to send him further accounts of what may happen at Jorullo and also to resettle the natives at La Guacana. But henceforth there is a complete absence of news, except oral traditions that violent eruptions continued until February, 1760, again during the next 4 years, and others apparently less great for 11 years more, bringing the end of eruptive activity down to the year 1775. There is, further, the allusion by Clavigero to an account rendered to or by the new Governor Bustamante in 1766, according to which three high mountains had formed themselves at Jorullo with a

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total circumference of 6 miles, a very fair statement of the actual conditions, the straight distance from the Volcancito del Norte to the V. del Sur being about 2 miles. We can therefore safely conclude that the main features of the Jorullo district as they are now, namely several volcanoes and the Malpais to its present fullest extent, had been completed by the year 1766.

The most interesting of these features is of course the great Malpais, the outbreak of lava, which covers several square miles to a depth of perhaps more than 100 metres, at least in the centre. All this must have happened between, say, the beginning of the year 1760 and 1766, and probably began in 1764, the period of alleged greatest eruptive activity.

This spreading of molten lava over whole square miles of land must of course have been a grand spectacle and I have not the slightest doubt that it is to these scenes that those stories refer which Colonel Riaño and Fischer were told on the occasion of their visit in the year 1789; and the same stories were told to Humboldt, 43 years after the event, when the number of surviving witnesses had probably as much decreased as tradition had adorned the facts. Be it noted, however, that the spectators observed what they saw from the heights of Aguesarca. Humboldt himself mentions this place in his account, but does not tell us that the distance to the Jorullo is about 6 miles as the crow flies. The tradition is good enough. A large stretch of land was seen to be in a frightful outburst of fire, and in the midst of the flames there appeared a large shapeless lump, like unto a black castle. Or, to give Pieschel's version (p. 96), from half a German square mile arose flames which

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threw up stones and thick smoke, and the molten soil rose like an agitated sea. The Indians may even have observed the formation of huge bladders and blisters which afterwards burst.

All these may be taken as facts; only they did not happen in the night of September 29th, 1759, but long after the volcano had built itself up to a height of some 250 metres; nor did they happen on one day, but they spread perhaps over years. Whatever has been added to the story—the perpendicular lifting up of the ground, its swelling in the middle and at several other places, then bursting and thus producing the several volcanoes—is pure invention.

Humboldt was naturally enchanted with his notion of having found, in Jorullo, an example of the elevation theory of his great friend L. von Buch, but it is nevertheless very remarkable that he does not say a word in his description of the Malpais about its being composed of lava. He makes much of the abruptly rising edge of the Malpais where it faces La Playa, and describes it as composed of banks of black and brown clay, covered on the top with but little volcanic ash. Burkart, who may have examined the edge at some other spot, found the wall to consist of light grey, not at all dense, basaltic rock and divided into several banks by undulating, almost horizontal cracks. Schleiden found it made up of blocks (of basalt) mixed with layers of 'schalen'.

Although not a geologist, I venture to give what I have observed myself. All the previous descriptions are right. It depends upon the place where the edge of the Malpais is examined, and its sharply upstanding or abruptly ending margin is several miles long. At some parts, for

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instance in the north, between Cerrito de la Cruz and the Cerro do Paso Hondo, it is now almost level with the rest of the ground, because washed-down sand and fallen blocks have levelled the difference; but opposite the last-named the edge rises to a height of perhaps 50 feet, quite impossible to climb and bare of vegetation because some of the upper ledges, especially the top ledge, are overhanging. There are many such ledges, maybe a foot thick, of hard blistered blackish lava, separated by layers of red or brown earthy matter, here and there with streaks of paler lapilli or of black, finer ashes or sand. Rarely are these strata horizontal, but mostly undulating or faulted. The soft layers are crumbling away, leaving the harder ledges between them. The deeper down they go, the more sand, or ashes and clay-like soil; higher up, the stony, basaltic matter becomes preponderant.

These conditions are still more striking a few hundred yards to the south of La Puerta, where the little stream has by this time made itself a deep gorge, having cleared it of all the once overlying sand so that its bed is now formed by the old crystalline rocks which underlie the whole district. Here and there the cliff rises over 50 feet and its face presents regular caves. Near the foot is non-stratified soil, which may be the original surface soil of the plain before there was any volcano. Then follow layers, or, as they present themselves in concave vertical sections, masses or nests, of other stuff, sandy, ash-like, mixed with soil, with inextricable contours; and still higher up follow the same alternating layers of earthy (i.e. disintegrated) matter, ashes, stones and strata of lava as I have described above. It may be an instance

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of unprofessional rashness, but the masses of about the middle third gave me the impression as if I were gazing at the 'mud' which is reported to have rained for weeks or which was carried by the spates which burst from the newly born volcano. According to the slope of the whole terrain they would have flowed in this direction (just like lava flow No. 1), blocking and filling up the whole gorge and thereby causing the great inundation.

The non-historic building up of the volcanoes and the Malpais, after November, 1759, seems to have proceeded as follows. We know there was a deep ravine at the bottom of which was the bed of the Cuitinga stream, along the foot of the basaltic hills ('basalto de nephelina' according to Ordoñez). This ravine we may well assume extended from the present Volcancito del Norte in an almost straight line from north-east to south-west to the southern volcancito, whence—according to the old diorite hills of the Peñablanca and the Cerros de las Pilas—it turned about at a right angle to the west, the stream passing between the Veladero and Agua Blanca, below which it joined the stream coming from the Playa. We know further that the future main volcano broke out at the bottom of the Cuitinga ravine. This was repeated, about 1400 metres to the north-east, by the future Volcancito del Norte, and to the south-west by several other volcancitos, the V. del Sur arising at a distance of 1600 metres from the main volcano. According to Ordoñez the Sur was the latest, because it has disturbed, or overlaid, the southern slope of the Enmedio.

It is important to note that there were most probably more than two southern cones. There is an almost

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comical uncertainty about the total number of cones. Sáyago, the eyewitness of the first eruption, describes only one, although the following passage may bear various interpretations: 'having belched out such a mass of red-hot stones, so that around its mouth was formed a circular wall, which is already higher than 300 varas and surpasses the others which stand on the sides of the ravine which latter it has filled up and disfigured'.¹ Does this mean the other volcancitos which stand at either end of the ravine, or does he refer to the neighbouring foothills and to the Cerro Partido which at that time rose about 200 metres above the original plain?

According to Landivar the big volcano had four companions, five in all.

Clavigero (*vide* Bustamante) said that three high mountains were formed; he may have omitted the smallest.

Humboldt counted and sketched six. Felix and Lenk likewise counted five 'Nebenkrater', six in all.

Schleiden drew four; and Ordoñez insists upon four only, viz. Jorullo itself, the Volcancito del Norte to the north of it, and the Volcancitos de Enmedio and del Sur to the south.

To ourselves it was obvious that there are five, the fifth adjoining the Enmedio but partly covered by its slope, although a little higher. It is unmistakable when examined from the top of the Enmedio, and to anyone walking on it there appear good traces that it was

¹ '...de modo que en el recinto de su boca ha formado un brocal, pretil ó círculo, que ya pasa su altura de trescientos varas, y sobrepaja los demás que están á los lados de la cañada, la que totalmente ha llenado y desfigurado.'