

IV. *Some Account of the Volcanic Eruption of Cosegüina in the Bay of Fonseca, commonly called the Bay of Conchagua, on the Western Coast of Central America.*
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THERE is perhaps no country on the face of the globe which shows more signs of vast geological disturbances than that part of the western hemisphere which, situate between its great northern and southern divisions, has obtained in more modern times the name of Central America. Its shores, extending to both oceans, are in spots precipitous, while other and extended lines of coast are low, and abound in mangrove creeks, intersected by mountains and volcanic vents, and excavated by a series of lakes, which in the province of Nicaragua interrupt and appear to replace the great chain of the Andes. The finely comminuted scoria affords a soil which produces the richest vegetation, and a vast and new field is offered to the man of science who will boldly face the miasma of the forest, or penetrate the rich mines with which one part of the country abounds.

At the termination of a narrow promontory, which runs in a northerly direction from the southern and eastern side of the Bay of Fonseca, stands the volcanic mountain of Cosegüina, washed on three sides by the ocean, of insignificant height, and flat-topped; two eruptions are on record, viz. those of the years 1709, and 1809. Since this last date it has remained in a state of quiescence, until the period of that stupendous eruption on the 20th of January last, the details of which I now beg permission to lay before the Royal Society. These details I have drawn up partly from official documents transmitted from the various towns to the government of Centro-America, and partly from the information of intelligent friends, eye-witnesses of all that occurred in those days of terror. The reports to the Government, which are voluminous, fully agree on the main points; in others, probably owing to the changes of locality and consequent variation in the direction of the wind, some slight differences are observable. It is, however, impossible to read these official reports, written too by persons little versed in classical learning, without being struck with the similarity of their description, even to the very terms he used, with that of the younger Pliny in relating to Tacitus the commencement of that eruption of Vesuvius which, nineteen centuries since, buried two cities under its ashes.

On the 19th of January, after twenty-six years of repose, a slight noise attended with smoke proceeded from the mountain Cosegüina. On the following morning

about half-past six o'clock, a cloud of very unusual size and shape was observed by the inhabitants of the neighbouring places to rise in the direction of this volcano. When viewed from San Antonio, about sixteen leagues to the southward, it took the appearance of an immense plume of the whitest feathers, rising with considerable velocity, and expanding in every direction. Its colour, at first of the most brilliant white, became tinged with grey, then passed into yellow, and finally became of a crimson hue. Columns of fire shot up directly through what was still imagined to be but a nebulous exhalation of extraordinary appearance; a severe shock of an earthquake was then felt. During the whole of the 20th the cloud preserved its appearance, although unattended by that magnificence which at first predominated.

At three P.M. on the 21st, two severe shocks were felt at San Antonio and Realejo, and at midnight five others were experienced; the two first undulations were not severe, but the third and the last were terrific.

On the morning of the 22nd the sun shone brightly at San Antonio, but a line of intense darkness was observed in the direction of the cloud which had excited so much attention two days before. At the same time a fine white ash was observed to fall around, the black line rose rapidly, the light began to fail, and darkness commenced with such quickness, that in half an hour it was more utterly dark than during the most clouded night. So intense was this darkness that men could touch without seeing each other, the cattle came in from the country showing all the signs of alarm and uneasiness, and the fowls went to roost as on the approach of night. This state of complete darkness prevailed until the following day, when at twelve o'clock it became a little brighter, and objects became visible at ten or twelve yards distance. This atmospheric darkness prevailed two days longer, during all of which time a fine white impalpable dust continued to fall. This deposit covered the ground at San Antonio about two inches and a half in three layers of different colours, the lower stratum being of a darker hue, the next of a greyish, and the upper of a whitish appearance. For ten or twelve days a murky light continued to prevail.

At Nacaome, a city in a northerly direction, eight leagues distant from the volcano, the same cloud was observed to rise at half-past six o'clock in a pyramidal shape. At half-past eleven on that day the darkness commenced, and at twelve nothing whatever could be distinguished; shortly before this a kind of ash had begun to fall, and at five o'clock had covered the earth to the depth of three inches. At six o'clock it fell in diminished quantity, and respiration became relieved. During the following night various undulations of different degrees of intensity were experienced, preceded either by heavy rumbling noises, or loud explosions. On the 21st at Nacaome the morning broke clear, but at eight o'clock the atmosphere became again thick and hazy, and during the twenty-four hours following, the volcanic matter continued to fall, attended with repeated noises and undulations of the earth. The darkness continued to prevail during the 22nd, and the depth of the ashes was from four to five inches; a fetid sulphurous smell proceeded from this deposit, which the

slightest breath of air drove into every interstice. At midnight violent explosions were heard, and, a quarter of an hour after, a severe shock was experienced, the forerunner of new eruptions. At 5 o'clock on the morning of the 23rd it was sufficiently light to observe that a fresh eruption had taken place from Cosegüina, and at 8 o'clock the darkness had returned as on the 20th. At 9 o'clock the obscurity was complete, and new and new awful echoes of vast discharges of volcanic matter, attended with flashes of lightning in all directions, convinced the panic-stricken inhabitants that the day of judgement had arrived.

No pen, says the Governor, is capable of describing the scene of dismay which prevailed. On the 24th the atmosphere became clearer. The houses were covered to the depth of eight inches with the ashes which had fallen, and many small birds and animals were found suffocated in them. Deer and other wild animals sought the town for protection, and the banks of the neighbouring streams were strewed with dead fish.

It would be but useless to tire the Society by giving extracts of all the reports made from different places within the sphere of the eruption. I shall confine myself to stating that at Macuelizo, in Segovia, the colour of the sand which fell was black; and on the Hacienda of Cosegüina, belonging to Don Bernardo Benevio, eight leagues to the southward of the crater, the ashes covered the ground to the depth of three yards and a half, destroying the fine woods and dwellings.

It also avails little to mention the great mortality which prevailed among the cattle. Thousands perished, and those which after the eruption reached the abodes of men, presented sad spectacles; their bodies in many instances being one mass of scorched flesh.

Within the bay of Fonseca, and two miles from the volcano, it is stated that two islands have been thrown up, of from 200 to 300 yards in length, their surface, but a few yards above the sea, presenting, it is said, a mass of scoria and ashes: their elevation has probably been caused by the heavy fall of scoriaceous matter on shoals previously existing in those places. However probable, the evidence is not conclusive, although the fact of the beach on the eastern or inner side of the promontory being extended by the ashes about 800 feet further out, gives additional reason to credit the statement.

On the 3rd of March, nearly two months after this great eruption, the volcano remained in a state of activity, but not ejecting ashes. By some geologists it has been considered that heavy eruptions of fine scoriaceous matter tend, by their falling again into the crater, to restore the volcano to a quiescent state, and that therefore this phenomenon more usually attends the conclusion of an explosion. In this particular instance it appears that the first effect of the explosion was to blow out of the crater, and finely triturate, the scoria and ashes left there twenty-six years before.

In the districts of Segovia, Comagagua, Choluteca, Nacaome, and Tegusigalpa, immense deluges of rain followed these clouds of ashes, and again gave rise to a fetid,

disagreeable odour. At this season such an occurrence was extraordinary, and almost unprecedented in Central America.

I shall conclude by stating that the ashes reached as far as Chiapa to the north, upwards of 400 leagues to windward of the volcano: thus proving the existence of a counter current of wind in the higher regions of the atmosphere. At St. Anne's, Jamaica, on the 24th and 25th of January, the sun was obscured, and not only there but over the whole island, showers of fine ashes were observed to fall. The distance in a direct line north-easterly is about 700 miles; consequently the ashes must have travelled at the rate of about 170 miles per diem.

Captain EDEN, of His Majesty's ship Conway, informs me, that in lat. $7^{\circ} 26'$ north, and long. $104^{\circ} 45'$ west, when 900 miles from the nearest land and 1100 from the volcano, he ran forty miles through floating pumice, some of which was in pieces of considerable size.

The latitude of Cosegüina is 13° north, and longitude $87^{\circ} 3'$ west. Its height above the sea is computed at 500 feet.

No volcanic eruption in modern times has been recorded that reached the frightful extent of the one of which I have now had the honour of laying an account before the Royal Society. The explosion of Tomboro in Sumbaya in 1815, described in the Memoirs of the late lamented Sir THOMAS STAMFORD RAFFLES, more nearly approaches it than any other with which I am acquainted.

Santiago de Chile,
18th August, 1835.