

**VOLCANOES AND EARTHQUAKES IN THE PHILIPPINES.**

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The Philippine Islands lie along the great belt of volcanic activity which extends from Japan to the Moluccas. The chain of living volcanoes enters the Philippine archipelago from Formosa, through the Bashees group, and, running the entire length of the great island of Luzon, bends to the west and enters the island of Negros at its northern end and, passing down this island, crosses to Mindanao, apparently through Siquijor or Fire Island. With several active volcanoes in the Bashees Islands and that of Cagua at the northeastern extremity of Luzon, the volcanic force seems to be exhausted until the vicinity of Manila is reached. One of the chief landmarks of the capital is the great cloud-capped cone of Mahayhay, standing off to the southeast. It appears to be now extinct, the last eruption occurring in 1730. It is over 7,000 feet high, but the crater has fallen in and the whole mountain is overgrown with luxuriant vegetation. Toward the top this consists, in great part, of tree ferns, with their trunks draped in mosses and overgrown with many species of smaller ferns.

In the province of Batangas and almost due south of Manila, at a distance of some 25 miles, is the active volcano of Taal. It stands in the middle of the lake of the same name. It is less than a thousand feet in height and looks like the summit of a great volcano which has sunk in the lake, and there are native traditions to this effect. At present its only sign of life is the column of white smoke which continually rises from its summit, but it was in active eruption in 1716 and again in 1754, when it threw out stones and hot ashes which destroyed the little villages on the shore of the lake. The clouds of ashes reached Manila, and the water of the lake is said to have boiled with the great heat.

At the southern end of Luzon are a number of volcanoes, but the most celebrated of these, both for its size and beauty and for the destructiveness of its eruptions, is El Mayon. It rises from the fertile plains of Albay to a height of over 8,000 feet, an almost perfect cone. The lower third of the mountain is densely covered with vegetation, which dwindles to bushes and coarse grasses above. The upper half of the cone is of bare sand and lava and other volcanic rocks. Mayon is constantly throwing out smoke and flames, and often streams of lava are seen flowing down the narrow ravines about the summit.

In 1766 there was a terrible eruption, destroying many villages upon the plains below, and in 1800 it was again in eruption, but with less destruction of life. In 1814 the most memorable of its eruptions occurred, perhaps appearing more destructive than the others, because there were eye witnesses to write its history. It was preceded and announced the night before by frequent earthquakes, concluding the next morning with a most terrible shock. After this the volcano was seen to immediately throw out an immense pyramidal cloud of smoke, black at its base, but of many colors in the middle, where the rays of the morning sun fell upon it, and ashy gray in its upper part. After another terrible earthquake shock and loud thunderings, the volcano began pouring out immense streams of lava. The atmosphere became suddenly dark and the flashes of lightning were incessant. Then, in the darkness, great red hot stones and hot ashes began falling. These reached for many miles about the base of the mountain and horses and cattle were killed in the fields. The villages were fired by the red hot stones falling and the people were crushed or suffo-

cated as they attempted to escape. The rain of hot stones and ashes lasted for three hours and the darkness for five hours. Twelve thousand people were killed and many flourishing villages destroyed, and their sites buried and lost beneath the ashes. This was so deep in some places at the base of the mountain that trees were buried out of sight. The Spanish curate of one of the villages, Fr. Juan de la Torre, survived as if by miracle, and wrote the following account: "I was able to save my life by crawling under the trunk of a cocoanut tree, which was bent over, forming a little shelter. There

established an estate upon the east side of Malaspina, on the strait separating Negros from Zebu, told me that the mountain was continually shaking and groaning. Near the southern point of Negros is the ancient volcano of Dumoquete. There appear to be no accounts of its eruptions, but as we steamed along the coast we were struck with the appearance of immense ancient lava streams reaching from the summit of the mountain to the sea. Some of them looked like gigantic railway embankments, so even was their grade and so level their surface. They were too recent to have weathered into good soils and were covered for the most part with low trees and coarse grass. While stopping at the town of Dumoquete we heard of the existence of a lake called Danao, in the mountains, and we determined to visit it. We first followed one of the old lava streams up to the village of Santa Rosa, made up of a few families of Indians who were engaged in cultivating abaca, or Manila hemp. After leaving the village and climbing for six hours up the steep mountains and along knife-like ridges, we reached the lakes. There were two of these, each perhaps a quarter of a mile in diameter and lying in a valley surrounded by mountains so steep that we were in continual danger of slipping down into the water, which was over our heads a step from the shore. The lakes seemed to occupy an ancient crater, but the whole country was so thickly covered with timber that we could get but little idea of its configuration. The barometer showed a height of 3,500 feet.

The volcanoes of Mindanao are outside of the territory occupied by the Spanish and Christian Indians, and have been seldom visited. Mount Apo is said to reach a height of over 10,000 feet.

Earthquakes, the usual accompaniment of volcanic activity, are too common in the Philippines to be remarkable, unless they tumble one's house about his ears. The light, basketlike dwellings of the natives, perched upon posts, sway about like cradles during these strange movements of the earth, and are often thrown out of perpendicular, but are rarely destroyed.

The stone buildings of the Spanish, though usually built of light volcanic rock, or of coral, and with thick walls and low stories and projecting buttresses, to protect them from earthquakes, are frequently thrown down. Spanish Manila, the old walled town, the only city in the archipelago built of stone, has suffered most, and some of the streets are still blocked by the ruins of the great earthquake of 1880. In 1863 the city was nearly destroyed, and at frequent intervals since its foundation it has suffered loss of life and property.

In the provinces, buildings of stone are rarely found, those existing being generally the churches and conventos, or priests' houses. These have been built by the untrained natives and with no other architects than the priests themselves, but are strongly built and rarely fall. Several times, while being entertained by these hospitable priests, we have been startled by the cry of "Temblor!" when all would rush out of doors, to be out of the way of falling walls, and after a few minutes' waiting, would return to take up our dinner or conversation where we had left it.

A RAILROAD to extend entirely across northern Sweden and Norway, from the north end of the Gulf of Finland northwest to Ofoten, on the Atlantic, about 120 miles north of the Arctic circle, is proposed. The line will be about 300 miles long, and will, it is said, be further north than any part of the new railroad to Archangel.



MANILA—CHURCH OF SAN AUGUSTIN INJURED BY EARTHQUAKE OF 1872.

I lay without my hat, and passing through a thousand dangers. I was accompanied under the tree by two wild boars, which had fled from the forest, two swine from the village, a crow with its wings stretched out, and a poor rat trying to protect its young ones."

The eruptions of Mayon are said by the natives to be preceded by underground noises and mutterings like distant thunder. These are accompanied by trembling of the earth, while the birds and other animals flee from the mountain.

One of the landmarks of the central Philippines is the great volcano of Malaspina, or Kanloon, in the northern part of Negros. The level and fertile plains of western Negros, containing the most valuable sugar estates of the Philippines, are probably the product of former eruptions of this great mountain. Its base is surrounded by dense forests and but little is known of any recent eruptions. A native who had recently es-



VOLCANO OF MAYON HEIGHT 8,000 FEET.