



## The Culture of the Highland Valley of Mexico

### I. Life Around the *Popocatepetl*, a Dangerous Volcano (to continue)

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#### Abstract

I want to dedicate this article about life, science and culture of the inhabitants around *Popocatepetl*, a living volcano, Puebla, Mexico. In addition, I formulated student research projects during autumn season and gave these to the six groups of students (each group consisting of four to six students), who were working under my guidance. They studied the social, religious and economic conditions of the inhabitants residing around and the vicinity of *Popo*. During three years of my stay as Professor in Chemistry and Biology Department of Universidad de las Americas, Puebla, I observed daily activities of *Popocatepetl* and described this experience here!

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#### 1. Introduction

*Popocatepetl*, situated about 40 km away from the city of Puebla, Mexico, is one of the most dangerous volcanoes in the world. I lived in the residential colony of the Universidad de las Americas-Puebla situated about 35 km away from *Popocatepetl*, popularly called *Popo*. I resided in this colony during my three years stay in the university and used to watch the activities of this volcano daily with great interest. I want to mention here a brief background of this volcano.

I developed a great love and affection for the great volcano. I admire *Popo* which is one of the great powers of Nature. Through my bedroom window I used to observe the activities of the volcano daily, continuously emitting gases and ashes when in very active stage, sometimes slowly, and sometimes violently specially during December-January. The movement of the clouds of gases and ashes was flowing in the direction of wind. Every morning, when I left for the university, I watched with great admiration the daily activities of *Popo*.

I want to narrate here a brief account of the pre-history of *Popocatepetl* from the description of Jose N. Iturriaga in his famous book, *El Popocatepetl: Ayer and Hoy, Don Gregorio* published by Diana, Mexico.

There are different types of volcanoes, such as dead and active volcanoes. *Popocatepetl* is one of the most active and dangerous volcanoes in the world. A volcano may be defined as a place from where the magma (the lava) and other magnetic substances come out with enormous force to the surface of the earth. A volcano consists of different parts—the main building, the chimney and the crater or mouth. The structure of the building is the product of the accumulations of lava and magnetic materials ejected and consolidated on the roof in the form of a cone. The chimney represents the

interior of the volcano in which the lava circulates up to the crater with a very high temperature and pressure. The crater is in the form of a funnel. It is to be mentioned here that the greater part of the earth is red-hot and active filled with lava and gas. The terrestrial layer is a relatively thin crust like the one, which covers the planet. This layer is formed by a tectonic sheet, which due to frictions or sporadic adjustments cause occasional earthquakes. A volcanic eruption is generally the emissions of vapours, rocks, ashes, sand particles and of lowering lava spreading all around like a violent cracker or bomb. Sometimes the sound of the eruption of volcano can be heard from as far as 800 km away. The temperature of the emitting gas crosses 500 °C.

In Mexico, about 3,000 volcanoes exist. Fourteen of them are active. The most dangerous ones are the Tacama in Chiapas, volcano de Fuego in Colima and Jalisco and el *Popocatepetl* in Puebla, Mexico.

I want to describe in a nutshell the history of *Popocatepetl*. Since the pre-hispanic time it has been regarded as a dead volcano *Iztaccihuatl* situated on the lateral side of *Popocatepetl* is his wife. *Izta* probably originated at the end of Meicene era about 20 million years ago, and *Popocatepetl* was formed at the end of Pleicene era, about 5 million years ago. *Iztaccihuatl* is 5,452 m. *Popocatepetl* is approximately 850 m in diameter and 300 m in depth. The volcano is situated 50 m from Mexico city and 45 km from Cholula, where I was residing in the residential colony of the Universidad de las Americas. At least four violent and gigantic eruptions had occurred since pre-historic times, causing explosions which collapsed the cone. Huge amounts of lava spewed forth all around leaving enormous deposits. The most violent eruption extended to 75 km and the volume reached the maximum



level. The colossal eruption occurred at least 25,000 years ago. About 14,000 years ago, there occurred a great eruption that produced an abundant precipitation of ash and stones in the valley of Mexico. The ultimate eruption with a high grade of explosion occurred between 800 and 1,000 years ago. *Popocatepetl* is popularly known as Don Gregorio. Nobody knows when Don Gregorio will turn violent again. We were at the mercy of this violent natural calamity.

Many traditional beliefs and rituals are prevalent. Some identify *Popocatepetl* as a violent warrior floating towards its lover *Iztaccihuatl*. It is popularly called *Volcano que humea* in Spanish, i.e. a volcano which smokes. It looks like a giant cigarette emitting smokes, blown in the direction of the wind. According to other legends, human sacrifices were made to satisfy the gods, who represent these two volcanoes. The most popular legend refers to the attack of a military enemy against Tenochtitlan, who fought for its defence and attacked a young captain, the lover of his daughter, the princes. Though false information spread and reached the capital, Aztec that the warrior, had been killed. This information reached his lover, *Iztaccihuatl*, who was broken, ascended the top of *Popocatepetl* and committed suicide jumping into its crater. Accordingly to the legend, *Popocatepetl* is guarding his lover, by constantly emitting vapour and gases. Everyday I used to observe the smoke of the volcano spreading laterally to cover the so-called lover *Iztaccihuatl*, perhaps.

It is a general belief that there is a good relationship between *Popocatepetl* and the indigenous population in the state of Puebla. Since the twentieth century the communities of Nealtican, San Marteo Ozolco, San Nicolas de los Ranchos and Santiagom Xalitzantia believe that there is a magician who is responsible for communicating with volcano casts a ray of light, inviting him to communicate with him. This person makes contact and talks with *Popocatepetl*-Don Gregorio and with *Iztaccihuatl*. The inhabitants really consider *Popocatepetl* as Papa Don Gregorio or Colosio. On 5<sup>th</sup> May, the people march towards *Popocatepetl* on a pilgrimage and offer prayers to the volcano. They offer *mole*, a popular preparation with peanut, *tamale* made of maize flour and meat, and money to satisfy the god volcano. In the case of loss of crops due to snowfall, they also give special offerings. Since ancient times and till now, the indigenous populations practise ritual and worship the two volcanoes.

Since the conquest of Mexico starting from 1521, *Popocatepetl* has attracted the attentions of many foreign visitors and many of them have attempted to reach the top of the volcano and have met with disasters. Hernan Cortes, the conqueror of Mexico, who first arrived in Cuba, and entered Mexico on 1<sup>st</sup> February 1519, wrote about *Popocatepetl*. Some Spaniards attempted to reach the top of the volcano, but could not reach the mouth of the crater due to emission of excessive vapours and gases. The vapours contained huge quantities of sulphur. Hernan Cortes wrote in his letter to the emperor in Spain that they could extract of the volcanoes, but due to the high risk, he suggested that they should import sulphur from Spain. Similarly several attempts to reach the top of the volcano by different persons failed. During the period of the Spanish conquerors, the activities of *Popocatepetl* were extremely violent. The Aztecs considered the volcano as a

red, angry spirit whose anger was expressed in the violent emissions of gas and lava.

In 1945, philosopher Hugo Breheme described in his excellent photographs depicting the beautiful scenery of *Popocatepetl* covered with white snow, freezing clouds, and the hot fields underground. Even now, during winter the volcano is completely covered with snow looking like a dazzling sun, with sunrays reflecting from the surface. He described that the animals slowly followed the zigzag stony paths with great difficulty. They breathed with difficulty owing to emission of gases and their faces were filled with ash. The volcanoes were 500-600 m deep and looked like a small lagoon of dark green colour. From outside the crater it seemed a gigantic plug was being raised with horrible sound, due to the pressure of the underneath lava. Once a Cuban soldier was climbing up the volcano in spite of bad weather. He fell down from the cliff several times. His body was shivering with terrible cold. Finally he could not climb up.

In December 1994, solid and volatile materials exploded with great force. The ashes spread out with abundance. The volatile gases reached about 8 km over the crater spreading 70 km away reaching Tampico in the center of Tamaulipas. To prevent a disaster the following security measures were adopted by the government.

- Strict vigilance.
- Seismic monitoring.
- Monitoring the possible deformation of the volcanic building.
- Geochemical monitoring to know the composition of gases and ashes.

Though *Popocatepetl* causes occasional disaster, but it brings boons to the agriculture around it and lower valleys. The amaranths (*Amaranthus* spp.) that grow abundantly on the slopes produce seeds, sacred to the Aztecs. It is one of the important items of worship to the deity. The mountains, such as *Popocatepetl* and *Iztaccihuatl* which receive clouds of water vapour, bring precipitations along with minerals and ashes to enrich soil fertility and high crop productivity in the lower valleys. These are considered as to be the blessings of God. Every year the inhabitants worship and offer fruits and other preparations to satisfy the god *Popo*. At the end of ceremony the devotees eat idols symbolising god *Popo*, made of maize flour and amaranth seeds, representing the body, and the seeds of *calaza* (gourd) representing teeth, and dry beans seeds representing eyes. It is mentioned that Spanish conquerors attempted to eradicate amaranths along with this symbol of culture, but failed, the amaranths survived.

Actually, many people living near *Popo* and *Iztaccihuatl* still remember *Popo* as the echo of their pre-hispanic inheritance. As reported by Williams, *Popo* is considered as the second god who will decide when it will ruin and when not.

Besides being the most active and the highest volcano in the world (5,426 m), *Popo* is also considered as one of the most dangerous volcanoes. Occasionally the volcano emits clouds of hot gases, rocks, water vapour and ashes, but it is capable of violent eruptions associated with rains mixed with snowy waters, and poisonous liquid clouds. In 1993, after twenty years of silence, *Popocatepetl* started anew its activities, emitting gases and ashes. During the Christmas season in 1994,



small explosions from the volcano compelled government to evacuate 25,000 people, most vulnerable to destruction by *Popo*. The volcano emitted clouds of ashes and incandescent rocks like fire balls over an area of 13 km around it.

Nobody knows when *Popo* first started its activities. More or less, these emissions happen every thousand years. The precipitation and ice water originate from the two glaciers located on the northern sides of *Popo*. These glaciers are the source of water for the inhabitants living around the volcano. The last great eruption of *Popo* occurred around 830 AD. This enriched the soil, producing bumper harvest of crops by the farmers residing near the volcano. The present eruption might cause severe destruction and death to about twenty million people, who reside over 80 km around *Popo*, including the residents of Mexico city and Morelos. Hundreds and thousands of the inhabitants of the city of Puebla, about 45 km away from the volcano as well as in the surrounding localities, may be affected severely by the devastation caused by the volcano.

In the case of violent eruptions, more than twenty million inhabitants will have to be evacuated from vulnerable areas. The government officers are in readiness to evacuate the residents in well-marked buses along the routes of evacuations.

According to a popular religious belief, the volcano *Popo* is a god, a mountain and a human figure at the same time. The people believe that *Popo* begins erupting when angry. It is believed that Don Gregorio, the king, married Donna Rosita and gave origin to human life. Farmers believe that *Popo* has to respire when it is suffocated. *Popo* is very kind to them, as it gives them food and water to drink to the inhabitants living around it.

According to Dr. Siebe, during three successive eruptions in 5000, 2150 and 1200 AD, layers of pumice stones and ashes were deposited, thereby covering the soil. The village Pompeya was completely buried under the layers of pumice stones, as large as 30 cm wide, which spread to a high level of over 25 km in the air and fell covering the surrounding localities in a dense layer leading to the death of all people. The large valley of Puebla, Cholula and Atlixco represent great extensions of deposits from the volcano extending to *Popo*. After one eruption *Popo* may become calm. It may occur any time after a long lapse of time. On 15 December 2000 (during my stay in Puebla) *Popo* erupted emitting huge incandescent rocks, water vapour, ashes and sulphur.

Since time immemorial, the people consider *Popo* as a god who captures clouds to create precipitations for crop production. They celebrate to offer worship to *Popo* at different times on 12<sup>th</sup> March for the preparation of the crop cycle; 2<sup>nd</sup> May and 3<sup>rd</sup> May Izta for rains for their crops. On 13<sup>th</sup> June they collocate crux and on 30<sup>th</sup> August in Izta, pray for a good harvest. On 12<sup>th</sup> March the farmers start to plough the land with horse-drawn, hand-made ploughs up to 15,000 m from the crater, a place considered to be sacred for a bumper harvest of crops. Near the crater the soil is soft and sandy, one has to walk carefully as one's legs get buried in the sandy soil.

The chief priest offers worship in the hole of the crater. He lights the sacred resin opal, which gives out a sweet smell and purifies the air. They offer the volcano traditional foods

including cooked turkey, fresh fruits, a plate of rice, a basket of maize tortilla and a bottle of brandy. The priest offers a white shirt and a garland for adoring the volcano and finally sings spiritual songs. Firecrackers are burst by youngsters at the beginning of lunch. In this atmosphere the freezing wind comes in contact with the hot gases emanating from the crater and coverts into water vapour. The festival is celebrated with a ceremonial dance. At 4.30 am the ceremony is terminated. People fill bottles with sacred sand to use in their garden to increase soil fertility.

During my stay on 12 November 2000 *Popo* increased its activities emitting a huge mass of gas, water vapour and ashes reaching a height of 6,000m, thereby causing terror in the city of Puebla. The government evacuated 2,200 inhabitants. Military was engaged for this purpose. On 14<sup>th</sup> December a gigantic emission of lava, incandescent gases, rocks and ashes ejected up to 20-30 miles above the crater of the volcano. Even in this situation, the farmers were unconcerned carried on grazing their cattle and harvesting maize, and other crops from their fields. They believe *Popo* will not do any harm to them. At 5.25 pm on 18<sup>th</sup> December, *Popo* started a violent eruption emitting with great force incandescent rocks, lava, vapour and ashes, accompanied with roaring sounds, I heard. Several such explosions followed subsequently. Several volcanologists and scientists were engaged day and night in monitoring the activities of *Popo*. On the night of 19<sup>th</sup> December the splendid illuminations kept changing constantly. The intensity of eruptions caused a shower of thousands and millions of particles heated to a temperature of 1,080 °C. On 19<sup>th</sup> December all the inhabitants within 12 km of *Popo* were evacuated and transported to about 80 safety camps. Food, blankets and medicines were supplied to the affected people.

On 19<sup>th</sup> December at 11 pm, the volcano calmed down and stopped emitting incandescent gases and burning rocks. The slopes of volcano were completely filled up with grey thick ash. The big glaciers were also covered with a thick cover of ash. Due to the heavy explosions and dashing of rocks against the mouth of the volcano, the pointed tip changed to a flat shape with deformation of the walls. Slight crevices or ruptures were observed in the morning of 20 December.

Thousands of people living in safety camps were agreed to go back to their residences, but were not permitted by the authorities in the apprehensions that volcano *Popo* may become active once again. On 15<sup>th</sup> January *Popocatepetl* broke his silence emitting gas and ashes with great force up to 30 km and a huge canopy of clouds extended to several kilometres reaching our locality. The sky was overcast with clouds of ash causing darkness in our locality. Fortunately nothing happened to us due to the mercy of lord *Popo*.

In the midst of such a great natural calamity, the inhabitants of *Popo* are habituated to all sorts of natural phenomena and continue their daily activities. They maintain their ethnic culture and religion. They harvest different plants for medicinal purposes and use different plants to meet their respective needs.

All these activities of volcano *Popo* representing nature's games will remain permanent as sweet memories throughout my life. I developed high regard for god *Popo*.



<http://www.cenapred.gob.mx/popo/UltimalmagenVolcanl.html>



Foto: Daniel Santos

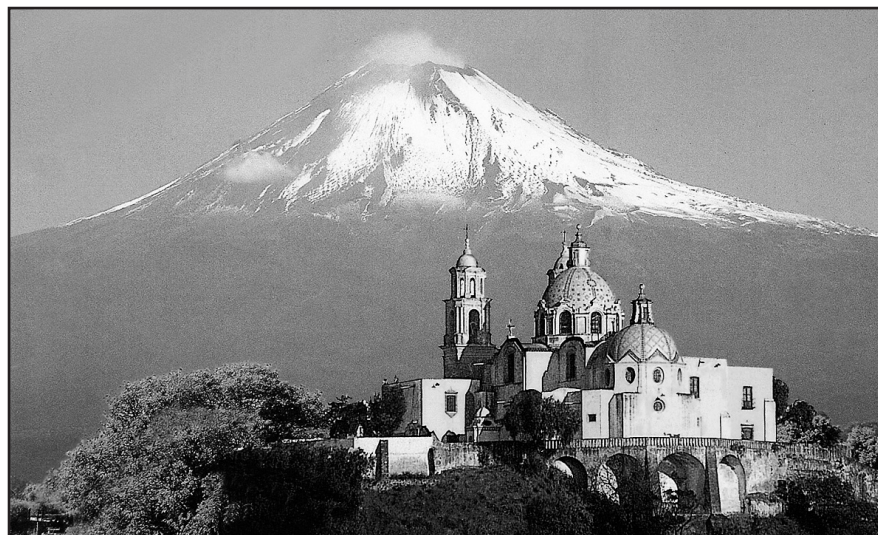


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