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THE PRESENT STATUS OF THE VOLCANOES OF CENTRAL AMERICA

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A volcano may be active, dormant, or extinct. In an established volcano the active and dormant stages may alternate, and often do. A volcano is "active when it is in eruption, dormant during a long cessation of activity,[1] and extinct after eruptions have altogether ceased." (C. M. Rice, *Dictionary of geological terms*, p. 444, 1947.)

According to this definition, the volcanic belt of Central America, extending from Guatemala in the northwest through El Salvador and Nicaragua to Costa Rica in the southeast, contains at the present time (1955–56) only five active volcanoes: Santiaguito (a dome on the flank of Santa Maria) and Fuego in Guatemala, Izalco in El Salvador, Concepción in Nicaragua, and Poas in Costa Rica. All others are either dormant or in solfatara stage.

In 1925, Sapper estimated that there were from twenty-three to twenty-five active volcanoes in this belt (Karl Sapper, *Los volcanes de la America Central*, p. 7, 1925). Doubtless, some of these volcanoes that are currently dormant were active at that time, but it seems highly improbable that all of them were active at the same time. Their distribution (fig. 137) does not lend itself to such a wholesale eruption. Most of these volcanoes occur in groups rather than singly. This would indicate that a given group has its own reservoir of magma, which is common to all the individuals composing the group. Thus, and in most cases, it could be substantiated by field evidence that when one member of the group is in eruption, serving as a safety valve for the ascending magma, the others are generally in a state of dormancy, with or without the accompanying fumarolic activity.

The common practice of grouping active and dormant volcanoes into a single category, "active," serves no purpose. It merely

[1] Cessation of true eruption as opposed to fumarolic activity.

lengthens the list and confuses the reader. Worse still, it minimizes the significance of dormancy in its relationship to the eruptive processes of volcanoes and brings to the forefront the question: "When is a volcano dormant?"

Were we to continue the present procedure of classifying volcanoes, there would be no need for recognizing the dormant stage at all, yet dormancy is an integral part of the life history of a volcano. Few active volcanoes are known that have not gone through a dormant phase. Even in those in which the interim periods between paroxysms are marked by mild activity, there have been periods of dormancy. It is during these periods that a volcano builds up its explosive forces. Most of the violent eruptions—those of Vesuvius, Mont Pelée, Novarupta and Katmai, Krakatao, Coseguina and others—have been preceded by periods of dormancy, either in the form of quiescence or characterized by fumarolic activity. The relation of volcanic eruptions to dormancy is manifest.

Admittedly, there is no stable line of demarcation between activity and dormancy. A dormant volcano may become active at any time and may continue its activity for an unspecified length of time. No long-range forecasting is possible for either phase. Nonetheless, *the two phases exist and must be recognized in classifying volcanoes.* Failure to do so defeats the very purpose of systematic classification. The "dormant phase" of a volcano, generally marked by fumarolic activity, is not one of the eruptive phenomena of an active volcano.

If, for any reason, the term "active" must be brought into play in association with dormant volcanoes, it would be far more appropriate if it were prefixed with the word "recently" and the year of the last eruption added. The phrase "recently active volcano" carries the implication that the volcano has passed into its dormant phase. It would be better still (where the dormant phase is limited to fumarolic activity), if the description were qualified with some phrase such as, "the activity is entirely fumarolic," as Bullard has chosen to do (Fred. M. Bullard, *Resumenes de los trabajos presentados,* XX Congr. Geol. Inter., Mexico, 1956, p. 6). In any case, dormant volcanoes may not be included with those that are in eruption, regardless of whether or not any qualifying term or phrase is used to denote their status. To select names of volcanoes from the active list and travel far to study them, only to find no more than wisps of imprisoned, post-eruptive gaseous material manifesting itself in one form or another, must be most

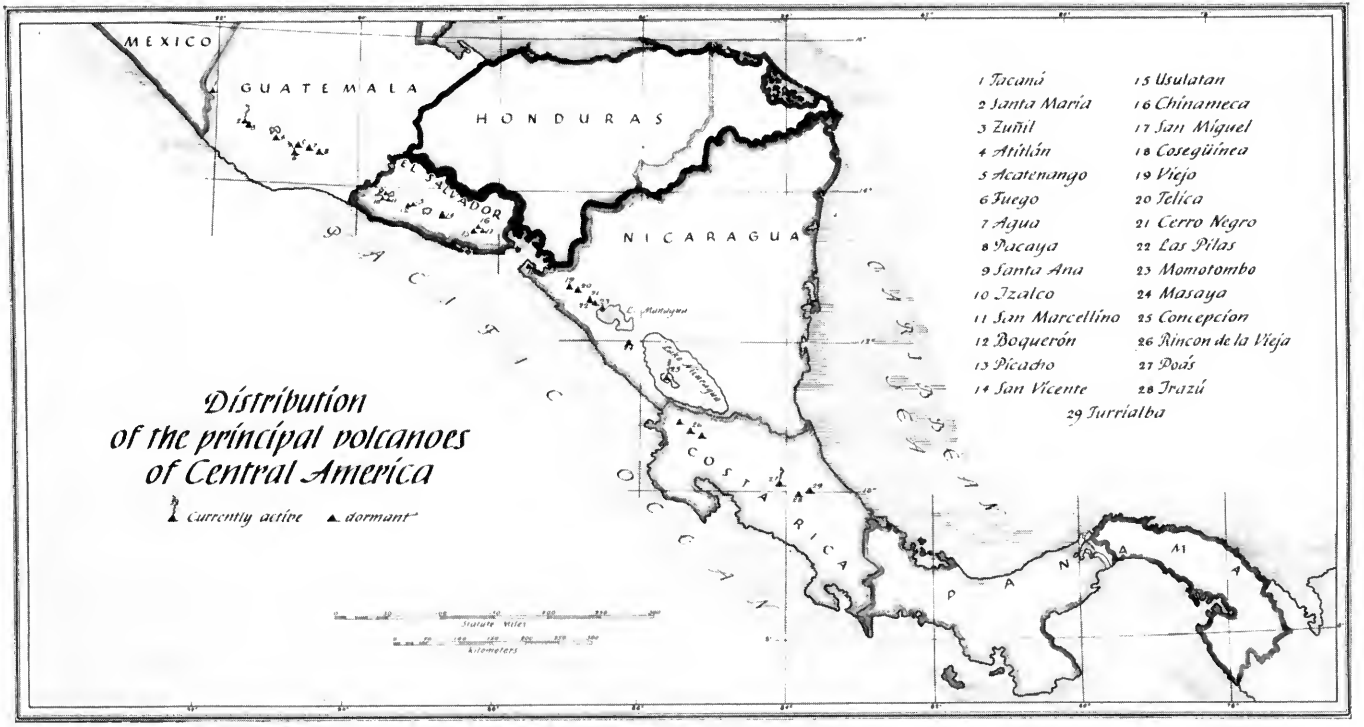

FIG. 137. Map showing distribution of principal volcanoes of Central America.

disconcerting. In my recent studies of volcanoes of Mexico and Central America, I have been repeatedly confronted with such situations. From the list of volcanoes purported to be active, one is led to believe that there is hardly a volcano in Central America that is not currently in eruption. To name only a few from the active list: Agua and Acatenango in Guatemala; Santa Ana and Boquerón in El Salvador; El Viejo and Telica in Nicaragua; and Turrialba and Rincon de la Vieja in Costa Rica. Can these be properly listed as active volcanoes? That a volcano was active in historic time does not, in itself, constitute a basis for listing it under "active volcanoes." Less than five years ago Paricutin was the most active volcano in the Western Hemisphere. Is it now? Should it be included in the "active list"?

In order to rest the classification of volcanoes on a surer foundation, it is imperative to differentiate the two stages: dormancy with or without fumarolic activity, and true eruptivity. The difference between the magnitude of energy and the nature of the material released by the two is far too great to give them the same or nearly the same essential meaning.

It may be relevant to mention here that the eruptions of Central American volcanoes have not followed any set course; that is, they have been erratic, not cyclic. The pre-requisite of cyclic recurrences is an orderly movement of magma and reactions within it. Whether or not this actually takes place is unknown. It would appear that the variable factors involved in the mechanics of volcanism would impede rather than facilitate the storing and releasing of energy and material in rhythmical regularity.

ADDENDUM

After this paper was in press, I received a copy of *Los volcanes activos de Guatemala y El Salvador* by Helmut Meyer-Abich (Anales del Servicio Geologico Nacional de El Salvador, bull. 3, December, 1956). It was a surprising coincidence that a publication containing a list of active volcanoes should appear at a time when the propriety of compiling such a list without giving due regard to the significance of dormancy was being questioned. Unfortunately, it is this very questioned procedure that the author of the publication has followed; in compiling the list he has made no recognition of the dormant phase of a volcano and has included in the "active" list practically every major volcano of the two republics. His list contains nineteen

volcanoes, ten in Guatemala and nine in El Salvador, all purportedly active. As can be established by current field observations, the list, in essence, is not that of active volcanoes but is one that represents a conglomerate grouping of volcanoes in varying phases of activity and decline, including some that are in solfatara stage. It would have been more appropriate if the title of the publication were: *Los volcanes de Guatemala y El Salvador*. During recent years, while engaged in field studies on volcanoes, I saw in Guatemala and El Salvador only three volcanoes which could properly be placed in the active category (see text).