

more become choked with copsewood. A few pools and springs of very salt and hot water remained as memorials of the former condition of the mountain. But this period of quiescence closed with the eruption of 1631—the most powerful of all the known explosions of Vesuvius, except the great one of 79. In the island of Ischia, Mont' Epomeo was last in eruption in the year 1302, its previous outburst having taken place, it is believed, about seventeen centuries before that date. From the craters of the Eifel, Auvergne, the Vivarais and central Italy, though many of them look as if they had only recently been formed, no eruption has been known to come during the times of human history or tradition. In the west of North America, from Arizona to Oregon, numerous stupendous volcanic cones occur, but even from the most perfect and fresh of them nothing but steam and hot vapors has yet been known to proceed.<sup>80</sup> But the presence there of hot springs and geysers proves the continued existence of one phase of volcanic action.

In short, no essential distinction can be drawn between dormant and extinct volcanoes. Volcanic action, as will be afterward pointed out, is apt to show itself again and again, even at vast intervals, within the same regions and over the same sites. The dormant or waning condition of a volcano, when only steam and various gases and sublimates are given off, is sometimes called the Solfatara phase, from the well-known dormant crater of that name near Naples.

**Sites of Volcanic Action.**—Volcanoes may break through any geological formation. In Auvergne, in the Miocene period, they burst through the granitic and gneissose plateau of central France. In Lower Old Red Sandstone

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<sup>80</sup> Eruptions occurred perhaps less than 100 years ago. Diller, Bull. U. S. Geol. Surv., No. 79.