of Guatemala and San Salvador were described in 1868 by M. Dollfuss-Montserrat, and Dr. Sapper has recently been engaged on a series of researches in this area.

There have been comparatively few geological publications dealing with the volcanoes and volcanic rocks of South America since the pioneer works of Humboldt. Dr. Alphons Stübel has, however, made a special study of the volcanic mountains of Ecuador, and published in Berlin in 1897 a special monograph of the district, accompanied by a Geological Map. Dr. Stübel gives a summary of his results in the introductory chapter, where he represents his views on volcanic phenomena from a general standpoint. He thinks it probable that in the first stage of the Earth's cooling, outpourings of magma occurred so frequently, and were of such colossal dimensions that the older volcanic material had only partially solidified when younger outflows burst forth and spread above them. In this way the cooling of the older magmas was indefinitely delayed, and they continued as local "peripheral" cisterns or reservoirs of volcanic material, occurring at very small depths below the surface, and extremely sensitive to any variation in the surrounding physical conditions. Dr. Stübel regards these "peripheral" reservoirs as the base of supply from which present volcanoes derive their volcanic material, and he correlates the surface extent of volcanic groups and the arrangement of the individual eruptive vents or fissures with the original shape and size of the respective areas of primitive, uncooled magma. The force which enables it to rise again to the surface resides, according to Dr. Stübel, in the magma itself, and the region of the least resistance is the path along which the liquid masses find their way to the surface. The conditions of least resistance, he adds, are most commonly met with at the limits of different kinds of rock.

The scientific study of the extinct volcanoes, and especially the exact petrographical examination of the products of eruption, has exerted a marked influence on the theoretical explanation of volcanic phenomena. It was only to be expected that exact knowledge should finally dispose of many fanciful hypotheses, such as those which explained volcanic action from the burning of coal-seams or petroleum, the decomposition of sulphur metals and other substances, from electricity, or the local disengagement of vapours.