

that similar appearances would be seen, if we could examine the floor of the sea in that part of the Mediterranean where the waves have recently washed away the new volcanic island; for when a superincumbent mass of ejected fragments has been removed by denudation, we may expect to see sections of dikes traversing tuff, or in other words, sections of the channels of communication by which the subterranean lavas reached the surface.

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## CHAPTER XXXI.

### ON THE DIFFERENT AGES OF THE VOLCANIC ROCKS—*continued.*

Volcanic rocks of the Older Pliocene period—Tuscany—Rome—Volcanic region of Olot in Catalonia—Cones and lava-currents—Ravines and ancient gravel-beds—Jets of air called Bufadors—Age of the Catalonian volcanos—Miocene period—Brown coal of the Eifel and contemporaneous trachytic breccias—Age of the brown-coal—Peculiar characters of the volcanos of the upper and lower Eifel—Lake craters—Trass—Hungarian volcanos.

*Older Pliocene Period—Italy.*—In Tuscany, as at Radicofani, Viterbo, and Aquapendente, and in the Campagna di Roma, submarine volcanic tuffs are interstratified with the Older Pliocene strata of the Subapennine hills, in such a manner as to leave no doubt that they were the products of eruptions which occurred when the shelly marls and sands of the Subapennine hills were in the course of deposition. This opinion I expressed\* after my visit to Italy in 1828, and it has recently (1850) been confirmed by the arguments adduced by Sir R. Murchison in favor of the submarine origin of the earlier volcanic rocks of Italy.† These rocks are well known to rest conformably on the Subapennine marls, even as far south as Monte Mario in the suburbs of Rome. On the exact age of the deposits of Monte Mario new light has recently been thrown by a careful study of their marine fossil shells, undertaken by MM. Rayneval, Vanden Hecke, and Ponza. They have compared no less than 160 species‡ with the shells of the Coralline Crag of Suffolk, so well described by Mr. Searles Wood; and the specific agreement between the British and Italian fossils is so great, if we make due allowance for geographical distance and the difference of latitude, that we can have little hesitation in referring both to the same period or to the Older Pliocene of this work. It is highly probable that, between the oldest trachytes of Tuscany and the newest rocks in the

\* See 1st edit. of Principles of Geology, vol. iii. chaps. xiii. and xiv. 1833; and former edits. of this work, ch. xxxi.

† Geol. Quart. Journ. vol. vi. p. 281.

‡ Catalogue des Fossiles de Monte Mario, Rome, 1854.