

PLEASANT HOURS

A PAPER FOR OUR YOUNG FOLK.



PIRD'S-EYE VIEW OF VOLCANO AND VOLCANELLO; OR, PRIMARY AND SECONDARY VOLCANO.

ABOUT SOME FIRE MOUNTAINS.

BY C. E. BRUCE.

What is a volcano? "A mountain," says the geography, "that sends forth fire and smoke from the top." A volcano is not of necessity a mountain. In the beginning of a volcano it is usually an aperture in the earth's crust. This opening has sometimes been made beneath the ocean, and in this case the volcano is not only not a mountain, but is below the level of the earth until enough matter is ejected from the opening to raise it to the level of the ocean. Some volcanoes on islands are but a few hundred feet above the general level of the island, and are by no means mountains. The height of a volcano depends on the material thrown out of the opening. If the ejected matter is lava in a very fine state, the height of the volcano will not be great. The volcanoes of the Sandwich Islands are illustrations of this class of volcano. If, on the other hand, the lava is very thick and viscous and great quantity of ashes and stone are thrown out with it, the volcanic cone will be of great height; such as Vesuvius, Cotopaxi, etc.

Again, a volcano is not a

"BURNING MOUNTAIN"

as some of the text books say. The violent action seen in a volcano is in no sense combustion, though it looks much like it. Of the six hundred volcanoes, said to be found on the surface of the

globe, more than one-half are extinct, or have exhibited no signs of fire or smoke, or anything like them, since the dawn of authentic history. Neither does the eruption always occur at the top, but quite as often from its side or base. The present crater of Stromboli is some distance below its top, and one can look down into it from points higher up on the mountain.

Neither do smoke or flame issue from the volcanic crater as is popularly supposed. That which seems to be smoke is really condensing steam, or watery vapour, and what looks like flame is merely the reflected glow from the molten lava beneath. If the vapour were not there to reflect the light we should see no "flame" or anything suggestive of it. When Vesuvius is not in a state of eruption, or is inactive, as when we visited it a few years ago, it is easy to see that the apparent flame only exists where there is vapour to reflect it. In great eruptions, however, enormous volumes of steam are poured forth, sometimes rising to the height of 20,000 feet, or about four miles, and when these are illuminated by the intense light of immense lava streams, overflowing the crater in all directions, and rolling down the sides of the mountain, it seems as if the world were on fire.

THE TREMENDOUS NATURE OF VOLCANIC ENERGY.

and its mountain-building work were both strikingly illustrated in the formation of Monte Nuovo, on the shores of the Bay of Naples, a few miles north of the city, in the year 1538. From a spot of level ground, we are told, water, at first cold but afterwards warm, began to issue; then the earth cracked open, showing incandescent matter within the fissure. Soon masses of stone, with vast quantities of pumice and mud began to be thrown up to a great height, and this continued for two days and nights, forming a hill more than four hundred feet high. Less violent eruptions followed at intervals during the next five or six days, when the volcanic action ceased, and the place has been undisturbed ever since. Monte Nuovo is now a smoothly rounded hill, covered with a dense growth of pines



EXTINCT CRATERS IN AUVERGNE.

to its summit; and as one rides past it on an excursion to Lake Avernus (itself no doubt the crater of a volcano, but now converted into a quiet and lovely lake with nothing to suggest its ancient terrors), you would never suspect that instead of being one of the

"EVERLASTING HILLS"

which fill the landscape, it was the sudden product of volcanic forces, acting only some three and a half centuries ago.

Many theories of volcanic action have been framed, but none of them are entirely satisfactory. Prof. Judd, in summing up the results of the latest investigations on this subject, says: "We do not at present appear to have the means of framing a complete and consistent theory of volcanic action."

It is a curious fact that volcanoes, with scarcely an exception, are contiguous to large bodies of water. All oceanic islands that are not coral are of volcanic origin, and many of them are still the scene of volcanic activity. There are two belts of volcanoes extending entirely around the globe, and nearly at right angles to one another. Where these cross or intersect each other is the region of greatest volcanic activity.

The proximity of volcanoes to the ocean has led to the theory that their action is due to the penetration of sea water through fissures or cracks in the rocky crust of the earth to the molten matter within. The chemical change that would follow, together with the expansive force of the enormous quantities of steam that would be formed in the confined space, are sufficient, we think, to account for all the phenomena. It is true there are difficulties with this

problem, but they are less than are found in any other of which we have any knowledge.

Stupendous as this action is when we look at some of its effects, still we should bear in mind that when compared with the vast bulk of the earth, it is of the slightest and most superficial character. A line the hundredth part of an inch thick, on a sixteen-inch globe, would bear about the same relation to the globe that the highest mountains on the earth do to its size.

FAMOUS VOLCANOES.

We give now a few particulars about some of the most remarkable volcanoes of the world. From A.D. 1600 to 1631 the crater of Vesuvius was as placid and pastoral as when Spartacus, the Roman Robin Hood, pranked it there gaily with his merry men in dolls dense and fragrant with hlex and myrtle.

In July, 1831, in the open sea off the harbour of Sciacca, on the south-western coast of Italy, the skipper of a Sicilian brig was astonished by the spectacle of a wave that swelled to the height of eighty feet, and when it subsided gave way to a dense column of smoke. This happened several times, at intervals of fifteen or twenty minutes. Scoriae and dead fish floated ashore in great quantities. In twelve days an islet had been formed, crateriform in shape, and capped with a sheaf of smoke and ashes two thousand feet high. The greatest breadth of the mound was eight hundred feet. Its height was variable, but usually at the extreme point of sixty feet. The materials ejected were too light to build a solid substratum or resist the action of the waves. Hence the short-lived island had in November dis-



CRATER OF NERABU.



WELLS CAUSED BY EARTHQUAKE.