

and formed the singular compound deposit under consideration, over which, probably at a subsequent period, the alluvial covering was drifted.

36. THE SAPPHIRE, RUBY, AND EMERALD.—Connected with the changes to which the metamorphic rocks have been subjected is the formation of some of those minerals, which from their beauty, splendour, and use as ornaments, are termed precious stones. The sapphire and oriental ruby, which are prized next to the diamond, and almost equal that gem in hardness, are found in trap rocks; and the common corundum, which is a species of the same mineral, and the emerald, occur in granite. The two former consist principally of aluminous earth;* and the supposition that they have been formed by intense igneous action, is not only probable, but is rendered almost certain, by the late experiments of M. Gaudin, who has succeeded in producing fictitious rubies, which, in every respect, resemble the natural gems. These were formed by submitting aluminum, with a small quantity of calcined chromate of potash, to the influence of a powerful oxy-hydrogen blowpipe, by which the materials were melted into a crystalline mass, that presented, when cooled, all the characteristics of the ruby. Instances occur in which garnets and other crystals are found in shale, when altered by

* The sapphire affords, by analysis, 98·5 of alumine, 0·5 of lime, and 1 of oxide of iron; the ruby, 90 of alumine, 7 of silex, and 1·2 of oxide of iron.—*Phillips's Mineralogy*.