

potash not excepted.* It would not be very surprising, therefore, as is well observed by the distinguished geognosist, Von Dechen, if we were to meet with a fragment of gneiss formed on the walls of a smelting furnace which was built of argillaceous slate and graywacke.

After having taken this general view of the three classes of erupted, sedimentary, and metamorphic rocks of the earth's crust, it still remains for us to consider the fourth class, comprising *conglomerates*, or *rocks of detritus*. The very term recalls the destruction which the earth's crust has suffered, and likewise, perhaps, reminds us of the process of cementation, which has connected together, by means of oxyd of iron, or of some argillaceous and calcareous substances, the sometimes rounded and sometimes angular portions of fragments. Conglomerates and rocks of detritus, when considered in the widest sense of the term, manifest characters of a double origin. The substances which enter into their mechanical composition have not been alone accumulated by the action of the waves of the sea or currents of fresh water, for there are some of these rocks the formation of which can not be attributed to the action of water. "When basaltic islands and trachytic rocks rise on fissures, friction of the elevated rock against the walls of the fissures causes the elevated rock to be inclosed by conglomerates composed of its own matter. The granules composing the sandstones of many formations have been separated rather by friction against the erupted volcanic or Plutonic rock than destroyed by the erosive force of a neighboring sea. The existence of these friction *conglomerates*, which are met with in enormous masses in both hemispheres, testifies the intensity of the force with which the erupted rocks have been propelled from the interior through the earth's crust. This detritus has subsequently been taken up by the waters, which have then deposited it in the strata which it still covers."† Sandstone formations are found imbedded in all strata, from the lower silurian transition stone to the beds of the tertiary formations, superposed on the chalk. They are found on the margin of the boundless plains of the New Continent, both within and without the tropics, extending like breast-works along the ancient shore, against which the sea once broke in foaming waves.

* D'Aubuisson, in the *Journal de Physique*, t. lxxviii., p. 128.

† Leop. von Buch, *Geognost. Briefe*, s. 75-82, where it is also shown why the new red sandstone (the *Todtliegende* of the Thuringian flötz formation) and the coal measures must be regarded as produced by erupted porphyry.