

of the interior of the earth increases towards the centre, and that it is cooling by the radiation of heat from the surface. Admitting these facts, it is easy to account for volcanoes, and many of the appearances which are presented by the several portions of the mineral crust. But there are many ways of applying these facts, and M. Cordier has one of his own; founding his explanation of volcanic activity upon the principle that solids contract in cooling; and if it be supposed that an enormous pressure be exerted upon a melted mass in the interior, by the external refrigerating mass, the intumescent rocks might be forced out. In this way M. Cordier explains the ejection of lava.

“At Teneriffe, in 1803, I calculated,” he says, “as nearly as possible, the amount of matter ejected by the eruptions of 1795 and 1798. I performed the same calculation in respect to the products of two eruptions, yet more perfectly isolated, which exist in the extinct volcanoes of France; to wit, in 1806, those of the volcanoes of Murol in Auvergne; and in 1809, those of the volcano of Cherchemus, near Izarles, at Mezin. I found the volume of matter in each eruption to be much less than one cubic kilometre, or 1,308,044,971 cubic yards. From these data, and others of the same kind, which I have obtained at other places, I feel justified in taking the volume of a cubic kilometre as the extreme limits of the product of eruptions in general. But such a mass is very small in relation to the whole earth. Applied to its surface, it would form a bed which would not be 1-500th part of a millimetre in thickness. More definitely, if we suppose the mean thickness of the crust of the earth to be 62,1 miles, a contraction of this envelope, which would shorten the mean radius of the central mass 1-494th of a millimetre (1-12694th of an inch), would be sufficient to produce the matter of one eruption.

“Proceeding upon these data, that the contraction produces the phenomenon (of volcanoes), and that over all the earth five eruptions take place yearly, we shall come to the conclusion, that the difference between the contraction of the solid crust of the earth and that of the internal mass, would not shorten the radius of that mass more than a millimetre (1-3937 of an inch) in a century.”

Whether we admit the accuracy of M. Cordier's deductions or not, it is evident that the same force which causes a