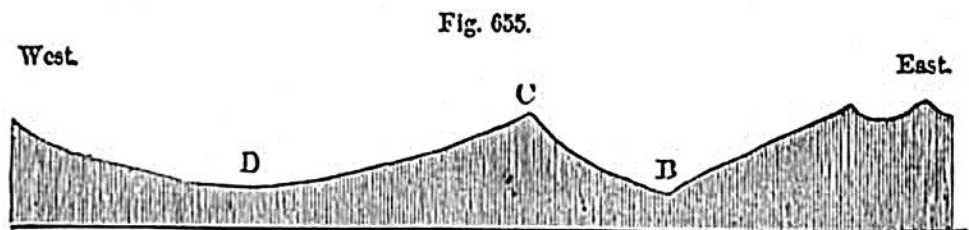


cooling slowly under great pressure, like those now incumbent on the impure lignite of S. Jorge. The dip of the latter cannot be clearly determined, since it is exposed to view for too short a distance; and the same may be said of the leaf-bed, part of which may be traced lower down the ravine. It seems, however, to dip to the north or towards the sea conformably with the general inclination of the basaltic and tufaceous strata.

A deep valley, called the Curral (B, fig. 655), surrounded by precipices from 1500 to 2500 feet high, and by peaks of still greater elevation, occurs in the middle of Madeira. It has been compared by some to a crater or caldera, for its upper portion is situated in the region where dikes and ejectamenta abound. The Curral, however, extends, without diminishing in depth, to below the region of numerous dikes, and it lays open to view all the beds *r*, *s*, fig. 653. Nor do the volcanic masses dip away in all directions from the Curral, as from a central point, or from the hollow axis of a cone. The Curral is in fact one only of three great valleys which radiate from the most mountainous district, a second depression, called the Serra d'Agoa (D, fig. 655), being almost as deep. This cavity is also drained by a river flowing to the south; while a third valley, namely, that of the Janella, sends its waters to the north. The section alluded to (fig. 655), passing through part of the axis of the island in an E. and W. direction, shows how the Curral and Serra d'Agoa, B and D, are separated by a narrow and lofty ridge, C, part of



Section through the central region of Madeira, from East to West.

- A. Part of the platform, called the Paul da Serra. B. Curral; a valley, 3000 feet deep.
C. Pico Grande. D. The valley of the Serra d'Agoa.

which is surmounted by the Pico Grande, before mentioned, nearly 5400 feet high. There is no essential difference between the shape of these three great valleys and many of those in the Alps and Pyrenees, where the valley-making process can have had no connection with any superficial volcanic action.

In the Alps, no doubt, as in other lofty chains, the formation of valleys has been greatly aided by subterranean movements, both gradual and violent, and by the dislocation of rocks. The same may be true of Madeira and of almost every lofty volcanic region; but, when we reflect that the central heights A and B, fig. 653, are more than 6000 feet above the sea, and that the waters flowing from them, swollen by melted snows, reach the sea by a course of not much more than 6 miles in the case of those draining the Curral, and by nearly as short a route in the Serra d'Agoa, we shall be prepared for almost any amount of denudation effected simply by subaerial erosion.