

lavas along the great east and west line of volcanic action, that we find the stony beds in the central region between *e* and *f*, fig. 653, nearly horizontal, or having a dip of no more than from 3 to 5 degrees, instead of having a very steep inclination like those in the walls of the Caldera of Palma.

These level or slightly inclined beds often form platforms, such as that called the Paul de Serra (*a*, fig. p. 516). But when we recede from the central axis, the lavas acquire an average slope of 10 degrees on the north (as between *e* and *g*, fig. 653), and of 15 on the south between *f* and *h*. Nearer the sea again, as at *i* and *l*, where the most modern lavas occur, the dip diminishes to 5 degrees, and even to  $3\frac{1}{2}$ , as at *k*, near Funchal. In this latter characteristic, however (the smaller inclination of the lavas near the sea, and their association there with modern cones of eruption, such as *m*, *n*, *o*), there is a strict analogy between Madeira and Palma. Buried cones of eruption also occur at many points, as at *p* and *q*, fig. 653, which have been overwhelmed by lavas flowing from the central region. The aggregate thickness of the more solid basalts alternating with tuffs rarely exceeds 1500 feet; but below Pico S. Antonio, or *n*, fig. p. 513, they attain a thickness of 3000 feet, being exposed to view on the sides of a deep valley called the Curral, presently to be mentioned.

As a general rule, the lavas of Madeira, whether vesicular or compact, do not constitute continuous sheets parallel to each other. When viewed in the sea-cliffs in sections transverse to the direction in which they flowed, they vary greatly in thickness, even if followed for a few hundred feet or yards, and they usually thin out entirely in less than a quarter of a mile. In the ravines which radiate from the centre of the island, the beds are more persistent, but even here they usually are seen to terminate, if followed for a few miles; their thickness also being very variable, and sometimes increasing suddenly from a few feet to many yards.

I saw no remains of fossil plants in any of the red partings or laterites above alluded to; but Mr. Smith, of Jordanhill, was more fortunate in 1840, having met with the carbonized branches and roots of shrubs in some red clays under basalt near Funchal. Nevertheless, Mr. Hartung and I obtained satisfactory evidence in the northern part of the island, in the ravine of S. Jorge, of the former existence of terrestrial vegetation, and consequently of the subaerial origin of a large portion of the lavas of Madeira. At *q* in the section (fig. 653) the occurrence of a bed of impure lignite, covered by basalt, had long been known. Associated with it, we observed several layers of tuff and clay or hardened mud, in one of which leaves of dicotyledonous plants and of ferns abound. The latter, according to Mr. Charles J. F. Bunbury, are referable to the genera *Sphenopteris*, *Adiantum*?, *Pecopteris*, and *Woodwardia*, one of them having the peculiar venation of *Woodwardia radicans*, a species now common in Madeira. Among the dicotyledonous leaves, some are apparently of the myrtle family, the larger proportion having their surfaces