

tary cinder cones rose at wide intervals from the basalt plain, as piles of scorix sometimes do from the vapour vents on the surface of a Vesuvian lava-stream, and were as unequivocally of secondary origin (Fig. 29). Riding hour after hour among these arid wastes, I became convinced that all volcanic phenomena are not to be explained by the ordinary conception of volcanoes, but that there is another and grander type of volcanic action, where, instead of issuing from a local vent, whether or not along a line of fissure, and piling up a cone of lava and ashes around it, the molten rock has risen in many fissures, accompanied by the discharge of little or no fragmentary material, and has welled forth so as to flood the lower ground with successive horizontal sheets of basalt. Recent renewed examination of the basalt plateaux and associated dykes in the west of Scotland has assured me that this view of their origin and connection, which first suggested itself to my mind on the lava-plains of Idaho, furnishes the true key to their history.

The date of these lava-floods of the Snake River is in a geological sense quite recent. They have been poured over the bottoms of the present valleys, sealing up beneath sheets of solid stone, river-beds and lake-floors with their layers of gravel and silt. The surface of the lava is in many places black and bare, as if it had cooled only a short time ago. Yet there has been time for the excavation of the Snake River cañon to a depth of 700 feet through the basalt floor of the plain. In so arid a climate, however, the denudation of this floor must be extremely slow. Much of the plain is a verdureless waste of loose sand and dust which has gathered into shifting dunes. Save in the gorges laid open by the main river and some of its tributaries, hardly any sections have yet been cut into.