

ordinary sedimentary detritus. We find it, indeed, passing insensibly into sandstone, shale, limestone, and other strata. Alternations of gravelly *peperino*-like tuff with a very fine-grained "ash" may frequently be observed. Large blocks of lava-form rock, as well as of the strata through which the volcanic explosions have taken place, occur in the tuffs of most old volcanic districts. Occasionally such ejected blocks or bombs are found among fine shales and other strata, the lamination of which is bent down round them

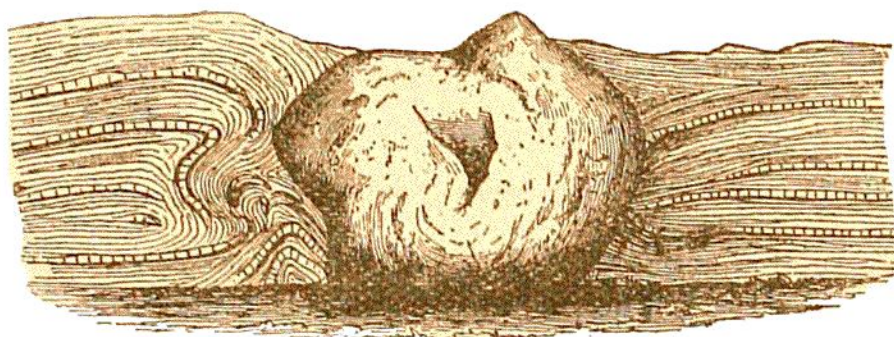


Fig. 305.—Ejected volcanic block (12 by 15 by 17 inches) in Lower Carboniferous Shales, Pettycur, Fife.

in such a way as to show that the stones fell with considerable force into the still soft and yielding silt or clay (Fig. 305).⁷

Volcanic tuffs and conglomerates occur in interstratified beds without any accompanying lava, much more commonly than do interstratified sheets of lava, without beds of tuff; just as, in recent volcanic districts, it is more usual to find cones of ashes or cinders without lava, than lava-sheets without an accompaniment of ashes. Masses of fine or gravelly tuff, several hundreds of feet in thickness, without the intervention of any lava-bed, may be observed in the volcanic districts of the Old Red Sandstone and Carboniferous systems in Scotland. These furnish evidence of long-continued volcanic action, during which

⁷ See Geol. Mag. i. 1864, p. 22.