

fragmentary materials were showered out over the water-basins, mingled with little or no ordinary sediment. On the other hand, in these same areas, thin seams of tuff interlaminated with sandstone, shale, or limestone, afford indications of feeble intermittent volcanic explosions, whereby light showers of dust were discharged, which settled down quietly amid the sand, mud, or limestone accumulating at the time. Under these latter circumstances, tuffs often become fossiliferous; they inclose the remains of such plants and animals as might be lying on the lake-bottom or sea-floor over which the showers of volcanic dust fell, and thus they form a connecting link between aqueous and igneous rocks.

As illustrations of the nature of the stratigraphical evidence for former conditions of volcanic activity, two sections from Linlithgowshire may here be given. In the first of these (Fig. 306), a black shale (1) of the usual carbonaceous type, with remains of terrestrial plants, lies at the bottom. It is covered by a bed of nodular bluish-gray tuff (2), containing black shale fragments, whence we may infer that the underlying or some similar shale was blown out from the site of the vent that furnished this dust and gravel. A second black shale (3) is succeeded by a second thin band of fine pale yellowish tuff (4). Black shale (5) again supervenes, containing rounded fragments of tuff, perhaps lapilli intermittently ejected from the neighboring vent, and passing up into a layer of tuff (6), which marks how the volcanic activity gradually increased again. It is evident that, but for the proximity of an active volcanic vent, there would have been a continuous deposit of black shale, the conditions of sedimentation having remained unchanged. In the next stratum of shale (7), thin seams and nodules of clay-ironstone accumulated round decomposing

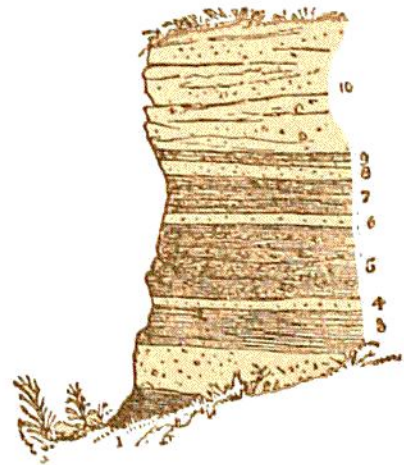


Fig. 306. — Section of interstratifications of tuff and shale, Old Quarry, Wester Ochiltree, Linlithgowshire (Lower Carboniferous).