farther, and not deposited in the same places as the grains of quartz; and since the force and velocity of the stream varies from time to time, layers of mica or of sand will be thrown down successively on the same area.

Original horizontality.—It is said generally that the upper and under surfaces of strata, or the planes of stratification, are parallel. Although this is not strictly true, they make an approach to parallelism, for the same reason that sediment is usually deposited at first in nearly horizontal layers. The reason of this arrangement can by no means be attributed to an original evenness or horizontality in the bed of the sea; for it is ascertained that in those places where no matter has been recently deposited, the bottom of the ocean is often as uneven as that of the dry land, having in like manner its hills, valleys, and ravines. Yet if the sea should sink, or the water be removed near the mouth of a large river where a delta has been forming, we should see extensive plains of mud and sand laid dry, which, to the eye, would appear perfectly level, although, in reality, they would slope gently from the land towards the sea.

This tendency in newly-formed strata to assume a horizontal position arises principally from the motion of the water, which forces along particles of sand or mud at the bottom, and causes them to settle in hollows or depressions, where they are less exposed to the force of a current than when they are resting on elevated points. The velocity of the current and the motion of the superficial waves diminish from the surface downwards, and are least in those depressions where the water is deepest.

A good illustration of the principle here alluded to may be sometimes seen in the neighborhood of a volcano, when a section, whether natural or artificial, has laid open to view a succession of various-colored layers of sand and ashes, which have fallen in showers upon uneven ground. Thus let A B (fig. 1) be two ridges with an intervening valley. These original inequalities of the surface have been gradually effaced by beds of sand and ashes *c*, *d*, *e*, the surface at *e* being quite level. It will be seen that although the materials of the first layers have accommodated themselves in a great degree to the shape of the ground A B, yet each bed is thickest at the bottom. At first a great many particles would be carried by their own gravity down the steep sides of A and B, and others would afterwards be blown by the wind as they fell off the ridges, and would settle in the hollow, which would thus become more and more effaced as the strata accumulated from *c* to *e*. This levelling operation may perhaps be rendered more clear to the student by supposing a number of parallel trenches to be dug in a plain of moving sand, like the African desert, in which case the wind would soon cause all signs of these trenches to disappear, and the surface would be as uniform as before. Now, water in motion can exert this levelling power on similar materials more easily than air, for almost all stones lose in

Fig. 1.