

that before he arrives at the districts in which coal is found, he will first pass a tract of clay and sand; then another of chalk; that he will next observe numerous quarries of the calcareous freestone employed in architecture; that he will afterwards pass a broad zone of red marly sand; and beyond this will find himself in the midst of coal mines and iron furnaces. This order he will find to be invariably the same, whichever of the routes above indicated he pursues; and if he proceeds further, he will perceive that near the limits of the coal-fields he will generally observe hills of the same kind of compact limestone, affording grey and dark marbles, and abounding in mines of lead and zinc; and at a yet greater distance, mountainous tracts in which roofing slate abounds, and the mines are yet more valuable; and lastly, he will often find, surrounded by these slaty tracts, central groups of granitic rocks.

The intelligent enquirer, when he has once generalised these observations, can scarcely fail to conclude that such coincidences cannot be casual; but that they indicate a regular succession and order in the arrangement of the mineral masses constituting the Earth's surface; and he must at once perceive that, supposing such an order to exist, it must be of the highest importance to æconomical as well as scientific objects, to trace and ascertain it.

§ 3. If with these views he is led to investigate the subject still further, he will find these mineral masses disposed for the most part in stratified beds, not exactly parallel to the horizon, but more or less inclined with reference to that plane; so that the edges of these beds, emerging in succession from beneath each other, make their appearance one after the other on the surface, thus:



This emergence is called the outcrop or basset of the strata. The other technical terms connected with this disposition, will be found in the subjoined note.*

It is obvious that by this arrangement a much greater thickness of strata is exposed to our observation than could have been had their planes preserved an horizontal direction; for in

* The angle of inclination between these planes and that of the horizon, is called their dip, or pitch; the strata are indifferently said to dip and pitch from, or to rise towards the horizontal plane—an horizontal or dead level line drawn along the planes of the strata; or in other words their intersection with an horizontal plane, is called their line of bearing or drift line.