

mines several times, under different beds of coal, with a perfect similarity both in the succession and thickness of each. In some instances, a single bed of stone of vast thickness separates two beds of coal. In other instances, only a very thin stratum of shale or clay lies between coal beds.

Though numerous beds or seams of coal occur in one coal-field, very rarely more than three of these are worked. The thickness of the coal strata in the same coal-field, often varies from a few inches to several yards; but each stratum generally preserves nearly the same thickness throughout its whole extent. Instances to the contrary sometimes occur, in which the same bed will become narrower or wider, and sometimes be divided by a stratum of incombustible earthy matter, in different parts of its course. Few beds of coal are worked at a great depth, which are less than two feet in thickness. The stratum lying over a bed of coal is called its roof, and the stratum under it the floor. The facility of getting coal depends very much on the compactness of the stone which forms the roof, not only on account of the security from falling, but for keeping out the upper water, and preserving the pit in a dry state. The great expense incurred in supporting the roof when it is loose, frequently prevents a valuable bed of coal from being worked, or absorbs all the profit. In some situations, the roof is indurated clay, impregnated with bitumen and pyrites. When this falls down, and is intermixed with water and small^a coal at the bottom, it takes fire spontaneously; on which account the miners close up the space with common clay, where the coal has been worked, to prevent the access of air to the combustible matter. This kind of combustible clay is called *tow*; it is common in the Ashby-de-la-Zouch coal-field, and in Staffordshire. The floor or stratum on which the coal lies, consists of clay in various degrees of induration, and is almost always of that kind which will resist the action of fire, called fire-clay, suited for furnace bricks and crucibles.

It has been before observed that coal strata are frequently bent in concavities, resembling a trough or basin, dipping down on one side of the field and rising on the other. In Plate IV. fig. 2. the section of a coal-field is represented, in which the coal strata *c c c*, *d d* are inclined in this manner, but partially dislocated by a fracture or fault at *f*. The extremities of the lowest stratum *c c*, are several miles distant in some coal-fields, in others not more than one mile.

In the great coal-field in South Wales, which is rather a long trough than a basin, the strata are arranged in this manner over an extent of nearly a hundred miles in length, and a variable breadth of from five to twenty miles. It is partly broken into by Caermarthen Bay, but it forms an extent of surface exceeding twelve hundred square miles. It contains twenty-three beds of workable coal, which are said by Mr. Martin to make together ninety-five feet in thickness of this valuable mineral; this will yield sixty-four million tons of coal