joining coal strata in Derbyshire, Leicestershire and Warwickshire.* In confirmation of the opinion here advanced, a saline spring, has very recently been discovered, about four miles north west of Nottingham; and coal has been lately found under the red marle and sandstone on the south side of Charnwood Forest, where it had not before been suspected to exist. It may, however be proper to say, that no search of this kind by boring should be undertaken by any one, to whom the expense, in case of failure, would be a serious inconvenience.

The dip and direction of the strata in the coal-fields nearest to the estate where the search is to be made, should be well known. If the strata dip towards the estate, it is probable the coal may extend under it: if they dip from it, the search should not be undertaken. To make this intelligible, see Plate III. fig. 3. *a. a. a.* are a series of coal strata, or, as they are provincially called, coal measures, dipping toward the side B. *c. c. c.* are strata of red marle or sandstone, lying unconformably over the coal strata. Now, according to this arrangement, a search for coal might be successful, though the bed might be at too great a depth to be worked. Whereas, on an estate at D, as the coal strata dip from it, were we to bore to the center of the earth, we could never find the beds 1. 2. 3. 4. If the estate B is situated a considerable distance from a known coal-field, the strata of coal may bend as represented Plate IV. fig. 2. and crop out at *a*, before they reach the station *b*, where the trial is made; and if the outcrop be covered by the red sandstone, this cannot be known but by trial.

Rock salt or brine springs are most likely to be found by boring in the vicinity of massive gypsum, without regarding the stratification. As for the districts where the upper secondary strata of lias, oolite, and chalk occur, all search for the regular coal strata must there be fruitless; as the vast thickness of these calcareous formations precludes the hope of success.

Coal mines, it is well known, are subject to fatal explosions of what is called the fire-damp, or carburetted hydrogen gas. This gas appears to be generated by the decomposition of iron pyrites in coal, and may often be heard issuing from the fissures in coal-beds with a bubbling noise, as it forces the water out along with it. The choke-damp, as it is called, is either carbonic acid gas, (fixed air,) or the unrespirable residue of air left after explosions, when all the oxygen is consumed. (See Appendix.)

The regular or great coal formation has never been discovered at a very considerable elevation above the level of the sea: it is generally found towards the feet of great mountain chains, or in the valleys near to lofty mountain ranges. The geology of large portions

* Since the third edition of this work was published, coal has been found under the red marle and sandstone near Manchester.