

improvements ; but it is only some kinds of coal that are proper for the purpose. Inattention to this circumstance has frequently led landed proprietors to great unprofitable expense. Finding ironstone and coal in abundance upon their estates, they have constructed furnaces and other works at a considerable cost, and have discovered too late that the coal, however suitable for domestic or other uses, was unfit to make iron of a marketable quality. To make good iron from the best ironstone, it is necessary that the coal should be as free as possible from every substance with which sulphur is combined. It should possess the property of forming a hard coke or cinder ; and if it have the quality of cementing or *caking*, it is the more valuable, as the small coal can then be used for the purpose of coking, which is frequently wasted where it does not possess this quality.

Different opinions have been formed respecting the origin of coal. In the primary and transition mountains, a particular species of coal occurs in small quantities, as before stated, which is extremely hard and splendent, and burns without smoke or flame, and is called anthracite ; it resembles and appears to pass into, the mineral called plumbago or graphite. Common coal also sometimes graduates into plumbago. Plumbago and anthracite are so completely mineralized as to present no indications of a vegetable origin ; but the slate, in which anthracite is imbedded, sometimes contains impressions of ferns, and the strata over common coal, abound in vegetable impressions : the cortical part of the vegetable is frequently seen converted into mineral coal. It is not often that vegetable impressions are found in the coal itself ; but some of the regular coal beds in the Dudley coal-field, of which I have specimens of considerable size and thickness, are composed of distinct layers of vegetables, converted into true mineral coal ; but, when separated, preserving the distinct cortical impressions of plants throughout the whole thickness of the coal. It is reasonable to believe, that all the coal beds in the same field are also formed of vegetable matter, though the impressions may be effaced. I have also a specimen of common coal from Derbyshire, with different cortical impressions. Granting that common coal is originally derived from the decomposition of vegetables, it may be fairly asked,—from whence did the vegetable tribes originally derive the carbon, of which their solid parts are principally composed ? Carbon either previously existed in nature, or trees and plants had the power of forming it from more simple elements. Neither of these opinions is improbable, nor are they at variance with each other. If carbon be a compound substance, of which hydrogen is a constituent part, it may be formed by the process of vegetation, or it may exist also in the mineral kingdom, independent of organic productions. That carbon is an original constituent elementary part of the globe, can scarcely be doubted, when we consider that, united with oxygen, it is an important constituent part of all limestone mountains, composing nearly one half, by weight, of