

‘ That the same action, having operated through a longer period, has produced the change on the brown coal of Bovey, is rendered extremely probable by the geognostic relations of that coal. From this to the harder lignites, *surturbrand* and jet, the transition is so gradual, that there seems no reason to limit the power of water to produce the effect of bituminization in all these varieties, nor is there aught in this change so dissonant from other chemical actions, as to make us hesitate in adopting this cause.’ (G. T. vol. 2. p. 19.)

3. Although it thus appears that water, rather than fire, has been the agent employed in the first bituminization of vegetable matter, yet there is a wide interval between the external characters of these bituminous lignites and true coal, although their chemical composition is nearly the same. As, therefore, many philosophers of high reputation have supposed that fire has been the probable agent in this part of the conversion, Dr. Mac Culloch felt it incumbent to examine what analogies in favour of this hypothesis result from experiment; and he represents those results as so far according with this theory, that by the application of heat under compression to jet, it was fused into a substance possessing the true characters of coal. It is possible, therefore, that the agency of fire applied to beds of lignite and peat, may convert, not wood, but vegetable matter previously bituminized, into coal.

Dr. Mac Culloch does not however pronounce in favour of this theory, but merely points out its possibility; fully admitting, on the other hand, that we cannot presume to state the period which nature has used in her operations, nor during how long a space the causes have continued to act, before the vegetable matter has undergone its ultimate change into coal; nor, therefore, whether the long continued agency of water and pressure may not have produced the required changes.

We ourselves, on the assumption that coal really is derived from altered vegetable matter, should infinitely prefer that view which refers the whole of this change to water; thinking it greatly more probable, that the same agents which have converted wood into jet should also have accomplished the last and least important steps of the same process, by converting it into coal. We cannot consider this as a sufficiently ‘*dignus vindice nodus*’ to evoke the god of fire for its solution; we are certain, from the nature and contents of the strata associated with coal, that water was present; but had fire been the agent employed in consolidating the coal, it is difficult to understand why it has not also consolidated the shales and sandstone. The coal districts no where present any appearances which obviously suggest