coal-measures, and as we are nearly certain they are marine in the former, we can have no good reason to pronounce them certainly fluviatile in the latter: it is nevertheless very remarkable, that these problematical shells are the only ones at all common in the coal-measures, and that remains of undoubtedly marine origin should be so very rare; we shall however find in the next section, that in the millstone-grit and shale formation the alternation of coal-strata with calcareous beds of marine origin is clearly ascertained.

We proceed briefly to notice the theoretical deductions concerning the origin of the coal-formation, and the circumstances under which this singular collection of strata were accumulated, which may be built on the nature of the remains they include.

It has been argued from the abundance of vegetable remains in the coal-field, as well as from the composition of the coal itself, that this mineral owes its origin to the vegetable kingdom; but it has been contended, on the other hand, that if we ascribe this origin to the strata of coal, we are bound by parity of reasoning to maintain, that all calcareous beds have been formed from the detritus of shells, because in many such beds, abundance of testaceous remains are preserved, and the same analogy of composition also exists in this instance; and it is further urged that as such an origin cannot with any plausibility be ascribed to the anthracite and plumbago which occur in primitive rocks, so neither ought we to ascribe it to substances so similar, when found in this part of the series.

The force of these objections must be duly allowed; yet when we observe the remains above described so peculiarly characterising, by their abundance, the carboniferous strata; when we observe the cortical part of these vegetables generally converted into a coal identical with the contiguous strata of that mineral; and when we observe in the lignites of Bovey Heathfield, the most decided wood pass into a substance nowise differing from common coal in chemical characters, the impression left on the mind seems clearly in favor of the hypothesis which derives these fossil combustibles from the vegetable kingdom, and this opinion is strongly sanctioned by the experiments and inferences of Hatchett and Mac Culloch.

The nature of the remains found in the coal-strata gives no countenance to the idea that the bituminization of animal matter can in any sensible degree have contributed to form them.

How then, on the above supposition, are we to account for such a surprising accumulation of vegetable matter arranged in repeated strata (sometimes to the number of sixty and even