

we know not if this proportion of carbonic acid be now constant in the air, and must admit that a reconversion of all the coal to carbonic acid gas *would* give a very large addition of this gas to the atmosphere,) we shall understand how the vegetation of the carboniferous period might be *even more abundant than that now seen between the tropics*, and at the same time comprehend the *possibility of there being no land animal on the globe*. Within what limits of proportion of carbonic acid in the air plants and animals can live, we do not know; but in this respect they are reciprocally circumstanced,—plants require most, animals require least.

De Luc, Brongniart, and other writers, prefer to explain the origin of coal from somewhat like peat-bogs, or from the decay or overwhelming of forests *in situ*: and this may possibly be found true of particular cases; but it is not to be admitted as a general explanation. In most coal districts are from 20 to 60 seams of coal, alternating with sandy and argillaceous strata, for each series of which (coal, sandstone, shale) the land must have been raised, decomposed to soil, covered by forests or peat, and then again submerged to receive sediments from the land or littoral agitation; and *these numerous risings and fallings of the bed of the sea have left no independent proof of their occurrence*. Undoubtedly there is a plausible argument furnished to De Luc's hypothesis, by the stems of sigillaria, supposed to be in attitude and place of growth; but until lepidodendra and coniferous trees, of which coal at least in part consists, shall have been similarly found, and in equal abundance, and until the reality of these stems being rooted shall be proved, we must not yield the general arguments to this exceptional and imperfectly ascertained phenomenon.* Inundations from the upraised land, littoral action of the sea, chemical decomposition of the oceanic waters, eruptive action

* What have been called the roots of these erect trees are not always really parts of the same kind of plant. We do not yet know *what were the roots of sigillaria*.