

and geological changes which then prevailed;* secondly, as affecting, in no small degree, the actual condition of the human race.

The strata in which these vegetable remains have been collected together in such vast abundance have been justly designated by the name of the carboniferous order, or great coal formation. (See Conybeare and Phillips's *Geology of England and Wales*, book iii.) It is in this formation chiefly, that the remains of plants of a former world have been preserved and converted into beds of mineral coal; having been transported to the bottom of former seas and estuaries, or lakes, and buried in beds of sand and mud, which have since been changed into sandstone and shale. (See Pl. 1, sec. 14.)†

* The nature of these vegetables, and their relations to existing species, will be considered in a future chapter.

† The most characteristic type that exists in this country of the general condition and circumstances of the strata composing the great carboniferous order, is found in the north of England. It appears from Mr. Forster's section of the strata from Newcastle-upon-Tyne to Cross Fell, in Cumberland, that their united thickness along this line exceeds 4,000 feet. This enormous mass is composed of alternating beds of shale or indurated clay, sandstone, limestone, and coal: the coal is most abundant in the upper part of the series, near Newcastle and Durham, and the limestone predominates towards the lower part; the individual strata enumerated by Forster are thirty-two beds of coal, sixty-two of sandstone, seventeen of limestone, one intruding bed of trap, and one hundred and twenty-eight beds of shale and clay. The animal remains hitherto noticed in the limestone beds are almost exclusively marine; hence we infer that these strata were