exercise a great influence upon the final result. It is to these two causes—that is to say, to pressure and to the central heat—that we may attribute the differences which exist in the mineral characters of various kinds of coal. The inferior beds are *drier* and more compact than the upper ones; or less bitumincus, because their mineralisation has been completed under the influence of a higher temperature, and at the same time under a greater pressure.

An experiment, attempted for the first time in 1833, at Sain-Bel, afterwards repeated by M. Cagniard de la Tour, and completed at Saint-Etienne by M. Baroulier in 1858, fully demonstrates the process by which coal was formed. These gentlemen succeeded in producing a very compact coal artificially, by subjecting wood and other vegetable substances to the double influence of heat and pressure combined.

The apparatus employed for this experiment by M. Baroulier, at Saint-Etienne, allowed the exposure of the strongly compressed vegetable matter enveloped in moist clay, to the influence of a longcontinued temperature of from 200° to 300° Centigrade. This apparatus, without being absolutely closed, offered obstacles to the escape of gases or vapours in such a manner that the decomposition of the organic matters took place in the medium saturated with moisture, and under a pressure which prevented the escape of the elements of which it was composed. By placing in these conditions the sawdust of various kinds of wood, products were obtained which resembled in many respects, sometimes brilliant shining coal, and at others a dull coal. These differences, moreover, varied with the conditions of the experiment and the nature of the wood employed; thus explaining the striped appearance of coal when composed alternately of shining and dull veins.

When the stems and leaves of ferns are compressed between beds of clay or pozzuolana, they are decomposed by the pressure only, and form on these blocks a carbonaceous layer, and impressions bearing a close resemblance to those which blocks of coal frequently exhibit. These last-mentioned experiments, which were first made by Dr. Tyndall, leave no room for doubt that coal has been formed from the plants of the ancient world.

Passing from these speculations to the Coal-measures :---

This formation is composed of a succession of beds, of various thicknesses, consisting of sandstones or gritstones, of clays and shales, sometimes so bituminous as to be inflammable—and passing, in short, into an imperfect kind of *coal*. These rocks are interstratified with each other in such a manner that they may consist of many alterations. Carbonate of protoxide of iron (clay-ironstone) may also be