

ures; but, says the opponent of the theory, by a parity of reasoning, we ought to ascribe the origin of those beds where large quantities of shells are found, to the destruction of shellfish. Could no other argument be used in favour of the vegetable origin of coal, we must give up the opinion altogether; but other reasons have been used for the support of the theory, and the combination of these is, we think, conclusive. The strongest individual argument is the absolute formation of coal from plants. It has been already proved that jet has a vegetable origin, and it might, therefore, be supposed that it is capable of conversion into coal. To determine the problem experimentally, Dr. Macculloch reduced a quantity of jet to powder, and placed it in a gun-barrel, covering it with clay. By exposing it to a moderately red heat, the jet was converted into a substance having precisely the same chymical and external characters as coal, while the clay was changed into a substance similar to that found in the coal measures, and called coal shale. An appearance has been observed at Meisner, in Hesse, which has a strong resemblance to the result of the experiment we have just described. A thick bed of imperfect coal is there covered by an enormous mass of basalt, from which it is separated by a thin bed of clay. The upper part of the bed of lignite is converted into coal, while the lower part still retains the fibrous woody structure.

Gathering together the variety of evidence that has been alluded to, we seem to be led to the conclusion that vegetable substances may be converted into coal by the united action of moisture, pressure, heat, and exclusion of air. The heat has, in many instances, resulted from the actual ejection of volcanic rocks among the beds; and where this has not occurred, the heat has been sufficiently intense, from the peculiar activity of volcanic causes at the time, to produce the change.

This brief account of the evidence which has been collected in reference to the origin of coal, may serve as an example of the manner in which the geologist pursues his inquiries into the origin of rocks, and to prove that his opinions are not mere speculative conjectures.

#### ORGANIC REMAINS.

It has been already stated that many stratified rocks con-