

are found the Silurian, Devonian, and probably also the Carboniferous limestone and coal-formations.

According to the numerous and very interesting plates of this fine work, the denudation of the coal strata in the region under consideration would have been such that there would not have remained in bulk the tenth part of that which existed in the first instance. It is true that the authors have voluntarily abstained from showing the scale of their plates; but it must not be thought exaggeration if it is said that they attribute to the denudations of the coalfields an importance at least as great as that which has just been shown.

If we consider the materials of the strata which separate the coal-seams as being almost entirely the result of the erosion of the slopes of the great coal valley, which slopes experience periodically a relative elevation, having reference to the areas of deposit, &c., the important phenomena of denudation during the period of the coal-formation must be admitted. But, after the conclusion of this, and of the compression which ultimately gave it its present form, it appears unnecessary to suppose that the coalfield itself underwent a denudation exceeding a few hundred yards.

Besides, in order to justify the frequent supposition of a colossal denudation of the coal-measures, it would be necessary to be able to show in the strata most recently formed at its expense either Carbonaceous deposits or thick layers of rock coloured black by the coal, which would account for the fresh form taken by the immense quantity of coal resulting from such a denudation. But neither the colouration of the black clays at the base of the Cretaceous formation of Hainaut, nor that of certain much more extensive Jurassic deposits, is sufficient, it is true, to justify this theory, even if we admit that this colouration could only be due to coal very finely divided.

It is believed that in the Franco-Belgian basin the upper coal-seams have had from the beginning a less extent than the lower seams, and that the vegetable matters of which they are formed were deposited in small drawn-out cuvettes or basins, with slightly sloping sides, and whose surface has successively diminished. This reduction is explained if we admit the mobility of the base of the coal-measures in process of formation, and also friction where they came in contact with the firm portion of the southern strata. In the same way one or the other of the hypotheses enunciated above would account for the reduction of the areas of deposit in this direction. Lastly, admitting that the downward movement of the coal-formation was only slight in the region of Samson, and was more pronounced in the east towards Liège, and in the west towards Charleroi, we shall understand how the deposit-basins of the different coal-seams were placed and diverted in these two directions, while gradually decreasing in width in a northerly and southerly direction.

At the beginning of the coal epoch the basins of Liège on the one hand, and of Namur and Hainaut on the other, were connected by the deposits covering the Calcareous base of Samson, and which was removed during the process of denudation; but these two basins become independent, if, as can be proved, the western extremity of one, and the eastern extremity of the other only followed in a slight degree the downward movement of the axis of the deposits which continue to augment towards Liège and Charleroi.

The basin-like formation of our coal deposits, so pronounced to-day, owing to movements later than their formation, must have been slightly indicated from their very commencement.

The areas of deposit of the different seams evidently extended beyond the actual outcrops, because, independently of their reduction resulting from the compression indicated above, certain phenomena of denudation also notably diminished the superficial extent of the coal-deposits, and, moreover, as we have seen in the Désirée seam, the Grande Faille has pushed down a portion of the slopes south of the lower beds. We are unable, from the want of a point of comparison, to estimate the ablation which the surface of the coal-formation has undergone; but, whatever may be the importance of this, it is certain that if it was of a uniform character throughout the Liège basin, with the exception of the plateau of Herve, which must have suffered a much greater denudation, the diminution in surface of the basin from each seam has been greater in proportion, as the seam is of more recent formation.

In order to compare from this point of view the upper seams with the lower it would be necessary to restore to the latter the portion of their southern slope suppressed by the Grande Faille; or, in other words, to endeavour to re-establish things as they were before the action of this fault.

A sufficiently accurate calculation has given 1 to 9.6 for the ratio of the horizontal surfaces under which the seams Grignette and Désirée, in the basins of Liège and Huy, now exist. Other calculations formed on the same hypothesis which has just been indicated, but whose degree of approximation is much less, have given for these surfaces the proportion 1 to 7 before the denudation, supposing it to be 320 yards—that is to say, the inverse of the ratio obtained for the amount of coal in a vertical direction contained in the two series, Cerisier-Grignette and Olyphon-Désirée, which ratio is 7 to 1.

It is probable, then, if we admit a denudation of 320 yards, that the amount in coal of these two series of pretty nearly equal thickness, and consequently the quantity of vegetable deposits which entered into their composition, were the same before the action of the Grande Faille and the denudation. Still, some of the data adopted for the calculations are not sufficiently certain to affirm that this was so; further, the proportions between the areas of primitive deposits and the basins determined by the plaiting of the coal-seams may have varied for the different seams. On the other hand, we can conjecture nothing as regards the duration and the activity of the periods of the vegetation which came between the successive subsidences of the areas of deposits. Neither can we form any idea of the extent of these supposed depressions. It is true that, if this last consideration were set aside, we might confine ourselves to applying to the two series under our notice the general notion which holds good in geology—viz., that given a series of sedimentary deposits of the same thickness