above all, oxygen, diminish rapidly. Volatile and bituminous matters decrease, while carbon undergoes a proportionate increase.

This metamorphism of the combustible minerals, which takes place in deposits of different ages, may also be observed even in the same bed. For instance, in the coal formations of America, which extend to the west of the Alleghany mountains, the Coal-measures contain a certain proportion of volatile matter, which goes on diminishing in proportion as we approach the granite rocks; this proportion rises to fifty per cent. upon the Ohio, but it falls to forty upon the Manon-Gahela, and even to sixteen in the Alleghanies. Finally, in the regions where the strata have been most disturbed, in Pennsylvania and Massachusetts, the coal has been metamorphosed into anthracite and even into graphite or plumbago.

Limestone is one of the rocks upon which we can most easily follow the effects of general metamorphism. When it has not been modified, it is usually found in sedimentary rocks in the state of compact limestone, of coarse limestone, or of earthy limestone such But let us consider it in the mountains, especially in as chalk. mountains which are at the same time granitic, such as the Pyrenees, the Vosges, and the Alps. We shall then see its characters completely modified. In the long and deep valleys of the Alps, for example, we can follow the alterations of the limestone for many leagues, the beds losing more and more their regularity in proportion as we approach the central chain, until they lose themselves in solitary pinnacles and projections enclosed in crystalline schists or granitic rocks. Towards the upper regions of the Alps the limestone divides itself into pseudo-regular fragments, it is more strongly cemented, more compact, more sonorous; its colour becomes paler, and it passes from black to grey by the gradual disappearance of organic and bituminous matter with which it has been impregnated, at the same time its crystalline structure increases in a manner scarcely perceptible. It may even be observed to be metamorphosed into an aggregate of microscopic crystals, and finally to pass into a white saccharoid limestone.

This metamorphism is produced without any decomposition of the limestone; it has rather been softened and half melted by the heat, that is, rendered plastic, so to speak, for we find in it fossils still recognisable, and among these, notably, some Ammonites and Belemnites, the presence of which enables us to state that it is the greyishblack Jurassic limestone, which has been transformed into white saccharoid or granular limestone. If the limestone subjected to this transformation were perfectly pure, it would simply take a crys-