

## XXVI. SOLIDIFIED SUNLIGHT.

## COAL AND COAL-BEDS.

I sit by my genial grate, this pinching winter evening, and watch the play of the flames which leap from the coal and play with the draughts of air passing up the chimney. Here is comfort—here is peace. How the fierce wind howls about the windows while I enjoy this life-sustaining warmth. Curious, is this coal—this combustible rock, wonderful, and abounding in suggestions. This warmth is yielded by combustion. This rock burns up. That which burns up is essentially carbon, or a hydrocarbon. It is so with petroleum; it is so with gas; it is so with coal. The source of uncombined carbon is in vegetation. Our carbonates, like limestone, contain carbon; but it is combined with oxygen; it is already appropriated, not free—not in a condition to be burned. The coal must be composed of free carbon, to a large extent—mingled, probably with some hydrocarbon. Carbon, as we see in charcoal, burns without any brilliant flame, and without smoke. Hydrocarbon, as we see in kerosene and illuminating gas, burns with a bright flame. The coal in the grate emits a moderately brilliant flame. It is a mass of carbon saturated with some liquid or gaseous, or perhaps, bituminous, hydrocarbon. In any event, we are induced to trace its carbon to a vegetable origin.

Now, if we look over a pile of coal we shall probably detect some indications of vegetable tissue. In some coals of the soft kind, we may find masses of woody fiber—black and brilliant, like some charcoal. In some of the shale attached to pieces of coal, or mingled with the coal, are some impressions like fern-fronds. If we go to the mines, we even discover stems of moderate sized trees imbedded in the shales above the coal, and occasionally in the coal itself. Again, if we prepare exceedingly thin slices of coal, and remove the black matter by proper treatment, we may detect, by means of the microscope, minute structures, such as belong to vegetation. All these circumstances then, conspire to convince us