

follow some of these rays, and observe the different changes or transmutations of energy. When the rays strike the leaves of plants the radiant energy is changed into the energy of chemical separation, the rays of light are gone, they exist no more but in the carbon of the wood, and the oxygen, if set free in the air, lies stored up, this energy waiting for the approach of man. The coal or wood is taken to the furnace of the engine, where the energy that has lain dormant, as it were, springs into activity as the carbon and oxygen again rush together and give rise to heat or radiant energy, which, coming in contact with the water in the boiler, changes it into steam, the radiant energy being now manifest under the new form of energy of molecular separation, and the power of this we soon see as it pushes forward the piston rod and sets in motion the whole machinery of the engine; and now, as the train rushes along at the rate of thirty miles an hour, we see the energy under the head of visible energy of actual motion. We are carried along so comfortably and so quickly, and it is of such a common occurrence, that we little think we owe it to the sun, nor does the thought impress us, true as it is, that we are carried by a train of energy that started from the sun ages upon ages ago at the rate of 186,000 miles per second. Suddenly the whistle blows, the brakes are down, and in a moment we are standing still; our visible energy of motion is gone, but where? If you examine the brakes and rails you will find them hot—friction has stopped the train and converted the energy of visible motion into heat; but gradually the brakes are growing colder, and soon the heat is gone, and with it has gone the energy. It is gone under the form of radiant energy of low temperature; it is no more within our control, it is no longer available for the wants of man. As radiant energy it came to us, it has undergone various changes, been locked up for centuries, and now, once more returned to the form of radiant energy, it has gone to return no more; gone on a journey through the boundless limits of space, to increase the quantity of useless energy that fills the interstellar spaces;