

upon it by going to the fire to warm you when you are cold. You see it in the cooling of the poker when taken from the fire. Put cold water in a saucepan on the fire, and the caloric of the fire goes into the water. When you are older, you will find this law of the communication of caloric to be the cause of most surprising effects. You need no tales of fairies and magicians to bring wonderful things before you. The God of nature has filled nature with both wonders and benefits. But now, remember a second law. Caloric enlarges the volume of bodies. This is the way the law is expressed. The poker when red-hot, would not go into a hole which it exactly fitted when it was cold. Its volume is larger.

C. But does it keep so ?

U. No ; as the caloric flies off, it comes to its former size again. But you have seen this law in operation at the blacksmith's shop.

C. When, Uncle ?

U. Why, have you not seen them put the red-hot iron rim on the cart wheel, and then turn it round in water to cool it suddenly ?

C. O Yes !

U. Well. This is it. The rim is made *a little too little* for the wheel. But as heat enlarges it, it is then quickly put on, and fits nicely. And they cool it quickly that it may thus, all at once, in a manner, become less, and so fix itself very tightly on the wheel, and make all fast. Otherwise, if it were such a loose fit as was necessary to get it on, the wheel itself would not be firm enough. Thus man finds out the laws and properties of God's creatures, and is enabled to turn them to his own advantage. But mind, as heat, by entering a body, *enlarges it* ; so when the volume is by some force or other *lessened*, that diminution of volume sets a portion of the heat that was in the body at liberty. I know these will seem curious things, and that they are too hard for you to understand yet ; but you may know the fact. Smart blows of a hammer on iron will make the iron sensibly hot. Friction produces the same effect. You *rub* your hands to make them warm. You may rub your hand on the table quick and hard till you cannot bear the heat. That is a well-known law of caloric. And hence come various methods of lighting fires.

C. How can that be, Uncle ?

U. Knock flint sharply against steel, in a slanting direction, and what happens ?

C. O ! the sparks fly off ; hot sparks of fire.

U. Thus, you see, by the laws of caloric which I have told you about, we can get fire ; we can strike a light, and so get a fire. But if they had no flint and steel ?

C. Whatever could they do then ?

U. I have read of some savages that could rub two pieces of dry wood together with such quickness and force, as that one should not only become hot, but begin to burn. They then gather dry leaves, and so have a fire. But in a civilized state, man discovers so many of