

end in a basin of water and hang the other on the outside, and the water will run out of the dish through the towel. Make a dry snow ball and touch its surface to the water and it soon passes through the whole. Suppose again, that you take a tube of glass one inch in diameter and two feet in length, and fill it with dry sand, and set it on end in a little water. In a single night the water will work up through the sand more than a foot. This is an instructive experiment to the farmer, because it shows precisely how our soils are furnished with moisture. Dip a piece of porous wood with one end in water, and it will pass up through the pores. Here are simple experiments enough to establish a simple law in nature—that porous bodies allow water to pass upwards through them.

Let us now notice its application to the soil. If a piece of land be well pulverized, it consists of millions of these capillary tubes, in the shape of pores. Suppose now we have a heavy rain. It passes down through the soil, carrying with it a short distance the soluble parts of the soil, but which are mostly filtered out by the loose earth, a wise provision of nature, to retain the nutritious portion of the soil within reach of the roots of plants. But suppose a drought comes on. The surface of the earth begins to dry and the water below begins to work up through the pores of the soil within reach of the plants. Were it not for this provision, one dry summer would make a barren waste of our fields in a short time. Every one may have noticed how a ditch full of water by the side of the road will cause the whole road to be wet. The bank of a stream will be covered with luxuriant vegetation. The peat moss will keep moist at all times on the same principle. Without this principle, our manure heaps would dry up at once, and fail to ferment and decompose.

There is another curious fact. However short the capillary tubes of glass may be, though the water may rise to the surface, it will never run over. So on this principle the water will never overflow the ground by capillary attraction alone. There is still another curious fact. Let these tubes be open at both ends and put them in the sunshine, and the water will not separate from them. We see sometimes akin to this in putting wet moss over anything. It will evaporate very slowly. Were not this check wisely provided for, the surface of the ground would evaporate water so rapidly, that from this cause alone the earth would soon be utterly parched up.

Now a word for the practical application of this simple law. Land, like clay, that is baked hard, has but few pores for the admission of water. Consequently, there is a small supply from below, and such a soil soon becomes perfectly dry. Land that has been carefully tilled will be supplied with moisture from the stratum of earth below bringing with it the soluble salts, such as lime, potash and soda, which have been dissolved out of the earth below the roots of plants, and brought up by capillary attraction within their reach. Farmers are generally aware of the value of hoeing and cultivating the ground to promote this object, and we have only endeavored to explain to them the simple and beautiful manner in which these simple laws operate for their benefit.

There is, however, one point in connection with this subject, which we have never seen discussed, but which we are inclined to believe to be true, that it is of more injury than benefit to a crop to stir the ground when the drought is very severe. We are inclined to the opinion that the evaporation is increased, while the moisture ceases to rise from below, thereby increasing the intensity of the drought. We learn, also, another lesson that the different laws of nature work in harmony. When we have a severe drought, the rains which follow seem to slake and more completely dissolve the particles of soil. Freezing the soil promotes the same object. Hence, it has been noticed that we usually have abundant crops after a severe drought.

The value of this same principle is seen in covering ice in our ice houses. If the melted ice could not pass through the sawdust, and keep up constant evaporation, the ice would all be melted in a short time. Hence another practical lesson may be learned. A large basket filled with ice and covered with sawdust will keep it much longer than in a tight box of the same size. The absorption of water by the skin is another illustration of the use of this principle.

Thus the simple fact of the rise of water in a small tube gives rise to some of the most important principles pertaining to agriculture. It is always gratifying to an enquiring mind to be able to explain whatever comes before us; and we write this article with the hope that some of our readers may comprehend the interesting facts here treated of as they shall hereafter witness them in their daily avocations.

Machinery and Manufactures.

Wood Paper.

The *American Artisan* says;—"The largest establishment in the world for the manufacture of wood paper pulp is that of the American Wood Paper Co., known as the Manayunk Wood Pulp Works, situated at Manayunk, Pa., between the Schuylkill river and the canal. These works, covering ten acres of land, have been leased jointly by Messrs. Jessup & Moore and Martin Nixon, of Philadelphia, and are now capable of producing daily from ten to twelve tons of wood pulp. This pulp is now being manufactured into excellent white printing paper by Martin Nixon, at the Flat Rock Paper mills, adjacent to the Pulp Works, and by Messrs. Jessup & Moore, at the Rockland Paper Mills, on the Brandywine Creek, near Wilmington, Del. These pulp works are among the most completely organized and appointed manufacturing establishments we have ever seen. Their erection cost half a million dollars, and the investment in them and the paper mills worked in connection with them is over a million. At the flat Rock Mills there are straw pulp works, of a capacity to produce daily from seven to eight thousand pounds of straw pulp, a certain proportion of which it is found advantageous to mix with the wood pulp. The daily production of paper from these wood and straw pulp works and the paper mills run in connection with them will be fully thirty thousand pounds.