

of plants, and less liable to be affected by drouth.

The first action of the drain is to take away the water from that part of the soil with which it is in direct contact. A contraction of the soil soon follows, and cracks are formed, beginning at the drain, and extending laterally and vertically, which admit the percolation of water and conduct it into the drain. When the soil is thus brought into a state which allows the water readily to pass through it, the former difficulties of its running together and baking, are obviated; the soil remains open and friable, and plants are protected against extremes of wet and drouth.

It is a fact that plants suffer less from drouth on a friable soil, than on a compact one; as may be seen by a comparison of crops on clay and loam. This results from two causes. The roots of plants have more scope in a loose soil, and are thus enabled to draw support from a greater source. A mellow soil is also most moist, in time of drouth—pulverization favoring the ascent of moisture from below, as well as its absorption from the atmosphere. A heap of moulding sand will seldom dry but to a little depth, while hard clay in the same situation will become almost destitute of moisture.

Professor Norton, in his lecture on draining given at Hartford in 1847, states that the extreme drouth which prevailed in Scotland in 1845, it was found that in all ordinary cases, the crops on drained land withstood the drouth much better than those on undrained, "because of the greater depth of soil available to the plant." And he adds that "it is now a proposition regarded among the best English and Scotch farmers as completely established, that drained land is not only better in wet seasons, but in dry seasons also." [Cult. for Jan. 1848.]

The full benefit of *subsoil ploughing*, on tenacious soils, cannot be fully obtained without thorough draining. If the water is not drawn off, it soon packs the soil together again, after the plough has been used. Prof. Norton states, that where drains have been laid at proper distances in hard-pan soils, the air and rains soon break up the crust, the water filters through into the drain, and the ochreous deposit is gradually dissolved and carried away. Air and heat being thus admitted into the soil, the noxious compounds which had there formed are decomposed, and wholesome food for plants is produced.

In regard to the question—Where is it proper to make drains? it may be said that they are necessary wherever the character of the natural vegetation indicates water. Rushes, ferns, and what are generally called water grasses, always grow where there is too much water in the soil, at certain seasons of the year, for the growth of the more valuable plants. When the soil is properly drained, these aquatic plants can no longer live. There is scarcely a field on any common farm, that has not spots that would be benefitted by the drain, even for grass, and still more for grain and vegetables. The farmer thinks, perhaps, that as the produce of grass is apparently large, nothing is wanting. But it must be recollected that the produce of wet land is of less weight and value in proportion to its bulk, than that of dry land. If the land is in pasture, animals will reject the herbage that grows on these damp spots, till forced by hunger to eat it. If the grass is made into hay, the same reluctance of animals to eat it is manifested, and their loss of flesh when kept on it, is evidence of its want of nutriment. Prof. Norton states that analyses of samples of grain from two fields, the one drained and the other undrained, showed a decided inferiority in that from the undrained field. It is plain, therefore, that draining not only increases the quantity of produce, but also improves the quality.

Another great advantage of draining, is the prevention of grain and grass from being "winter-killed." This effect is caused by sudden freezing of the ground while the surface is wet. Land on which wheat and rye have been very uncertain from this cause, are found to produce the best crops after having been thoroughly underdrained.

But the advantages of draining in a *sanatory* view, are in many instances of the highest importance. It is well known that stagnant water is very prejudicial to health. In those sections of our country which are particularly subject to bilious fevers, and fever and ague, the soil usually abounds in vegetable matter, and during wet seasons is flooded with water, which frequently covers a large portion of the surface for several days or weeks, and finally goes off chiefly by evaporation. Sad experience has taught the inhabitants of those sections to regard such floodings as precursors of sickness. Similar causes have produced like effects in Europe. An eminent physician, Dr. McNab, observes—"After twenty-six years practice,