

that distance down the running stream of water, and would no doubt eventually have choked the pipe. Unfortunately, I was not present when this obstruction was found, and in taking up the drain the man cut the mass into a number of short pieces, some of which I preserved, and have brought with me to exhibit, as the best exemplification of the difficulty I am speaking of. This will necessitate the destruction of the tree, as I have no doubt that the same will occur even at the depth of the present drain, as from the springy nature of the ground there will be a permanent flow of water.

The next class of land that I shall speak of is a sandy or other porous soil, underlaid by a gravelly or other permeable substratum. In many cases the course of the stratum below this again is greatly diversified with undulations and inequalities which embarrass or effectually debar the underflow, as it were, of the water, which is thus gathered and pent up in what may be termed subterraneous ponds, where are bred all the evils of stagnation almost as effectually as if the impediments existed on the surface. The evil in these cases may be successfully treated by the insertion of a very few branches, the duty of which will be simply to cut through the walls of retentive soil which impede the flow of waters already gathered in the permeable underlying stratum. There are many cases also, where the sandy or loamy soil lies very deep, but is fine and close in its nature, and holds a large quantity of water suspended in it by capillary attraction, similarly to the action of a sponge. A few branches in such soil will be most beneficial, especially when the ground is level and flat in its formation. In such soils as I have described, there is of course no necessity for drainage, when no water ever appears on the surface, or, on digging trial pits, say three or four feet deep, a few hours after heavy rain, no water is found standing in them. I hold however, the decided opinion, that wherever it is found necessary to have open furrows in ploughed or meadow land, to carry off rain or snow water, there underdraining is wanted. The escape of water by the surface is absolutely detrimental, and a waste of one of the most important sources drawn upon by nature for fertilizing and enriching the ground.

The two great cases, where perhaps it is patent to every mind that underdraining will be necessary, are: First, hilly and uneven lands, where strata of earth replete with moisture crop out to the surface, and discharge upon the lands beneath, slowly but constantly, their injurious springs, which we should hasten to tap before the water finds its way to the surface. Secondly, all low lying lands, from which, on account of the evenness in the formation of the ground, it is evident that it will be impossible for any water which exists in injurious quantities upon or beneath the surface to find a timely escape by any other means.

I have reserved for the last consideration a class of lands which are, perhaps, the most valuable description of all, and to which it is generally supposed that any treatment of this kind is the least applicable. I mean dry clay or other strong lands in every respect situated in the most advantageous manner. Fine, high, sloping, undulating lands, from which it is generally supposed to be the easy duty of good and judicious ploughing to lead off at once all the water which falls upon them. And I do not wonder that unthinking men should rebel against the idea of *draining* such lands, in which perhaps they have already sunk wells, thirty and forty feet deep, without meeting a drop of water, and beneath the surface of which they have found, to their cost, that the heaviest showers of rain can scarcely penetrate. This prejudice against, and distrust of the principles of draining, is produced and fed by what in this case is a misapplication of terms, but may, I think, be counteracted and disarmed by a view of the subject which I have as yet never seen or heard advanced or explained. Although the mechanical means in all cases are the same, yet in this class of lands the first effect of the work is so entirely different as almost to induce the change of name, and instead of drainage it should assume the name of *ventilation*. The effect of this operation upon these soils is to bring the atmosphere into immediate con-

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