

mission of water. Or, as is the case in many tenacious clays, small veins of *silt* exist in stratified order, and accomplish the object of allowing the water to pass off slowly by their assistance. Professor Ansell, in speaking of the London clay, says, "It is tough, and of course impermeable;" and this has been proved over and over again to be correct.

Much of late has been advanced upon the benefit to be derived by not allowing any of the rain water to be carried off by surface drains, but that the whole of it should be admitted, and pass through the soil to the drains below. The argument advanced in favour of such a practice is assuredly carried too far. It is true that rain water contains some fertilizing properties, more especially as regards the ammonia and nitric acid that become combined with it, but which, at all times minute in quantity, during very rainy seasons exist in the smallest perceptible proportions. Whenever these enter into and become combined with the soil, they are by their affinity immediately taken up by it, and retained to be given out to plants vegetating upon its surface. The greatest amount of injury sustained by soils surcharged with water arises from the exclusion of air and the lowering of its temperature, as well as by the admixture of mineral ingredients with it, which become injurious to vegetation. Air contains substances equally beneficial to vegetation as those contained by rain water: those properties in the latter, before referred to, being taken up in its passage through the air as the rain-water descends to the earth. After long periods of drought, when the air has become highly charged with those substances, the quantity brought down by the first shower that falls is far greater in amount than what is brought down by the next and succeeding showers. In long continuous

seasons of rain it ceases altogether. As it is during such seasons that a surcharge of water to the soil becomes most injurious, it is at once apparent that, if a large portion of this matter can at once be carried off from the surface, the necessity of an increased area of drainage below may be dispensed with, especially in districts where the amount of annual rainfall is greatest.

Water in a state of evaporation from a surface discharges the heat also; and, therefore, if no other means exist whereby water can be discharged from the soil, it must remain until sufficient heat is produced by the rays of the sun, or by increased temperature of the atmosphere upon the surface to again convert it into vapour. During this process the heat of the soil becomes diminished, especially at the immediate surface; and a soil of a district of naturally higher temperature is reduced to the temperature of one of higher latitude or elevation. This effect has, however, been greatly exaggerated. It has been recently computed that the heat lost in the process of evaporation by the sun's rays an inch-fall of rain would be sufficient to reduce the temperature of the soil, to a depth of ten inches, no less than 99 degrees! The more porous the soil, the more rapid is the evaporation; and consequently we have an explanation why crops upon gravelly subsoils become most affected in the early spring months, and at the same time arrive at a remedy in relieving them from surplus water by drainage. The radiation of heat from a surface coming into contact with vapour discharges the heat at the immediate point of contact, and explains the cause of hoar frost when the thermometer shows, at a few inches from the surface, no frost actually existing. The drainage of land, therefore, by lessening the amount of evaporation from the sur-