of the Fourth of July. The rest of the field had been cultivated only once after the rain, but was in a fair condition. The uncultivated strip was very hard upon the surface and quite badly cracked open. Moisture determinations were again made as in the first instance, and very remarkable results obtained. The samples of soil were taken upon the same level and within one hundred feet of each other. Three tests were made in each case as follows:

Cultivated soil, July 26, 1st foot 19.80%; 2nd foot 19.38%.
Cultivated soil, August 6, 1st foot 15.21%; 2nd foot 17.63%.
Cultivated soil, August 13, 1st foot 17.68%; 2nd foot 22.45%.
Average, 1st foot 17.56%; 2nd foot 19.82%.
Uncultivated soil, July 26, 1st foot 12.68%; 2nd foot 11.80%.
Uncultivated soil, August 26, 1st foot 11.32%; 2nd foot 12.76%.
Uncultivated soil, August 13, 1st foot 11.44%; 2nd foot 12.22%.
Average, 1st foot 11.81%; 2nd foot 12.26%.
Difference in favor of cultivated soil, 1st foot 5.75%; 2nd foot 7.56%.

These figures show very conclusively that the physical condition of the surface may very materially affect the percentage of moisture retained within the soil in the region of plant growth and what an important effect one cultivation, and not a really good one at that, may have in contributing to the conservation of moisture by hindering the formation of a crust and breaking the capillary connection between the surface and the soil beneath. The important point to be aimed at is perfect capillary activity to within a few inches of the surface, where it must be arrested, and the above figures show that this can be done through a disarrangement of the soil particles by means of the cultivator. On the lighter soils this can be done with comparative ease, but to get heavy clays and gumbo into a fine condition is often a difficult matter. But if conditions are carefully watched and the cultivator put to work at the right time after each heavy rain, good results can be obtained. A large humus content of the surface soil very materially improves the friability of heavy soils and adds much to the efficiency of the surface for conserving moisture.

This was very strikingly noticed upon a field, a portion of which still contained a large amount of decaying vegetable matter from the original prairie sod. The importance of keeping up the humus content of the surface soil cannot be too strongly emphasized and the burning of grain stubble and other plant residue should never be permitted under any circumstances. Where burning is practiced a few years will generally suffice to reduce naturally stiff soils to a condition under which cultivation and the conservation of moisture become very difficult if not impossible. A soil containing plenty of humus will never bake and crack open no matter how hot and dry the weather may be.

In order to arrive at some definite figures relative to the amount of available soil moisture necessary to keep corn alive, tests were made upon parts of fields where the corn was badly burned and showed signs of dying completely. It was found that corn could not live under normal atmospheric conditions when the moisture in the first foot of soil dropped below six per cent, and the amount of moisture necessary to keep an average corn hill alive may vary from five to eight per cent according to the condition of the atmosphere. The tassel will generally die when the available moisture drops below eight per cent.

On the whole, observations seem to indicate that to make an average yield of corn the moisture in the first two feet of soil should never drop below ten to twelve per cent. And, further, conditions here during the past summer have conclusively proven that by careful and proper attention to cultivation the corn crop need never suffer to any extent for want of moisture, except perhaps upon a few small sandy spots.

Another question to be answered was, why were so many ears only partially fertilized? To fully account for this phenomenon a botanical study of the agents and of the process of fertilization is necessary, together with a study of the effects of drought upon the tassel and silk. Now, understanding that it is necessary for the live germ of a pollen grain from the tassel to find its way through the medium of the silk to the corn kernel that is to be, before fertilization can take place, and that each kernel must be independently fertilized through its own thread of silk, we can readily see that if for any reason the threads of the silk are not all properly developed or pollen fails to reach them there will be just so many gaps upon the corn cob. Under normal conditions nature makes no mistakes, there is an abundance of pollen, the silks are in a receptive condition at the proper time and few grains escape fertilization. But this year the sudden and decided change from rather wet weather to extremely high temperatures and hot winds so checked growth that in many cases the tassel withered and died before pollen could be produced. In other cases the development of the cob and the appearance of the silk were so retarded that all the pollen had fallen off before the silk was in a condition to receive any. In still other cases the silk, being already weakened as a result of insufficient moisture, withered at the tips soon after its appearance and before all the threads had received their pollen. The bearing of soil moisture upon this question is quite plain, and where there was an insufficiency of moisture it was to be expected that the development of the whole plant would be more or less arrested. Withering of the tassel was found to be not generally the direct cause of failure to fertilize, for only a tassel here and there withered and there was an abundance of pollen for all needs. Observations seem to indicate that fertilization failed to take place oftener through arrested development of the silk than through withering of the tassel. Both were the result of extreme heat and a lack of moisture, but poorly filled ears were found on stalks whose tassels had produced an abundance of pollen.

A. T. WIANCKO.

Ames, Neb., Sept. 17, 1901.

THE SIROCCOS.

In Northern Africa are neither mountain ranges nor forests, a tropic sun pours its fierce rays upon the Libyan desert sands and as the wind blows over the desert it accumulates a vast amount of heat. Meeting with no obstructions in its onward flow across the desert and then over the Mediterranean Sea, its hot breath deals destruction to Malta, Sicily and Italy.

Either a range of mountains or a heavy forest would deflect this hot current upwards; mixing with the colder air of the higher strata, the temperature would be reduced and a colder current forced to the surface.

The Mexican sirocco has a clean sweep as it moves northward over Texas, New Mexico and Oklahoma, not a range of mountains nor forest belt to obstruct its passage. It reaches Kansas, Nebraska and other states, accumulating heat all the way, and those who have felt its breath realize its terrible character.

Extensive plantations of forest trees in heavy east and west belts, especially upon the higher ridges of the states along its course, will be an effectual and only relief.

This can only be done by the combined efforts of the national government, each individual state and the farmers and land owners of the entire region, reduction of taxation upon lands so planted in timber-bounties by the national government, seeds and trees to be supplied of suitable character, and practical instruction by the Forestry Bureau. When the land owners are assured that practical forest planting means a profitable return in after years, and that the demand for good timber will always continue, they will be willing to do their part as the states and nation do theirs.

JOHN P. BROWN.

Connersville, Ind., Sept. 25, 1901.