and what we have heretofore frequently pointed out to our readers, viz: that the better the condition of the soil the less dependent is the crop upon the state of the season; that a deeply-ploughed and fertilized soil resists drought and produces a fair crop, while shallow, poor soils fail to carry a crop to maturity in a dry season. Also, that a well cultivated and mellow soil, being porous and absorbent of water, and retaining much of it within reach of the roots of the growing crop, and preventing waste by surface flow or subterranean drainage, tends greatly to reduce the ill-effects of drought, if not to directly obviate them. These considerations are now especially appropriate. To keep the surface open and mellow will keep it moist. Frequent cultivation is needed for this, and we hazard nothing in repeating a statement recently made in this column, that the ripening of the corn crop may be hastened ten days by constant cultivation, until it is too rank in growth to permit the passage of a horse among the rows. In stating this, we state what our own experience has proved in several years of accurate observation.—*New York Times.*

COVERING CORN WITH A ROCK.

Farmers who are not provided with a regular planter, will find that one of the best ways to cover corn is with a rock. This should be from eighteen inches to two feet long, and about eighteen inches wide. Drill a hole through the lighter end, through which pass a small chain, to which attach a singletree, and you are ready for business.

Thus provided, you can drop the corn and cover it at the same time, by leading a horse drawing the rock. One or two hills at the end of the furrow you can cover with your foot.

In this way a hand can plant more corn in a day than with anything else he can use, except the regular planter, and farmers who have tried this plan for a number of years, regard it as a most excellent way of planting It mashes the clods and leaves the ground in good condition for ploughing close to the corn as soon as it gets above the ground.

Some farmers object to the use of a rock, saying that it causes the ground to bake, while others, who have used it for a number of seasons, claim that it does not pack the ground any more than the regular planter, or the roller which many farmers run over the field after planting. Of course the rock, or anything else you may use, will cause the ground to bake if stirred while too wet.

Others object to the rock because it displaces the corn. This never happens, however, if you plant across the furrows last made in marking off.

In selecting a rock, be careful not to get one too heavy. Take such as have no more than sufficient weight to mash the clods; and where the ground is mellow, it needs to be only sufficiently heavy to cover the corn.

One decided advantage this way of planting possesses over the bull-tongue so often used, is that you can drop and cover at the same time, while it mashes most of the clods that chance to fall upon the corn, which the latter fails to do.—*Farmer's Home Journal.*

LENGTH OF ROOTS.

Prof. J. W. Beal, of the Michigan Agricultural College gives the following interesting facts, mostly the result of his own examinations, in relation to the length of roots in plants and trees:

The soil has much to do with the length and number of roots. In light, poor soil, I find roots of June grass four feet below the surface. People are apt to under-estimate the length, amount and importance of the roots of the finer grasses, wheat, oats, &c. Some roots of clover and Indian corn are large enough to be seen by every one on slight examination. A young wheat plant, when pulled up, only shows a small part of its roots. They go down often four to six feet. It needs very careful examination to show that clover and Indian corn have any more weight of roots than June grass. They probably do not contain more.

The roots of a two-year old peach tree in light soil were found seven feet four inches long. In a dry, light soil, this season, we pulled up one parsnip three feet long, and another three and a half feet long, small roots even still longer.

The noted buffalo grass on the dry western prairies, is described in the agricultural reports at Washington as having very short roots; but Mr. Felker, one of our college students, found they went down *seven feet.*

The roots grow best where the best food is to be found. They grow in greater or less quantity in every direction. If one finds good food,

it flourishes and sends out numerous branches. Many of the smaller roots of trees die every autumn when the leaves die, and others grow in spring. Near a cherry tree in my yard was a rustic basket without a bottom, filled with a rich soil. On removing the basket and earth, cherry roots were found in large numbers in the top of the soil. They had grown full of small branches where the soil was good. Roots in soil will grow up just as well as down, and do this.

THE REMOTE ACTION OF FERTILIZERS.

Mr. C. I. Bettes, Summit county, Ohio, relates an interesting experience, and asks suggestive questions:

"I once burned a large quantity of brush on a piece of sod ground; I ploughed this up and planted it to corn, but could see no difference between the crop where the ashes were and where there were none. The following spring I sowed the field to oats and seeded to clover; there seemed to be no difference in the oats or clover at harvest, but the following summer the difference in the clover was very marked; there was at least double the clover where the ashes were. Now remember it was the third season that developed the value of the ashes. Supposing I had applied a different kind of fertilizer on my clover, would not the last applied have been likely to receive all the credit? In making experiments, are we always sure we know what produced the result?"

It is not usual to meet with so striking an instance of the remote action of a fertilizer. It is a fact well accredited among farmers who practice the use of lime, that lime is commonly of little immediate effect on hoed or grain crops, but manifests its influence most strikingly on forage crops. It is also an article of practical faith in some localities that the effect of lime is not evident on the first or second crop so much as on the third. The case of Mr. Bettes is in accordance with these facts. Wood ashes chiefly consist of carbonate of lime. They contain also some 2 per cent of phosphoric acid and some 8-10 per cent of potash. Wood ashes and lime are even more alike in their effects than in their composition. Wood ashes supply potash directly; lime releases it, or displaces it from the rock dust and silicates of the soil, and thus supplies it indirectly. Both exert, then, the same ultimate action. But why do they wait for a certain time or a certain crop to show their strength? That question is easy to ask, but not easy to answer in a satisfactory manner. Any explanation that can now be offered must be in part, and for the most part, conjectural.

The theory of the matter may be, perhaps in this wise. The ashes left upon the ground a dressing of lime and potash. This was turned under to the depth of six inches, more or less. Subsequent heavy rains carried down the lime and potash into the subsoil slowly, and as far as the absorbent qualities of the soil would permit. The lime and potash were thus incorporated with *the subsoil*, and not only were there themthemselves as plant food, but by their chemical action undoubtedly made other needful plant food—phosphates probably—nitrogen almost unquestionably—much more freely available in the deeper parts of the soil than would otherwise have been the case.

The inverted sod formed a rich seed-bed for corn, and after that crop oats did well, because both are shallow-rooted plants when the surface soil is rich enough to supply them abundantly with food, and moist enough to afford them needful water. The cereals, when fairly supplied with average quantities of all the soil elements that nourish crops, are pushed to high production by nitrogen, but not by phosphates nor by alkalies, as Mr. Lawes's grand experiments have taught us. So that the failure of the ashes to improve these crops is simply evidence that the inverted sod yielded enough lime and potash for the corn and oats. The clover accompanying the oats was not noticed to be better where the brush had been burned than elsewhere, because it was not closely looked at. That it was better is highly probably from the result of the next season's growth.

Very likely the clover roots were chiefly fed from the surface soil during the first season of its growth, but the third year, when its roots struck down, as appears to be their habit, to a greater depth than the roots of the cereals commonly reach under the same circumstances, they found, below where the ashes had been buried, an abundance of food, and perhaps an openness of soil—for lime and potash both favorably affect the texture of compact soils, and are thus often in a high degree, substitutes for drainage, which were denied to the clover on the remainder of the field. I will not say that such is the real explanation of Mr. Bette's facts, but it is a theory which may provisionally answer the purposes of an explanation, being in harmony with known facts to such a degree as to give it credibility.—Prof. S. W. Johnson, in *N. York Tribune*.