

Harrowing is an operation usually very badly performed, and an operation that is almost always ended up sometime before it should be on any given area. Good ploughing is a necessary condition of the best crop results, but thorough harrowing is an indispensable condition of profitable crop returns from any field. Thorough harrowing does not necessarily mean three or four or ten different harrowings, but it means such treatment as leaves the surface of the seed bed smooth and friable, and leaves the bottom of the seed bed firm and solid. Until these two conditions are fulfilled the harrow should not stop.

Where sod land is being prepared for any crop, possibly the best treatment would be about as follows: Roll with a heavy roller, disc harrow lengthwise and crosswise or on the bias; roll again, disc harrow once more, and then smooth harrow with a common spike-toothed harrow. If, however, it is found that the land is not yet in perfect tilth, then it might be necessary to repeat the disc harrowing and the rolling. In any case, seed should not be sown until the soil is in perfect shape for crop production. It is usually safe to harrow again after conditions seem nearly perfect for seeding.

The spike-toothed harrow may often be run over the land when the average farmer would consider it utter folly to use it at all, for instance, in the corn field a few days after sowing or planting the corn, and in the same field a few days after the corn is up. Harrowing the field at such times is almost certain to materially help the crop.

Where large areas of corn are grown, an implement likely to prove a considerable value is what is known as the slant-tooth or tilting harrow. This enables one to control the depth to which the harrow shall sink in the soil, and so permit of harrowing the corn or potatoes at times and under conditions when the common spike-toothed harrow might do some small amount of damage.

### Seeding.

Seeding is now rarely done by hand. It is, however, in too many districts still done broadcast, that is, what are known as broadcast seeders are used. Such seeders are not nearly so satisfactory as drill seeders. Much of the seed is insufficiently covered, while another part is buried too deeply. Consequently it comes up unevenly, grows unevenly, ripens unevenly, and there is thus considerable loss at harvesting, to say nothing of the seed lost by being buried too deeply or by being insufficiently covered.

The hoe drill and the single disc are the best seeders, and of these, I believe the single disc to be the better. Here, as in the case of the plough and the harrow, as large an implement as possible should be selected, since such implements aid materially in reducing the cost of production.

### The Roller.

The roller is commonly looked upon as the implement wherewith to give the finishing touch. It is just at this point, however, that the greatest danger lies. It is as an operation after seeding that rolling is, on the average, of least value. There are, of course, conditions when it is advisable to roll after seeding, but the true value of this