

to manage, more durable, of less weight in proportion to its increased strength, and requiring much less motive power in effecting deeper and better work.

The horse-hoe, invented by Jethro Tull, has of late years received great improvement, and is now a most useful and effective implement, quite indispensable in row or drill husbandry. Grubbers, scarifiers, clod-crushers, &c., have either been invented of late years, or so much modified and improved, that quite a new feature has been given to the practice of cultivation, which has become more clean and thorough, and the crops consequently much increased. Machines for thrashing and cleaning grain have of late received great improvement, saving power and increasing work. While the changes made of late years in the reaping machine, adapting it for mowing grass, have been on this continent most marked and beneficial, chaff-cutters and drills for sowing seed in rows have been gradually improved and introduced of late years. The introduction of steam for agricultural purposes, including ploughing, in Great Britain, and the substitution in some degree of grubbers for ploughs, may be instanced as among the most striking changes in agricultural mechanics, indicating the advent of a new era in husbandry.

*Question 11.*—What are the principles and benefits of Draining, in reference particularly to Canada? Open and covered drains, their depth, form, distance, inclination, materials, and cost.

*Answer.*—The principles upon which Draining depends, are :—

1. That water is always more or less present below the surface of the soil.
2. That the roots of plants will not penetrate this water, and consequently do not go down so far as they otherwise would in search of food, and are consequently cut off from a due supply of nourishment.
3. Air, which is essential to vegetable as well as animal life, cannot find sufficient access in soil saturated with water.
4. That *stagnant* water is always hurtful to vegetation, inducing cold by constant evaporation, and forming noxious chemical combinations in the soil.

*Benefits.*

1. Soils that are stiff, and therefore difficult and expensive to work, are, by under-draining, rendered dry and friable, and consequently cultivated with more certainty and less expense.
2. Larger crops and of superior quality are reaped.
3. By carrying off the superfluous water by drains, instead of the much slower process of natural evaporation, seed time, and consequently harvest, are earlier.
4. Large root crops are raised, where before only oats and the coarser grains and grasses only could be produced. Draining thus becomes essential on all wet lands, to the successful breeding and fattening of superior cattle and sheep.
5. Summer and naked fallows are rendered much less frequent and necessary, and an improved rotation introduced.