

Outfit for Stacking Hay.

Mr. Frederick Axon, of Conboyville, Brant County, kindly sends us a sketch, from which we make the accompanying illustration. With regard to it he says:

"I send you a sketch of a cheap stacking outfit, as I never saw a similar arrangement. I gave it a trial last summer. Our hay being cut before the grain, we stacked it at the end of the barn, and after we threshed we horse-forked it back into the barn again. We unload from the centre of the barn, and as the hay falls in the centre of the stack it packs it solid, settling at the sides so that no rain can enter into the stack. As quite a number of my neighbors are putting up a similar outfit, I thought I would send you a description."

Ensilage.

Prof. Roberts, of the Cornell University, gives the following as his experience with ensilage:—In 1881 we built a pair of small twin silos, and for four years afterwards we filled them with fodder corn, field corn with mature ears, green rye and clover mixed with timothy. Sometimes we used heavy pressure, sometimes light; some of the material was put in when the growth was well advanced, some when very young; some was ensilaged rapidly, some slowly; sometimes it was put in quite dry, sometimes so wet that the water ran out of it; but none of it was "sweet." In fact, I have never seen any sweet silage. Often the odor of the product could be noticed in the milk, and many times the customers imagined they could smell and taste it—a fact which we were compelled to treat as seriously as if the genuine flavor and odor had been present. The clothes of the hired men and the barn always had an unpleasant odor when the ensilage was about. All things considered, we felt that we could not afford to use it.

Scratches, grease heel and all similar complications come directly from not taking proper care of the horses' feet and limbs. Farm horses, most especially, are allowed to stand too long after usage with the mud adhering to them, says the National Stockman and Farmer. This, though, is no more prevalent than allowing horses to stand in unclean stables, where the manure is, perhaps, not thrown out more than once a week. The ammonia arising from the fermenting manure is not only injurious to the general health of the animals, but is one of the most prolific causes of grease heel, cracked quarters, etc. The stable should be cleaned at least night and morning, and the horses should not be allowed to stand in their dirt after being used any longer than necessary for the mud and sweat to dry.

A correspondent of the *Mass. Ploughman*, in reporting the proceedings of a farmers' institute, suggestively says that a discussion of the subject of fertilizers ended with the reflection that after all "the field of actual knowledge is before us." To which the *Maine Farmer* adds: "This may not be complimentary, but, if true, it ought to spur us on to still further investigation."

Farm Drainage.

No VII.

Distances between Drains and Size of Tiles.

We have already spoken of the most practical and the accurate method of ascertaining the distances apart of the drains, viz., by means of observation for several seasons and by digging test holes; but a general standard may be laid down, which may be varied according to circumstances. In a stiff soil, they should not usually be more than 50 to 75 feet apart, and about 100 feet in a porous soil, it being understood, as we previously pointed out, that in a stiff soil the drains must necessarily be shallow, especially when the greatest stiffness is near the surface. In general, the depth may range from 3 to 4 feet, but some clays are so stiff that the water will not permeate more than 2½ feet sufficiently rapid to insure good drainage.

The most difficult question in drainage is to ascertain the size of the tile, so many variable conditions being required in the calculation. Here also standards have been adopted, but no farmer should follow them blindly; he should study all the conditions. It is a fact worthy of a note, that a very large percentage

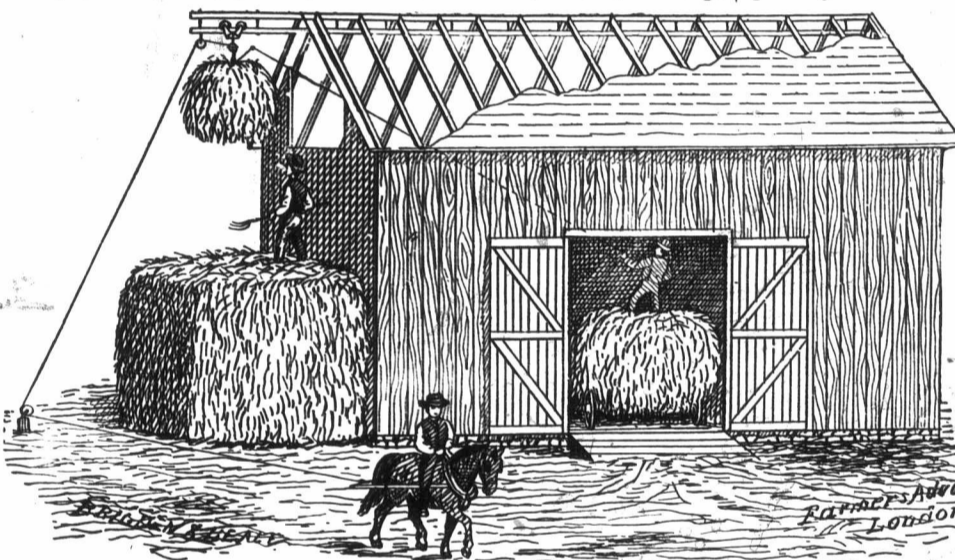
of the drain; (8) The smoothness of the bore; (9) The character of the soil; (10) The depth of the drain, and the distances apart.

With reference to the rainfall, it is not only desirable to know the quantity that falls per year, but also whether the rain falls in heavy or light showers. The average rainfall, expressed in inches, for the provinces of the Dominion, for the past twelve years, is as follows: Ontario, 23.78; Quebec, 24.76; New Brunswick, 33.10; Nova Scotia, 37.17; Prince Edward Island, 29.90; Manitoba, 17.22; British Columbia, 25.26; Newfoundland, 35.99; Average for the whole Dominion, 28.39 inches.

It is necessary to know these figures because the following table for the size of the tiles takes 30 inches of rain fall per year as the standard, and it will thus be seen that the table will, for all practical purposes, apply near enough for the average for the Dominion, although in some of the Provinces, notably Manitoba, smaller tiles may be used, than those expressed in the table.

These figures are also modified by the quantity of rain which falls in 24 hours.

Observation has proved that if the drain makes provision for maximum fall of one inch in 24 hours the practical results will be excellent; but these figures are again modified by other circumstances. In the first place the drain will never carry off all this inch of rainfall, for a portion of it will always be absorbed by the particles of soil, the balance finding its way into the drain. The usual calculation is the removal of one half this amount, or one half inch of rainfall in 24 hours; but the



STACKING OUTFIT.

of the tiles used is too large, not only incurring unnecessary cost, but depreciating the stability of the drain. It is necessary to the durability of a drain that it should at times be exercised to its full capacity for the purpose of effectually washing out the silt deposits, and this advantage cannot be attained if the tile is too large. The other extreme, viz., too small a tile, has also serious disadvantages, notably the tardiness with which the water is removed from the soil, caused by the lack of carrying capacity, and the greater friction in small tiles, compared with large ones, thereby retarding the velocity of the flow. On the whole, drains whose tiles are too small are, if carelessly made, more apt to fail than drains whose tiles are too large, and the general use of the large tiles may be attributed to the lack of sufficient knowledge in the construction of drains.

The size of the tiles is affected by the following considerations: (1) The rate of inclination or fall; (2) The area to be drained; (3) The greatest rainfall in 24 hours; (4) The quantity of water other than the rainfall, if any, due to overflowing or underlying springs; (5) The soil, if any, indirectly acted upon, owing to peculiar slopes in the neighborhood land; (6) The length of the drain; (7) The straightness

character of the soil affects those figures considerably. For instance, a heavy clay, when dry, will absorb 60 to 70 percent of its weight of water; a dry clay loam, 50 percent; a dry loam 40 percent, so that the heavier the soil the less the water to be removed by the drain. Occasionally, perhaps once in two or three years, two or three inches of rain may fall in 24 hours; but it does not pay to make provisions against this excess; for if the surplus is not removed for say 36 hours, only some of the growing crops would be affected. If these heavy showers fall during dry weather, little damage need be expected; for the soil will absorb a much larger quantity of water. As a rule, however, it is considered that thorough drainage demands the removal of the surplus water within 24 hours. With regard to the quantity of water to be removed from other sources than rainfall, each farmer must use his own judgment as to the extra size of the tile required.

The friction is governed by the length of the drain, the size of the tile, and the character of the flow. Long, crooked, roughly laid drains, with tiles of rough bore, should be made of larger tile than where the reverse is the case, even under conditions otherwise identical, for when