catch of clover or grass mixture. This is a subject of great interest, and I hope will draw from your readers the experience of many who may be of different opinions, and yet who may have worked out for themselves a rotation which is satisfactory under their local conditions.

Ontario Co., Ont. WILL A. DRYDEN.

Windmill for Pumping Water.

To the Editor "The Farmer's Advocate":

Spring is drawing near, and the farmer who has to drill or dig for water, and intends to put up wind-power to supply his house and barns with water, may find some useful hints in this letter, in regard to an outfit. First of all, with the wind-power once installed properly, the first cost is all, only for oil. The windmill will force water almost any distance, and lift out of a well from 10 to 400 feet. The well may be around the buildings, and fresh water may be had at the house by means of a small tank at the house, or small tank set inside of big supply tank at barn. I would advise farmers to put a cement tank in the approach of their barns, as it is water-tight and away from frost and water, is always clean and fresh. When a small tank can be set in a house high enough to run an overflow pipe from house tank to barn, it is all right. All the water pumped goes through the house tank; the water is fresh and good, and if barn is too high, would put small tank inside of big tank, with small tank set two inches higher than top of supply tank. The water in small tank can be used at house, and will be almost as cool as out of well. Power-mill can be used for chopping, running cutting-box, root-pulper, saw, and, by putting on pump jack and attachments, can be used in pumping water out of deep wells at a reasonable distance, or by a suction pump when the lift is not over 27 feet. I would advise not to have over 20 feet of lift, as the less lift, the better the satisfaction. I erected one mill—the mill was 400 feet from pump, and pump 570 feet from well. This outfit has been working over two years, and is giving good satisfaction yet.

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Stabling for Ninety Head of Cattle.

Seeing in "The Farmer's Advocate" your request for plans of stables that are giving satisfaction, I enclose the plan of a stable that I am now using the second winter, and which is proving to be not only a great saving in time and labor, but also a comfort to the animals and to those who are caring for them.

Five years ago the large silo was built, the hay barn was placed on a concrete wall, and the stabling put in as it now is, but needing room for about ninety head of cattle, and wishing to have them all together, the north-east corner wall was taken out and the new barn was placed endwise to the older building, and about twenty feet along the east side. The end wall that was removed was replaced by one six feet to the north, thus giving additional space in the feed room, and at the same time bringing the silo directly into the feed room. The ensilage falling at once into the feed room is very easily mixed with chaff or cut straw, which comes down quite near. When the large silo is empty the ensilage from the smaller one is thrown down into a three-wheeled truck and taken to the mixing place. The floors being all on the same level, this truck takes the place of the back-breaking basket, and is used exclusively for taking the food down the hallways to the stock, saving much time and labor. The truck box, 3½ x 6 ft. and 2 ft. deep, is open at one end, has a swivel wheel under the open end, and will turn in its own length. It will hold sufficient to feed twenty to thirty cattle, according to size.

The barn is supported by 6 x 6 in. cedar posts, placed on dwarf walls, which are about three inches higher than the hall floors. The posts make the division between each stall, to which the partitions are fastened, and are 6 ft. apart across the hallway. The dwarf walls, eighteen inches wide, form the bottom of the manger. The front of the manger is formed by a plank, cut as shown in diagram herewith, which is nailed to the 6x6 posts. The partitions in front of the cattle are made of ten No. 7 crimped wires, from 2½ to 3 inches apart, stretched very tight on the side of the 6x6 post nearest the cattle. The two bottom wires are stapled firmly to a 1x3 strip of wood, giving greatest strength where most needed. The wires make a very neat finish, permit of free circulation of light, and being fastened on the side of the posts nearest the cattle, keep them standing back nearer the gutter, and also gives eighteen inches space for feeding and cleaning out the manger from the hallway. The dwarf wall along the box stalls is raised about ten inches higher than the other mangers, excepting at the gateways, where it is but two inches higher than the floor level. The manger is built on this wall.

The stall posts are of cedar, all turned to six inches in diameter, and the end set in the floor was given an application of boiling coal tar and pitch to preserve them from decay.

The stable has a complete water system. The pump, which is set just under the windmill, does not occupy any extra space. It raises the water about twenty feet, and draws it 180 feet from a never-failing spring, and forces it into a fifty-five barrel tank. The 1¼-inch pipe that supplies the water boxes runs along just on top of the manger plank, and the water-box placed about six inches higher. The boxes are placed not through the partition, but between the two cattle in the stall. The top of the water boxes are about two feet higher than the floor, keeping reasonably clean, and the cattle drink from them with ease. They seem to be in about the right place. The supply of water is governed by only one regulating tank, shown in cut at end of the row of feeders' stalls. The walls are of concrete throughout. They are ten feet high, and are one foot in thickness, with the exception of the manure shed, which is but ten inches. They are plastered on the outside with a mixture of cement, sand and iron dust from the rumblers, and blocked off with white lead, giving it a gray-stone finish. The floors are of concrete, excepting in the box stalls. These have only a little gravel pounded in for a bottom. The gutters are seven inches deep, having a gradual slope of fifteen inches from the passage. The floors on which the cattle stand are of different lengths. The cow stable has the greatest length; the feeders opposite, two inches shorter; the feeders in the larger part of the stable, two inches less, while that for the yearlings is still shorter by three inches.

The partitions between the box stalls are of concrete, eight inches thick and four feet high, and above this are upright octagonal hardwood pieces, one and one-quarter inches by two feet long, and six inches apart, fitted into a two-by-four top and bottom, and bolted on top of wall. These concrete partitions also support the wall against the driveway.

The manure from the entire stable is taken into the manure shed in a little carrier, running on a continuous track. No switches being required is another saving of time. The ground slopes away quickly at the east of the barn proper, which enabled us to make the bottom of the manure shed four feet below the stable floor, and yet on a level with the outside, and while we do not make a practice of hauling out every day, we quite often drive the sleigh or spreader under the track and dump the manure into it, saving once handling. The manure shed has a sloping roof against the end of barn, and is covered with corrugated galvanized steel sheets; much less sheeting being required with this roofing than the shingle, a strip every two feet being all that is required.

The window frames are two and one-half by four feet. Part of the sash are put in to slide past each other, and part are on a swing pivot. I like the swing window the better. It is much more easily opened or closed in the winter season. The sliding window freezes down, and it is almost impossible to open them to admit fresh air.

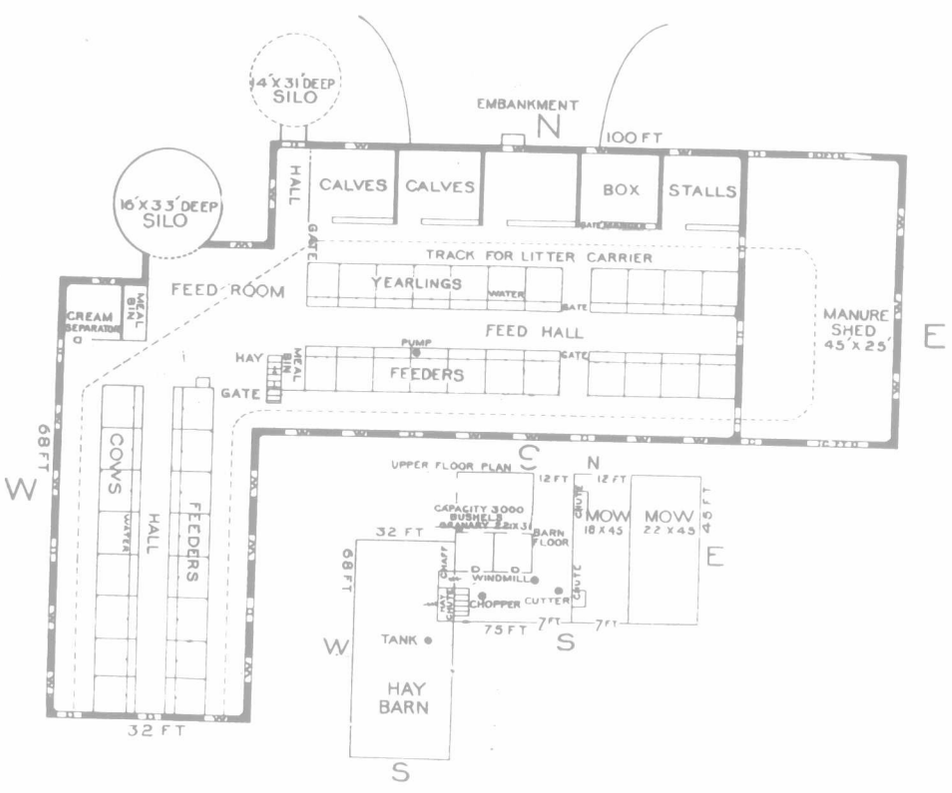
The only system of ventilation in the stable is three-inch tile, laid through the wall about seven feet apart, and near the top of wall. The tile acted quite satisfactorily in the first stable I built—it standing with its sides east and west—but have not proved sufficient for the larger stable. I would be pleased to hear from those who have successful systems of ventilation in large stables.

The farm is framed in five bents. The posts are 20 feet and the purline posts 32 feet in length. Its roof is covered with steel galvanized shingles. The doors for the driveways are six feet apart, which permits of sliding the half door out of the way. There is a window and swing pivot door (which is always closed unless fastened open) in each end of the barn, and small doors over each of the four large doors. The granary has an eight-foot hallway, in which the elevating of grain is done. It is so arranged that in loading grain the wagon is backed alongside the wall just under the outside granary door, and the sacks are lowered to the wagon, saving much heavy lifting. The two side doors in granary serve a double purpose. They save carrying much of the grain alongside the machine in the dust to the main hallway door, and also are very convenient to the chopper. The space from the granary to the south side is covered the same height of granary. Steel tracks and slings are used in filling the barn, and the hay is taken in the south end of the hay barn. A fifteen-foot windmill furnishes power for pumping water, cutting straw, and, if judiciously handled, will grind all the grain needed for all the stock.

I do not present this as a perfect plan of barn and stable, but as one from which perhaps a few ideas may be taken that will lighten the labor and shorten the time required in caring for quite a number of cattle.

Brant Co., Ont. A. W. VAN SICKLE.

[Note.—On a smaller farm, or where fewer cattle were kept, the basement of the hay barn could be utilized as a horse barn and "drive stable" for rigs.—Ed.]



Barn plan of A. W. Van Sickle, Brant Co., Ont., showing basement and upper floor.

The Effect of Humus on Soils.

By Prof. R. Harcourt, Chemist, O. A. C., Guelph, Ont.

The term humus is applied to a large class of ill-defined bodies derived from the decay of former animal and plant life. When this organic matter undergoes complete decomposition, nothing is left but a few gases and a small amount of mineral matter, but when it is in its intermediate stages of decomposition, and mixed with the soil, it is known as humus. It is essentially a product of the millions of living organisms in the soil, and the rapidity with which the raw organic matter is broken down to humus and the humus on into its ultimate constituents, depends upon the number of these organisms, and upon the presence of favorable conditions for their action. If the soil is well aerated, warm, moist, and contains plenty of basic substances to combine with the acid formed from the humus, the decomposition will be rapid. Thus it is that more humus is found in meadows and pastures than in continually-cultivated soils, more in heavy clays than in light sandy soils, and the accumulation of humus reaches its maximum where for any reason the soil becomes so waterlogged that the supply of air is cut off, as in swamps.

The value of an abundant supply of humus on a cultivated soil can hardly be overestimated. It influences the temperature, texture, absorptive capacity, and color of soils, and directly or indirectly controls, to a large extent their supply of water, nitrogen, potash and phosphoric acid. In fact it, more than any other factor, fixes the productive capacity of an arable soil, and in many ways may be looked upon as a panacea for all the ailments of the soil.

Humus tends to warm soils, because it makes them darker, and dark-colored soils become hotter in the sun's rays than light-colored ones; the extreme difference observed in the case of natural soils is as much as 8 degrees. No difference will be observed on cloudy days, and at night all soils will cool to the same point. The chemical changes that take place in the decomposition of the organic matter also have a marked influence in raising the temperature of the soil.

Humus has a wonderful influence on the texture of clays, in that it diminishes their tenacity, renders them more pervious, and more easy of tillage. On sands it has the opposite effect, for it tends to bind the particles of the soil together, and thus make them firmer. The influence of humus on the texture of soils of all kinds is so well known that it is not necessary to dwell on this point.

Humus absorbs a large amount of water. This it does because its particles are irregular in shape and porous, thus presenting a large amount of surface on which the water of a well-drained soil is held. A soil rich in humus also holds its moisture more firmly in time of drouth than a soil poor in humus. In fact, this water-holding power is one of the most important differences be-