upright and letting the planks rest on top of it will keep plank from slipping down.

By using bolts the corner planks are put up the same as for uprights. Saw notches in bottom edge of planks about 1½ inches deep, for the bolts and to allow the planks to go below the top edge of concrete wall; place another bolt or clamp on top edge of planks and put in spread sticks to keep them to their place. In raising the planks these bolts are drawn out of the wall and placed under planks again the same as before. In putting in the door and window frames, take a 2 x 4 scantling and dress off the two corners and nail it to the door-jamb uprights next concrete wall, so this will be dovetailed in concrete wall. It keeps jamb to wall, and no wind or cold can get through. In my next letter I will deal with stable floors, silos, etc.

Welland Co., Ont. NORVAL B. HAGAR.

Whole Corn in a Silo.

To the Editor FARMER'S ADVOCATE:

SIR,—Last fall I was blessed with five acres of excellent corn, of the Whitecap variety and exceptionally well eared. I have a tub silo, 16 feet high by 15 feet in diameter, and the problem which presented itself was to find the cheapest and best way of placing this corn in my silo without buying a cutter and power, for it was impossible to hire one at the right time.

Finally I decided, in spite of the protests of my friends, to put the corn in whole. One man said that the silo would not hold one-third of the crop unless it was run through a cutter, and it did look preposterous to think of stowing all that rank growth in so small a space. Some said that I never could get it out without an axe, and others were sure it would all spoil.

I was very uncertain myself how it would come out, but I had made up my mind not to invest any money in a power and cutter last year at least, so when the corn was well glazed we went at it. One man and a boy remained in the field cutting and loading; another man drove the team back and forth from the field, leaving the loaded wagon at the silo and taking the empty one back. Two men unloaded the corn and handed it to me in the silo. The first layer was placed with tops to the north and in three rows, the first row lapping about two feet against the side of the silo. The second row was lapped on the first and the third on the second, in such a way that the butts of the third row reached the south side of the silo. This process was repeated for the next layer, except that it was laid at right angles to the first; *i. e.*, the tops pointing west. The tops of the third and fourth layers pointed to the south and east respectively. This process was continued till the silo was full, which occurred at the close of the second day. Fully half the crop remained standing in the field. It was at this time that I heard such remarks as "There, I told you so." But I only smiled blandly and said, "Wait." I had seen silos filled before, and knew something of the settling power of heating ensilage. On the third day after filling it began to sink, and one could almost imagine that the bottom had dropped out of the silo. Then we began to fill again with less help until all the corn was in except a little which we husked, and most of these stalks went in afterwards. They could all have been put in by allowing time for settling, but some of them became too dry. For a covering we used the scrapings of the barn floor, consisting of chaff and husks.

We opened the silo on Nov. 1st. After removing the covering, the center of the silo was found to contain excellent ensilage, but a good deal was hurt around the edges, especially on the east and west sides, where the roof prevented proper treading near the top. We have fed ensilage now for a month, and find that the lower we go the less there is spoiled at the sides. Most of it comes out in good shape, and the cattle eat it eagerly.

No trouble is found in throwing it out. We simply keep track of the layers and courses, and take it out in armfuls, just as it was put in.

Next year I shall put the corn in whole again, as it is less labor and saves the expense of buying or hiring a machine. I shall do it with less help and give plenty of time for settling, keep the sides higher than the center, and take more pains in treading. By so doing I hope to eliminate most of the loss which took place this year. C. S. MOORE.

Missisquoi Co., Quebec.

Sulphate of Iron as a Weed Destroyer.

A few months ago, in the FARMER'S ADVOCATE, accounts were published of experiments that were being made in France and England in destroying certain noxious weeds, principally wild mustard, with a sprinkling of bluestone solution. The following additional reference to the subject, taken from a leading Old Country exchange, will be read with interest: "Repeated reference was made in these columns during the autumn to certain experiments which were carried out at the Durham College of Science and elsewhere during the past season, with the object of testing the value of solutions of sulphate of iron in destroying that bane of the arable farmer, charlock (wild mustard). After an extensive series of experiments in Cumberland and Durham, Dr. Somerville found that by applying a solution of iron or copper sulphate by means of a suitable spraying machine at a time when the charlock plants are one or two inches high, the weeds are at once killed. The best results were obtained by a 7½ per cent. solution of iron sulphate applied at the rate of about 40 gallons per acre, the cost being (exclusive of the outlay for a spraying machine) a little over 1s. per acre. The reason given by Dr. Somerville for the destruction of the charlock, while the corn and other plants escape, is because the latter has a smooth, upright leaf, on which the liquid cannot rest, whereas the leaves of charlock are rough and broad, and lie more or less horizontally. The consequence is that the latter catch and retain the poison, which has thus the opportunity to be absorbed and to bring about the death of the plant. The result is the same on all rough-leaved plants, and thus it is that such weeds as thistles are also blackened and crippled by the spray. With the object of bringing this method to the notice of farmers who have infested ground, the agricultural department of the Newcastle-on-Tyne College of Science is proposing to demonstrate its efficacy by undertaking to spray a few hundred acres of land in the counties named above. The college proposes to supply the spraying machine, the material, and a superintendent to direct operations, while those taking advantage of the offer will be expected to supply three workers and two horses during the progress of work, and also to contribute a small charge per acre towards the expenses of the undertaking. In order to show the effect of the spray on each area dealt with, half an acre will be left untreated in each field."

Holyrood Chiel 46927, Imported Collie Dog.

We have pleasure in presenting above a lifelike photo-engraving of Holyrood Chiel, a notable year-old collie, imported by Mr. McEwen, of Byron, Ont., from the Isle of Man, where he was bred by Mr. T. Caley. As will be seen, he is a dog of striking appearance, being beautifully marked sable and white, carrying an abundant frill and coat of proper texture, and is built on the galloping lines of a worker. His head and expression bespeak an intelligence which only requires time to be directed in the proper channel, making him a farm assistant as useful as he is ornamental. His sire was Champion of Wellsburne Conqueror, dam Onchan Queen, by Champion Ormiskirk Emerald, sold a few years ago for $8,000, by T. H. Stretch to A. H. Megson, of Manchester, Eng. The other collie dog used by Mr. McEwen in his kennels at "Alloway Lodge Farm" is "Old Hall Paris," that won the championship at New York last year. At the same time Holyrood Chiel was brought out, a two-year-old female, "Holyrood Duchess," was imported. She was sired by Rossendale Don, sire of many champions, and herself won six 1st prizes and several specials in England.

It has been young collies of the above type that we have been sending out during the past three years as premiums to persons obtaining new subscribers to the FARMER'S ADVOCATE, and that the premium was a popular one is not to be wondered at. Apart from its utility, there are few individuals who do not appreciate the comradeship of a noble dog. We have accordingly decided to renew the offer of a collie pup from Mr. McEwen's kennels to anyone sending us the names of twelve (12) new subscribers to the ADVOCATE at $1.00, and trust the offer will be very generally taken advantage of.

The Agricultural Education of the Future.

In an address before the Northern Illinois Horticultural Society, the President, Mr. J. L. Hartwell, in referring to the deplorable lack of interest of many farmers, who could neither be induced to read the agricultural press, to attend Farmers' Institute or horticultural meetings, made the following prophecy:

"They must be reached, and it is purely and simply a matter of education. The agency by which they can and must be reached is our public schools. I wish to go on record as making the prediction. By the time the child now in its mother's arms becomes the father or mother of a family, the children in our rural schools will be studying the physiology of plants and animals, farm economics (both of the household and the field), under a teacher skilled in these things. A well-equipped country school will include a well-conducted farm of from one to four acres, and a successful candidate for a position in a rural school must be thoroughly qualified along the lines suggested by this prediction."

Rotation of Crops.

BY A. A. BRODIE, MIDDLESEX (EAST) CO., ONT.

Rotation of crops, or the alternation of any one crop on the same land, has been known to a more or less extent from earliest history. We have ample reasons for believing that the antediluvians observed in the small areas of land they cultivated that with a continual repetition of the same crop the land gradually ceased to respond bountifully. The first intimation that we have of rotation or something approximating to the same purpose was when the Israelites were commanded to rest the land every seven years. Flax was grown in Egypt, as well as barley and wheat, and analogy would lead to the conclusion of a kind of rotation. Little light is thrown on the practice or science of agriculture in ancient history; incidentally a gleam may be observed here and there in obscure nooks and corners, showing that it was not wholly lost sight of amid the terribly devastating wars and pestilences. Coming down to the Roman occupation of Britain, and especially in Tacitus' account of the campaign of Agricola, he simply mentions that corn grew abundantly on the alluvia. Over one thousand years ago, according to Geddes' History of the Russian Empire, wheat, rye and barley were extensively grown on the southern steppes of Russia, supplying many countries with bread. Flax and hemp were also largely cultivated. Experience had already taught them that when the land ceased to produce abundantly they had recourse to breaking in a new piece of land or alternating the crops.

When manuring became a fixed necessary adjunct to successful farming I have failed to ascertain. No doubt its beneficial effects had been observed long before it had been generally practiced. It would appear that what we understand as mixed farming raising domestic animals in connection with tilling the soil—is of comparatively late date. Abel was a keeper of sheep and Cain was a tiller of the ground. We notice that Abraham and Lot had large flocks and herds, and Jacob and his sons were shepherds, following a kind of nomad life. Not until their settlement in the land of Canaan do we hear of them raising grain. No further back than our grandfather's, or at least our great-grandfather's, time, they knew as well as we do now that dung made crops grow, but possibly not the reason why; nor did they care much, as long as the result was remunerative. As the demand for human food increased with the population, and virgin soil was no longer within their reach, a new era began in the science and practice of agriculture.

We therefore lay it down as an axiom, that rotation is necessary to successful agriculture, and the desideratum would be rotation suitable to the production of the various kinds of crops our soil and climate are best adapted for, and which the market demands, with this understanding, that one of the alternations must be bare fallow or a crop in which the land can be cleaned. Let us now take a cursory glance at the principle of rotation. Science has domonstrated that no two plants of different kinds require the same elements of food and in the same proportion. The air is of practically the same combination all the world over when not corrupted by foul gases or decomposing matter, viz., of oxygen, nitrogen, carbonic acid, water vapor, ammonia, nitric acid, and ozone. Oxygen and nitrogen constitute by far the greater bulk and weight of the air; the others are present in much smaller quantities. It is quite evident, then, that every plant has free access to the air to draw from it what it requires for its growth. It follows, then, as an incontrovertible fact, the growth and luxuriance of the plant devolves on the soil. The quantity of ash left by different plants when burned is quite various. A hundred parts of wheat leave two parts of ash; oats, 4 parts; beans, 3 parts; clover, 9 parts; potatoes, 12 parts. This ash or saline food of plants must first become soluble before it can be assimilated as plant food. Every root and fiber are so many mouths sucking, as it were, nourishment from the soil. As a plant cannot move about like an animal, bird or insect, in search of food, it is forced to put up with what is within the sphere of its roots; and if there is not sufficient there it will be more or less dwarfed, if not actually starved. There are some plants that require a larger amount of humus than others in order to obtain a good crop. Turnips and potatoes desire an abundance of alkali; corn delights in rotten sod in which there is present plenty of humus; while beans, peas and clover require a good deal of lime—in fact, all legumes like a calcareous soil. Wheat and other cereals also require lime. A soil must contain a good deal of silica to secure a good crop of wheat. Silica is more or less abundant in most all soils. It is this that forms the glaze on the stems of cereals, especially between the head and the upper leaf, rendering it more or less impervious to rust or mildew. It is also the principal agent in stiffening the straw against lodging. It is quite noticeable that in any part of a field very rich in humus or black earth the straw is more apt to be soft and more prone to rust and fall down for lack of sufficient silica.

Now, falling back on the fact that different plants require different food for their growth, experience as well as science has taught us that a continual growing of the same plant on the same land will ultimately end in the crop refusing to respond bountifully. Lands in some of the Southern States become almost barren through continuous tobacco growing. A tract of country that has beem lumbered seldom grows up again with the original