THE FARM.

Farm Engineering.

THE COST OF CONCRETE.

Every live farmer is planning farm improvements for the future. The limit to what he wants to do is usually determined by the cost of the improvements, but in very few cases has he had the experience necessary to estimate closely the cost of any structure. More and more he is looking to concrete as the material for permanent buildings. The cost of cement per sack or per barrel is easy to obtain, but then his task is to determine the proper proportions to use and the amount of each of the ingredients used in any building with that mixture.

It must be remembered always that the main, if not the only, reason for using sand and stone with cement is to decrease the cost of the concrete. These materials act as adulterants or filling substances to increase the bulk. Cement itself, neat cement as it is called, is far stronger when set than either a cement-sand mortar or a cement-sand-stone concrete, as shown by the following table of tests made with Portland cement.

TENSILE STRENGTH OF PORTLAND. CEMENT MORTAR.

Material.	Age. 7 days. lbs. per sq. in.	28 days. lbs. per sq. in.
Neat cement	450-550	550-650
Mortar:		
1 pt. cement, 2 pts. sand	200-300	300-450
1 pt. cement, 3 pts. sand	150-200	200-300

An ideal concrete is a mixture so constituted as to be absolutely non-porous. This ideal is approached by grading the sizes of the adulterant materials. The holes or spaces between the large stones are filled by the smaller gravel; the spaces in the gravel are filled with sand; the pores between the sand grains are filled with the cement particles. The cement is so very finely divided that even each tiny grain of sand is coated with it and so adheres to the neighboring grains, the whole forming a mortar which coats the stones and holds them together. The purpose, then, of the cement is to form a binding material for the more bulky substances, as well as to fill the finer pores in the aggregate.

Much study and thought has been given to this problem of proportioning the various materials to give the ideal and yet the most economical mixture. In practice it is not possible to fill all of the spaces because of the impossibility of mixing the materials perfectly and also, because of the fact that water is added to the mixture. This, when it evaporates, leaves some pores. These, of course, are partially closed by shrinkage under proper conditions.

Normally broken stone contain from 40 to 50 per cent. voids. That is, if a measure is filled with broken stone, the total volume of air spaces between the stones amounts to nearly half of the total volume of the measure, 45 per cent. being a general figure. The voids in sand and gravel run from 30 to 50 per cent., probably 40 per cent. being an average. From these considerations it has been found that, to produce one cubic yard of concrete, the amounts of materials are needed, depending on the mixture used, as given in the table below:

CONTENTS OF A CUBIC YARD OF CONCRETE.

Proportions by volume.	1-2-4	1-2-5	1-2½-5	1-3-6
Barrels of cement (packed)	1.46	1.25	1.20	1.00
Cubic yards of sand (loose)	.41	.35	.42	.42
Cubic yards of stone (loose)	.82	.88	.84	.84
Cost of concrete (materials)	$4.96	$4.45	$4.34	$3.84

The cost of the concrete for materials will vary slightly from place to place depending on the cost of rock, gravel, sand and cement. The variation will not be great from $2.50 per barrel for cement, $1.00 per cubic yard for sand, and $1.10 per cubic yard for crushed stone. It is upon these values that the above costs are figured.

Nova Scotia. R. P. CLARKSON.

A Good Corn Marker.

We recently saw a very simple, yet practicable corn-marker attachment for an ordinary grain drill where it is to be used in sowing the corn in drills. Some of the drills now made have a single-board riding platform attachment at the rear. To this was fastened a two-by-four scantling, the ends projecting beyond the wheels a sufficient distance to allow of fastening markers to these ends to make marks for the wheel the next time across. The ends of the scantling were rounded and the marker attachment was simply a piece of solid material about two by six with a hole bored through one end and large enough to slip over the rounded end referred to. This may be fastened on with a small key or plug and needs to be just long enough to reach the ground on a sufficient slant to drag easily. These are attached at either end of the two-by-four. The length of the long scantling is regulated by the width of drill used and the distance apart of the rows. Where a riding platform is not attached to the drill it would not be a very difficult task to attach the scantling without it. This simple arrangement makes it possible to mark the land so as to get all the rows straight and a uniform distance apart and does the work at the same time as the corn is being sown. Most of the corn is already planted and growing, but this is worth remembering for another year.

Farmers' Profits.

Editor "The Farmer's Advocate":

I have read several articles appearing in different agricultural journals commenting on the statement on farm finances recently issued in the annual report of the Ontario Minister of Agriculture. Most of these articles lead one to think that the farmer must be in a pretty fair position financially when he is told that mortgages are decreasing steadily, and that the amount on deposit in our banks is $600 per farm. I do not wish to appear too pessimistic, but it seems to me that with the period of prosperity that the country has enjoyed for the past decade or more farmers should have more than $100,000,000 to their credit in the banks. It may be that they are spending a larger amount for improvements, drainage, pure-bred stock, etc., now than formerly, in which case they will probably realize much more than bank interest on their investment.

The fact that deposits range from $700 to $12,000 does not show very much. There may be a few individual farmers who have the latter sum to their credit; but for every fortunate individual of this kind, there are probably fifty who have no bank account whatever. I don't think that the great majority of our tenant farmers, who form from twenty to thirty per cent. of the rural population in some counties, can show a bank account of anything like $600.

It is rather strange that whenever city people hear about farmers putting by money they jump to the conclusion that we are receiving too high prices for our produce. If you dispute their statements you hear something like the following. "Well, what's the cause of it? Farmers are getting big prices. Why can't they save money? Why don't they apply better business methods? etc., etc." Prices of millinery and other finery may soar, but you never hear that mentioned. It is always the price of food that is talked of. It seems to be the peculiar privilege of some people to hand out valuable advice in big chunks to the farmer. They always know just what he should do to increase the fertility of the farm, to double his income and a host of other things that work out better in theory than in practice. It is a comforting reflection that a lot of their well-meant advice will never hurt anyone as long as he is careful not to take too much of it.

In regard to "big profits," I would like to give you an example. My father usually turns off a number of two-year-old steers each winter. We do not pretend to keep account of the cost of feeding, but I happened to know the exact age of one pair; so I figured out what the daily income from them was from birth until they were sold. One was one year and eleven months old, the other two years and one month. They were sold for a trifle over $120, to pay us for our trouble of feeding, supplying all feed, stabling and pasturage and carrying all risks, we had the munificent sum of eight and one-half cents per day. Now, Mr. Editor, there are not many of those who talk of the high cost of living who, if you offered to give them the animals, would agree to supply all feed, labor and accommodation for that figure. Even this, however, was more profitable than another case I know of. A farmer fattened some steers at three years of age and his daily income was five cents.

Coming to the price of dairy products, how much profit does the average cheese factory or creamery patron make per hundred pounds of milk? Nothing startling. During the past five years we have sold our cream to the local creamery at twenty-five cents per pound of butter fat and paid for the drawing. Allowing an average test of 3.5, the farmer receives 87.5 cents per hundred pounds. We have weighed the milk from our herd for a few years and the average was nearly 6,000 pounds per cow. This means an income of $52.50. Valuing feed and care at $40.00 per year, I don't think a man would need to stay awake many nights wondering how he would spend the profits. Doubtless other lines of produce pay better, but there is not time to discuss them here.

For my part, I do not believe that there are a dozen farmers in this county that receive decent wages, interest on their investments and allow for the wear and tear of buildings and implements. It is quite probable that many of our business men in towns and cities are doing no better. If the farmer, the business man and the worker each claims that he is not receiving sufficient remuneration, and the production of wealth goes steadily on, where on earth is it all going to? A good many people would like an explanation.

Peterboro Co., Ont. C. S. BROWN

Mixing Fertilizers.

Editor "The Farmer's Advocate":

I have read with interest the various articles on this question since Mr. Hunter started the ball rolling a few weeks ago.

Until R. Austin, District Representative, at Welland, replied in your issue of April 23rd giving full particulars re the experiment conducted, your readers had very little information, but it is quite easy to draw conclusions after reading Mr. Austin's letter.

I have also read with considerable astonishment the letter of R. Innes, of Toronto. I am surprised that a graduate of the O. A. C., which fact Mr. Innes wishes particularly to impress—upon "James Hunter"—would insult a man by telling him that he didn't know what he was talking about because his views on the fertilizer question didn't agree with Mr. Innes', if, however, this is the correct method of reckoning it will be quite in order for me to return the compliment to Mr. Innes, as I am, before I get through with this article, going to quote men whose views on the fertilizer question can not very well be disputed, and yet they are entirely opposite to those held by Mr. Innes, that is if I understand his views.

Let us examine this experiment conducted by Mr. Barron, of Font Hill, and Mr. Crysler, of Allanburg. The soil in the one case was sandy loam in the other clay loam; in the natural order of things we would expect the clay loam to be the more fertile. To make conditions still more unequal the previous cropping on the sandy soil was timothy hay, while the clay loam for several years was in alfalfa — the one crop, timothy, a soil robber, the other a soil builder. Did anybody ever see a poor crop grow on land plowed out of alfalfa sod? I don't think so. As to the fertilizer applied in these two cases. In the first place Mr. Barron made a mistake by applying basic slag on sandy soil. The phosphoric acid in slag is not water soluble but requires the action of organic acids to liberate it, which in all probability were not present in the sandy loam. Basic slag should only be applied on clay or peaty soil, and applied in the fall or very early spring. There is not the slightest doubt in my mind but that Mr. Barron's crop of potatoes got absolutely no benefit from the basic slag. What Mr. Barron should have applied was acid phosphate. As to the rest of the fertilizers used by Mr. Barron, viz., potash and nitrate of soda, comment is unnecessary. In regard to the fertilizers used by Mr. Crysler, which was factory-mixed, I have nothing to say either for or against it, except that it would be absurd to say that the difference in the results obtained in this experiment was in the slightest degree owing to the application of a factory-mixed fertilizer in preference to a home-mixed.

Now, in regard to home mixing versus factory mixing, Mr. Innes says, "I am confident that it does not pay one farmer with the average farmer's knowledge of chemistry to try to assemble the proper fertilizer ingredients and mix two or three tons." Lack of the knowledge of chemistry is no doubt responsible for the large number of farmers who are using factory-mixed fertilizers in preference to home-mixed, but they are acquiring all this knowledge that is necessary for home mixing very rapidly, and I can not see any reason why a farmer with ordinary intelligence could not mix a fertilizer for his particular crop and soil conditions a great deal better than some one in a factory not acquainted with the conditions. Firms dealing in fertilizers publish an abundance of literature—which any one can have for the asking—brim full of valuable information relative to the whole fertilizer question, and dealing very minutely on how to home-mix fertilizers.

Mr. Innes says further, that "Home-mixing is an absolute impossibility in order to secure the best results, and when farmers learn this to their entire satisfaction it will be better for the agricultural interests of the country." It certainly would be better for the agricultural industry of making fertilizer, but not for