

bottom, which, upon being levelled with the rake, left the trench 4 inches deep. Upon this cushion I placed the potatoes without cutting them, putting them 18 inches apart by exact measurement, and I found that each row used up exactly half a bushel of medium sized potatoes, or 97 in number. The variety used was the Beauty of Hebron, and I selected good, averaged sized seeds specially for the purpose. Of the first 18 rows all received a different kind of fertilizer, except three which I planted at the greatest possible distance apart from each other, using no fertilizer. My object in doing so was to test the uniformity of the soil; and my expectation was fully realized, for each of the three rows produced exactly the same quantity of potatoes. Now I considered it to be quite evident that if I produced more or less bushels from the other rows, the results must be attributed to the action of the fertilizers.

It being well known that the constituents of plant food which are usually most deficient in every soil are nitrogen, phosphoric acid and potash, it is evident that no brand of fertilizer would be of any use for my purpose unless I had its analysis, showing its percentages of these constituents which it contained. Owing to the lateness of my purchase and the consequent expedition with which I had to rush the work, I could not get all the kinds of fertilizers which I desired, but I succeeded in getting a fair variety. My mode of application was this: I raked about three inches of soil upon the top of the potatoes, and then sprinkled the fertilizers in the trench at the rate of 400 pounds to the acre, or 4 lbs. to each row. I then raked on another inch of soil, which completely filled the trench.

On some of the rows I applied fertilizers of which I had no analysis, and which I procured from several markets. These I have grouped together, and it will be seen by the following table that they produced 6 bushels per acre less potatoes than where no fertilizers were used. The potatoes were planted on May 23rd—nearly two weeks too late—and harvested Sept. 18th. The yield of each row was measured, the rotten potatoes being carefully separated and measured.

TABLE SHOWING THE YIELD IN BUSHELS PER ACRE, THE PERCENTAGE OF ROTTEN POTATOES, AND THE PERCENTAGES OF GAIN OR LOSS:

Name of Fertilizer.	Total Yield Per Acre.	Percent Rotten.	Percentage gain or loss in Yield.	Percentage gain or loss in the money invested.
No Fertilizer	305	16		
No. 1 Fertilizer	325	15	+20	+1000
No. 2	350	21	+32	+1416
No. 3	330	24	+35	+1250
Dried blood	250	20	-6	-125
Cow Manure (1,000 lbs.)	250	40	-6	-7500
Sulphate of Potash	302	15	-12	-63
Mixture	325	15	+23	+400
Ashes (12 lbs)	300	16	+13	+1750
Hen Manure (33 lbs.)	350	14	+32	+8100
Superphosphate	300	16	+13	+350
Unanalyzed brands	259	18	-23	-120

The following is an analysis of the brand of fertilizer No. 2, mentioned in the above table, with the method of reckoning the price per ton:

Soluble phosphate of lime	19.62	196 lbs × 13c = 25.48
Soluble do	3.72	34 " × 7c = 2.38
Sulphate of soda	10.44	100 " × 5c = 5.15
" " potash	1.69	
" " lime (plaster)	25.33	
" " magnesia	3.19	
" " iron and alumina	3.06	
Insoluble matter	16.65	
Organic matter, moisture, etc	16.30	
	100.00	\$33.31

Fertilizers Nos. 1 and 3 have nearly the same composition, but are not quite so strong, containing more moisture. You may be somewhat surprised that the figures in the column representing the total yield per acre are rather round numbers. To tell you the truth, I employed a boy from the High School to pick the potatoes, one who said he was expert at figures, but when he came to count up the half-pecks, quarter-pecks, etc., by converting them into decimals of bushels, he was completely bewildered. What a sad commentary on our educational system! A boy of sixteen who had "been all through the big 'rithmetic" stuck at a simple problem like this! However, I was present at the picking of the most important rows, and as there is a great difference in the yields, approximate figures are useful enough for all practical purposes. I am convinced that weight should be used instead of measure.

An examination of the profit and loss column in the above table cannot fail to astound you. Just think of it!—making a profit of 1416 percent on a fertilizer which sells in the market for \$33.31 per ton! Look again!—producing a loss of 125 percent on a fertilizer (dried blood) which costs \$60 a ton in our markets! And so on with all the other figures. Is it a wonder that the blind-fold system of applying fertilizers has proved a failure? In the unanalyzed brands (about half a dozen) the table shows that I lost an average of 120 percent on my investment. The question arises, can these heavy losses be averted, and a gain of at least 100 percent on the investment be assured? I emphatically say, YES—if you learn how.

(To be continued.)

Agriculture in Schools.

BY MARSHFIELD.

Of all the agricultural questions which are destined to make a lasting impression upon the rising generation, this is by far the most pertinent. It is the least perfectly understood; hence the great diversity of opinion. Argument and sentiment are both brought into play. The objectors to the introduction of agricultural science into our rural schools maintain that agriculture, being a profession, should have no greater rights in this respect than other professions. To this it is answered: "Agriculture is the bone and sinew of Canadian industry, and should therefore take precedence to all other professions." It is not denied that the principle is wrong, the offset being urged that nothing in our educational or industrial institutions is right. It is very true that our existing systems of agricultural education are all rotten to the very core, just because they have been established upon wrong principles, and a like disaster threatens the agricultural education of our youths.

The discovery having recently been made that we began at the wrong end, a cry has been raised favoring a start amongst our children. Is it not the teacher that makes the educational impress upon the pupils? Have not the trustees a voice in the personal idiosyncrasies and fads of the teacher? Does not the Government mould the educational character of the teachers as a body? Is the Government not a pale reflex of the people? Where now is the right beginning of the ring and the wrong end? If our Government has

brought shame and disgrace upon the agricultural education of adult farmers, to whom must we then intrust the literary lives of our farmers' boys?

But there is more than one way of beginning at the wrong end of agricultural education. This is strikingly exemplified by the heroic efforts which are being made by our fruit growers to introduce botany, floriculture, entomology, horticulture, pomology, etc., into our public schools. This also illustrates the iniquity of hobbies, especially when indulged in by powerful corporations supported by the peoples' money. Taking advantage of the ignorance of farmers as to what the principles of agriculture really are, the Fruit Growers' Association attempt to foist their fads upon the attention of the Government under the name and delusion of agricultural education. They want to prune the asperities from wayward urchins by the introduction of flowers into the school room; in other language, the useful must yield to the ornamental, despite the fact that it is only through the useful that the means for acquiring the ornamental can be obtained. Little does it matter to them whether the principles are right or wrong—in other words, whether they begin at the right end or the wrong—so long as they gain a step in their own aggrandizement.

But I do not accuse the fruit growers entirely of wilful aggression; for they commenced and have continued their own business from the wrong end—not designedly, but unwittingly. For example, I have heard such questions as the following discussed with the greatest gravity: "Are ashes good for gooseberries?" It is true that the President of the Association, who is an eminent chemist, knows better, and on one occasion, when asked him why he tolerated such nonsense, he answered to the effect that if he told his hearers that every plant would derive the greatest benefit from such constituents of plant food as were most deficient in the soil, he would be compelled to use technicalities which they could not comprehend, and he would then be stigmatized as being theoretic.

Herein lies the whole secret of agricultural education. Teach the boy not to be afraid to go back to first principles on account of certain technicalities intervening between his mind and the truth. Teach him that the requirements of the plant are subordinate to those of the soil, and his common-sense will then be his best guide. If we have to study what we and our domestic animals are to eat and drink, we must go back to the soil for first principles in order that we may begin at the right end; and the composition and classification of plants must therefore be subordinate to those of the soils in which they grow. If the soil and the fertilizers are right the plant cannot go wrong—except by forces which are external and visible.

Those champions of agricultural education who cannot defend it on principle are beginning at the wrong end. If it be introduced as a science, and not as a profession, all objections will instantly vanish. If it cannot be introduced as a science, then, on the same principle all other sciences must be wiped from the course of study. The farmer has a right to demand that the principles of mathematics, physics, chemistry, and biology should be illus-