

should prepare papers on agricultural implements and machinery, and direct the requirements of the whole club in practical matters pertaining thereto, so as to prevent imposition by manufacturers or agents. Similarly all the departments of farming might be divided amongst the members; and the school teacher should be invited to lend a helping hand. A great deal of experimental work could be done in this manner. Some members should make a special study of the science of experimenting, and lay out such work as could be easily and inexpensively conducted by different members of the club.

#### Prizes at Exhibitions.

It would be too arduous a task, within the scope of an ordinary article, to inquire into the principles underlying all the prizes awarded at exhibitions.

A cattle beast, and especially a cow, has often been compared to a steam engine, and the more the comparison is studied, the more complete it is seen to be. There are high and low pressure cows, and even automatic cut-offs—that is, cows that will shut their valves when they have taken in enough. The fuel in the dead engine produces heat, and the surplus heat is expended in the production of mechanical force; just so with the live engine—with the slight exception that if all the fuel is not expended in mechanical force, the surplus is stored up as animal increase or reserved energy.

We now find that most of the portable engines built in this Province have been judged and prizes awarded. The judges being scientific men, the engines were, of course, judged by points or mechanical principles. It was hardly to be expected that one engine could be first in all the points—for example, that the engine imparting the greatest power, produced it with the least pressure or with the greatest relative economy in wood and water; but the combined efficiency of all the points was the crucial test; or, as applied to stock, one would say, the cost of production. The figures were checked by the best mathematicians, and prizes awarded accordingly. What we wish to urge by these awards is this, that if the same tests were made by any other judges in any part of the world, the results would be exactly the same, so that the justice of the awards is placed beyond all possibility of doubt. It is natural to suppose that such awards cause an incentive to improvement, or are at least in some way conducive to desirable ends. Can all this be said of live stock awards?

But the consideration of the question does not end here. In the test of the engines it was placed beyond dispute that the combined efficiency of the best engine was nearly fifty per cent. greater than that of the worst. Did this wide difference drive the inferior article out of the market? To our discredit it must be said that it produced no perceptible effect on the number of sales. Why? From the tables contained in the award each manufacturer had no difficulty in convincing himself, and especially his customers, that his engine produced the best results, and the number of sales depends upon the amount of talk and advertising, not upon the undoubted merits of the engines.

So it is with the breeders of live stock and their position in respect to their customers.

One breeder gains audience with the cry that his cow is a small consumer; another that his cow is a great consumer; another that his cow is big, slick, fat, or the reverse, and so on throughout all the points, regardless of the combined efficiency of all the points.

There is still another phase of the prize question. Take threshing machinery for example. There are machines which do fast and perfectly clean work with a small expenditure of power; there are other clumsy, heavy-running monsters which waste at least twenty per cent. of the grain. Would it not be a desirable aim to encourage economy in threshing? These machines can also be tested by points or mechanical principles, and their merits and demerits placed beyond dispute. Why then are there no prizes awarded? Because a majority of the manufacturers have protested against prize tests, knowing that such awards might prove fatal to their business, that the principles involved in the tests would be more easily understood by their customers, and that deception could not be so easily practiced.

Under our existing mode of awarding prizes very little regard is paid to principle, or attaining the encouragement of desirable ends; or, when the principles are sound, the ends so devoutly to be wished are frequently unattainable in practice—like the making of a good law, the observance of which is not practicable. That the exhibition managers are more deserving of censure than the farmers is questionable. The only hope for reform lies in the education of the farmers.

#### How to Save the Manure.

##### No. II.

In our No. 1 we showed that if the farmer had to buy in the commercial form the same quantity of fertilizing ingredients which are found in a ton of unleached farmyard manure, it would cost him \$3, and that the waste incurred under the ordinary treatment of the manure heap amounted to \$19 per cow, or her equivalent in other stock, during the seven stalling months. These figures are based on fair average conditions, so that the value and consequent loss will be higher or lower according as the circumstances are more or less favorable.

For example, the value of the manure heap depends (1) upon the age, breed and condition of the cow; (2) upon the quality of her food, and (3) upon the character of the litter. All other things being equal, the manure from an old cow is more valuable than that from a young one; for in the production of milk, young or growth, a great deal of substance is taken out of the food, which would otherwise have been voided. If there is no such increase all the nutritive substances of the food must be left in the voidings, bearing in mind that the carbonaceous compounds of the food which sustain the animal heat, are of no value as manure, as plants get their carbon from the atmosphere, not from the soil. The excrements being in a soluble condition, just almost ready for plant food, it will be seen that the cow-machine manufactures plant food at a much higher rate of speed than the soil and atmosphere machine. It takes a steam engine, a crusher, a boiler and a quantity of sulphuric acid to convert bones or apatite rock into soluble plant food, but the

animal is the machine used for making the vegetable kingdom readily soluble. With regard to the quality of the food, although some foods are more digestible than others, it is a safe rule to say—the richer the food, the richer the manure; and when it is considered that not more than about 5 per cent. of the nutriment of the food is stored up in animal increase, 95 per cent. being excreted, the importance of husbanding the excrement will at once appear plain. The question as to the effect of litter in affecting the quality of the manure is not so complicated. Straw is better adapted for food than for litter; it is a poor absorbent, except when put through the cutter, and when it is borne in mind that the use of straw necessitates the trouble and expense of fermenting the heap, its value as litter is considerably lessened; while as an article of food, if of good quality, it can be profitably fed in connection with rich foods. All these questions must be taken into consideration by the farmer when estimating the value of his manure heap.

There are many methods by which the manurial constituents of the heap may be preserved from waste; but we shall confine our observations to three, all of which are quite practicable under our conditions, and many a farmer would find it advantageous to make use of more than one method. They may be briefly mentioned as follows: 1. The use of straw as an absorbent, with fermentation of the heap under cover. 2. The use of other absorbents, as dry muck or earth, gypsum, saw dust, etc., without fermentation. 3. The construction of tanks to gather the liquid.

1. *The use of straw as an absorbent with fermentation of the heap under cover.* A sharp distinction must be drawn between a material used for litter and that used as an absorbent, although some beddings are used for both purposes. The primary idea of straw in the farmer's mind is its use as litter, not as an absorbent. Although straw makes a comfortable bed for stock, it must be used in great quantities in order to absorb all the liquids; and then, unless the liquids are retained, much straw is more injurious than beneficial to the heap; for, in the first place, fermentation cannot take place, and secondly, straw manure injures the texture of some soils, so that manure prepared in the ordinary way is often more injurious than beneficial. Coarse manure will not do for a loose soil. The heap should be fermented for the following reasons: (1) It gives the manure the proper mechanical texture; (2) It prepares the chemical constituents for plant food, and (3) It destroys the vitality of weed seeds; whereas without fermentation, it is in its worst condition as to texture; the juices are not retained in the heap; the soil has to prepare the remaining small quantities of food at the expense of nearly as many years as it would take months under systematic fermentation, and weed seeds are not destroyed. But there are also disadvantages under the fermentation system, which involve the combining of it with the other systems, if all the manurial constituents are to be retained. When straw is used for litter a pungent odor is often felt in the stables in the mornings when the manure is stirred; this is a loss of ammonia—the most valuable part of the dung, and it cannot be checked without the use of a better absorbent