

THE SOLUBILITY OF PHOSPHATE.

By T. C. Wallace (Wallace & Fraser) St. John, N. B., and Toronto.

Rudolph Von Wagner, in his manual of Chemical Technology, says: "Soluble phosphates is an error which has cost Germany 200,000,000 marks." Why? It is quite important that we should ask and seek an answer to this question, for the time has undoubtedly come when the Canadian farmers are opening their eyes to the absolute necessity of using some form of phosphate to supplement the manures of the soil and of the farm yard, to bring to a proper balance the fertilizing elements of the soil which is being robbed of its "bone earth" by the formation of bone in the stock and people of the farm, and the growing of grain to form bone in the horses and people of the cities and towns. It is no longer a question of whether we shall use phosphate for this purpose, but the question is what form of phosphate will most effectually and economically meet the want? From the writings of the ancients it is evident that this loss of bone earth was recognized by them hundreds, and probably thousands, of years ago. In the latter part of the eighteenth century in Europe they gathered bones and broke them up small to restore to the earth. Also they were composted with lime and ashes for manurial purposes. About 1840 Baron Leibig commenced the manufacture of superphosphate by the use of sulphuric acid (oil of vitriol) to render the phosphoric acid water soluble, or partially so. With the advance of years came more modern machinery and methods, until the double concentrated superphosphates, freed from sulphuric acid, appeared as the highest form of pure phosphates for plants. The teaching of botanists that plants took their food in a water soluble state caused manufacturers to strive entirely for a water soluble phosphate, which we know as superphosphate. By and by, the diligent chemists and experimenters in agriculture, who are supported and encouraged by the German Government, intimated that some citrate soluble phosphates were nearly as soluble to plants as the water soluble.

Further investigation, however, showed great variation in the growing experiments, and while still admitting that some citrate soluble phosphates were quite readily available to plants, others, equally as soluble in citrate, were almost insoluble to plant life. About 1883 or 1884 the Darmstadt Research Station announced that a new form of phosphate had been found which was the product of the dephosphorising of phosphatic iron ore by the Thomas process. It was classed as a citrate soluble phosphate, but Prof. Wagner, the director of the station, reported that from exhaustive experiments it proved much more available than bone, ground either coarse or fine, steamed or raw, and equally soluble with the best forms of super-phosphate, and even more available, when tested in the soil in the open field or in pots on grains of all kinds and all sorts of plants. It showed all the activity and availability of the superphosphate, but is much superior to it, as, not being water soluble, it did not become dissolved by soil waters to get washed down into the subsoils, and for the

same reason did not revert and become more insoluble in the soil. The experiments were continued until 1889, when it was proved so lasting that its effects were marked for four years and longer in the crops. Here then was a form both quickly available and lasting. Superphosphates, it must be remembered, rarely produce lasting effects. This new phosphate was also safer than superphosphate, as, being free from oil of vitriol, it could be freely used with the most delicate cultivations, which made it a safe phosphate for fruit, tobaccos, etc. Being well fortified with a very fine form of lime it sweetened an acid soil by supplying a new base, whereas superphosphate being an acid manure made by the use of about half a ton of oil of vitriol (sulphuric acid) to the ton of phosphate, had too great an amount of deleterious residue to be freely used in fine cultivations. The error then in water soluble phosphates is their wasting by drainage and reversion, and over their acidity through the excessive amount of acid used to prepare them.

LARGE vs. SMALL COWS

Brandt (*Jahresher. u. Agr. Chem.* 1894, 474) conducted three experiments with light and heavy dairy cows, each lasting four weeks, the second commencing seventy days after the close of the first, and the third a year after the beginning of the first. Thirty of the heaviest milkers in the herd were separated into two lots of fifteen cows each according to live weight. The cows were kept under similar conditions as to feed and care during the trial, none being bred after the beginning of the experiment. The average weight of the heavy cows was 1,205 pounds, and of light cows 979 pounds. The leading conclusions from the experiments are:

1. The milk of the small cows is richer in fat than that of the large ones.
2. Large cows eat a greater amount of feed than small cows; per thousand pounds live weight they eat less.
3. Small cows produce less milk than large cows, absolutely and relatively.
4. When in thin flesh small cows may produce more per thousand pounds live weight than large cows.
5. Large farrow cows are more persistent milkers; on the other hand, small cows show a greater tendency to fatten on the same feed, with a decrease in the milk flow.
6. The loss in selling ten of the large cows amounted to five guilden per head on the average, after having been kept nearly a year, while the loss for ten small cows was twelve guilden per head.—*Feeds and Feeding.*

A NEW IDEA FOR LOCAL FAIR MANAGERS.

Editor of FARMING:

The utility of our smaller agricultural fairs has recently been discussed in your columns. Could not such fairs do a good work, in localities where some one breed of cattle, sheep or swine predominates, by concentrating their efforts on the improvement of that one breed? Thus, in a district where most of the cattle are Ayrshires,

why not give all the prize money allotted to cattle to that one breed, giving larger and more numerous prizes than would otherwise be possible, inducing keener competition, and so making the surrounding district one to which intending buyers of Ayrshires, both pure bred and grade, would flock from all parts? Would not the stock-breeding interests of a county or township be better advanced in that way than by encouraging the keeping of little show herds or flock of all the known breeds, each having its own little section of the prize list to itself, with little competition to face, and would it not tend to check the habit so disastrous to the ordinary farmer, of not sticking to one breed in his choice of sires, and consequently making "hash" of his grade stock? Particularly should this be the effect if grade females of the chosen breed were generously remembered in the prize-list. I should like to hear this suggestion criticised by those familiar with the conditions of the live-stock interests of Ontario.

W. B. F.

QUESTIONS AND ANSWERS.

(CLOVER PASTURE FOR PIGS.)

Editor FARMING:

Enclosed please find the names and addresses of three new subscribers for FARMING; also post office order for amount and one dollar for my last year's subscription. I will always try and send a few subscribers to your valuable paper. How many spring pigs do you consider an acre of clover will pasture?

FRANK HALLIDAY,
March 31st, 1898. Eldon, Belfast, P.E.I.
An acre of clover should give pasture for from 15 to 20 spring pigs, with the addition of a little grain. Mr. D. M. MacPherson, whose article on "Business Methods in Farming" appeared in FARMING for December 28th last, claims to be able to pasture from 30 to 40 pigs on an acre of clover. Mr. MacPherson's method, however, is different from that of the average farmer as he feeds more grain, and we hardly think it would be well to pasture more than twenty on one acre. With extra grain more might be kept.

PEA-FOWL WANTED.

Mr. F. S. Green, Greenwood, Ont., wants the address of some one who has pea-fowl for sale. Will some of our readers who have this fowl for sale kindly correspond with him.

ROOTS FOR HOGS.

Editor FARMING:

Since February of the year 1895, I have been a subscriber for FARMING, and during that time have found a great deal of valuable information in its columns. To the services which your publication has already rendered me, I should like you to add the answers to a few questions. I am at present operating a 100 acre farm. Upon this farm we keep 32 milk cows and from 10 to 15 heifers, with the usual complement of hogs to take up the bye products of the dairy. Last year I sold over \$2,600 worth off this farm, and only bought \$102 worth of concentrated feed for the dairy cows. I believe that by the practice of still more intensive methods I can increase the revenue of my farm to \$3,000 yearly. My plan is to keep more hogs and to grow roots for their feed. I have a 10 acre sod field to break up this spring, and this field is comparatively free of weeds. Would it be practicable for me to grow roots upon this whole 10 acres, and could those roots be profitably turned into cash by feeding them to hogs next fall and winter? I have 24 young pigs now, and I have six more sows that will farrow in May, and I have been thinking seriously of going into roots extensively for hog feed, and I only need the advice of some good authority to either cause me to give up the notion or to bring me to the right pitch of determination to go ahead with the enterprise. I have had considerable experience in root growing for dairy cows, but I now use ensilage, and think roots unnecessary as part of a dairy ration where ensilage is fed. In case you believe

that the scheme can be carried out profitably, what variety of roots would you recommend? What kind of an implement would you recommend for putting in the seed and for cultivating the crop, and where could such an implement be procured? An answer to these questions in your next issue would greatly oblige.

W.H.C., Dundas Co.

The growing of roots for swine feeding has come largely into vogue during recent years. In our issues of November 16th and 23rd, 1897, we published the replies to a number of questions on this subject from several prominent farmers and swine breeders. Where roots were fed to hogs, invariably good results were obtained. We would advise our correspondent to read these back numbers. Aside from this, we believe it would pay to grow roots for hogs. The ten acres of sod referred to could be utilized for this purpose. We would recommend plowing it middling deep, so that a good depth of soil could be obtained on top. This should be worked well and made as fine as possible. It might be possible to sow the seed by means of some drill adapted for sowing on the level ground, but we think, if a fair depth of soil can be obtained on top of the sod when plowed under, it would be better to make light drills. These drills need not necessarily be deep, but just high enough to admit of the seed being sown to advantage. As to the kind of roots to grow, we would recommend growing two or three kinds. Turnips, carrots, mangolds and sugar beets are profitable for swine-feeding. If the whole ten acres were sown to turnips, there would be plenty of time to get the sod in good shape before it was time for sowing, while if mangolds or carrots were sown the ground would have to be prepared much earlier in the season. W.H.C. seems to be a successful dairy farmer, and we would like to have full particulars of last year's business.

IN-BREEDING.

Editor FARMING:

Will you kindly inform me through the columns of your valuable paper, FARMING, what is your opinion of in-breeding horses? I have a very fine brood mare half Royal George and half Whistle Jacket, which I wish to breed this spring. I have been advised to breed her to her sire, Old Whistle Jacket, as he is one of the best in this section, but I am a little afraid it might not be wise to in-breed in that way.

J.P.H.

Eden, Ont., March 25th, 1898.
In-breeding or line-breeding has been practised with good results when properly understood, but it should only be carried on by persons who thoroughly understand what good breeding means. In the hands of a novice in-breeding might lead to bad results. Thirty or forty years ago in England in-breeding was carried on to such an extent that there was a revulsion of feeling in regard. Later, however, some of the authorities are recommending it very strongly as a means of improving high-class stock. In the present case we hardly know what to advise. If both animals have good records and are excellent types of animals we would feel very much like giving it a trial.

Editor of FARMING.

Can you name a desirable and profitable ration in which a large proportion of fresh brewers' grains, oil meal, etc., could be used for feeding calves from commencement to eighteen months? Am anxious to feed as little milk and hay as possible. At what age will calves commence to eat brewers' grains? Also please give ration for feeding six months old calves taken from pasture. What is the probable gain in weight on these calves, if fed all they will eat? Would two-year-olds be more profitable to feed?

Yours respectfully,

Sherbrooke, Que.

S. C. NUTTER.

ANS.: Mr. Nutter's letter bears upon a subject that is out of the ordinary course of raising dairy calves, and therefore it is the more difficult to give much definite information upon it. According to the best authorities on the subject, it is not a good plan to raise calves on brewers' grains, as they would prove a very unsatisfactory substitute for milk. Calves will learn to eat brewers' grains as soon as anything else. Oats, ground flaxseed, and clover hay would combine well with the grains, but most feeders would prefer to make them the main part of the ration, and use the brewers' grains very sparingly. For mature animals a meal ration and some hay should be added to brewers' grains in order to get the