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THE FARMER'S ADVOCATE.

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several years, and from them draw our conclusions.

Actual tests made by growers themselves, where the results, not personal opinions, are presented to the public are valuable in the extreme, for they are derived where the average conditions exist, and indicate, to a large extent, what might be expected generally. Anything of this nature will be presented to the reading public through the columns of this paper, in order that growers may converse with each other and discuss the problems arising in their business.

Peas as a Canning Crop.

The highest development of economy in farming lies in producing a good crop for the market and at the same time improving the soil in texture and fertility through the growth of that particular crop and apart from the use of artificial fertilizers and manure. The last mentioned commodities figure prominently in good farming, but if climatic conditions and the presence of factors make possible the growing of a crop that partially eliminates the necessity of manuring and at the same time enriches the soil, so much the better. Peas will do this and recommend themselves very strongly as a canning crop.

The pea crop is not altogether independent of the weather. Hoed crops, through persistent cultivation, may withstand considerable drought, but the crop of peas will utilize 27 inches of water in its growth and evaporation and a season of frequent showers is best adapted to a profitable production. Fall-plowed land in good tilth allows for a good seed bed in the spring and with this provided conditions are favorable for a crop. In most districts, the summer of 1913 was a propitious one. Growers in many cases received checks for \$50.00 and \$60.00 per acre from the factory after the price of seed had been deducted. Considering that peas get a considerable quantity of their nourishment from the air and leave it in the soil in the shape of nitrates, our most expensive fertilizer, they must be looked upon as an important crop in the farm rotation. Furthermore, they are harvested early and leave the field in excellent shape for fall wheat or fall cultivation.

The date for sowing the seed rests largely with the canning factory for which they are being grown. They must be threshed green, for if they are allowed to remain over a single day at the factory they will become hard and undesirable for canning. On this account the factories ask that no more be sown in one day than they can thresh in a day. The early varieties are sown on the early land and then the late varieties follow, extending the period over which the vining operations may be conducted. Many varieties, such as Advance, Market Gardener, Alaska, Admiral and French Cannons, are grown, but the Admiral and Alaska are the main croppers in most districts.

On an average it requires about 71 days to mature a crop of peas fit for canning. This allows the grower and canner considerable latitude in their choice of dates and extends the season over a period of about five weeks. Usually the early-sown peas are most profitable to the grower. The peas are paid for when threshed at a rate ranging around \$32.00 per ton and an acre will produce from one to two tons of peas. This was exceeded during the last season, but the amounts stated are more often obtained. The commendable character of this crop is that it feeds almost entirely from the air and if any commercial fertilizers be applied they should consist largely of phosphates, with some potash. They obtain nitrogen from the air and very much enrich the soil in this ingredient. For this reason they have an important part in the crop rotation and yield a good revenue besides.

FARM BULLETIN.

"The Demon Rabbit."

By Peter McArthur.

I am almost convinced that there is, or was, a demon rabbit in this neighborhood. You all know the stories that come from far countries about ghostly tigers, and phantom lions that seem to bear charmed lives, and to be invulnerable to the bullets of the most skilled marksman. According to the talented liars who tell the stories they are the actual bodies of dead and gone lions and tigers that "revisit the glimpses of the moon" to torment hunters. The rabbit I have been having experiences with seems to be of this kind. He appears in the open with insulting indifference, and so far we have no evidence that he has been seriously injured by our attempts to get him. But before proceeding with my story perhaps I had better say a few words to put myself on the right side of the law. I have a hazy recollection that the game laws protect rabbits, but I make my appeal to an older

code which asserts that "self-protection is the first law of Nature." I do not mean this in the sense in which it was used by the sheep thief, who, when caught red-handed, protested indignantly, "I'll kill every doggoned sheep that tries to bite me." I am not afraid that the rabbits will bite me, but, besides the young orchard, between two and three thousand seedling forest trees have been planted in the wood-lot and I do not want to have them all girdled. Game laws, or no game laws, we have been obliged to begin a war of extermination against the rabbits on the place. Perhaps that is why we are being tormented by this unshootable rabbit.

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For some weeks past a particularly large rabbit has been reported almost every day as crossing the road into the hedge and heading towards the orchard. At different times when I was driving to the postoffice he squatted by the fence and stared at me. He seemed so tame that I thought we would have no trouble with him until the boys had missed him a few times. Then I took the rifle and went after him myself. Of course I do not claim to be an unerring marksman, but still my record for picking off such small game as English sparrows is fairly good and in trying for rabbits during the fall I did not make many misses and I never had such a chance as I have had at the demon. The first morning I went after him I spied him sitting up on his hind legs at the corner of a stack. It was as pretty a shot as a pot hunter could ask for, and as we were treating rabbits as vermin rather than as game, I felt no scruples about the lack of sportsmanship in shooting at him when standing still. As a matter of fact I am not sure but it is entirely sportsmanlike to shoot at a standing rabbit with the rifle. I never managed to stop but one with a bullet when it was on the run and the attempts I have made since have convinced me that that shot was an accident. Anyway, Mr. Rabbit was sitting up offering a provokingly good target when I drew a bead on him and fired. Zip! He whirled and disappeared around the stack in two jumps. As I approached the place where he had been standing I saw something floating in the air and grabbed it. It proved to be a bunch of rabbit fur and on the ground where he had been there was a lot more. Next day I found him squatted beside the trunk of an apple tree, took deliberate aim and fired. Just one jump and a little white tail flitted saucily under a rail fence and disappeared. On the ground where he had been standing I found enough rabbit fur to stuff a pin-cushion, evidently I had made another of those near-hits. Next day we were driving past the place where I had shot at him and one of the boys was carrying the rifle. Suddenly, I spied Mr. Rabbit among some tall grass under the roadside fence. Grabbing the gun I took careful aim and fired once more. He seemed to be badly frightened, but that was all, and this time there was enough fur where he had been sitting to stuff two pin-cushions. I couldn't have been more than a rod from him this time and it hardly seems possible that if he were a normal rabbit that I shouldn't have hit him fair 'and square. However, he hasn't been seen since and it is just possible that he decided that things were getting a little too hot for him. If he appears again I think I shall have to try him with a silver bullet for that is said to be the only thing that will kill a demon of this kind. But perhaps, instead of using the silver to shoot with I should offer a quarter to a boy who is a better shot than I am to get him for me. Anyway, I have no need to fear the game wardens about this rabbit for I did no more to him than the Western desperado did to the Tenderfoot. I just shot him through the thin places around the edges. And yet—and yet—it is just possible that it was not my bullets that knocked out the fur after all. This may be the season of the year when rabbits are changing their hair and he might have been merely attending to his toilet when I disturbed him by shooting at him. But demon or no demon, we must get him before he gets the little trees.

I had an impression that these rabbits were introduced into Canada as they had been into Australia, but I find on referring to Nash's Vertebrates of Ontario that his explanation is different:

"This animal has gradually extended its range from the States south of us, into and over the entire Province, wherever the land is under cultivation, except the extreme Northern and Eastern portions. I do not know exactly when it first appeared here, nor am I certain as to whether it first entered the country by crossing the Niagara River on the ice, or by crossing at some point on the Southwestern boundary. I first saw it in the winter of 1871-72 on the banks of the river at Niagara. During that winter the river had frozen completely across and their tracks showed that large numbers of rab-

bbits had crossed to our side on the ice bridge that formed. For some years they increased and spread very rapidly, but of late years they have been so much pursued that in spite of the fact that they are remarkably prolific they seem to be rather decreasing than gaining in numbers."

I can remember myself when they first appeared in this district. It was some time early in the eighties when I was beginning to hunt through the fields and woods. Mr. Nash's observation about their numbers does not apply to this district. The rabbits have been increasing steadily since they were first seen in the neighborhood, and now they are quite plentiful. This winter, however, I hope to thin them out considerably if my shooting eye does not go back on me.

Artificial Fertilizers, Their Nature and Use—V.

By B. Leslie Emslie, C.D.A., P.A.S.I., F.C.S.

MINERAL SOURCES OF PHOSPHORIC ACID.

In the gradual evolution of the fertilizer industry, coprolites might be termed the "stepping stones" in the transition from organic to inorganic or mineral substances.

Coprolites.—In England towards the middle of last century the attention of agriculturists and fertilizer manufacturers was attracted to the coprolites, which were found over a considerable area of the eastern counties. These coprolites, which resemble pebbles in form and appearance, contain 50 to 60 per cent. calcium phosphate and supposedly consist of concretions of phosphate of lime deposited around excreta, fragments of bone and shell, shark's teeth, etc. They were for many years mined in Bedfordshire, Cambridge and Suffolk, though now the industry has entirely ceased, owing to the larger and richer deposits, which have been discovered in Florida, Tennessee and South Carolina. It is generally believed that these deposits resulted from the percolation of phosphoric acid from animal remains to the underlying limestone rock.

Canadian Apatite.—This form of phosphate rock, which is mined to some extent in Ontario and Quebec, is generally extremely hard and variable in composition, due to the presence of other minerals, although occasionally "pockets" of remarkable purity (up to 40 per cent. total phosphoric acid) are uncovered. Owing, however, to its usual hardness and variability the mining of the material is difficult and expensive and the present prevailing low price of acid phosphate from the United States does not tend to encourage extensive exploitation of our domestic phosphate deposits.

Raw Phosphate Rock.—The crude material, when finely ground, is believed by some to possess considerable fertilizing value, but, while it may produce some results on soils containing a large amount of vegetable acids, which act as solvents, its general use in this form cannot be recommended. One of the chief objects in fertilizing is to supply available "plant food" for immediate needs, which raw phosphate can by no means satisfy.

Sir John Bennet Lawes, the founder of the world-famous experiment station at Rothamsted, England, commenced in the year 1834 to conduct experiments with bones as a fertilizer and found that by treating with sulphuric acid, the phosphoric acid of the bone was rendered more available to plants. Later on, the discovery of the mineral phosphates furnished him with a new material, which, treated in the same way, produced similar results.

Superphosphate or Acid Phosphate (13 to 18 per cent. available Phosphoric Acid).—Natural phosphate of lime (tri-calcic phosphate) is insoluble in water and only slightly soluble in dilute acid, so that in this form it would be very slowly available to plants. By treating the ground mineral phosphate with strong sulphuric acid, part of the lime is displaced and substituted by water, which renders a great part of the phosphate water-soluble and, therefore, readily available to plants. The term "available phosphate" includes, besides the water-soluble, also the citric and acid-soluble or di-calcic phosphate. Tri-calcic phosphate denotes a substance having three parts of lime (lime being an oxide of calcium) to one part of phosphoric acid and may be illustrated thus:

Ordinary tri-calcic Lime)	
Phosphate	Lime) Phosphoric Acid
	Lime)

When this is treated with sulphuric acid we get a superphosphate containing water-soluble phosphoric acid, as follows:

Water-soluble or	Lime)
Mono-calcic Phosphate	Water) Phosphoric Acid
	Water)

In the above it will be seen that two parts