Agriculture.

Liquid Manure.

Manure in a liquid state is the most beneficial manner of applying it, when immediate results are required. Containing as it does the fertilizing principles in a liquid condition, it is more readily absorbed by the feeding roots of the plants. It can also be applied at all stages of the plant's growth, which often cannot be done with solid manure; and some plants, which are not in a condition for being much stimulated in the earlier stages of their growth, can more readily receive it at the time they do need it when in a liquid form. For instance, peach trees grown in pots or beds under glass, if heavily manured with ammoniacal fertilizers before or at the time they are started into growth, are apt to drop their fruit when stoning—the most critical period of their growth—but if applied after this stage, it is of the greatest benefit to them, increasing the size of the fruit.

Farmers who allow the liquid part of their maf nure to go to waste, lose the most beneficial part o- it, as ammonia is produced in the greatest abundance in the liquid part. The urine of cows, horses and swine, together with the drainings of their droppings, if allowed to run into a tank, then pumped on the manure heap or upon a compost heap, and then applied as a surface manure on the grass, will produce very beneficial effects. Some of the leading farmers in Scotland utilize all the urine and drainings of their barn-yards in this manner. It is conveyed from the stables into a large tank, into which they place a pump. Near by they collect into a heap all the road scrapings and ditch cleanings they can secure on their farms, and pump upon it the contents of the tank, conveying it to different parts of the heap, with gutters. During the season the heap is turned once or twice, and when thoroughly saturated with the liquid, is conveyed to where it is wanted—more being added to the heap as it can be procured. According to Johnston, the urine of man and that of the pig, for most soils, are more beneficial than that of the horse, the cow and the sheep; they contain phosphates—the phosphates of the horse, cow and sheep remaining in the solid excrements. In applying liquid manure to growing plants, great care should be exercised that it is not applied too strong, nor the ground saturated with it, as in either condition it is apt to destroy the tender rootlets of the plants.

Urine used in an unmixed state is very beneficial to plants. It should first be allowed to putrefy, then be largely diluted with water. Pigeons' dung makes an excellent liquid manure for all kinds of plants in pots, of a succulent or soft-wooded nature. A peck put into a barrel of water and allowed to remain for a few days before being used, and when applied diluted with about one-half water, I have used with very beneficial results on roses, fuchsias, geraniums, and other fast-growing plants.

Guano used as a liquid manure should be cautiously applied, for if used too strong it has very injurious effects. It should be mixed with water to the color of weak tea before using, and twice a week is often enough for any class of plants. When a plant is injured with guano water, its leaves get yellow and fall off, the oldest and most mature dropping first.—*M. Milton, in Country Gentleman.*

The Culture of Chicory.

Below we give an article on Chicory in California abridged from the *Rural New Yorker*. The plant is hardy enough to grow in Great Britain, and it may be worthy of trial in Canada. We require greater diversity in our agriculture, and if the cultivation of chicory prove successful, on a small scale at first, it may after a time become an important acqisition to our additional resources.

The successful cultivation of chicory depends on having the right kind of soil. It must be a rich, mellow loam, with sufficient clayey texture to make it firm and moist. It must be plowed in the fall to a depth of 12 or 15 inches, and pulverized and rolled with as much care as is usually given to a flower garden. The seed is very fine, like the carrot or lettuce, and is put in in drills about 15 inches apart. Great care must be taken to put it in the proper depth, a half inch of soil over the seed being sufficient. The seed is sown the last of February and through the month of March, if the ground is moist enough. The seed is imported from Germany, it being found impossible to raise it in California successfully, as the plants from California-grown seed all run to tops and produce a small, tough, gummy root of no value.

The seeds, however, are not expensive, costing, delivered here, about 32 cents per pound, and only one and a half to one and three-quarter pounds are required per acre. The roots of the chicory grow about the size of the average carrot, sometimes attaining a weight of four pounds and upwards. The yield is from 10 to 18 tons per acre, if sown at the right time, upon proper soil, and with thorough cultivation; but if sown too early the plant grows woody, and runs into stalks and stems. The harvest begins about the first of August, and runs through the month of September. It is desirable to harvest them when the sun is hot, as the chicory is best when sun dried. The roots are thrown out of the ground with a sub-soil plow, men following after to cut off the tops and throw the roots in heaps. Sheep, cattle, horses and hogs are very fond of the tops of the chicory and eat them with avidity. As the foliage of the top is very heavy, making several tons to the acre, its value for feed is no inconsiderable amount, although not usually calculated upon at all.

The roots are hauled to the factory or mill, where they are chopped into blocks about an inch square, and spread on a board platform in the sun. Here they are exposed four or five days, being turned over every day. At the end of that time they are put into a revolving iron roaster, where they are baked to a crisp of dark brown color. From the roasted they are passed into the grinding mill, and after cooling off, are ground to about the fineness of ground coffee. In the process of drying and roasting the chicory loses a little more than two-thirds of its weight, so that ten pounds of the roots will make about three pounds of marketable chicory.

The cultivation of chicory, when rightly understood, is very profitable. It costs but about $5 a ton to raise the roots, including seed, cultivation, digging and hauling, while the prepared chicory is worth from $125 to $250 a ton in the market. The net profits per acre are $300 to $500, according to the market price. At present the market for chicory is dull on account of an overstock of the foreign article.

It is said that the chicory grown in California is superior to that grown in Germany. In the latter country, about the cities of Magdeburg and Braunschweig, an immense area of country is devoted to chicory alone, millions of dollars being invested in the manufactories. Very little if any chicory is raised in the United States outside of California. One of the sources of profit in the manufacture of chicory is the use of the residue or pulp from the beet sugar factories to mix with the roots in the roasting pan. A large percentage of this inexpensive article can be put in without deteriorating the general quality. A large amount of unmarketable dust from the grinding mill is also made available by sprinkling it with molasses and water, by a secret process only known to the manufacturers.

Sowing Salt on Wheat.

An experienced New York farmer writes to the *Country Gentleman* on this subject as follows:—

During the last four years, I have made many experiments in sowing salt on spring wheat. For over twenty-five years farming on land too hot and dry for spring wheat to fill well (in the usual manner of cultivation), it proved a very uncertain crop. Becoming nearly discouraged in trying to raise it, I began four years ago sowing salt. The first year three bushels were scattered on the ground just as the wheat was fairly up and the ground was dry. Twenty-five bushels per acre was the first year's yield. The second year four bushels of salt were sown, and twenty-nine bushels of plump wheat was raised to the acre. The third experiment was four bushels of salt, and thirty of wheat to the acre. For the past summer in Onondaga county the thermometer has marked 80° and upwards for thirty-eight days, fifteen of which were over 90°; and it was a scorching time for spring grain. For the last trial I drilled, on six acres of corn-stubble ground, one and three-fourth bushels of wheat, and sowed six bushels of salt broadcast to the acre. A strip was left without any salt, which was very light; on this ground the dew dried off quicker, and the wheat headed out two days later, with the straw darker colored and badly crinkled down. The yield this year was twenty-six bushels per acre.

Great Britain—Its Diminished Wheat-Growing.

The lately published agricultural returns demonstrate, once more, in the unmistakable language of facts, the slow but apparently certain advent of a time when we shall be virtually dependent on foreign sources for the supply of our cereals. The process whereby lands once devoted to the production of grains of different sorts are now being gradually converted into pasturage appears continuous, and, unless checked seriously by some as yet hidden causes, the time must inevitably arrive here when, practically speaking, "horn" will in a great measure have taken the place of "corn," to employ a popular phrase now in vogue, especially in certain districts where cattle are fast putting a period to cereal culture. The official returns show that the total number of acres under wheat in 1876 were 3,124,000, a decrease on the acreage of 1875 of eleven per cent. as compared with 1876, and of twenty-two per cent. as compared with the returns of 1869. Remembering that the population is rapidly increasing, it is evident that the real significance of these facts is even more serious that the actual percentage, considerable as that is, would warrant, and clearly year by year a still more augmented import of breadstuffs is absolutely necessary. In a word, so far as cereals are concerned, this country is approaching a time when it will need feeding in this respect quite as much as the metropolis itself needs feeding from the districts surrounding it. It must not be supposed for a moment that these facts concern farmers only, the action extends much further than that; the English millers would do wise to study the various issues involved in this great fact of the permanent contraction of the wheat-growing area of the United Kingdom. In truth, the farmer and the miller are virtually co-relative; they stand in absolute need of each other, and their interests are in essentials alike. The selfish and shortsighted might, indeed, argue that the miller could work as well on foreign wheats as on home-grown, and that, the nation paying an enhanced price for its daily bread, it would matter little to him where the grain was raised; but the miller must remember that science is abroad, that technical culture is fast sharpening the intellectual industrials of every alien country no less than those of his own, and that the import of flour on a constantly increasing scale would be one inevitable result of our continued and increased dependence on foreign sources for the supply of bread. Clearly, the British farmer and the British miller should recognize the fact that they are mutually dependent, and that whatever seriously injures the one cannot fail to re-act injuriously upon the other.—*London Miller* (*Eng.*).

Scientific Agriculture in Germany.

An American writer says:—Agricultural science in Germany is either far in advance of our operations and scientific attainments here in America, or our scientists are a great distance behind the Germans. In Germany far more attention is paid to conducting experiments than in our country. When professors are conducting the feeding-trials at the German stations, neat cattle, sheep, goats, horses and swine receive different foods in varying proportions and mixtures, and the effects are accurately noted. Among the questions whose solution has been sought are, the chemical composition of different food materials, and the proportions of food ingredients in each, as albuminolds, carbohydrates, and fats, which are digested by different animals; the parts which they play in the animal economy; which elements are the "flesh formers" and which the "fat formers;" which make the fat (butter) and which the casein (curd) of the milk; which produce heat and muscular force, &c.; in what proportions and mixtures the animal will digest most fully and use most economically the food ingredients; and, finally, what amounts of each will be needed and utilized to the best advantage by different animals and for different purposes.

The care and patience and thoroughness with which these experiments are conducted, the amount of labor and time and money they cost, and the ways that their results are applied, would be quite astonishing to most American farmers. Careful weighings and analysis are made of the food the animals consume, the milk they produce, the excrement and urine they void, and even the air they breathe. A single experiment often requires the hard and unremitting work of several chemists day and night for several weeks or months.

The accounts of the experimental investigations on the subject of animal nutrition, published during the last fifteen years in the German