

fresh, juicy and crisp vegetables. If you prefer the husks and tasteless things generally found in corner groceries, then let your garden spot grow up to weeds or make a croquet ground of it, and buy what you want to eat. I stand forth as the advocate of the garden, and would like to see a portion of every homestead set apart for growing vegetables for family use, and that cultivated too up to the very highest point of the art.

DRAINAGE.

The practical and important question asked by every farmer or gardener is, Will draining pay? That depends on many considerations, to be developed in the course of these lectures. It may, doubtless, be said, however, at the outset, that on most of the lands of Iowa it would not pay at present; that most of our farmers are at present too poor to undertake it; and further, that the greater part of our lands do not need it. There remains a small part of our lands that would be benefited by it, a few farmers that are abundantly able to undertake such permanent improvements, and some lands which, from their peculiar position, would warrant the outlay. Among such may be enumerated gardens, nurseries, orchards, village lots, highways, dairy farms near large cities, and in general such as are of great value in the market or receive much labor in cultivation; and it is manifest that the area of such lands is rapidly increasing year by year; but for cheap and remote lands, the time has not yet come.

On what lands is drainage needed? In general, lands with gravelly or sandy subsoil need no artificial drainage, for the subsoil itself allows the free overflow of the surface water. Lands with a clayey subsoil only need drainage. It is needed wherever the subsoil does not of itself allow a ready outflow. The indications of such needs are numerous and distinct. They are, standing water, rank, coarse vegetable growth, wide cracks during drought, curling corn, fogs, the collection of water in pits in the spring, or general muddiness. The conditions requisite to vigorous vegetation of our cultivated plants are warmth, moisture and air in due proportion in the soil; and, for subsequent growth, fertility. A very dry soil checks growth by want of moisture; a very hard or wet soil by want of air; a very cold one by want of needed heat. Our soils are made up of particles more or less finely divided, with spaces between. They are best fitted for cultivation when moderately moist, not wet; i.e., when air fills the larger and water the smaller spaces. The office of drainage is to remove the surplus water. The source of water in our soils is three-fold: rain, overflow, and springs. The rain in summer is warm, and is loaded with ammonia and nitric acid. It should be absorbed and filtered by the soil. The overflow is often hurtful and seldom useful; it is generally to be avoided. The springs are cold, have no fertility, chill and check vegetation; they are to be cut off.

Water is removed from soils in three ways: by evaporation, by overflow, and by filtration. The first cools the soil by the absorption of heat in the act of evaporation; the second washes out and away all the finer and richer parts of the soil; they are both to be avoided. The last leaves its warmth and its fertility in the soil, works downwards, and is always to be chosen. To this end the soil must be comparatively dry and mellow, for if it be hard the rain cannot penetrate it; and if it be already saturated with water, it can receive no more. In both it must flow off above ground.

The kinds of drains are various. In stony fields, wide ditches are sometimes dug and filled with stones, more or less carefully laid. It makes a useful drain and a good deposit of useless stones. Such drains are likely in time to be choked with dirt and fall. The bottom may be filled with brush, covered with a board or straw, then earth. It works well till decay and final settlement choke and destroy it. A plough with a long cutter makes a mole drain. Open drains serve well to carry off surplus water, but need constant attention to prevent filling; besides, they are inconvenient in the fields. The above are makeshift affairs, frequently useful and frequently the only thing possible. What is needed is a thorough and complete system of permanent drainage.

FACTS ABOUT MANURE.

At a meeting of the London (England) Farmers' Club, Professor Voelcker, said: "The subsoil can be manured to a certain extent through the topsoil. And it is as well to bring up a little of the subsoil and get back the elements of fertility which have sunk down through the topsoil. This reminded him of certain facts which showed how careful we ought to be in generalizing from what he would call half-understood facts in agricultural chemistry. It was very natural to make that mistake when a discovery was made, because we did not know the full extent of the facts involved. When it was discovered that plants absorbed ammonia, leaving the sulphuric acid to pass through the soil, it was thought that in all big elements might be stored up in the soil and the soil be manured accordingly; but that it was

not known how rapid were the changes which ammonia undergoes in the soil. It was a mistake to suppose that ammonia would remain permanently in the surface soil. It would get rapidly washed, in the shape of nitric acid, into the subsoil. Fertilizing elements could not be permanently stored up in the soil. It was not possible permanently to improve the fertility of the soil. The best thing the farmer should expect, after applying artificial manures to the land, was a heavy crop, and to look forward to profit by the ultimate improvement of the soil. Frequent manuring was the most profitable mode of procedure, but to manure with a view to the future was, in a great measure, all moonshine. Unless they saw their money back which they expended in manure in the weight of the crop to which the artificial manure was applied, they had better keep their money in their pockets. If the manure was not utilized at once it passed, in a great measure, into the drainage water, and he was not at all sure that there was not more fertilizing matter lost in the drainage and carried away than ever passed into the crop.

VEGETABLE FERTILIZERS.

The original soil, as it was derived from the decomposition of rocks, had in it sufficient elements of fertility to produce grass and trees; at the same time, these elements of fertility were increased by the continual decay of the vegetable matter. In the same manner we may restore a soil to near its original fertility by planting trees thereon and allowing them to grow for years. The leaves draw sustenance from the atmosphere as well as from the soil, and they return all except the moisture to the soil. Any matter of a vegetable nature, which will decompose readily, may be made available as a fertilizer, whether it be dry or green.

Of these two, without doubt the green plant turned under has the most beneficial effect, and of all the plants thus used, clover is generally acknowledged to be the best. But there are soils which will not grow clover, and these are usually soils which especially need the organic matter. For such soils the common field pea is adapted, and being well known is easily cultivated. Many efforts have been made to introduce the German lupine, but with little success.

The principle upon which vegetable fertilizers act is, that the plant draws a part of its sustenance from the atmosphere, and when turned under there rotted it gives to the soil the nitrogen which it had extracted from the atmosphere. Hence any green plant is an excellent fertilizer—even the weeds. But we wait until they become hard and dry, then we rake them together and burn the "pesky things." While clover may draw more nitrogen from the atmosphere than any other plant with whose constituents we are acquainted, yet every weed draws some, and if weeds are ploughed under they will to that extent enrich the soil.

A gentleman asked us how to fertilize his land without manure; we told him: let the weeds grow, plow them under while green and sow lime on them; keep at that for several years and you will have rich land. But he said, I do not want that trouble. Then we said, plant trees and let them stay there forty years. The principle of vegetable manuring is as old as the trees upon our hillsides, but while many have learned this, few have learned how to enrich their soils by the same natural means by which they were first created.

In connection with vegetable manures much may be added by, as it is but little more than a deposit of vegetable matter. Hauling muck out upon the land is a short mode of replacing its organic matter, but one which we do not believe to be equalled as plowing under green crops. The latter is more permanent; by it you get into your soil no latent seeds of bad grasses or weeds.

Muck is of but little value except in connection with other vegetable matter and lime. It is an efficient agent in assisting in the decomposition of various mineral matter, and in the manufacture of composts. Sewerage might be classed among the vegetable manures. Of this material there are two varieties: one of value as it decomposes, the other bakes hard in the sun. It is extensively used in our Atlantic coast, especially on Long Island, as it contains a large amount of potash.

We might further add to the list of vegetable manures the various oil cakes, but as yet they have been little placed to use in this country. They are rich in nitrogen, and are valuable chiefly for composting with other substances.

To the vegetable fertilizers, in conjunction with mineral and vegetable matters, we look for the redemption of the thousands of acres of soil called worn out all over the land; but however aided, they must be the great agent, for with plaster and clover or peas there is no other so cheap or more sure means of restoring elements of fertility which have been exhausted by excessive cropping and bad cultivation.—E.C.

PLOUGHING AND PREPARING THE SOIL.

In order that stable and chemical manures should produce all their effect, the soil should be well prepared. It has been ascertained that deep ploughing is an essential condition for success in agriculture, and that the mere scraping of the ground is highly objectionable. We cannot do better, in order to point out the advantages of deep ploughing, than reproduce the excellent observations of Mr. Schatterman:—

"In the Bas Rhin, and doubtless in many other departments, ploughing is but superficial, and not deeper than from three to five inches. This depth is evidently insufficient, and should be increased to 12 or 16 inches, in order that the plants may thrive. The proportion of mineral substances in the soil is in the ratio of the thickness of the tillable layer, and will be doubled or trebled by deep ploughing. A system of rotation of crops becomes at the same time more easy. The great majority of agriculturists, who persist in superficial ploughing, do so for fear of bringing to the surface sterile soils. It is a mistake, since a good subsoil plough allows of the simple stirring and gradual incorporation of the under layers without bringing any of them to the surface. Experience has, however, demonstrated that deep ploughing is always advantageous, and without the fancied inconveniences. We should fight such prejudices.

"The arable layer, when its thickness is no greater than from 3 to 6 inches, is insufficient for the development of the roots of plants, and does not protect them against the influence of an excess of dryness or dampness.—As the tendency of plants is to grow as much below as above the surface, it is evident that they cannot expand properly in a thin layer. Therefore, the principal condition of a deeply-thinned ground is seldom met with, principally in plants sending their roots deeply into the ground. Even grain crops, which are believed to vegetate at the surface of the soil, will have deep roots in properly prepared ground.

"With an arable layer of 3 to 6 inches' thickness, the roots of plants will not acquire their natural growth, and will greatly suffer by the inclemency of the weather. An abundant rain will flood the plants, and when the water escapes over the surface of the field, it will carry away the soluble and more fertilizing substances. By drying, the damp earth will become compact, and will compress the roots, the development of which will thus be hindered. After a long drought, the plants which have their roots near the surface of the soil find no dampness, remain stationary, or even perish.

"On the other hand, in arable layers, 12 to 16 inches thick, plants are able to penetrate and to grow properly, and are protected against drought and the inclemency of the weather. An arable layer of this thickness easily absorbs water; during an abundant rain water penetrates, and is drained through the bottom, without carrying away any earth or manure. When the rain ceases, the surface of the soil is quickly dried, and does not become compact, as is the case with too wet grounds.—Should a drought take place, the roots of plants which have penetrated sufficiently deep find there enough dampness to continue to thrive."

[The above article, from the "School of Chemical Manures," states the case in favour of deep ploughing very forcibly. The truth of his observations had been impressed on my own mind from my earliest experience in agriculture. Never, when I was farming pretty extensively in the old country, did I allow the ploughman to cut a furrow less, at the very shallowest, than 8 inches, except in some special cases. The depth of the furrow was generally twelve inches. It is true, a man and pair of horses could not go over as much ground in the day as he does here in America. One hundred rods per day I always considered a fair day's work, when all well out, and turned at

the proper angle, and of a depth of ten to twelve inches. Of this thorough labor I reaped the benefit. Such tillage would be unsuitable to some sandy soil.—As't. Ed.]

AN UNPRECEDENTED SALE OF HORSES.

The sale of the breeding stud of the late Mr. Blenkiron of Middle Park, England, was so remarkable in its results that we cannot omit to place them briefly on record, though we have not the space to enter upon the subject as fully as its importance to some might seem to demand. From the details as they reach us in the London Field of July 27th, it seems that the sale lasted four days, with an attendance of many thousands from first to last, including agents from the governments of Austria, Prussia and France, and representatives of one or more large foreign breeding establishments. No classified summary is given, and we have not counted the lots disposed of on the several days, but the aggregate number is elsewhere stated as 13 stallions, 197 brood mares and 129 foals—330 head in all. The total amount produced was 102,000 guineas, equal in round numbers to \$525,000 in gold—an average on the large number offered, young and old, of about \$1,550 per head!

An association recently organized (chiefly with a view to this sale, we believe), with a capital of £50,000, called the Stud Company, was the largest single bidder and purchaser, and but for this fact it is probable that many of the best lots would have been sold to the Continent. As it was, nearly all the choicest animals will be retained in England, though some high prices were paid by foreigners.

The great feature of the sale was the bidding on the stallion Blair Athol by Stockwell, and Blink Bonny by Melbourne, which began by an offer from the Stud Company of 5,000 guineas, and in two minutes ended, after vigorous competition, in a sale to this association for the enormous and unprecedented sum of 12,500 guineas. Gladiator brought 7,000 guineas, and Breadalbane (by Stockwell) went to the German Stud Company for 6,000 guineas. Saunterer and Mandrake brought 2,100 guineas each. In looking through the list of brood mares, we observe the sale of one at 2,500 guineas, two at 1,600 guineas each, one at 1,550 guineas, and two at 1,000 guineas each.

The Farmer, in commenting on the sum made for Blair Athol, states that he was bought by Mr. Blenkiron for 5,000 guineas, and had earned £4,000 a year since he went to Middle Park. Mr. B.'s annual sales of yearlings were always very successful, and indeed there must have been something exceptionally good or fortunate in his management, as the Farmer asserts that his profits from the stud have been nearly £20,000 per annum, on a capital of less than £100,000. The most important previous sales of horses mentioned in that paper, are—that of the late Mr. Jackson of Fairfield, (when Mr. Blenkiron purchased Blair Athol)—aggregate returns 23,230 guineas—that of Sir Tatton Sykes, aggregate 24,192 guineas—and that of Lord Lonsborough, aggregate 21,000 guineas—but, as will be observed, the three put together are considerably short of the result at Middle Park.

PRESERVING EARLY POTATOES.

A correspondent of the Rural New Yorker gives the following as his method of preserving early potatoes:—

My Early Rose potatoes are ripe, and if I have them in the ground during the hot, dry weather of August, they will be more or less injured, either from the high temperature of the soil, or, if rains occur, a partial second growth may injure the quality of the tubers. Taking all the circumstances into consideration, I think it is best to dig them, and spread in the coolest cellar I have, admitting all the air possible without light. From several years' experience with the Early Rose, I have found it one of the very best potatoes for use in Spring as well as Fall and Winter; but, like all the very early sorts, more difficult to keep through the latter part of the Summer than in Winter, although no loss need occur, provided the tubers are carefully harvested when ripe, and stored in a dry, cool place.

[To these remarks I would append some information on the method I pursued for some years in saving early potatoes for seed. Forcing a very large crop of potatoes, while beneficial to the producer from the large product, injures them for seed. A force growth is not by any means so healthy as a natural growth. And the more healthy the parents

they can to if strictly be product-parts of the e worth the the case in and back of FARMERS' experiment them, that He has ap- agriculture to ng, but his ful. There benefit to t large, and try to give an under- are made by or permitting and the care- should use sance before w making it t down the ises or within we trust that heard of one farm because thist'e to go t farming was abourhood. mportant last Mon- g, J.P. The Hogar against Canada thistles h he occupies he charge first time the section of the ted the fine to will do well to der themselves adra thist'es to ; and whether makes no dif- the spread our variety of or very greatly that is unpro- ust the one for It will always ed varieties.— no use in these or all timo- s whatever it be granted that r one kind; e seasons, it is like paying We do not get we are more than we should specially East- sion of having by itself, and ll still advocate this year's ex- Press. GARDEN. es, who have to the green grocer, agon, knug not gain a garden at everything fresh etables cheaper can, but it is at crispness. The fore being us'd, e lost. Tender th their fine fla- this is especially stuff as are used The most of ery or from the afternoon before, morning When if a day through in the sidewalk in quality of such in the case very etables, they are s, and are many eaching the con- food for any one ood living? ultivate your own ne, if you desira