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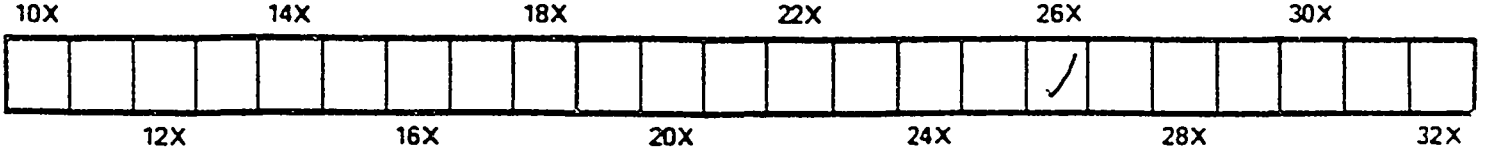

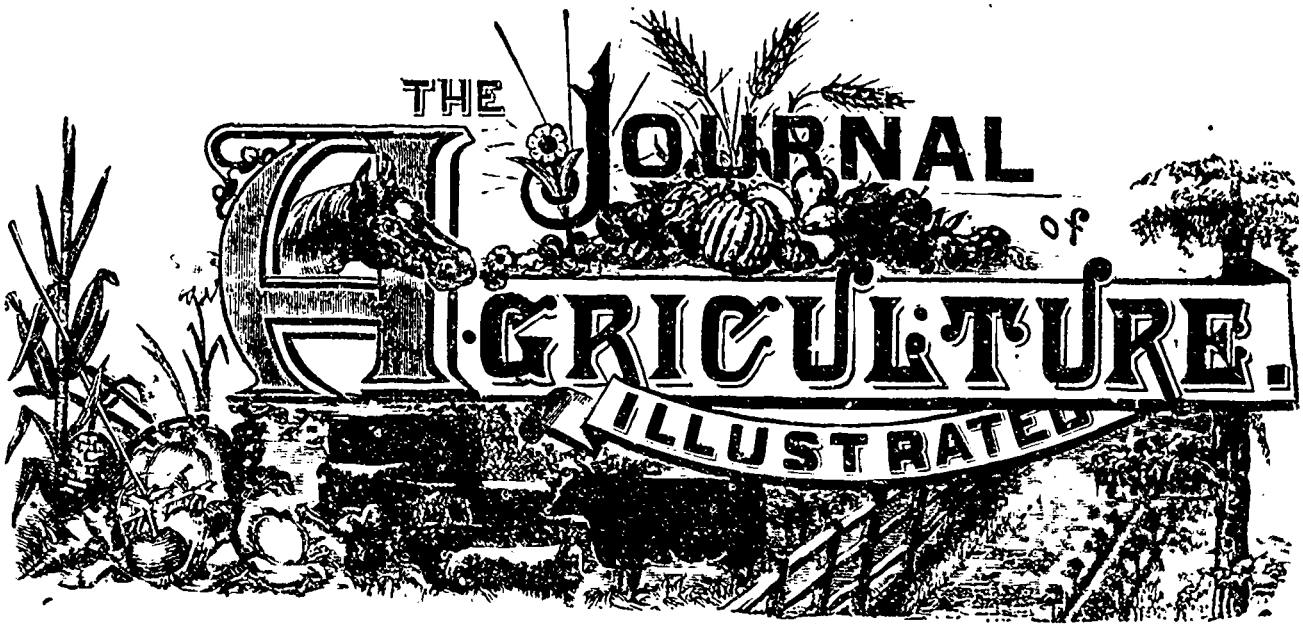

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OFFICIAL PART.

Table of Contents.

MOST IMPORTANT LEGISLATION.

His Excellency, The Governor General, has just sanctioned a most important Act, by which Experimental Stations of the highest order become one of the duties, even the leading branch, of our Department of Agriculture, at Ottawa.

The principal Station is to be at Ottawa and may cover 500 acres of land, if necessary, with all required appliances for a thorough and complete Experimental Station. Under-stations are also proposed · one for the Maritime Provinces, a second in Manitoba, another in the N. W. Territories and a fourth in British Columbia ; to which under stations as many as 300 acres of land may be attached, $360,000,—a most liberal vote, has been given, this year, for the found ations of such stations, with a promise of the needed maintainance supplies in the future. Without going into details, it may be averred that the *Act* covers the needed powers for the thorough investigation of all and every agricultural problem.

These Experimental Stations, altho'worked in the interests of the various provinces, are in no wise under the control of the provincial authorities. They will, all of them, be under the exclusive direction of the Minister of Agriculture.

We frankly confess that no country, to our knowledge at least, has started its Experimental Stations with a project more general in its useful aim, or more generously endowed at its creation.

Having, as we have, for several years past, called so strongly for such experimental stations, we now take great pleasure in tendering to all concerned in this important move our heartfelt thanks for what we consider a much needed and most patriotic project.

But now that the necessity of Experimental Stations has been so fully admitted, it becomes the duty of all who have made a study of this difficult subject to suggest what is needed, in order to obtain as quickly as possible, the best results. We therefore venture the following suggestions, with the hope that they may lead to a full study of the whole question, before any useless expenditure be made.

THE SITE . Each of the proposed Experimental Stations should, in our opinion, command as great a variety of soils as can be found within a reasonable distance in the chosen locality. Even detached fields, at a distance from the stations, should be secured, if a full variety of soils cannot be obtained otherwise. The main station, at least, should comprise soils heavy and light, wet and dry, even swampy, with facilities for irrigation and the formation of water meadows, permanent grasses, &c. All this, we believe, can easily be secured near Ottawa.

A HEAD: However important may be the proper selection of a site for the proposed experimental stations, fully equal in importance is the selection of a *Master Head*, whose arduous duties must extend even to the under-stations, *after*, we suppose, the main station shall have been put properly under way. For it would appear to us, most unwise —we respectfully submit here— to attempt the creation of the under-stations before the difficulties to be expected in the proper starting of the main station have been thoroughly mastered. Who this *Master Head* should be, and where it is to be found, are questions which we frankly admit ourselves incapable of solving. But this much must we say: *Success*, or *want of success*, hinges on such selection. Competent subordinates are needed at each station. And, to be successful, such heads must work together and unite, in a high degree, under the soundest judgment, PRACTICE WITH SCIENCE; nay, a great deal of science, controlled by the very best practical ability.

THE AIM: A thoroughly competent *Head* having been secured, and this *Head* exercised in the proper selection of a site, with the needed grounds, for the main Experimental station,—of sub-heads, and all proper appliances,—the *aim* should be to arrive, as soon as possible, at such *practical* results as must prove beneficial to the farming community in general.

PROBLEMS: In our humble opinion, the first problem to solve is how to increase surely the net returns from Canadian farms, without incurring too much expenditure, and without impoverishing the soil. We frankly admit the problem to be most complex, in fact it might better be termed: a whole nest of problems. And yet, we submit, its more or less complete solution, in a given time, and without extravagant means, will be the gauge by which the Head Experimental Station Master will be judged in the future, both by the Legislature and by the people

It cannot be gainsaid that the net revenue from Canadian agriculture is far below what it should be. High authorities admit that, even with the scanty capital at the command of the ordinary farmer, our agricultural returns, on an average, could certainly be doubled all over Canada, and, in some provinces, even tripled. It is also admitted that, nearly everywhere, very great waste prevails: waste of manure, of all descriptions; waste of land; waste of time; waste, from bad agricultural practices; waste from poor, dirty seed; waste, from want of drainage; waste by weeds; waste, from slovenly and hurried cultivation; waste, in the proper adaptation of cattle foods; waste, and very great waste, from the underfeeding of stock, both winter and summer; waste, in fact, from innumerable sources!

Who shall gainsay that, in ordinary Canadian farming, and in a very large proportion indeed, wasteful practices in agriculture are the general rule, and thoroughly efficient, paying practice, the exception? Few farmers are aware of their deficiencies in agriculture? Should not those deficiencies be *tested* and *gauged* at the Experimental Station?

Here are problems indeed: How best to feed our crops? How to feed our stock? How to husband our manure? What seeds to select? What implements to prefer? What varieties of stock give the largest net returns? How to treat various soils, under varying climates? And how many more!

But should our Experimental Stations become model farms? We say, no. Model farming depends on circumstances of soil, locality, means, markets, climate, &c. Model farms cannot be improvised. They can only, at best, be *models* for a circumscribed locality, and it takes many years to make a really model farm. On the other hand, Experimental stations have a given mission—one entirely distinct from model farming: Their object is to solve unknown, or, more generally, disputed problems. Some of these problems,—many of them,—can be solved in less than a year: the selection of pure, healthy, powerful seeds, &c., &c. The comparative value of various fertilisers, of various cattle foods, can also be demonstrated in a comparatively short time. Other experiments of great importance, must take many years to solve, and yet should *show progress* from year to year. In fact the task is a tremendous one, especially, on the scale proposed by the *Act* lately passed.

Let us hope that wise counsels will prevail. That too much be not attempted at once; that too much be not expected, at first; that every person concerned in this vast enterprise be thoroughly competent and *willing* to perform this most useful, but most onerous task.

E. A. BARNARD.

Home-made Superphosphates.

The following correspondence explains itself. Our readers will no doubt avail themselves with pleasure of Mr. Skaife's, kind offer. We shall; certainly.

Dear Mr Skaife,—I am afraid our experiments with *char* are to be nipped in the bud! The cost of sulph. ac. in Brockville—66° B, is 2½c. a lb. wholesale; *freight* about ¼c.! In England the same, or better, (70° B.) is advertised at $8.50 a gross ton; here it would cost $47.60.

Of course at such prices sulph. ac. is out of the question. Could not the amm. waters from gas works make the char soluble enough to give a sufficient return? If you are right in valueing the char at 75 % of phosphate, and if we could dissolve just ⅓ of this for immediate use, it would be far better to buy char than the Canadian superphosphate.

What would be the effects of fermenting manure, on the char? I have a manure cellar receiving every atom of liquid as well as of solid manure. The char could also be dropped in the manure troughs behind the cattle. Could it not also be fed to the stock, in small quantities, mixed with prepared food, and thus get the gastric juices to help in its future *solution? Voilà bien des questions pour notre savant chimiste!*

I do not intend to give this matter up. I want cheap phos. ac. I can get bones at about ¾ c. per lb., but how to dissolve the large ones without a crushing mill is the question.

Please help one *out* of these problems, and oblige

Yours very truly,

ED. A. BARNARD

Dear Mr. Barnard,—In reply to yours of May 25th I can tell you that the ammoniacal waters from the gas works would be of no use whatever as regards making the phosphates in char soluble. Muriatic acid is sometimes used, but owing to the formation of calcium chloride, the resulting mixture always remains moist, and this is objectionable. Sulphuric acid is cheaper than muriatic and the superphosphate formed when it is used is very dry.

As to mixing the char with manure I think the experiment is well worth the trial. There are certain weak organic acids generated during the fermentation which might act on the insoluble phosphate. The char should however be in the form of dust and the mass should be stirred up frequently.

I may say that it is a disputed point among agricultural chemists whether char dust or very finely ground apatite, (*coprolite?*) are not after all very effective manures when put in the ground in fall, without any treatment with acids. It is held by some that the organic acids present in the soil act upon the phosphates slowly but effectively. It is well known that bone-meal can be used directly with excellent results. It

is made by first subjecting bones to high-pressure steam which renders them friable, crushing them, and then grinding them between mill stones.

I cannot say I think it would be in any way advisable to feed the char to cattle. You would find that gastric juice would be more expensive than sulphuric acid, even in Canada.

In conclusion I would strongly advise a trial of simple char-dust direct from the refinery, where it can be had in large quantities, and that it should be tried both as a spring and fall manure.

I shall always be glad to furnish any information in my power on subjects like the above and answer any questions which the readers of the Journal may like to put.

Your's very truly, WILFRID SKAIFE. (1)

FACTS RESPECTING PLASTER.

Mr. Editor:—I have for twenty-five years been gathering facts on the best authority of well-known farmers, such as go to make clear what plaster does, and how it does it—or under what conditions success or failure may be predicted—going to show, as I infer, that the hay crop may be made perpetual, so far as we yet know, without any other fertilizer, on the lime soils, such as nearly the whole of Northern Maine, the valley of the Penobscot river from three to ten miles wide, the valley of Lake Champlain for twenty miles or more on the Vermont side, from Canada to Connecticut on the south, nearly the whole of the state of New-York, together with all the lime regions of the Middle States, Kentucky and Virginia. And now any facts coming from any of these localities corroborating or denying my own statements will be equally welcome to establish the truth with its limitations.

In Elmira, N. Y., Dr. Morrill, an educated physician, now a large farmer, will show where may be seen grass ground mown for seventy-five years with a full crop of hay, without any other manure, and without the sod ever being broken. Judge Cummings of Fort Fairfield, Maine, will show a field mowed in the same way now twenty five years. The Isaac Haynes farm near Passadumkeag, thirty miles above Bangor, being left by its occupants, was mown until the crop was one-fourth ton to the acre in 1847. With plaster alone the crop was restored to one and one-half tons per acre for thirty years, when last reported. In Masardis, Maine, Sanfield Read, as executor of his neighbor's property, applied plaster to the mowing-land then yielding but one-fourth ton to the acre, getting the first year one and one-half tons, the next year two tons, and the third year nearly the same as the first. All over Aroostook county I can find where one hundred pounds of plaster, costing thirty to fifty cents, has produced, or increased, the crop three tons of hay, or feed in proportion.

Such facts have come to the public more numerously from the State of New York than anywhere else, where plaster has been most extensively used. Last fall, in the whole valley of the Penobscot, one hundred miles north and south on the alluvial Champlain clays, I found but a single farmer in the whole region getting any benefit from plaster, while hundreds of farmers were distressed to know how they might sell hay in Bangor without spoiling their farms.

I watched the reports of the Penobscot Farmers' Club for two or three years. There were frequent discussions on the hay crop, not once naming plaster. When I give the facts in public, I am met with incredulous ridicule. One good farmer in Holden and another in Orono testified to the benefits of plaster in a single trial thirty years ago, but dared not repeat its use for fear of spoiling the land.

On granite and slate lands, where water is soft, it has no effect. This includes the whole of new Hampshire and the most of Southern Maine, and this failure on these granite hills has kept thousands from trying on lime soils near those hills. The springs of water from under the alluvium of Aroostook river are soft, and plaster does no good, while in Penobscot valley the opposite is true—water is hard, and plaster works its wonders.

With regard to the use of plaster on grain and hoed crops, I often hear the farmers saying that it only shows its effects about three years, while the sod of broken-up grass-lands is rotting, and facts generally indicate that it is of doubtful utility on those crops, and perhaps of lasting injury to the land, though we cannot say but straw manure previously put on might develop nitrogen by plaster and make its effects perpetual, as it does on grass-lands.

I now come to the only known facts as to how it does its wonders on grass-lands: First, it has in itself no plant food—is not a fertilizer. Second, it takes nothing from the air, for in all crops its utility depends on the soil. Third, its effect on a hill of corn is the same when put in with stones (*sic*) on the hill as when put upon the hill. (Any one may put this to the test of trial. My authority is Charles Gilman, a well-known farmer of Houlton, Maine.) Fourth, a little plaster scattered on a pile of heating manure prevents all evaporation of ammonia and thereby retains the moisture and prevents burning of the manure, and in this case it cannot be as an absorbent, though as a deodorizing agent in privies this may be the case. Now, from these facts, I venture a conjecture that it has the power to hold back the nitrogen of the annual decay of grass-roots from escape to the air, enough to perpetuate the crop.

And now all I have to ask of the many thousands of farmers living on these extensive lime soil regions is to put these statements to the test of trial. Take any acre of dry grass-land now in sod and put on one hundred pounds of plaster once in two years. Mow it every year and do what they like with the hay. If the water in your wells and springs is hard, try it. There is not a cent in it for me, but many millions for them, either in selling hay or using their manure on specialties. Here in Northern Maine there are many towns where for forty years they have struggled to sell hay and oats in alternation for less than the cost of work, exhausting their farms and making them nearly worthless, when they might have been rich from the sale of hay with a small outlay for plaster. And to my surprise I cannot find an agricultural college giving the matter any attention, when the whole might be put in a text-book as clearly as a problem in mathematics. Now, farmers in the Champlain valley, or any lime region, send forward your facts and put me down.

M R. KEEP,
Ashland, Aroostook County, Maine. (1)

FORWARDING EARLY POTATOES.

Cutting up perfectly dormant tubers, and planting the sets in cold soil, is not the way to have a crop of new potatoes

(1) I wrote, some time last winter to Mr. Skaife suggesting the use of *char* in the form of *meal*. I presume my letter must have failed to reach him, as I never received any answer Lawes, Aitken, and the late Aug. Voelcker, all agree with me in believing that Apatite, "or any other crystalline form of phosphate of lime," is utterly useless unless dissolved in sulphuric acid. v. Journal, vol. IV, p. 113. One bushel of bones recent bones, unboiled—and two bushels of unlixiviated wood-ashes put into a flat-topped heap, kept moist, but not wet and turned twice will be found fairly homogeneous at the end of two months. The larger bones should be cracked with a sledge hammer. ARTHUR R. JENNER FOST.

(1) I have never found plaster of any use for grain or roots. On pease it works wonders, and is good for all pod-bearing plants
A. R. J. F.

early. All of the methods for "forwarding" the crop, begin with exciting the tuber into growth and inducing the eyes or dormant buds to start. In Lancashire, Eng., the growers build frames of sods, in which the potatoes, already started in boxes in the dwelling houses, are planted. These frames are covered with straw mats, which are removed whenever the sun can shine upon the soil within them. Such interest is felt there in potato culture, that whoever forwards

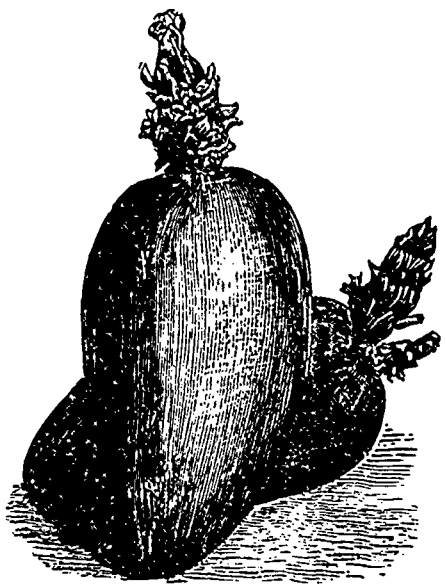


Fig. 1.—Marjolin potatoes,

the first hamper of potatoes to market is given a prize by his brother growers. We illustrated this Lancashire method some years ago, and few years later, one that we saw on the Island of Jersey, which bears something of the same relation to the London market that the Island of Bermuda holds to the New York market. On the Island of Jersey, the potatoes are stacked on end in a crate made for the purpose, which exposes them to the light, and they become throughly greened, in which condition they are kept until planting time. In France, the leading early potato is the "Marjolin." This,

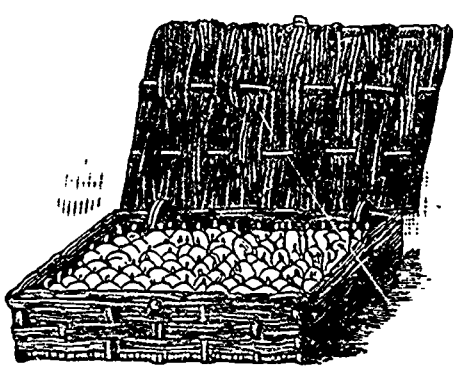


Fig. 2.—Basket of sprouted potatoes.

figure 1, closely resembles the "Ashleaf Kidney" of the English. It is a remarkably smooth potato, having a prominent eye at the "seed end," and a few obscure eyes distributed over the surface. Planted in the usual manner, the "Marjolin" is very slow to germinate, and the Paris seedsmen offer their customers seed-potatoes that have been already forwarded. At the time of digging the crop, the tubers, of uniform size, are selected, and placed on end, seed end up, in panniers or hampers. The potatoes (fig. 2) are stacked together so closely that they will retain their position when the pannier is handled. In this position and exposed to the light, the prominent eye develops rapidly, and may be kept in this condition until planting time. Those with us who grow potatoes for market, cannot afford to be at much trouble to forward their early potatoes, but by exposing their seed-potatoes in a warm, light place, they may make an appreciable gain. Those who pride themselves on having early potatoes from their own garden, can gain much by adopting some method for starting the growth of the eyes before the tuber or set is planted. (1)

American Agriculturist, for May.

FEEDING FOR BUTTER.

EDS. COUNTRY GENTLEMAN— I would like very much if Prof. Stewart would suggest the make-up of a good ration for the maximum production of cream for the Baltimore market, the writer having plenty of good ensilage, crushed corn, well-cured cut corn fodder and middlings, with a limited supply of clover hay. No cooking apparatus used, and I do not want any. J. M. S.

J. M. S. has a scanty pattern out of which to construct the best ration for rich milk. Wheat middlings, the richest grain food he mentions, has only a nutritive ratio of 1 to 6. 9, while a properly balanced milk ration for rich milk requires a ratio of 1 of albuminoids to 5 of carbohydrates. The cow cannot produce rich milk unless her own muscular system is kept well nourished. This is why, in all successful butter tests, there has been a portion of pea meal, oil meal or bran, or of all these, in the ration. They also usually feed clover hay, and other albuminous foods. Corn has a nutritive ratio of 1 to 8.6. Nature's milk ration, succulent pasture grass, has a nutritive ratio of 4.4, and the richest pasture grass has a ratio as low, 3.6. This will show why the milk is most satisfactory when pasture grass is at its best. When this same rich young grass is matured sufficiently for hay, it has a nutritive ratio of 1 to 6.4, and common hay is still poorer in nutriment. This is why milk cannot profitably be made upon hay, unless that hay is from young clover, nicely cured and preserved, and even then an addition of grain will render the ration more profitable. Mr. S. will therefore see that, unless he has the very best clover hay, he cannot get a ration for rich milk out of his materials. A ration for cows in fine condition can be made to produce, for a time, a liberal yield of milk, but its quality will not improve as when the ration is more nitrogenous or muscle-forming. Ensilage will produce a better quality of milk than cured corn fodder, because more digestible. The following ration, from the best materials of the kinds, will show the construction and composition:

	Albuminoids.	Carbohydrates.	Fat.
40 lbs. ensilage	0.52	4.00	0.24
6 lbs. best clover hay	0.64	2.25	0.12
6 lbs. corn meal	0.50	3.62	0.28
6 lbs. middlings	0.53	3.28	0.16
	2.19	13.15	0.80

This ration has a nutritive ratio of 1 to 6.9. Here the albuminoids are deficient. Two pounds of *decorticated* cotton-seed meal, or two pounds new process linseed meal, would make it an excellent ration; and if the quality of the milk is not important, the ration as it is will do well, unless the cows are

(1) Always supposing there is no frost. A. R. J. F.

in poor condition, and then the ration should have the condition mentioned It will also be seen that if the clover hay were increased to ten pounds, this would much improve the ration If, instead of increasing the clover hay, four pounds of good wheat bran were added, it would balance the ration fairly. If S will feed two pounds of linseed meal or decorticated cottonseed meal, he may reduce the corn meal and middlings each one pound. This ground feed should be mixed well with the ensilage.

Very good, but the substitution of 2 lbs. of pease and 1 pound of linseed for part of the corn-meal and middlings would improve the ration amazinly. I am glad to see J. M. S does not want any cooking apparatus. A. R. J. F.

EDIBLE QUALITIES OF TABLE FOWLS.

The testing of dead fowls for flavour and distribution of meat is a natural sequence to their being shown dressed for table. Unfortunately this cannot be done in the majority of cases, though there is as much value to be attached to the flavour when cooked as to the appearance before that process has been gone through. We have been pleased to see this question of flavour raised by one of our contemporaries, for in too many instances it is entirely ignored. And we should be glad to see also the flavour and quality of eggs from our various breeds of poultry made more of than is now done. An egg may always be an egg, and a chicken a chicken, but the differences between the one and the other are very great indeed—far greater than many persons imagine. The other evening M. Comyns invited a few friends to practically test the merits of four of the fowls exhibited by him at his lecture on table poultry on Thursday, March 18th. These were La Bresse (from Paris), which, before being cooked, weighed 4 lb. 14 oz.; a Dorking, 4 lb. 15 oz.; an Indian Game, 4 lb.; and a Brahma-Dorking, weighing 3 lb. 14 oz. The weights of these before they were dressed are given in another column. The unanimous opinion of those present was that the La Bresse carried the palm, and for quality of flesh, fineness of skin, and exquisite flavour, we never remember to have tasted anything equal to it. Of course it had been fattened in the French style, but was not specially prepared, as it was simply bought in the Paris market. The Dorking was beautiful, but it certainly did not equal the La Bresse. The Brahma-Dorking cut well, and had very white flesh, and was good in flavour. We were very interested in the Indian Game, but the bird was rather old, and, therefore, not a fair specimen. Our opinion is that the Indian Game is a splendid fowl for crossing, as it has an abundance of breast meat, and of high flavour, but requires to be a little softer in texture. The experiment was a most interesting one to all concerned.

RAISING FLAX SEED.

Flax will succeed on any soil that yields satisfactory crops of spring grain. On the contrary, if the soil is so thin and poor that it will produce only a few bushels of grain per acre, the owner of the land cannot expect a good crop of flax. When grain has been raised for several years on certain fields, and flax has not been one of the crops of the farm, it will usually be more profitable to raise flax, for one season, than to continue to grow barley, or oats, or rye, year after year, on the same land.

Flax seed (if well cleaned) may always be sold at a fair price for making linseed oil and oil cake. There is also a market in the older states for all the haulm, or flax-straw, which is used to make tow, the straw is usually sold by the ton, to those who rot it properly and pass it through brakes, removing the "shives" from the fibre, which is packed in bales.

The soil requires a more careful preparation than for barley or spring wheat. The kernels of all sorts of cereals remain in the soil during germination and growth of the stems, whereas the kernel of flax is lifted by the radicle or stem of the root above the surface of the ground, where the seed splits into two equal lobes which form the seed-leaves of the young plant, see figure 1 in which also plants are seen in other stages of development. Figure 2 shows a plant in

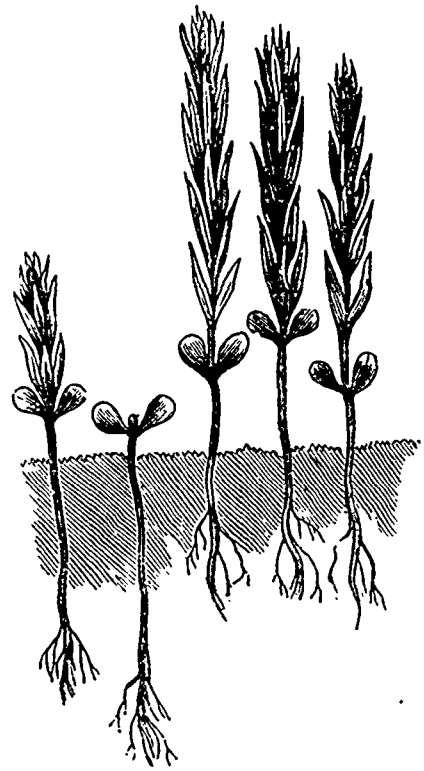


Fig. 1.—Young flax plants.

full bloom. The blossoms of flax are usually of a bluish shade. As the seed is small there is great danger of burying it too deep. Cereal grains will send up their sharp-pointed spears when covered with several inches of earth; but if a kernel of flax is buried three or four inches beneath the surface of a heavy soil, there will not be sufficient force in the tender radicle to thrust the germinating kernel to the surface. Consequently the seed must die and decay. The soil should be plowed thoroughly as for spring wheat, and the surface leveled off as true and smoothly as if seeding down a meadow. If the land is lumpy, it should be rolled, that the surface of the ground be smooth, so that the crop may be mowed close to the roots. The aim should be to have every kernel of the seed buried at a shallow and uniform depth, so that all the stems will grow alike and the seed ripen uniformly, otherwise the seed of some of the bolls will be dead ripe, while other stems are only in blossom.

The seed may be sowed by hand, or with a seed-drill, or with a broad-cast seed-sower; but teams should never be allowed to travel where the seed has been distributed. A grain-drill that can be regulated to put in the desired quantity at the proper depth, may well be used. But, in mellow soil, there is a great danger of burying the seed too deep. If sowed by hand, as the kernels are so slippery, half the quantity of seed should be sown in one direction, and the other half going at right angles. Cover the seed with a brush-

harrow, with which a strong man can go over ten acres in a day. The quantity of seed per acre will depend on the size of the kernels. If the latter are small, sow between half a bushels and three pecks; and if the kernels are large, nearly a bushel per acre is about right. (1) When the object is seed raising, the seed sown must be distributed very thinly. Sown thin, every stem will throw out numerous branches and every

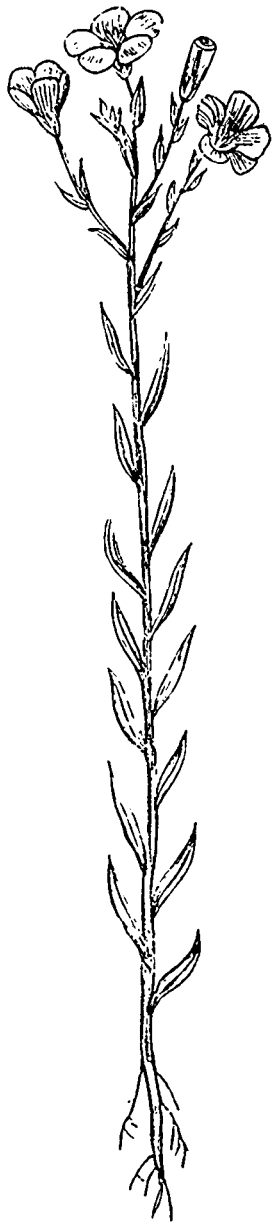


Fig. 2.—Flax plant in bloom.

branch yield plump seed. There is usually nothing gained by sowing before the soil is warm enough to plant corn; weeds and grass will get the start of the plants and maintain the ascendancy. If is safe to say, sow flax when it is safe to plant Indian corn.

As soon as half the bolls or heads turn brown, the crop ought to be mowed. If the surface of the ground is smooth, the crop may be cut with a reaper. Teams ought not to travel over the mowed or the standing flax. As soon as the haulm is cured and dry, the crop may be stored in the barn, or put in a stack until winter, or the seed threshed or shelled out by a machine. Many employ horses to tread out the seed on a threshing floor. The seed is cleaned in an ordinary fanning mill, and the haulm sold to dealers in flax-tow. Ordinarily a crop of flax will yield a larger net profit than a crop of wheat. The great fertility of the new soils of the far West and their freedom from weeds, makes linseed a very profitable crop. The straw is neglected, but the seed pays better than wheat. And the planter should remember, that it is a very exhausting crop. (1)

(1) For flax of fine fibre, 2½ bushels; but as the writer talks of *mowing*, instead of pulling, and of making *tow* of the straw, I presume he only speaks of flax as grown for the seed alone. All flax is sown by the broadcast method, as drilled flax is invariably branchy, and sells for an inferior price. A. R. J. F.

(1) As in proper flax culture all the crop (straw and seed) is sold off the farm, of course it is an exhausting crop; but if the seed is crushed and given to cattle, as it ought to be, there is nothing to hinder its coming into the regular rotation of the farm.

A. R. J. F.

ENGLISH SHIRE STALLION.

The stallion Garfit, shown at Fig. 110, is a fine young specimen of the Shire horse, a breed highly distinguished in England for its many excellent qualities; but about which, until quite lately, very little was known to the general public in this country. Recently, however, several large importations of choice specimens have been made, and a stud-book of Shire horses has been started to co-operate with that of England in keeping the breed pure. In view of the many merits of these horses, of their high standing in their original home, and of the enterprise and judgment of the men who are importing them, it is not at all unlikely that Shire horses will, ere long, take rank in this country with the Normans and Clydesdales.

Garfit is a bright bay with three white legs and a blaze on the face. He was foaled in 1882, and bred by John Garfit, a well known breeder of Nottinghamshire, England. He was imported in March 1885 by Messrs. Galbraith Bros., Janesville, Wis. At present, at the age of 3½ years, he weighs 1,900 pounds, and when mature will probably turn the scales at 2,050 pounds in good working condition. He is a finely proportioned, symmetrical animal, with fine bone and hair, and promises to be a success in the show ring and the stud. His sire was Don Carlos (2416) a Shire-horse well known in England, whose pedigree traces back through the best strains of Shire blood, to the famous Bassingham Brown horse foaled about the year 1790. His dam is by Lincolnshire Lad (1196), famous as the sire of many noted brood mares.

Lamb Raising and Feeding Lambs.

HOW OFTEN TO FEED

is a question greatly perplexing to the novice, and not fully considered by the majority of feeders. While it is a good feeder of mature sheep who adds 20 per cent. to their weight, and this mostly in fat, it is a very poor lamb feeder who does not add 50 per cent. to their weight, and this largely in muscle, and no one must expect rapid increase of carcass without a corresponding consumption of food; nor is it possible to crowd a sufficient quantity of food into the stomach at one or two feeds without overloading it, and producing indigestion. It is an old proverb that "Lambs eat always," and its truth can be easily attested by watching a bunch running at pasture; no matter how good the feed, they never

cease eating except for a few hours in the extreme heat of the day, or when the flies are very annoying.

It is no wonder that lambs fed, as is the too prevalent custom, with hay once, or, at most, twice a day, and a run at the straw-stack for the rest, instead of gaining all winter, come through "spring poor" and many fail to come through at all. There is no stock on the farm that should be so generously fed as the lambs, even when only intended for stores, and doubly so when it is desired to render them fit for the market. Another point not to be forgotten is that lambs are very cleanly in their habits and we must follow the rule of feeding a

LITTLE AND OFTEN,

if we would have them eat the largest proportion of what we give them. If the fodder is thrown upon the ground, and they run over it but once or twice, they will not eat more of it, even though suffering from hunger. The same is true when it is put in large quantities into their racks, and they have "nosed" it over and breathed into it for a short time. The better way then is to put only such an amount of fodder into their racks at once as they will eat in a short time, and feed the oftener, and at each time of feeding the racks and troughs should be thoroughly cleaned.

FEED A VARIETY.

Lambs will be found to be quite "human" in their tastes. They love a variety, and not only do they love it, but it is very necessary for their most profitable growth. The various kinds of forage and grains used should be selected with a view to supplying the elements of growth, and beyond this they should be varied so as to keep the lambs always with a keen appetite, ready to eat quickly whatever is given them. This is best accomplished, not by mixing the different kinds of forage together, but by feeding each at a separate time, and also by varying somewhat from day to day; and in the grain even, it will pay to add occasionally a new ingredient, or to give a feed of some other grain.

SHEARING PAID HIM.

Our good friend Green, of Western New York, writes us: "I had my barns filled with feeding lambs that were uneasy, constantly rubbing and biting themselves so much that I feared they had the scab. But as they were in warm quarters, I mustered courage to follow your advice in shearing them. In taking off their fleeces, I took off all the ticks, and having thus removed the cause, the rubbing and biting ceased. Never before have my lambs done so well. Hereafter I will not question what you say." We hope no one will for a moment think that any parts of these notes are mere theory or are written for effect. They are only a plain recital of what we do and the manner in which we treat our stock, and which, all things considered, we believe to be the best.

SHEEP TICKS.

Another friend, J. T. Baynes, of Tioga Co., Pa., wishes to know what to do with a lot of ewes which are to drop lambs about April 6th, as it will then be too cold to shear them. We have tried many remedies for sheep ticks, but have never found one more effectual or easier to apply than the following:—Mix crude petroleum or, in absence of that, kerosene, with lard, lard oil or, better still, with the grease fried out of pork, in the proportion of two parts of kerosene to three parts of the other grease. Whatever is used, have the mixture as hot as it can be without burning the sheep. This should be applied to the animal by having one person part the wool along the back and sides of the neck and another pour in the mixture from the spout of an old-fashioned lamp filler. It is also advisable to occasionally give the sheep sulphur mixed with their salt, one pound to six of salt.

SHOULD BREEDING EWES BE HOUSED

constantly, or allowed to run at large in the fields, having a warm, close barn, nights? asks the same friend. It is far better to let them run out constantly, having only an open shed for protection against rains, than to put them into warm quarters a part of the time and turn them out-of-doors the remainder. Sheep have close, warm fleeces, which enable them to withstand dry cold very well; but these they must wear constantly, and housing them warmly a part of the time, and turning them out the rest, is much like a man's wearing a heavy over-coat in the house, and going out into the cold without change or additional clothing—he would be sure to have a constant cold, and so will the sheep.

HOUSING ALL STOCK PAYS.

We have, this Winter, in one barn, 30 cows that are turned out twice each day so that the stables may be cleaned and they can get water. In another barn we have 26 cows that never go out, being watered inside. They are all well cared for, and have all of the hay, roots, rich foods and straw they care to eat. While those that never go out will drink about the same amount of water each day, those turned out to drink will, on very cold days, scarcely drink any, and then the next day will drink till they "are ready to burst." The result is that the cows constantly housed give the most milk, which makes the most butter, and they are looking the best and taking on flesh most rapidly. Surely there is much yet to be learnt in the care of stock.—*Rural New Yorker.*

LAND MARKER.

Figures 1, 2, and 3, represent a one-horse land marker, such as is used in Rensselaer Co., N. Y., among the gravel and cobblestone soils of that section, where it does good service. The drawings and description are furnished by Mr. John

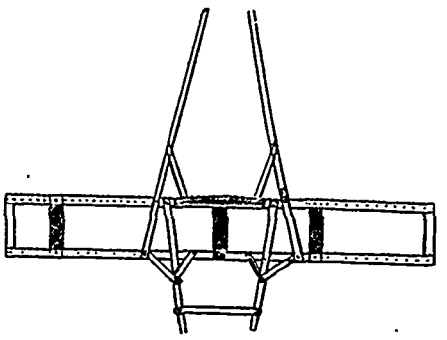


Fig. 1.—LAND MARKER COMPLETE.

Jeannin, Jr. The lumber should be of well seasoned oak; the long rails, two by three stuff in pairs; the cross bar and end pieces the same; the cross bars in which the teeth are set, three by three inches square; the thills one and a half by two inches at the large ends and tapering beyond the braces. The handles are common straight plow handles, that is, bent only at the grip. Three-eighths bolts are large enough for the frame.

The centre tooth should be framed in stationary, the outside teeth being adjustable, work in the slot between the long rails, and are held in place by two three-eighths iron pins. They can be moved so as to mark from two feet six to five feet. The rails should have seven-sixteenth holes bored through

them every three inches, commencing at two feet six from centre of middle tooth. For shares use old points of shovel plows. The whiffletree is held by a bolt passing through the centre cross-bar.

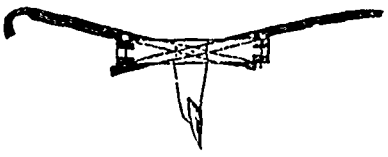


Fig. 2—END VIEW OF LAND MARKER.

Figure 1 shows the adjustment of the teeth. one being set at two feet six, the other four feet, also the position of the thills, the wiffletree, the handles. The cross rail tenons at end should fit in the ends of slots and be bolted fast with three-eighths bolts. The braces on thills and handles are of iron, a quarter of an inch thick and an inch wide, held by quarter inch bolts. Figure 2 is an end view, showing the pitch of handles and thills, a tooth also, and the mode of fastening the same. Figure 3 shows one end of a pair of long rails, which

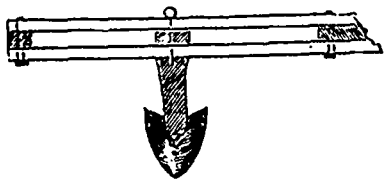


Fig 3.—MOVABLE TOOTH OF LAND MARKER.

form the slot for a movable tooth; also the shape of share. This implement is not patented, and can be made by any one with common tools and the knowledge of how to use them.(1)

Land Plaster—Its Use and Value as a Fertilizer.

ISAAC H. FICKEL, OHIO.

Soils in general consist of disintegrated rocks. Disintegration of rocks is caused by the action of the elements. Chemistry has taught us that every crop of grain or hay, fruit or vegetable, taken from a field, removes therefrom a certain quantity of the mineral ingredients, as lime magnesia, sulphuric acid, etc,, and that the soil is made poorer until these are replaced. Liebig says: "Large towns, like bottomless pits, gradually swallow up the conditions of fertility of the greatest countries." "The field is sold with the crops."

Land plaster (Gypsum, Sulphate of Lime) has been long and extensively applied to land in many countries and to various crops. But it has probably been more extensively used in the United States than in any other country, and with great benefit.(2)Every crop taken from a field diminishes the elements in that field necessary to a succeeding crop; hence, in time the field becomes what we call "worn out." The following table shows the matters removed from the soil in 1,000 pounds of each crop:

	Nitrogen.	*Potash.*	*Soda*	*Magnesia.*	*Lime*	*Phosphoric Acid.*	*Sulphuric Acid.*
Wheat, grain	20.8	5.5	.6	2 2	.6	8.2	4
" straw	3.2	4.9	1.2	1.1	2.7	2 3	1.2
Oats, grain	19.2	4.2	1.0	1.8	1.0	5.5	.4
" straw	4.0	9 7	2.3	1 8	3 6	1.8	1.5
Indian corn	16.0	3.3	2 0	1 8	.3	5 5	.1
" stalks & leaves	4 8	8.9	1.2	2 6	3:8	3.8	2 5
Red Clover hay	21.3	19.5	9	6.9	19.2	5.6	1 7
Tobacco	46.0	54.1	7.3	20.7	73 1	7.1	7 7

Of the elements in the above table, sulphuric acid, phosphoric acid, lime, magnesia, potash and nitrogen are necessary to plant growth, and the absence of any one of these would render a soil incapable of sustaining agricultural vegetation of any kind. To cure soil exhaustion, we must either restore the essential elements removed from the soil or we must change the state of those which still exist, so that they may become available plant food. A farmer must have the food for the plant before he can expect to get the crop, hence, he has to learn what his soil is deficient in. The following is the analysis of gypsum:

Sulphuric Acid	46.51
Lime	32.56
Water	20 93
	100.00

Hence, it is readily seen that the elements of land plaster enter largely into the composition of plants. Important changes are produced upon other elements, which will be treated of further on. Besides entering into the crops, sulphuric acid and lime are washed out of the soil, slowly, but continually, and in quantities whose aggregate is quite large. Hence, this is one advantage gained in the use of land plaster as a fertiliser,—it should be constantly applied to make up the constant loss of its elements.

SOIL BEST ADAPTED FOR THE USE OF LAND PLASTER.—Where there are so many different kinds of soil as we have in this country, it is hard to arrive at any definite conclusion as to which soil is best adapted to the use of land plaster. The south and southeast parts of this State (Ohio) consist of natural soil, while the remaining portions consist of drift, brought down from the far north. Our natural soil, as a rule, already contains a large amount of lime, and hence the application of land plaster thereto would be of no benefit. But portions of our drift contain only a small amount of lime, on this kind of soil, land plaster may furnish extraordinary results, because it supplies an actual deficiency of this ingredient. From land plaster, plants may provide themselves with lime and sulphur; but it will act only on such soils as are destitute of one or the other of these substances. A farmer, if possible, should know the chemical analysis of his soil.(1)If he has not this opportunity, he should find out its wants by careful observation and experiment. (2)

All experiences agree that for the development of the manuring effects of land plaster, it requires a soil which is loose, deep and dry, containing those elements in some form essential to plant growth, in a state suitable for the action of lime and sulphuric acid. In England and Germany, light, sandy soils, loamy sand, marly loam, sandy loam or chalk soils, in a dry situation, and with a porous subsoil, are the ones which

(1) Why *whiffle-tree*? In England we call it the whipple-tree; and locally, the *whippen*. A. R. J. F.

(2) It is utterly useless in England. A. R. J. F.

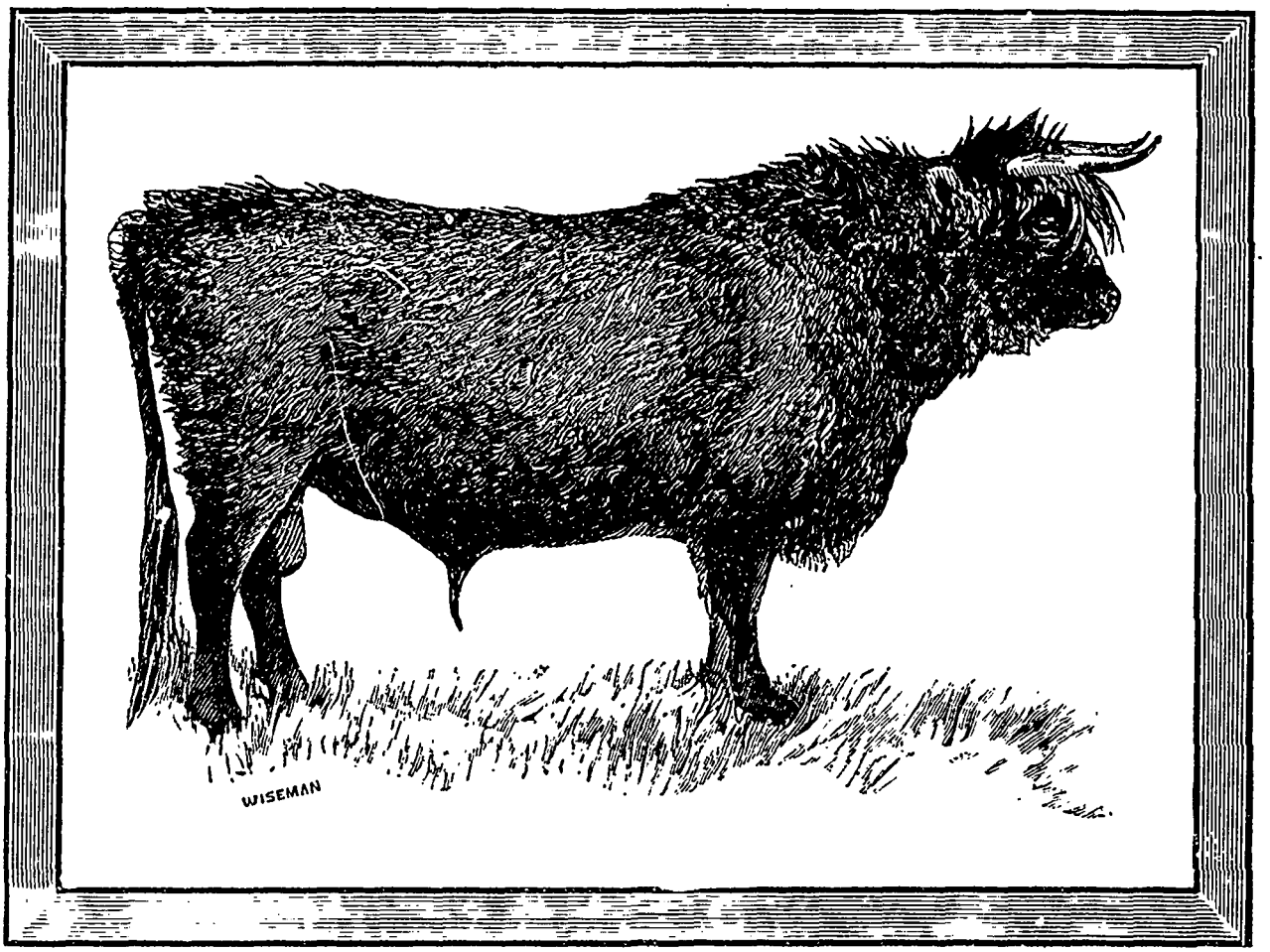
(1) It would not help him in the least if he did know it. A R J F.

(2) Right enough. A. R. J F.

manuring with land plaster has proved best and surest;(1)while on heavy, or clayey soils, as well as on wet and cold bottom fields and meadows, it has produced but little effect, and in particular cases has been actually injurious. It has been of just as little use on poor, weak, exhausted fields. These statements should induce farmers who have tried land plaster on wet land without results, to repeat those experiments on the same fields after they have been rendered drier, and less tenacious, by drainage.

If the soil is destitute of those matters essential to plants, that is, if it is entirely exhausted, no effect of land plaster can be observed, for the soil must first contain all those matters which vegetation requires in some form. A dry, deep, well cultivated, middling clay soil would be the most favorable for it. Again, climate has much to do with its action. The land must be so situated that it will receive a sufficient supply of rain. Wet weather causes it to act more rapidly, while drought arrests it, because the means are then wanting to render it soluble. Too heavy storms of rain act unfavorably.

ACTION PRODUCED BY LAND PLASTER. —We have seen that land plaster is especially adapted for use on certain soils only. Those which are poor in lime, and those which have been partially exhausted by cropping, are the ones that will be most benefited by an application of this kind. Upon these soils land plaster is supposed to produce the following results: 1. By entering into the composition of vegetable life. Braconnot and Sprengel hold that it supplies sulphur for the formation of the legumen of the leguminous plants. Hegder claims that if the soil is very much in need of lime, calcareous earth plays here the prominent part. Experiments upon clover have shown that land plaster caused an increased formation of vegetable structure, the leaves increasing in size, and being of a deeper color and more succulent. This is usually followed by an increased formation of seed. 2. (*a*) By its action upon the elements already contained in the soil, but in an inert state. (*b*) Its power in fixing volatile and escaping carbonate of ammonia. (*c*) As a regulator of the supply of water.



A WEST-HIGHLAND BULL.

On some soils the application of land plaster is equivalent to an addition of potash and magnesia, because the plaster liberates these elements from their chemical combination and renders them soluble, and therefore available to plants. Pagel observed that in the fermentation of bone-dust, thirty-nine per cent of the original amount of nitrogen escaped, while this loss was reduced to less than one per cent, when gypsum was applied as an absorbent. This shows that land plaster may be used to great advantage to sprinkle in stables, poultry houses, and privies, where it absorbs the escaping gases, saving them for the use of plants, besides purifying the air.

CROPS MOST BENEFITED BY THE USE OF LAND PLASTER. —In Germany the use of land plaster has been most beneficial upon grass and clover, while in parts of this country it is ap-

(3) Marls and chalks are lime-soils; and yet in the last paragraph the writer says: "Plaster would be no benefit to our natural soils as they contain already a large amount of lime"! A. R. J. F.

plied with advantage to almost every crop. The most universal agreement, however, prevails that land plaster is above all a specific manure for red clover and such plants as have an abundance of delicate and succulent leaves and stems. As a rule, it may be said that land plaster is of more value to broad-leaved plants than on grasses. Lampadius says of the use of land plaster on clover in Germany: "It may with certainty be stated that by the use of gypsum (land plaster) the produce of clover and the consequent amount of live stock have been increased at least one-third." Land plaster is an excellent dressing for wheat. Mr. Harris says, in his "Talks on Manures," "Clover is good for wheat; plaster is good for clover." "It is good for pastures and meadows; a also favorite for young corn and potatoes." It is a valuable application to tobacco, because it renders soluble and accessible the potash and magnesia, which too often exist in close combination. Land plaster is a manure for the sub-soil, and therefore, its effects are greater on all plants which derive their nourishment from that source.

TIME AND MODE OF APPLICATION.—Much depends upon the time, the kind of crop, and the method of applying land plaster. Care must be taken in order to obtain the best results. The following are the experiments of Prof. Koerte in the same field:

Undressed.....	100	pounds yield.
Top dressed on March 30.....	132	" "
" " " April 13.....	140	" "
" " " April 27.....	156	" "

Thus it is easily seen that much depends upon the time it is applied. To obtain the best results it should be applied in the finest powder, the weather damp, in the morning or evening while leaves are wet with dew, and when the plant is from two to four inches high. On meadows and wheat it is usually sown broadcast. In the case of potatoes it may be put into the drills or holes along with the manure. Emerson and Flint say that "plaster should be scattered in the shape of the finest impalpable powder in the spring, just as vegetation is beginning, while the dew of the morning or evening is on the plants, that it may stick, but not in rainy weather." It should be applied every spring, or as often as the crops require it.

QUANTITY PER ACRE AND COST.—In regard to the quantity of land plaster to be used, 200 or 300 pounds per acre is sufficient, if in a very fine powder. The cheapness, and the valuable qualities of land plaster as a fertilizer, make it on of the most economical methods of restoring the fertility of soil. The cost varies according to the locality. Freight is an important item, when long distances are considered. At this place it can be supplied for about six dollars per ton.

RECAPITULATION.

Soil.—Not sufficient in lime or partly exhausted by cropping; sufficient amount of rainfall. Light, sandy, loamy sand, or dry, deep, well-cultivated, middling clay most favorable.

Necessary Elements of Soils.—Nitrogen, potash, magnesia, lime, phophoric acid, sulphuric acid.

Composition of Land Plaster.—Sulphuric acid, lime.

Action.—Elements of land plaster enter into plant growth; dissolve potash and magnesia; absorb ammonia, forming nitrogen.

Climate best Adapted.—Moist; frequent precipitation.

Crops Most Benefited.—Clover, meadows, wheat, tobacco, corn; valuable for many.

Time Applied, Etc.—Spring; plants small, sown broadcast (or in hill with seed) while wet with dew.

Quantity and Cost.—From 200 to 300 pounds per acre in fine powder; cost, about six dollars per ton.

DE OMNIBUS REBUS.

Box 23, Sorel, P. Q. June 1st, 1886.

Black Tartar Oats.—I have heard this spring certain complaints of the late ripening of black Tartar oats. According to my experience, the reverse is the case. They ripen much earlier than potato oats, and at least a week earlier than the common oats sown in this neighbourhood. Besides, the greater yield of grain would in any case make up for a few days of later maturing. The immense crop—72 bushels an acre—grown by Mr. Gylling on the Fosbrooke farm last year, after roots, which alone would show their powers of yielding, is not by any means the limit of their capabilities. The ridiculous prejudice against their colour, which hinders their ..., is a remnant of pre-agricultural-club days, and need hinder no one from sowing them, as it, with other like absurdities, must soon vanish under the beneficent rays of the rising sun of the modern agricultural mode of thought.

Thick vs. thin-sowing.—I am happy to say that the farmers of this district are beginning to sow a fair quantity of seed to the acre. Major Paul, of Sainte-Anne de Sorel, M. David Lavallée, of Sorel, and many others, are becoming convinced that their ancient practice is inconsistent with true principles. The quantity of seed that was sufficient when the land was newly cleared and full of natural stamina will not answer the purpose now-a-days, when, exhausted by a long course of injudicious cropping with grain, the plants on such land no longer possess the power of *tillering* or throwing out from the original shoot several additional stems. The way of computing yield leads to a good deal of error in this matter. Ask a farmer, here, how his wheat-crop turned out, and he will probably reply: I sowed ten bushels, and I got one hundred bushels. He will have no idea how many bushels to the acre! Now, it is evident that the yield per acre is the point, and the reason is clear: supposing I sow ten bushels on ten acres of land. I have the ploughing, harrowing, and other work to do on these ten acres, to say nothing of rent, in the form of interest on the purchase of them, and I reap, say, one hundred bushels. But if I sow 20 bushels on the same ten acres, and reap only seven and a-half bushels to each bushel sown, I get one hundred and fifty bushels, the only extra expense laid out in this increase of 50 % being the additional bushel per acre of seed. And, of course, it is of immense importance to get the ground well covered before the sun gains power. I have sown this year, on a farm belonging to the Hon. Baptiste Guèvremont, who is good enough to have some confidence in my knowledge of farming, the following quantities of seed per acre:

Oats.....	4 bushels.
Barley.....	2¾ "
Wheat.....	2⅓ "
Barley and Buckwheat (mixed).....	2¾ "
Pease.....	2½ "

Also, for green-meat, the following mixture, which is an experiment, and, judging from present appearances, a successful one:

Oats.....	1 bushel.
Pease.....	1 "
Corn.....	½ "
Tares.....	1 "

With two pounds of rape sown broadcast after the above mixture is harrowed, and finished by rolling. The grain, except the wheat, was all put in deeply with Noxon's broadcast machine, and the plant is as perfect as possible. The wheat was sown by hand and dragged in with the "Planet Jr."

cultivator which, owing to its want of solidity, made rather a rough job of it. However, though too thick in places and too thin in others, the plant and colour are good, and the prospects for harvest all that the very poor sandy land can be expected to show.

Now, Capt. George Nelson, of Pot-au-Beurre (what a name—*butter-pot*), tells me he sows the following quantity of seed per acre:

Wheat	1¼ bushels.
Barley	1¼ "
Oats	1¼ "

At which statement, I can only hold up my hands in utter amazement, and reply that either Capt. Nelson or I must be terribly mistaken.

I observe that Mr. Barnard, in the June number of the *Journal d'Agriculture illustré*, demurs to my proposition as to the proper quantity of seed of beans per acre. I sow three bushels, and, with the rows 26 inches apart, I do not find the plants too thick. Of course, the small white-bean does not require so much seed, but even of these I should not like to sow less than 2½ bushels. As a rule, the bean-crop in this country is a ridiculous sight. Compare this seeding with three bushels of pease per acre at 3 feet apart. Our English seedsmen, who furnish seed and contract for the crop, will not deal with any farmer who will not engage to sow at the above rate: and they, the seedsmen, are supposed to know their business pretty well. The fact is, that beans, unless well shaded, never yield more than half a crop, and the thick sowing provides shade. In Scotland, 4 bushels of pease to the acre, broadcast!

The month of May 1886.—I never saw such a sowing season! From April 21st to May 25th! Positively, no interruption from the weather during the whole time! And the land worked admirably too. The only thing I regret is that there was not a sharpish frost about the middle of the month to destroy the self-sown buckwheat. This is a horrible pest here, and now people have taken to sow a mixture of buckwheat and barley for ripening, it will be worse than ever. Will the two ripen together? I doubt it.

Swollen udders.—If people will let a calf suck a cow whose normal yield of milk is 18 quarts without milking her after the young one has done his best, they must expect their cows to be troubled with swollen udders. This is what our Sorel gaoler, M. Morgeon, did, and, the case becoming serious, he came to me for succour. I prescribed a pound of Epsom salts to be dissolved in water and taken fasting. Unfortunately, M. Morgeon thought it would do if given in a bran-mash, but the bitter taste caused the cow to reject it. However, the next day the salts were given as directed, a bran diet was adhered to, the udder was bathed with Goulard's lotion, and anointed with the following preparation: 4 drachms mercurial ointment, the same of camphor rubbed down with q.s.(1) of high-wines, and mixed with lard. After this application, the udder was poulticed with swedes and linseed meal, and in three days the hardness disappeared, and the cure was completed. It must be a very bad milker that a newly-born calf can suck dry.

Bad ploughing.—The first thing my good neighbours have to learn in farming is: How to plough! They are beginning to grow root-crops, and in forming the drills, they begin to see that the difficulty of making them arises chiefly from the unevenness of the furrow slice. I found a young man at work, in a lovely sandy loam, making his furrow 16 inches wide by 7 inches deep at the land side; on the ploughed side it was only 3 inches deep! Fortunately, I got the proprietor to cross-plough the piece, so the fault was partially remedied; but the feeling is evident here that as long as the land is poked over in some form or other, that is all that is necessary. As for a straight furrow, that is looked upon as quite a piece of fancy farming, and no attempt is ever made to secure it. Rows of corn-stubs may be seen in the middle of the ridges as firmly rooted as ever, because, instead of commencing the *feering* by throwing two furrows *out* at a bout, and then turning them back again, the ploughman begins by throwing the first two furrows together, thereby leaving the middle of the ridge unploughed, and, in nine cases out of ten, too high.

Shallow-ploughing.—A man, who told me he was the best ploughman in the parish of Sorel, which he is not, exclaimed against a neighbour that he was going "défoncer le terrain;" by which he meant that he was ploughing deeper than is customary, and would thereby "knock the bottom out of the land". "I", remarked my friend, "plough narrow and shallow, and not like that man, who is ruining the land". Upon inquiry, I find that the speaker has passed all his life, till this season, on a small island in the St. Lawrence, and, no doubt, was, or esteemed himself, a person of vast agricultural experience. And yet, the same men who would think it ruinous to plough their fields 7 inches deep, dig their gardens 10 inches deep! I fear our farmers, as a rule, are not given to reasoning.

Arbor-day at Sorel.—There was no attempt to celebrate this national festival at Sorel. As far as I know, not a tree was planted. The truth is, you cannot excite enthusiasm in the minds of the Sorelois by any ordinary means. The Queen's birthday fell as dead as a stone, except that there was more gunpowder burnt by means of crackers and pistols than would have satisfied a village *custom* on the West coast of Africa. From what I hear, Arbor-day is a universal failure.

Steeped vs. dry mangel-seed.—Steeped seed was up on the 6th day from sowing, dry seed did not show for 21 days. An immense gain, as the one was ready to horse-hoe before the weeds had a chance to grow, while the other gave them a chance to overpower the young plants. Again, the seed sown by the *Planet Jr.* drill on Mr. Gylling's farm has come up perfectly. He tells me that it will sow steeped carrots-seed, if mixed with sand, as well as it sows dry seed, and the regularity of the depth at which it deposits the seed is quite perfect.

Permanent pasture.—Mr. Lunan, whose farm lies on the west bank of the Richelieu, has as nice a piece of permanent pasture as one can desire. The sown grasses have died out, and the natural ones have taken their place; it is full of white clover, and the cows do well upon it. If Mr. Lunan will take my advice (which he won't), he will never break up this valuable piece of grass.

Bad seed.—The seed-oats sown on the Hon. Baptiste Guèvremont's farm were about as bad as bad could be. Four bushels an acre were sown by Noxon's machine at twice—2 bushels across and two bushels along the ridges—and in spite of that they are thin. One-third of them were *shells*. It is

(1) q. s. means *quantum sufficit*, as much as is required.

almost inconceivable, but on this large farm—250 acres—there is no winnowing machine! Pease, from a neighbour, were so full of rubbish that the tubes of the sower were continually choking, and as the custom here is for the driver to sit on the machine, there are no means of detecting a failure to sow until the vacant space is visible after the seed has *brairded*. In using all sowing machines, drill or broadcast, the driver should walk behind, and keep a sharp look-out over the whole concern.

Cow-pasture.—Close to the village-end—called here Le Bout—is the farm of M. Idace Guèvremont. Here pasture about forty of the Sorel cows. About 90 acres in grass, 5 years down, and all in one piece. Consequently, by about the end of June the cows will find themselves heartily sick of their over-eaten pasture, and the milk will fall off in a lamentable degree. Four colts, and 40 ewes with their lambs, have been ranging this lot for a month, nipping off every young blade of grass as fast as it shot. Poor economy this!

Rolling grain.—People here are beginning to roll their grain as soon as it is sown: a correct practice on this light land. On my road to Montreal on the 25th May, I looked out of the window of the railroad carriage all the time and never saw the slightest sign of the use of this indispensable implement. And, oh, my goodness, the rye! For the first few miles, the Sorel line runs through very light soil, and as it is poverty itself, the farmers sow, as I should judge, about a bushel of rye to the acre, and it is a sight to be seen! Where the land is heavier, are the old 7 feet ridges, and the furrows between them, about 18 inches wide, bear nothing, absolutely nothing. Now, I am an advocate for narrowish ridges on really heavy land, but never picking up the crumb-furrow is an awful mistake, a mistake which is universal, alas, in this province, except were an accidental Scotchman has taught a much needed lesson. Cross-harrowing is beginning, as I said before, and I saw, incredible to state, two acres and a half of ley, in preparation for potatoes, cross-ploughed!!! The potato-planting on this piece, however, was carried on in a funny fashion: the drills were drawn, and very fairly drawn, with a double mould-board plough, the potatoes planted a foot apart, the dung carted and spread on the potatoes, and the whole covered in with the... hoe! (1) In consequence of this last insane act, when they come to harrow the potatoes—the farmer in question told me he meant to do so—the long, strawy dung will be pulled out of the drills, the harrows will be continually stopped, and the horse-hoe will make a rare mess of the subsequent operations.

Beans and Corn.—An evil practice has crept in lately of planting both beans and corn too early. Many of the Sorelois planted them about the 6th of May, and, in consequence, the cold winds checked their growth, and turned them yellow. When once these crops receive a check, they never wholly recover their pristine vigour. The same thing happened last year, but no warning seems sufficient to deter people from this mistaken practice. In this district, the 25th May is easily enough for planting beans and corn.

Price of cheese.—The price of cheese is, as I prophesied, low enough. Seven cents a pound for the best new is about the figure. My brother writes me word that at the first Berkeley cheese-fair the price of Glo'ster cheese was 35s. per 112 lbs. = 7⅓ cents! This is lower than it has ever been for the last thirty-four years. *Good* butter, in England, still fetches its price, but inferior is almost unsaleable; plenty to be had at 13 cents. By the bye, a curious discrepancy exists in the reports of the market between the Montreal Star and the Longueuil Impartial:

STAR; MAY 22ND, 1886:

Best new cheese.....	7 cts. to 7¼ cts.
Best old cheese.....	8 cts. to 8¼ cts.
Cheese at Liverpool.....	45s. per 112 lbs.

L'IMPARTIAL; MAY 22ND, 1886:

Best new cheese.....	9 cts. to 9½
Best old cheese	10¼ to 10½
Cheese at Liverpool.....	60s. per 112 lbs.

I need hardly say that the Star's report is the correct one. What object the Impartial can have in view, I really cannot tell, but it argues very ill of the supervision exercised by the editor that such a flagrant error should pass uncorrected. I see by to-day's (June 21st) telegram, or rather cable-gram, that the price at Liverpool for best cheese is 39s. = 8 cents a pound.

Sprouting potatoes.—For many years I have been in the habit of sprouting my early potatoes in the light. About the beginning of April, I place them on the floor of a room in the garrets, and keep them there, in a temperature of about 60° F., until the land is ready to receive them. They throw out short, stubby sprouts, about ⅜ of an inch long, a purple-green in colour, and so firm in texture, that the handling of them in planting does not break them off. Here, after allowing the sets to shoot in the *caveau*, the people put them into boxes with some earth, and they sprout readily enough; but this can only be done on a very small scale, whereas, by my plan, a very small room will accommodate 8 or 10 bushels. Besides, as far as appearances go, the potatoes sprouted in light and planted April 22nd are far in advance of those treated in the other way. Dug to-day, June 21st.

Strangely enough, a correspondent forwarded me lately a copy of the "American Agriculturist" for May, in which the whole process is described, and which, with the engravings, I copy in this month's Journal.—v. p. 99. I myself have practised the system for forty years.

OUR ENGRAVINGS.

Potatoes sprouted in light.

Flax plants —See article, p. 101.

Land-marker.—See article, p. 103.

West Highland bull.—A good specimen of the Argyleshire Kyloe, the hardiest of all beef-cattle. Whoever has eaten a sirloin or the ribs of a real Highland four-year-old, has tasted good beef.

English Shire Stallion.—See article on this horse for description.

Two articles, from American exchanges, on the use of land-plaster, are transferred to this number of the Journal. The rule for its use is this: all plants are the better for the application of lime in some form, but plaster—sulphuric acid and lime—seems to suit all pod-bearing plants better than any other form of lime. How it acts, is as yet a secret.

ARTHUR R. JENNER FUST.

TURNIP FLY.

METHODS OF PREVENTION AND REMEDY.

[A lecture on the turnip fly, or flea beetle, and the methods of treatment and cultivation which have been found serviceable in keeping it

(1) After completing about one-fourth of the piece, the farmer resorted to the plough for the remainder. A. R. J. F.

in check, was delivered before the students of the Royal Agricultural College, Cirencester, last Thursday (June 15), by Miss Eleanor Ormerod who has kindly placed her copy at our disposal.
We are glad to give the following extracts.]

HISTORY AND DESCRIPTION.

The fly, or more properly the flea beetles, live through the winter—in a torpid state or otherwise, according to the amount of cold—and under such shelter as is afforded only too often by rough ground, stones, or apparently almost any kind of moderately dry field rubbish.

With the return of sunshine they come out to trouble us, and feed, until the turnips and cabbage are ready for them, on such wild plants of the cabbage kind as they can find—as the common Shepherd's Purse, the tall weed with large somewhat heart-shaped leaves and white flowers known as Jack by-the-Hedge, the purple-flowered Ladies' Smock or Cuckoo flower, and others, and more especially charlock,(2) all which may be known to belong to the order cruciferæ, or the cabbage kind, by having flowers with four leaves arranged in the form of a cross.

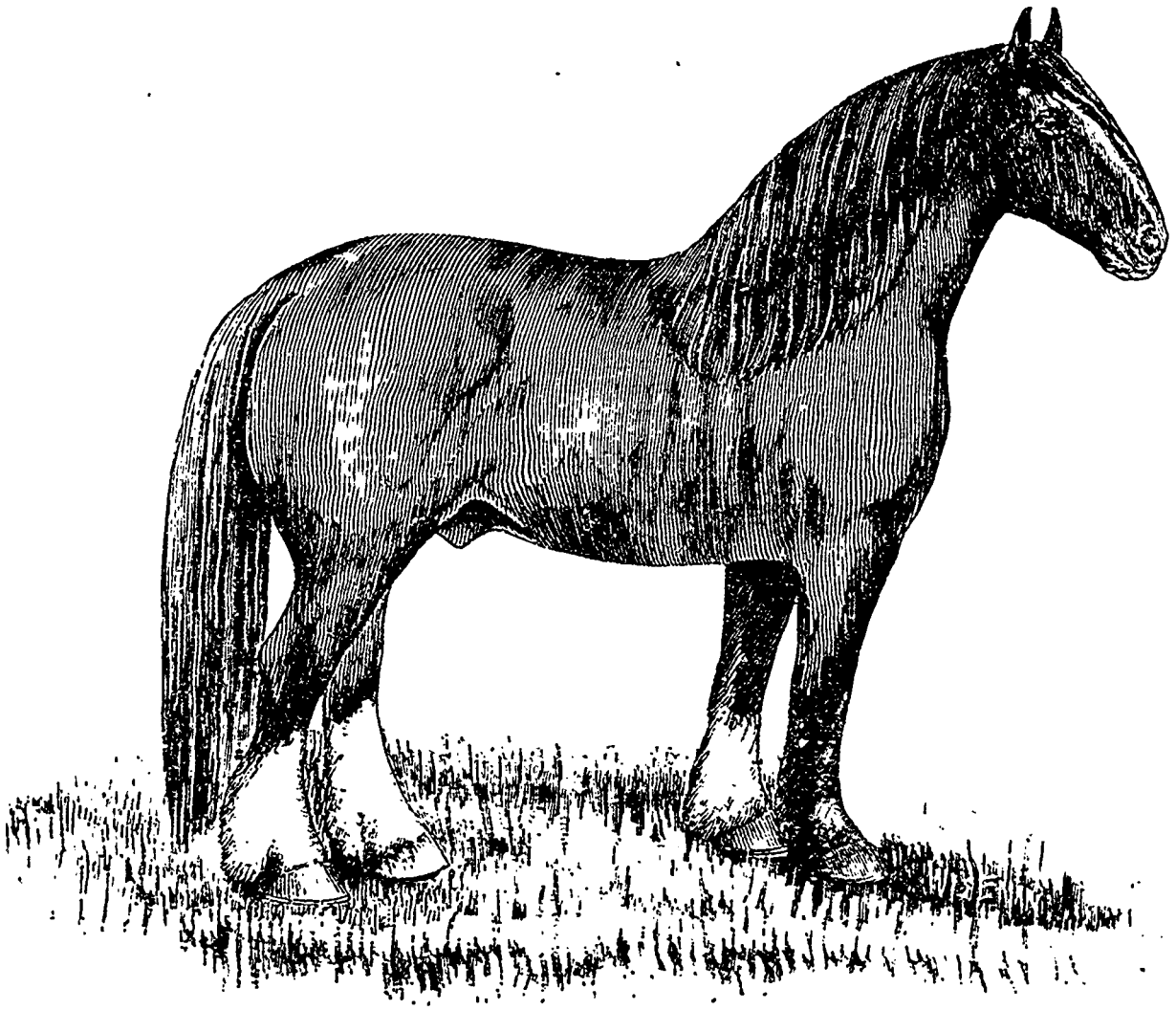
Egg-laying begins about April. When the attack is on the turnips, the eggs are laid on the under side of the rough leaf. The maggots soon hatch and piercing into the leaf, feed between the two sides. These maggots or larvæ are full grown in about six days, when they come out of the leaf and bury themselves an inch or two below the surface of the ground near the turnip.

Here they turn to chrysalids (pupæ), from which the flea beetles (or fly) come out in about a fortnight, and there may be as many as five or six broods during the season. The first brood appears to be at its height in May and June, and it is stated by John Curtis that "it is admitted on all sides that the beetle is weakest in July" (*Farm Insects*, p. 28), which is a very important observation relatively to dates of sowing.

Two of the commonest kinds of turnip fly are the Phyllotreta nemorum and P. undulata—blackish, with an ochrey or yellowish stripe along each wing-case, and may be distinguished from each other by the P. nemorum having yellow shanks, and also being rather larger and more coarsely punctured than the P. undulata. Formerly they were scientifically known as different species of Haltica.

REMEDIES.

Two great points to be attended to with regard to fly are



ENGLISH SHIRE STALLION, "GARFIT," 3093. Fig. 110.

(2) *Charlock, cadluck* or *kilk*, is the wild mustard, *sinapis arvensis*. A. R. J. F.

to clear it out beforehand, or to support the crop under the attack if it occurs.

To clear it out, we should allow these flea beetles no winter shelter in rubbish alive or dead, and we should starve them out in the spring by destroying their wild food-plants, which are mostly very conspicuous, and which keep them in comfortable circumstances until the delicate new food of our crops attracts them to it. But as even with the best care the pest may come from neighbouring shelter over which we have no power, or be borne on the wing in hot sunshiny weather, the next thing is to induce such a hearty growth of the crop as may run it quickly through its first stages to the rough leaf, in which the fly has much less power over it;(1) and it will be seen that great benefit may be securely reckoned on by measures falling within the scope of regular cultivation, such as treatment of the ground calculated to preserve the surface moisture in it at sowing time—a fine tilth; the addition of artificial manure to stimulate early growth; good seed, and a liberal supply of it; in short, all measures that will tend to cause rapid germination, and to run the plant on well and quickly.

If we take the points to be attended to in regular order, one of the first is—Where does the general appearance of the turnip fly which begins the attack in spring come out from?

This may be from almost any kind of shelter. On the surface of field, clods of earth, lumps of rough manure, stones, or even the hollow stalks of standing stubble, may serve to protect it. At the sides of the fields heaps of stones and rubbish, that are often gathered together and increased in size each year, serve it admirably for winter shelter; also it has been seen making progress from a field border of neglected grass by the side of the kind of loose stone wall or bank known in Scotland as a "dyke."

In such situations it is said by John Curtis, who in his day did so much for agricultural entomology, "The fly or flea beetles may be seen on the first indications of spring, if the weather proves fine, sitting on walls in considerable numbers, or sunning themselves on dry banks and on clods of earth protected from the wind."

They also harbour amongst dead leaves, which accounts for fly ravage sometimes beginning at the side of a field only divided by a hedge from woodland, and as they are likewise to be found in decayed stumps or under loosened bark, an eye should be kept on accumulations of wood rubbish as well as on other possible shelters.

These are the starting-points from which the parent beetles come out; but as young turnips are not to be found so early in the year, and the creatures need food, the first brunt of the attack is believed to fall on the weeds of the cabbage kind that I have just named, and these should be cleared away wherever it is possible, for three reasons: 1st. To starve the fly. 2nd. Because the fly, either by scenting its prey or by some means not yet known, has been shown by the observations of many years to have such powers of finding where there is suitable food and migrating to it, that in the absence of food plants we may confidently hope it will not come to us, or, if present, that it will leave us for better supplied localities. The third point is, I think, a very important one, and not brought forward as much as it ought to be. We have seen where the spring attack of the fly comes out from, but where does the first brood or progeny of these winter flea beetles come from?

We are told that the fly begins to lay in April, and that it lays its eggs on the under-side of the rough leaf of the turnips; and so it does in due season, but turnips in the rough leaf are not sufficiently plentiful early in the year as to afford leafage for the maggot stage of the coming legions of what has been truly described as "this pest of a fly." Professor Buckman helps us here, as he tells us that the earliest broods are bred on the wild cruciferæ; therefore if we clear out all weeds (or waste cultivated plants) of the cabbage tribe to which the fly resorts, we cannot fail to do good, both by lessening the amount of fly then present, and also lessening the amount of the coming brood.

Charlock is especially attractive to fly. Where this weed abounds the beetles will come to it and feed until turnips or cabbage are ready to be attacked, and where the golden carpet of charlock blossom is seen, there is a spot where fly ravage is extending to the neighbouring fields.

Where a stubble is foul with charlock and other weeds is a very good plan, as a means of prevention, to run the chain harrows over it, or brush it, and so shed the ripe seeds. These will sprout at once, and the young weeds from them will be destroyed by after cultivation; whereas, if they are left to ripen and shed gradually, these seeds are ploughed in too deeply to germinate at the time, and in the next ploughing they will be thrown near the surface, and will then sprout, and give us a growth of weeds along with the growth of the crop.

The presence of shelter in the winter, and of plants suitable for food to the wintered flea beetles and their maggots in the spring, seem to be the conditions to which we owe attack in ordinary seasons; and when, as in 1879 and part of 1880, we have such long continuance of wet weather as makes it impossible to clean or cultivate the land properly, attack may be looked for as likely to occur in excessive amount.

Weather influences bear strongly on the amount of injury caused by fly attack.

It is most hurtful in hot dry weather accompanied by bright sunshine, because the fly is then in its fullest vigour, propagates most freely, and also flies well, and consequently spreads far, whilst the young turnips in such circumstances fail quickly under attack, but when once fly attack is established, every circumstance that is bad for the turnip helps to keep it under the power of the enemy. Frosts that check the growth of the young plant, or cold rain, or cold drought, will all keep it back, and thus, although the fly will not be multiplying and spreading so rapidly as in hot and bright weather, yet what there is of it on the crop will need food, and the plants suffering from ungenial weather will not be able to grow past attack.

CULTIVATION.

A slow weak germination and growth through the stage whilst the plant is in its seed leaves, is the great thing to be guarded against to save the young crop from the fly. The trouble may be caused, as we have seen, by heat, or cold, or drought, but it may also arise from the land being ill-prepared or undermanured, from the surface being too dry at sowing time, from bad seed, or in fact anything unfavourable to plant growth, and if the plant loses heart it loses all, it most surely will fail under attack. But make it healthy, and in the full sense of the word "hearty," and there is good hope that enough of the crop to afford a paying return will keep its head above the amount of attack of ordinary seasons.

The great principle of cultivation brought forward by our agriculturists is so to prepare the soil beforehand as to ensure a fine tilth and good seed-bed, with such small amount of disturbance of the soil at the time of sowing as may preserve the surface moisture in it, and thus, with the addition of some artificial manure, afford conditions favourable for rapid germination and good growth.

(1) Hence the superiority of dissolved bones, or superphosphate form any source, over raw bones &c., in *starting* the crop A. R. J. F.

In many parts of the midland and south of England, and especially on strong land, autumn cultivation is considered the best means of warding off fly attack in the following season. Where land is well ploughed in the autumn, and laid as fallow during the winter (what is sometimes known as stale fallow), the frosted surface mellows down, and is in a good friable state, so as not to require further ploughing in spring. The application of the scarifiers should be enough, and thus the young sprouting weeds will be cleared and the soil stirred sufficiently, whilst by the use of this implement (in whichever of its various forms of cultivator, scuffler, &c., it may be most suitable), instead of the plough we avoid throwing the ground open to the drying winds and baking suns that often occur during the spring. Also we secure the wintered mould on the surface, which forms an excellent seed-bed, and is believed to be much less attractive to the fly than freshly turned earth; also, we preserve the stores of moisture (which have accumulated during the winter) undisturbed and ready for use below the surface.

There is also the great advantage in autumn cultivation, that where stubble land, whether heavy or light, is foul with weeds, we thus clear out these harbourages of future fly attack.

A fine tilth is also of great importance in driving on rapid growth of the young plant in its first stage, and partly because this state of ground gives the best conditions for healthy germination. Germination requires warmth, moisture, and some air, and where there is a fine tilth the seed is in far better circumstances in all these respects than where the ground is rough or "cloddy," as it is termed; and therefore part of the seed is buried under great lumps of earth, and part exposed on the surface to drought or anything that may happen. The fine soil preserves the underlying moisture evenly and evaporates it gently, and, besides, makes a good bed for the young rootlets. Rainfall at sowing time is often beneficial in the highest degree; in fact, the saving of the plant.

How far artificial application of moisture with the seed (or after sowing,) can be brought to bear, is a point that we need to know more about. When the season is moderately damp the use of the water-drill has been found to do much good; on the other hand, in dry seasons it has been found to do harm, by just starting the plant into a growth that there was no further supply of moisture in the dry ground to carry on.

As to date of sowing, opinions differ, and probably this must differ with climate and circumstances, but the larger proportion of last year's observers are in favour of late sowing; a few are in favour of sowing early, but the medium time seems the most undesirable, and this view corresponds fairly with the observations of John Curtis, of the fly being weakest in numbers in July; also about this time there are usually some intervals of rain or thunderstorms alternating with warm sunshine, which are favourable to the plant, and (as noted) bad for the "fly."

Thick seeding is strongly advised as a fly preventive, and shown to answer by instances given of the plant doing well where the supply was liberal, and failing under attack where the amount was small. The quantity usually thought desirable appears to be 3 lb. per acre; but at one locality in Haddington 5 lb. are regularly used, and at another near Sunderland 6 lb. is the amount, of course taking care that thinning is looked to in good time.

Commonly the point needing attention is to provide enough plants to stand fly attack (which may generally be expected more or less strongly), if it comes, but also to keep good watch lest, if it should not come, the plants should run each other into a valueless and spindly growth, which may be the result of even one or two days' dally in thinning.

The question of whether steeps or dressings for seed really act as preventives for fly attack appears as yet quite undecided. Petroleum has been used in the proportion of 1 gill to moisten 10 lb. of seed. Spirit of turpentine has been used in the proportion of 8 oz. to about 28 lb. of seed, the seed being frequently stirred, and drilled three days after with a mixture of chalk and sand. Paraffin has also been used; and these various applications have been found to answer well (or at least to have been followed by absence of fly) in instances recorded; but instances are also given of some of these and other applications being of little if any benefit.

When the plant has fairly sprouted and attack takes place, the methods of remedy or mitigation lie in means of catching the fly and destroying it wholesale—of applications (mechanical and otherwise) by which the fly may be disturbed from its destructive work and destroyed, and repellant dressings.

The plan of running tarred boards over the plants has been found to work well, by reason of the flea beetle taking its customary leaps to avoid the ennemy, and consequently becoming attached to the tar. In the plans of driving sheep, dusting, dressing, &c., one great point is to secure that the flea beetle cannot take its customary leaps and thus escape us; therefore we see the reason of making these applications (as advised on all hands) late in the summer evening or early in the morning, or after a light rain, when the leaping legs of the flea beetles are clogged, and thus they are at our mercy. They may be brushed or trampled into the earth, or mixed up with the dressing, and if we do not kill all we stop the progress of their work for a time, and even if this time is only a couple of days it is great relief to an infested crop in the seed-leaves.

Applications of dilute soft soap, which are serviceable in garden cultivation, act by clogging the fly and making the food distasteful, and possibly in other ways besides direct action as plant stimulants.

We all know the importance of this crop and our great losses in it last year. On only half the acreage in swedes and turnips of the thirty-three English and Scotch counties, from which I had returns in of 1881, this was estimated at more than half a million directly calculable loss on seed and outlay alone for one resowing. A waste, utterly unremunerative outlay, as it was to gain a crop, that, but for the "fly" we should have had without it, and a sum also not nearly covering the real damage through late crops, loss of food for stock, and consequent derangement of farm routine, and loss of farm material.

We have seen that, throughout the course of fly attack there are points by which this may be much aggravated or diminished; we see this in many points of the history almost with mathematical precision; the flea beetles that torment us must have a locality somewhere during the winter; and if we clear out these beetles with their shelters, by just so much we are sure of absence of attack,—it may come from elsewhere, but we do something.

With regard to what comes from elsewhere, I wish to direct your attention to some points which have lately been brought forward for the first time as a principle of insect prevention, by one of the great authorities on these subjects, Professor J. A. Lintner, State Entomologist, New York.

He shows the probability—or rather the extent to which it can be proved—that insects have powers equivalent to those of perception of scent in the higher animals, and that what are called repellent dressings, such as gas-lime, tar,

kerosene, and the like, act in part by so overcoming the plant scent that it does not attract the feeder, and he gives notes of microscopic investigations, from which the organs of scent in many instances are considered to be placed in pits and sensitive bristles on the antennæ or horns, some beetles appear to be without them, as the weevils,—some, as the chafers, to have them in vast numbers.

Practically we all know that insects are sometimes attracted to each other, and to their food or place for egg-laying by circumstances in which action of sight cannot be the guiding power, and in the special case of flea beetles, we know they will fly up the wind to their prey, and also migrate in bodies to a more suitable crop.

If we could have experiments as to the effect of various strongly scented dressings including in these both such as are known to be unattractive, as various forms of tar, or paraffin, kerosene, petroleum, &c., also of dressings of gas-lime or mixtures of sulphur—and on the other hand, of effects of special animal manures, some of which are either attractive or at least have had their application followed by appearance of "fly," we should gain very beneficial information, and also it would be worth while to note whether any increased attack could be definitely shown to follow the operation of thinning.

NON-OFFICIAL PART.

M. C. Farnum of Savage and Farnum, proprietors of Island Home Stock Farm, Grosse Isle, Hayne Co., Mich., sailed June 5th for Fraser to bring back a large importation of Percheron horses.