Soybeans and Corn

Wm. McD. Stone
Soybean and Corn Specialist
Atwater, Portage County, Ohio

A Square Deal

This is our motto for doing business whether at home or away from home, in the seed business or in any other business. Or it can be expressed just as well in the old rule of conduct: "Whatsoever ye would that men should do to you do ye even so to them." Not all men agree on every interpretation of this rule, but the most of men will.

When we sell seed to you, we want to sell you the best we can grow, because the best always pays. But to be fair to ourselves at the same time, we must charge a price commensurate with the thought, labor, money and time we have spent on it.

To produce the very best improved strains of farm seeds takes the very best that is in the producer and he ought to receive commensurate pay. We hope that when our customers buy these seeds which have received so much care in the breeding and growing that they will give them the very best opportunity to give their maximum yield. Our calico corn and at least two strains of our soybean seed have been bred up by painstaking care to give extra high yield of grain. Give them a first class opportunity to prove it.

We hope our customers well keep this point in their minds.

We wish to build up a large permanent business among the best, most intelligent class of farmers of this and other nations, for our trade now reaches to Asia and Australia. To build up such a business, we **MUST** give our customers the best of seed and the best of service. We are not trying to give our business an unnatural "boom," but to make a steadily increasing gain, based upon the best principles of business.

We try to give each shipment, large or small, particular care, but it is manifestly impossible for one man to clean, weigh up, tie up, tag and ship every shipment of seed we make. Mistakes are liable to occur during the rush of shipping. If we ever make a mistake with your shipment, give us a chance to correct it, because we have an ideal in our mind which we want to try to live up to. That ideal is to try to score up as near to 100% as possible in our customer's estimation.

Perhaps a statement from one of our oldest, and largest customers might be of interest to prospective ones. We have always tried to treat all of our customers right.

"If I can be of any help in giving you a testimonial of any kind just state in what connection and will give you my experience. Will do anything I can, if you will only name it."

I am yours truly,

ANTHONY COLLSON,

Elmira, New York.

SOYBEANS AND CORN

A Treatise on the Most Valuable of the
Farm Crops of Ohio.

Also Practical Suggestions for Improvement of Soils
Through Scientific Use of Lime and Legumes.

LONE ELM FARM

Northern Ohio Acclimated Seeds

WM. McD. STONE

SOYBEAN AND CORN SPECIALIST

ATWATER, PORTAGE CO., OHIO

SB 205
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Northern Ohio Acclimated Seed

Every well posted farmer knows that to secure best results in corn and soybean crops at least, he should not get seed from a more southern latitude than his own, better to the north if possible. The farther to the north it is acclimated the earlier it will naturally ripen. One of the most important and most desirable qualities of corn and soybeans is early maturity.

We are located only about 40 miles south of Lake Erie. We have been growing our soybean seed here for several years and it should now be well acclimated this far north. Our variety of corn has grown and ripened in Atwater township, Portage Co., for about 30 years so it is certainly well acclimated. Now unless you are located very much farther north than we are located, you ought to get very satisfactory results from our seed in ripening qualities and yield.

This past year the soybean seed crop of Northern Ohio has been very much reduced in yield by a drouth of unusual severity followed by the earliest of heavy fall frosts.

Consequently our best advice to every customer who lives north of our latitude is to order his soybean seed from us as early as possible, so as to get Northern Ohio acclimated seed.

Of course we have to purchase our Mammoth Yellow soybean seed and other very late varieties in the South, because they would not mature at all in this climate. The same is true of our southern varieties of ensilage corn, our cowpeas and other seeds of like character, but all of the northern Ohio soybean seed which we do not grow ourselves on our own farm, we try to have raised for us by some of the very best, most reliable farmers in Portage county.

We have so far grown all of our pedigreed calico corn on our own farm. But the seed of other varieties of field corn we buy from farmers who live even farther north in Ohio than we live, and who make a business of producing seed corn. Last year we sold a large lot of the varieties of corn, such as Leaming, Pride of the North, Early Huron Dent, and White Cap Yellow Dent corn here in Portage county for seed and although we have here about the coldest climate, on the average of any part of Ohio, yet we have heard of only one complaint so far about the corn not ripening properly. This is all the more remarkable, when we know that the past year has been one of the poorest in many years for growing a satisfactory crop of corn.

Practically every agricultural expert in the United States is now recommending the use of northern acclimated seed for growing maximum grain crops. We have occupied a leading place among American seed growers in the outspoken advocacy of this movement and we are confident of securing the support of the best class of farmers of Northern Ohio, Pennsylvania, New York, Michigan and other northern states in our work.

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Introduction

It is worth quite a good bit to be able to read the signs of the times, if such a thing can be done. Though we lay claim to no prophetic insight yet we do believe that two points in farming and live stock raising, very closely related to each other, are going to receive a much larger proportionate share of attention in the future than in the past. They both come very nearly to being of supreme importance.

These two subjects are a cheap source of protein for live stock and a cheap source of nitrogen for the soil. Solve these two problems and the problem of reducing the high cost of living is also solved. We will remark at this opportunity that the more one studies these two subjects, the more he finds they are bound together.

A number of years ago we began our work with the soybean because we believed that if this plant could be grown successfully in our climate, it would largely help to solve those problems. The more we find out about them, the nearer we feel they come to furnishing the solution or helping to furnish it at least.

We have always entertained a very kindly feeling towards Dr. C. E. Thorne, that kind, earnest, progressive, high powered Director of the Experiment Station at Wooster, Ohio, since he gave us the advice, several years ago, to grow soybeans instead of oats in our rotation of crops. At that time very few farmers knew anything at all about soybeans or soys as they are commonly called. Now they have become very popular and justly so.

The Soybean and Protein Problem

On account of the tremendous increase in population of the large cities all over this country, most of the live stock farms have been changing very rapidly from cattle growing to dairy farms. This is especially true in the north-east quarter of the U. S. While an abundance of protein food is necessary for best results in any kind of live stock production yet a large proportion of stockmen were not trying very hard to get best results, so they fed their cattle mostly corn and timothy hay, with some clover when they happened to have some.

Now in changing to dairying most of them have already found out that it is absolutely imperative to have a good liberal supply of protein grain and forage in order to secure the best results.

In the average farm rotation but a very small proportion of protein grain is raised, even if there should be occasionally a good crop of clover hay produced. Even if a great plenty of clover hay or alfalfa hay was fed to cows yet they would have to have some grain and some protein for best results. Oats are not high protein grains. Where then does the farmer and stockman get his protein grain? Well the most dairymen buy it. They keep their farms to raise feed for their dairy cows, and then buy the high priced part of the feed and raise the low priced part themselves.

We meet many dairymen who privately, confidentially, and often ruefully tell us that after they have paid for their bran, linseed oil meal, gluten, cottonseed meal, brewers grains, etc., out of their cream checks they have but little left. It is very poor business "to save at the spigot and lose at the bung hole."

The greater the demand on the eastern farms for milk and butter the more the farmers on these farms compete with each other in buying the protein feed stuffs on the market to balance up their farm rations for cows. The more milk produced, the higher goes the price of the protein feeds to make it.

We think the common sense thing to do is to raise at least a part of this protein grain. The corn crop long ago solved the problem of furnishing the bulky carbohydrates food for cows. The soybean we believe furnishes the solution of the farm grown protein feed. In most sections it will very handily take the place of oats in a corn, oats, wheat, clover rotation, or if the soybean ground cannot be put to wheat in time, then clover may be sown with oats the following spring, thus keeping up the four year rotation.

On account of the analysis of soybean grain being so high in digestible protein, over three times as much digestible protein can be raised in an acre of good soys as in an acre of good oats. Don't you think that fills the bill nicely for what the dairymen need? We think so. The foremost dairymen in the U. S. have begun to grow soybeans in their rotation in place of oats, not only because protein grain can thus be grown cheaply, but also because they realize they should not run the unnecessary and large risk of feeding the market protein feeds, the purity and quality of which they know but very little, to valuable dairy cows, some of them worth thousands of dollars.

If they can grow all the feed for these cows on the farm as they can do in a corn, soybeans, wheat, clover rotation or a corn, soybeans, oats, clover

rotation they have not only eliminated a large feed bill but a larger risk of possible injuring the health of their cattle by feeding questionable feed.

By reference to bulletins issued by the U. S. Department of Agriculture at Washington, D. C., and to bulletins issued by different State Experiment Stations, we find that the soybean is very valuable as a protein food, whether we feed the grain, the straw, the whole plant, either cut green as a soiling crop, mixed with corn silage in the silo or made into hay.

Lack of space will not allow us to give the results of all the many trials of soybeans at experiment stations concerning their values as a protein feed.

The U. S. Dept. of Agriculture has tried out over 300 vareties of soys in the last few years and we have already tried 40 or more of the best recommended of these varieties. However we offer to our customers only such of these varieties as we think are superior to others either as hay, grain, or ensilage producers.

A very good idea may be had of the relative value of soybeans as a protein feed compared with other grain by the following analysis.

Soybean grain analyzes 35.4% protein; linseed oil meal 32.9%; Bran, 15.4%; Oats, 11.8%; Corn, 10.5% protein.

Soybean hay analyzes 15.4% protein, Alfalfa hay, 14.3%; Red Clover hay, 12.3%; Millet hay, 7.4%; Timothy hay, 6% protein.

Many prominent authorities on farm feeds are now advocating the growing of soybeans for either hay, ensilage or grain. By far, the great majority of our customers grow soybeans for ensilage to be mixed with corn ensilage at silo filling.

Soybeans for Ensilage

Soybean must be used with corn for ensilage and the two mixed together as the silo is filled. Soybean plants are hollow stemmed. If cut up into ensilage along with corn, the juice from corn will fill up the stems and silage will keep well and will also be mixed ready for feeding. Soybeans put in as ensilage by themselves will spoil. About five feet of the top layer of ensilage should be just plain corn ensilage.

There are several ways in which soybeans may be grown for ensilage. The way which we consider best for conditions in the corn belt is to plant apart, and giving them the same treatment that they would receive for grain growing. They should be cut if possible just before the leaves begin to fall.

The soys then will not have to be planted until after corn is planted and ground is well warmed up. They can then receive just exactly the care needed for best results. The time of planting the different varieties can be gauged to suit the time at which corn is to be cut for ensilage. If corn is not cut until about October 1st, do not plant Medium Green Soys until June 20th, or they will get too ripe for ensilage by cutting time.

Roosevelt soys can be planted about the same time. Ohio 7455 can be planted earlier, and Peking can be planted about the same time as the corn, to be ready at cutting time. Plant $\frac{1}{2}$ bushel Peking, $\frac{5}{8}$ bushel of Black Beauty or Roosevelt, $\frac{3}{4}$ bushel Medium Green, or 1 bushel of either Ohio 7455 per acre.

The second way advised by some farmers for planting soys for ensilage, is broadcast the seed, using every feed cup in grain drill for the work, and us-

ing from three to four times as much seed per acre as used when planted in 28-inch rows.

The soys will grow taller than if planted in rows; they will be easier to harvest with a binder for ensilage; they will not have to be cultivated, and possibly will add more fertility to the soil on account of more roots (to the square yard) covered with nodules. They will also give a large amount of grain and perhaps more forage if grown this way than if planted in rows.

IF!

It does not begin raining or turn cold after planting or both before the soys are large enough to shade the ground completely. In case the weather does turn bad you will have a very unsatisfactory crop. Since the possible loss is so many times greater by this method than the possible gain we do not advocate this method. Our customers may do as they see fit to do.

The third way advocated is to plant them in the same rows with the corn and treat them almost as if they were corn plants. The idea is to substitute a solid growth of soybean plants from one corn stalk to the next in place of the more common sight; rows of weeds and fall grass in so many cornfields, grown for ensilage.

This plan has several advantages as well as disadvantages. It is more suitable for farmers who grow the ordinary early Ohio field corn for ensilage, especially on farms in New York, Michigan and other like latitudes where ensilage is harvested earlier than in Ohio. One principal reason for this is that the soybean plants will have a better comparative show when planted with these varieties of corn than when planted with great tall ensilage corn. This plan will produce a crop to be harvested all at one time by the corn harvester, and all mixed up in the bundle to be run through the cutting box and it will take but little extra time, in fact, to plant, cultivate and harvest it.

Last winter one of the largest soybean-corn ensilage growers in New York State told us that in 1912 he carried on an experiment, growing hills of corn under the same conditions, except that he planted soybeans in with some of the hills of corn and inoculated the soys.

He claims that the weight of the cornstalks in the hills where only corn was planted was only one-half as much as the weight of the cornstalks in the hills where the inoculated soys also grew.

We believe it was the Cornell Experiment Station in New York that found out by experiment that timothy plants grown close to clover plants (inoculated) contain 48% more protein than timothy grown by itself.

The effect of the inoculated soybeans growing with the corn seems to be much like that produced by the inoculated clover growing with the timothy.

The disadvantages of this third method of growing soybean-corn ensilage is principally a matter of comparison. To make a close approach to a balanced ration in the silo, the ensilage should be about one-third soybeans. If the regular amount of seed corn be planted then there will not be much use in planting in the same rows with seed corn, any more than 6 quarts of Peking Soys or 8 quarts of Medium Green Soys per acre.

While this amount of soys growing with the corn will help increase the protein analysis in the silage very much, it will not furnish as large a proportion of soybeans as we think best in the silage. If the rows were only 36 inches or 32 inches apart and the corn stalks were not quite so close together in the

row, then one would have a large proportion of soys and would utilize the ground better, without materially decreasing the yield of the corn, because 28 or 30 inches is about the full width of soybean rows in good thrift.

INOCULATION.

We wish to emphaize this point: Be sure to inoculate the soys which you grow with your corn. Why?

2nd. To keep them from competing with the corn for the supply of the soil's nitrogen.

3rd. To help the growth of the corn.

4th. Experiments have proven that inoculated soys are richer in protein than are those not inoculated.

5th. To help the following crop in that field, by means of the nitrogen stored up on the soybean roots, when they are inoculated.

The surest and best way to inoculate the soybean roots is by the use of soybean bacteria-inoculated soil. It can either be broadcasted over the field before planting or else sifted and drilled in with seed.

It will take about 100 pounds per acre of inoculated soil, used in this way to inoculate the soys well the first year they are planted. After that the field is inoculated for soybeans, practically forever.

Protect the inoculated soil from bright sunshine, or the bacteria in it will be largely killed. If the soil gets very dry before it is used it will have the same effect, on the bacteria. Since the cost of the inoculated soil, with even long freight rates added is not any more more than the cost of cheap fertilizer, the gain from its use is large, and once inoculated the soil is inoculated forever, it would certainly seem to be wise to use it plentifully the first year. After that you will have all the inoculated soil you want for yourself and inoculated soil to sell to your neighbors.

METHODS OF PLANTING SOYBEAN-CORN SILAGE FIELDS.

Several methods are used for planting the combination corn-soybean ensilage fields.

The first method and common one is to mix the two kinds of seeds together very thoroughly and then plant them just as if they were all kernels of corn. Then sow the inoculated soil as fertilizer through the fertilizer boxes.

The second method is to plant the soybeans with the corn planter, using the inoculated soil as fertilizer and then go over the field afterwards with the hand planter, planting the corn in hills along in the soybean rows.

The third method is to plant the corn first with the two-horse planter, using fertilizer in the fertilizer boxes, and then drive right over the same rows again, planting the soys very shallow and sowing the inoculated soil at the same time.

The fourth method is to secure from the manufacturer of corn planters, seed-planting plates to be used in fertilizer cups and then plant seed corn with one set of plates and soys with the other set in the fertilizer boxes.

The fifth method is to plant the cornfield first either by machine or by hand and then go over it again with a hand planter, planting the soybean hills as closely together as you prefer them. Do this directly after planting corn. Don't let the corn get the start of the soybean.

The sixth method of planting is to plant the seed corn with a two-horse corn planter using the regular feed cups for planting. The soybean seed

can either be mixed with the fertilizer in the correct proportion if no inoculated soil is to be sown, or mixed with the inoculated soil in correct proportions if no fertilizer is to be sown. If it is desired to mix fertilizer and inoculated soil together as many of our customers did in the spring of 1913, then we advise our customers to use some form of non-acidulated fertilizer, such as bone or basic slag phosphate as the fertilizer. For example; if you intend to use 100 pounds of steamed bone, 100 lbs of inoculated soil, and 8 quarts of soybean seed per acre, then mix all together very evenly and run the mixture through the fertilizer feed cups while corn is being planted through seed grain boxes. The dry fertilizer will help the soil to go through cups more easily.

It is very advisable that the soys be inoculated. On good soil, the uninoculated soys will grow apparently as well as those which are inoculated but it will be at the expense of the soil's supply of nitrogen.

If soys are planted with the corn it is even more important that they be inoculated so that they will help and not hinder the growth of the corn plants; not to speak of the good which will come to the following crop.

Don't plant your soys and corn while ground is cold. Don't plant over one or one and one-half inches deep. Be sure to inoculate. Soybeans can be inoculated with soybean bacteria only. No other legume's bacteria will do it.

Buy your seed and soil from us. Get the best and start right.

Soybeans for Hay

However many feeding experts, especially well posted on corn silage use, claim and perhaps wisely so that every farmer should either grow or purchase a plentiful supply of high protein analyzing hay, to feed to ensilage-fed live stock.

Ensilage-fed cattle seem to crave some dry feed and the high protein hay not only helps to satisfy this natural craving but also furnishes one of the cheapest best ways of balancing up the stock ration. Corn silage is very low in protein, so the hay feed to cattle should be very high in protein if possible.

There is no high protein hay crop which comes so near to being a sure one as the soybean hay crop. We have never known any man to have a failure of a soybean hay crop who made any fair attempt to get one, but we have known many men making **absolute failures** at times in trying for clover and alfalfa hay crops.

We would advise that the soybean be allowed to grow until pods are well formed. Then cut them and let them lay in the swathe as long as one dares to wait before leaves begin to shatter.

Then rake up and bunch them in moderate sized cocks and let them stand until cured. If it rains very much during the curing period, turn the bunches upside down occasionally, so that hay exposed to wet ground will have a chance to dry and not get moldy. Don't do any unnecessary worrying about your soybean hay spoiling in wet weather. We believe that soybean hay will endure more wet weather without loss than any other kind of hay. Even if some of it gets badly bleached live stock seem to like it very much anyhow.

Use same amount of seed per acre and same care in growing as one does when growing them for ensilage.

A large share of the soybeans grown on dairy farms in the near future will be cut for ensilage. This saves the whole plant, leaves, stems and grains, and at the time it contains the most nutriment. Since soybean silage is very high in protein and corn silage very low, if the soybean silage be mixed with the silage at the cutting box at the rate of one load of soys to two loads of corn, the silage will have its protein content so largely increased that not nearly so much purchased grain will have to be fed in order to balance up rations properly for highest milk production.

In cutting soybeans for ensilage use a grain binder cutting two 28 inch rows at a time.

When we consider that soybeans are planted after corn is planted, without interfering with that work; that from 20 to 40 (60 lb.) bushels of this rich protein grain can be grown to the acre and that from one to three tons of cured hay and as high as 12 tons of soybean silage can be grown to the acre, we begin to realize some of the wonderful possibilities of this crop.

It has been found by experiment that soybeans are worth about 10% more than middlings as a hog feed. When substituted for oats in a corn and cats grain feed for lambs, they gave very larger gains both in wool and weight of carcass than did those lambs fed corn and oats. The consumption of pounds of feed to each pound of grain was also much less with the lambs fed corn and soys.

We believe that the poultry business is going to prove one of the large bidders for the commercial soybean grain crop. Progressive poultrymen are not afraid to feed new grains if evidence is in their favor. We find that chickens love every kind of ripe soybean, regardless of size or color and the effect of eating such high protein grain soon shows in increased egg production in winter time when eggs are high.

In the countries from which the soybeans were introduced soybeans are grown largely for the oil which is extracted from them. Millions of dollars worth of soybean oil is manufactured in the Oriental countries every year. Manchuria alone ships millions of pounds of the oil cake, remaining after the oil is extracted, to different countries largely as a dairy feed.

As soon as they are grown by farmers on a large enough scale to warrant the erection of mills through which to extract their valuable oil, the business of growing them will receive quite an impetus in this country, because nearly all of the most valuable food elements in the bean will be found in the oil cake left for stock feed.

The Soybean and the Nitrogen Problem

We have spoken in a general way of the soybean crop as furnishing a solution to the problem of finding a cheap source of protein feed for live stock. Now it furnishes just about as well the answer to questions as to where to find cheap nitrogen.

The cheapest and perhaps the best form in which to buy nitrogen in the fertilizer sack, is nitrate of soda. In that form nitrogen is worth 15 to 20 cents per pound. Since phosphoric acid can be bought for 4 to 5 cents per pound

and if some soils need purchased potassium, it can be bought for the same price, it is very important to look after the most expensive element, nitrogen.

The propagation in our soils of the bacteria belonging to the different kinds of legumes is, we believe, the scientific, practical and common sense solution of the problem of cheap nitrogen, and since we believe that the soybean is the easiest to grow of all the legumes, the surest of all to do well if they are taken care of, we consider the growing of soybeans, if we consider their nitrogen gathering habit only, as of very great importance to our soils, especially if they have been robbed of much of their store of nitrogen.

Winter vetch does well under some conditions, so does alfalfa, if conditions, some of them very expensive, are fully met. Clover will do well if we have enough lime, phosphorus and humus, but we believe that the soybean will produce some kind of a crop, if inoculated, on any kind of soil, no matter how poor it is.

Another great advantage it has over the other crops we mentioned is that it is harvested and the land is improved the same year as grown. With the renting farmer this is much more important than with one who owns and farms his land. The renter must make his living the same year he plants the crop. There would be an inducement to grow soys, because there would be returns the same year, but many tenants never sow clover because they think that they will not be there to harvest it.

Rented farms as a rule are not noted as being very successful clover farms.

Other things being equal we believe that the soybean comes the nearest to filling the bill correctly, for a profitable, easy growing, early maturing leguminous crop of any. We have seen them grown successfully on every kind of soil in this section. Can this be said truthfully of clover or alfalfa?

Planted after all the other crops are put out in the spring, ordinarily the early maturing varieties may be harvested and the ground put to wheat in good season, without any more plowing, the summer cultivation of the soys furnishing almost a perfect seed bed for wheat.

The soybean bacteria under good conditions is a tremendous multiplier. One hundred pounds of good soybean-bacteria-inoculated soil will inoculate well an acre of soys if the soil is sifted and run through the three cups in the fertilizer box of the grain drill corresponding to the three feed hoppers used in sowing the grain, as we advise in practically all cases planting soybeans in rows 28 inches apart, using middle and outside hoes of a 9 hoe drill and cultivating the soys once in the row with a one horse cultivator a few times during the growing season. In a favorable season in three to four weeks from time that earliest cultivation is begun they will on good soil be too large for cultivation.

We sell soybean bacteria soil from one of our fields, which is wonderfully well inoculated, for inoculating their crop. This field so far as we have seen in many years has never grown any such foul weeds as white daisies, buck-horn plantain, Canada thistle, quack grass or anything of that order, so you won't run much risk of importing new weed seed from us.

The question is often asked us by practical, level headed farmers, "How much nitrogen will the nitrogen-fixing bacteria on the soybean roots take from the air in one season?"

In a carefully conducted test by Dr. Wheeler, of Rhode Island Experiment Station, lasting 5 years, the following results were obtained by growing inocu-

lated soybeans in certain sizes of plats, the soils of which were analyzed at the beginning and the end of the five years' experiment and the yields by the acre computed from this test.

No. of plot	Pounds of nitrogen per acre in soil and seed at the start	Pounds of nitrogen per acre removed in the five crops taken off	Pounds of nitrogen per acre in soil after five years
1	3698	1313	4908
2	3602	1317	4777
3	3602	1373	4783
4	3673	1355	4810

If the nitrogen gained per acre in soil and crops was valued at the same price per pound as the nitrogen in nitrate of soda or any other good fertilizer the average gain in nitrogen would figure at about \$75.00 per acre per year, so if we cut down the value of this nitrogen gained to only 3 cents per pound we have even then a gain of \$15.00 per acre each year.

In a corn, soybeans, wheat, clover rotation or a corn, soybeans, oats, clover rotation we have two very good soil builders to offset two nitrogen robbing crops. In the common corn, oats, wheat, clover, timothy rotation, we have only one builder to four soil robbing crops.

Now the soybean helps so much to solve the cheap protein feed problem and seems fitted to give such help in furnishing us with free nitrogen to keep up and increase the fertility of our soils that we believe that the progressive dairy farmer if not the progressive live stock farmers of all branches should and will gradually embark in the growing of soys in the regular farm rotation.

Growing a Crop of Soys

Soybeans can be grown on almost any kind of soil in the eastern part of the United States that will grow any kind of cultivated crop, but we want our seed to go to farmers who like to do the best they know how to do when growing a crop.

Now to put the directions in the fewest possible words we would advise you to plant them on the richest field you have preferably one which was in corn last year and then spread on all the fine ground limestone you can afford after the ground is plowed in early spring and then before planting after ground is well fitted, broadcast or put in with a drill several hundred pounds of acid phosphate steamed bone, or basic slag per acre.

Prepare a fine deep seed bed for planting and in drilling soys be sure to drill them, if possible, not over 1 or 1½ inches in depth. We advise that if you can secure good soybean-bacteria-inoculated soil that you drill it in with the soys when you plant them, using the middle and two outside seed hoppers of a 9-hoed drill for the seed and the corresponding hoppers in fertilizer for drilling in the inoculated soil. Do not plant until ground gets well warmed up, from May 15th to July.

Cultivate the soys with a one horse cultivator once in a row just as early as they can be cultivated without covering them. Cultivate once a week or every 10 days.

If soil and other conditions are favorable, they will make such a very rapid vigorous growth that it will not be possible to cultivate more than four times, possibly only three times, on account of tramping the soybean plants with the horses.

Harvest the soys with either an old fashioned reaper, a binder, or mower with either a wind-rowing attachment or else a platform, fastened to back of cutter-bar on which the plants will fall back, when cutting two rows. This platform with a little help does the best work of any machine we know of so far in harvesting. This platform we made of just one full sheet of galvanized iron, costing \$1.35. The platform has a board railing around it to keep soys from falling off until a good big heavy fork full is gathered. Practically all the seed shelled in cutting the soys is caught on this platform and saved.

We thresh our soys with a common separator using one blank concave. If the soys are pulled by hand, there will be quite a lot of dirt stirred up in threshing, but it does not seem to be at all poisonous like the dust from threshing grain, especially oats.

In storing the seed be sure that it does not heat up or the germination will be much injured, perhaps all ruined. If not well dried out at threshing time, they should be spread out and shoveled over until dry, or else stored in sacks, a bushel per sack so they can be moved easily and have plenty of ventilation.

The best time in which to have soybean seed shipped is during cold winter weather. The germ life of soybean seed does not seem to be at all injured by exposure to low temperature.

We have known soybean pods to lay out on the ground all winter long and when spring frosts had buried them in the soil, the seed would sprout and grow very readily. What small loss in germination we have ever had in soybean seed, has been caused by either heating or molding in warm muggy or damp weather.

The most likely place of all for soybean seed to be injured in germination is tightly packed freight cars during a long railroad trip.

Yet in all the years we have shipped soybean seed all over New York State, for instance, **we have never received even one** complaint from customers about germination of our seed.

We don't know how long we can keep up such a clean record but if our customers will order their soybean seed early in the winter it will help us very much to give nearly perfect satisfaction to them.

Soybean Varieties

In the descriptions we give of the varieties of soybean seed that we grow and sell, you may find some statements contrary to what other seedsmen have to say about them. As a general proposition those seedmen who sell soybean seed but do not grow it know but very little of the merits or demerits of the different varieties.

There is such a very remarkable difference in the growth and characteristics of the different varieties of soybeans that the only reliable course for a non-posted farmer to follow who wishes to grow soys for some particular purpose, is to purchase his seed from a reliable farmer seedman, who grows his seed and knows them as he knows his horses and cattle.

His harvest will very likely be satisfactory, very much so, if he has done his own part well, because the seed he gets will be just suited to his needs. But it will be nothing uncommon, if the seed that he buys from some city seedman will turn to be of a variety fitted for some other purpose than the one for which he intended it.

One of the most common of these mistakes made by city seedsmen, jack-of-all-trades on about 2,000 kinds of seeds, is to sell a farmer some southern grown variety of soys as seed for a northern grown seed crop. That mistake nearly always means absolute failure.

The Medium Green or Guelph Soy

The Medium Green or Guelph Soybean is one of the oldest well known soys in the U. S.

It is an old stand-by at the northern state experimental stations as a general purpose grain and forage growing crop. It is a good grain yielder. In the 1911, Wooster Experiment Station raised 33 bushels per acre. We have had it grow in soil, over 3½ feet high. It ripens medium early and if sown about June 20th in our latitude is about right to harvest for ensilage when corn is ready to cut for same purpose. Farther north where much earlier maturing corn, like Pride of The North corn, for example, is used for ensilage, Medium Green soys are mixed with the seed corn and they are planted, cultivated, harvested and put in the silo together.

We have received from some of our old customers wonderful reports of the effects on milk flow of feeding this mixed soybean and corn silage as compared with straight corn silage. We wish to recommend it as a good soybean to plant on very poor soil. We raised 15 bushels to the acre of them on a large field this past backward season, one of those poor, run down fields at which practically every man in the neighborhood has taken his turn at crop robbing. This in spite of a very backward summer and planting delayed until nearly July. Medium to large size green seed.

The Mammoth Yellow Soy

The Mammoth Yellow Soy is a large yellow soybean which is only suitable for planting where we wish to raise a big lot of green foliage 3 to 4½ feet high for use as a green manure, cover crop, hay, ensilage, etc. But it never so far as we know, ripens seed in the northern states. Yet this is the only variety many city seedsmen handle, because it is cheaper and easier to get. Their ignorant customers think soybean growing is a fraud, because their soys do not ripen seed.

A field of Medium Green Soys, flanked by a field of Stone's pedigreed early Calico Corn.

A five-acre field of the famous Stone's Roosevelt soys, just before ripening time. This shows an amateur grower's first crop of soys. A good illustration of how a field of this variety appears when yielding 30 to 35 bushels per acre.

Stone's Roosevelt Soy

This variety of soys we introduced to the seed trade in 1912 as a good all around general purpose grain grower and we have been very pleased to find out how well it lived up to its reputation. We prophesied last spring that some good farmer would grow 40 bushels of Roosevelt soys to the acre in 1912. We have already had yields reported to us of this variety, running from 27 to 35 bushels per acre in spite of one of the coldest, most backward seasons in very many years time.

The Roosevelt has the following good points. It is small seeded and does not take so much to plant an acre. It is full of vitality and starts up vigorously. Its growing very erect on even very rich land, making it easy to harvest. It ripens a little earlier than the famous much advertised Medium Green soy. Under average farm conditions in Northern Ohio it will outyield the Medium Green 5 bushels or more per acre. It shells out but very little unless handled when very ripe, and then not nearly so bad as the Medium Green. It can be threshed fast by a common separator without breaking practically any seed.

The Medium Green will excel it in only one point. That is in yield of forage, hay or ensilage. On account of its many good qualities we believe the Roosevelt Soy, will be as well known in a few years as Poole wheat or Big Four oats. Small yellow seed.

Black Beauty Soy

The Black Beauty soy will be a competitor with the Roosevelt soy, as a good all around vigorous grain-producing soybean. It has small shiny black seeds, whence cometh the name. It is an improved strain of the Ebony. In 1911 it gave us a yield of about 33 bushels per acre in our test plot and ripened earlier than the Ito San, very much earlier than the Medium Green and Roosevelt. In 1912 for a change, the Roosevelt ripened first of all. We can't tell which will ripen first in 1913.

A field of the famous Black Beauty Soys. A fine general purpose Soybean in almost every respect. In 1911 they ripened very early and gave a remarkable heavy grain yield.

But we know that the Black Beauty takes about the least seed per acre of any variety we grow except possibly the Peking, and when it comes to reproduction it has them all beaten rather badly. We found in 1911, one Black Beauty Soy plant which carried 541 pods containing 1170 seeds weighing 6 ozs. and another 495 pods with 970 seeds weighing 4½ ozs. Perhaps it should have been called Abraham, because its descendants will be as the "sands of the sea."

The Black Beauty is a very vigorous grower from the start and has a very valuable habit of its own of spreading its first leaves out over the ground very early, so the rows where the plants grow are shaded so early that but little chance is given weeds or fall grass to start up in the row.

We believe that the Black Beauty will shell the least in harvesting and stand the hardest threshing of any soybean. We threshed our Black Beauty, in 1912, with full set of concaves in separator and even then many pods went through without being threshed and practically no beans were split.

The Peking Soy

The Peking Soy is a small flat black-seeded soy, but the plants grow very, very tall and very straight making them almost ideal for harvesting. They pod up very thick, but on account of the seeds being so very small they can't compare with our Roosevelt, Ohio 7403, or Ohio 7455 as grain producers, but as hay producers we think they are the very nicest variety we have seen to date. Thick planting does not weaken the plants at all, apparently, but it produces fine slender tall plants with a wealth of foliage, practically ideal for forage conditions. To dairymen in our latitude in Ohio who wish to grow soys with their corn for ensilage, plant the Peking. It is late maturing, so it should not be ripe before corn is cut for silos. It should on good land grow tall enough that corn binder would tie it up securely with the corn.

View of Northern Ohio acclimated girls and Northern Ohio acclimated Peking Soys, grown on Lone Elm Farm, Atwater, O.

The Ohio 7455 Soy

Ohio 7455 is a pedigreed strain of Medium Early Brown Soys bred by Prof. Williams of Wooster, O. It is a very high yielding soybean and we like them very well. Of the two pedigreed strains of soys we like the Ohio 7455 the best, but some of the men who helped us handle and thresh the 1912 crop like Ohio

Two good specimen plants of the very valuable pedigreed Soybean, Ohio 7455, one of the best grain yielding Soybeans in America. Bred by Prof. C. G. Williams of Ohio Agricultural Experiment Station.

7403 the best. It is something like trying to decide which of two very good horses is the best all-around horse.

Ohio 7455 is a remarkably heavy yielder and has caused us practically but little loss in seed by splitting in threshing. This is a very valuable point in seed production. Another much more important advantage they have over many soybeans, especially the Medium Green, is that they do not lose their seed even when they stand dead ripe. This may mean, in a crowded season, the saving of a loss of several bushels of seed per acre.

We believe that quite a number of men will firmly believe, by next fall, (if they give this soy a good chance) that they have by far the highest yielding variety of soys of any in this 7455. We know a few strictly first class farmers who, if they would give these high yielding grain soys the same chance they would give their best corn or potato field, would be astonished at the weight of rich grain they would harvest from the field.

On the front page of catalogue you will see Specimen plants of Stone's Roosevelt Soybeans.

Why Do We Advocate the Application of Lime to Our Eastern Ohio Soils?

Very few questions connected with the subject of successful farming in the eastern half of Ohio, in West Virginia, Pennsylvania and New York have aroused as much interest as has the subject of liming our soils.

Prof. Bailey in his great work on Agriculture mentions about a dozen reasons for the use of agricultural lime. We won't give all of the reasons but will try to discuss in a brief way the most important reasons for liming and the ones which most concern us in this section of America.

LIME IMPROVES MECHANICAL CONDITION OF SOILS

If you have a very tough tenacious clay soil and you apply plenty of ground limestone to it you will help very much the physical condition of the soil. It will tend to make it friable and much more easily worked and cared for and give more of the character of a sandy soil. On the contrary if one applies lime to a sandy soil it helps to correct the short comings of such a soil. The lime seems to bind the particles of soil together and tends to give it more of the good qualities of a clay loam soil. It will hold moisture much better and we believe it will not allow the valuable plant foods to be leached out so easily during wet weather. If you have an old garden spot or a truck patch on a clay loam soil you will likely acknowledge that after farming it for a number of years your soil has become hard to keep in nice condition even after yearly applications of manure. Now try a very heavy application of fine ground limestone on your truck patch and garden and note the pleasant results you will get from its use inside of a year or two. We have seen some remarkable changes made in some farmer's gardens by the use of only fifty cents worth of lime. Try it yourself next spring.

LIME IS A PLANT FOOD.

In the case of some plants we find that lime or properly speaking carbonate of lime is a plant food. Take alfalfa for instance. Alfalfa is a great feeder on carbonate of lime. Look up the chemical composition of the alfalfa plant and you will perhaps be surprised to find out what a large proportion of carbonate of lime is contained by it.

For years there has been a warm discussion going on between the users of lime and the agricultural scientists over the subject "Is Lime a Fertilizer?" Several firms who manufactured hydrated lime for agricultural use, put it up in paper bags and marked them Lime Fertilizer. Now farmers as a class have never objected so much to the name given by the manufacturers as they have to the exorbitant price asked for the lime by the salesman.

Lime is a plant food, for just as surely as phosphorus, potassium, and nitrogen are necessary in the structure of plants so are carbonates of calcium and magnesium. Carbonates of calcium and magnesium is the chemist's name for natural limestone or carbonate of lime. It is true of course that the majority of plants do not use but a very small proportion of lime in their growth, but they use it nevertheless, and some of them, especially legumes, use far

more than others. Later on we will speak of lime as being a corrector of soil acidity, which is the principal reason for its use, but lime is of much value as a plant food as well. At the Wooster, O., Agricultural Experiment Station they found that a heavy application of either ground burnt lime or ground limestone corrected the soil acidity so that medium red clover grew very luxuriantly where it was almost a failure before liming. Nevertheless they were not able to get alfalfa to do well there at all until finally they doubled the application of lime to the land intended for alfalfa.

After that the alfalfa grew very well. Do practical farmers really care very much whether the alfalfa did well because the soil was sweeter or did well because alfalfa is a very large feeder on carbonate of lime and found a supply plentiful enough to suit it? As the man who was cured of blindness said to the Pharisees. **"THIS I KNOW. Whereas I was blind, now I see."**

Years ago when we began to use fine ground limestone in heavy application to the soil on our farm, we wrote to Dr. Chas. E. Thorne, Director of Ohio Agricultural Experiment Station, and told him of our plans. He answered our letter personally and in his answer to us stated that where they compared yields of crops at the Station on plots of ground, which were limed for corn, with plots not limed for corn, they found that the application of lime produced an increase of about ten bushels of shelled corn per acre, about the same number of bushels of oats extra per acre, the following year, and two to three more bushels of wheat per acre extra, the year following the oats, than they secured on the unlimed plots, not to speak at all of the increased clover crop, the most important of all. We have had a number of arguments with fertilizer agents on this subject and they have tried to make out that Dr. Thorne meant that these increases in crops came after the big clover crops began to improve the limed strips. But that is not the idea which Dr. Thorne had in mind when he wrote to us. This winter we heard that the experiment station tests on lime now show a gain of about eleven bushels shelled corn per acre. Now we don't care, whether the college scientists call lime fertilizer, plant food, filler, ballast or anything else, so long as we can get such an increase from its use. If you estimate the value of the increased crops from the use of lime on the Wooster Experiment Station farm at the present farm prices, you will see that the increase would pay for an enormous application of fine ground limestone per acre.

LIME CORRECTS SOIL ACIDITY.

A great many farmers are trying to do so much physical work on their farms every day in the year that when night comes on, they are too tired out to do any mental work, much less to reason out the whys and wherefores of farm chemistry, which is a subject that requires some study in order to fully understand it.

It would likely surprise a large share of American farmers if one told them that all the vegetable matter which they incorporate in their fields tends to produce an acid condition of the soil, yet such is the case. It is true also that, when one uses heavy applications of some commercial fertilizers such as so called acid phosphate for instance he adds a small, very small amount of free sulphuric acid per acre, which may not have been entirely used up in the manufacture or combining of fine ground phosphate rock and commercial sulphuric acid. Acid phosphate, however, is not, strictly speaking, what

chemists call an acid, but is a salt; that is a combination of an acid and a basic element. One ton of commercial sulphuric acid is mixed with one ton of ground phosphate rock they work chemically on each other for quite a long time. The substance then formed is no longer sulphuric acid and phosphate rock, but a combination of two salts. The sulphuric acid breaks down the phosphate rock, eating into it and forming sulphate of lime and another form of phosphorus salt which is readily available as a plant food. Now if there is a little surplus sulphuric acid left free or unused in the combination the acid phosphate will be a little acid. But, brother farmers, don't fly off on a tangent and claim that the use of acid phosphate has made your soil acid. It might have helped a little, but the principal source of acidity is the natural addition of vegetable acids, formed by plowing under vegetable matter.

The better farmer you are the more vegetable matter you will try to get into your soil so as to increase its supply of humus. We want now and must have all the humus we can get into our fields. This means that we are manufacturing acids in our soils now and have been doing it for many years.

Nature has provided a way to correct this acidity. She furnished the remedy by giving nearly every soil a plentiful supply of finely pulverized limestone. As fast as the acids are formed in the soil, they are neutralized by the carbonate of lime or limestone in the soil. But nature did not treat all soils alike in furnishing them supplies of limestone. Some soils were only given a small supply which was soon used up in farming the land, while other soils were furnished an almost exhaustless supply of limestone. The soils in Eastern Ohio received only moderate supplies compared with the soils of Western Ohio. The farmers of this end of Ohio have been using up their supply of limestone for from 50 to 100 years, without putting but little if any back on the land. Do you know that the better you farm, the faster you use up your lime supply? Don't be alarmed about that, because the game is worth far more in this case, at least, than the ammunition.

Down at Wooster Station, a good many years ago, they analyzed the soil in one big experimental field to find as nearly as possible how much limestone per acre, the soil contained. Since that time they have been farming those fields in the most practical up-to-date way that they know how to do. They first applied to the land, years ago, two tons of fine ground limestone per acre. They also give the fields in each 4 years rotation liberal application of fertilizer and moderate supplies of farm manure and one ton fine ground limestone per acre. From these specially-handled fields they are growing tremendous big crops and the yields are gradually increasing. This heavy cropping of the soil, is giving highly profitable results above the cost of all lime and fertilizer applied to them. Although the bills for fertilizer and lime are large, the profits are very much larger.

Recent analysis of the soil of these Experiment Station fields have shown that the heavy cropping and consequent rapid formation of soil acids are using up over two thousand pounds of ground limestone per acre, every four years!

Furthermore, a leading authority there says that if limestone dust should be the limiting factor in crop production on these fields, the additional profits from its use would be so great, that if necessary they will apply **MORE THAN THE ONE TON PER ACRE**, every four years. We think they will

eventually apply from one and one-half to two tons ground limestone per acre in the same length of time.

LIME PROMOTES THE DEVELOPMENT OF SOIL BACTERIA.

Our farm soils if they are kept well supplied with humus and carbonate of lime are full of soil bacteria, of different kinds. These bacteria do the great work of preparing the food for different plants. They break up the different chemical compounds in the soil and get them into forms so our plant roots can utilize them. Carbonate of lime and humus are the great agents for promoting soil bacterial growth so we should not only apply a plentiful supply of fine ground limestone, but also add lots of humus making material to our fields in the form of live-stock manures, and cover crops and other vegetable matter, all thoroughly worked into soil..

Under the head of Soil Bacteria Inoculation we have shown how absolutely necessary it is to successful farming, generally speaking, to raise legume crops on our soils, especially if they have been depleted by poor farming. It is an absolute fact that the most of legume bacteria will not do well at all on acid soils. It almost seems unbelievable that so few farmers, comparatively, in Eastern Ohio seem to recognize the fact and act on it.

The condition of your medium red clover crop is almost always a sure indication of your limestone needs. The legume bacteria of medium red clover are present in our soils. If the soil is not acid and humus is in fair supply, the bacteria will multiply fast on the clover roots and your clover will thrive. If your soil has a fair supply of humus and the red clover does not do well, then get busy, buy a carload of our fine ground limestone of best analysis and get into the game.

Leading farmers all over the country are now taking up the business of liming their land, mainly to get the profits from raising big crops of legumes.

Every year adds a big army of recruits to this enterprise. One can almost judge the zeal and enterprise of the farmers of any section of Eastern Ohio by their lime purchases. We now sell a carload of ground limestone, more easily than we used to sell a ton.

While it is perhaps true that Atwater, O., has become almost as well known for her soybeans as is Boston for her baked beans, we take more pride, as citizens, in the record she is making in the use of lime. We believe more agricultural limestone is unloaded here than at any other R. R. station in Portage County and are glad of the part we have taken in introducing it and encouraging such a large consumption.

We started in to use Kelley Island fine ground limestone because that was the best kind of lime we could buy and as time goes on, we feel more sure of that point. The manufacturers now claim an analysis of about 98% carbonates of lime for their ground limestone.

When we first began to use and to sell ground limestone, some old farmers tried to make us believe that it would not act for years and many said that we were absolutely throwing time, work and money away. Yet an intelligent man would hesitate to make disparaging remarks now about agricultural ground limestone before our best farmers here because he would in so doing, make himself a mark for ridicule.

Some of our customers have tried various ways of testing it out on their fields. Whenever they left unlimed strips the difference in clover growth be-

tween the limed and unlimed strips was oftentimes, the difference between success and absolute failure. A few made the mistake of using a very light application of only a few hundred pounds per acre. While some of our customers use only one-half ton ground limestone per acre each rotation, the most of them are now using one ton per acre and the most farsighted ones are using two tons per acre. In tests which we have made on our own farm, we found that (for the first application at least) we secured as much profit from using the second ton of ground limestone per acre as we did from the first ton per acre. One of our customers, who uses ground limestone, two tons per acre each rotation harvested the past season from ten acres of meadow, forty big loads of hay.

Field of mixed clover hay on Lone Elm Farm, two years following a crop of Medium Green Soybeans.

We are illustrating in our catalogue two views taken in our new 1913 meadow. This field previous to liming had never produced but few big crops. The first year we limed it we grew a big crop of corn, the following year the big crop of Medium Green soybeans, illustrated here in catalogue. The following spring, a very wet one, we disked up the soybean stubble, and well along in May we sowed a bushel and one peck of Big Four oats per acre, seeding at the same time a mixture of medium red clover, alsike clover, timothy and alfalfa. The lime and soybean treatment produced a 50 bushel crop of oats per acre and a beautiful grass catch.

We were sorry that we had no farm scales at the time on which to weigh the hay which we hauled from that meadow. The reader may get some idea of the crop when we say that it took only sixteen to eighteen of those cocks of hay shown in one illustration to make a load of hay like the one shown on the other. Our hay rigging is eight feet wide by sixteen long. While we have never inoculated our soil for alfalfa yet we found nodules on practically all of the alfalfa roots which we examined in this field: The alfalfa grew just as thrifty or more so in this field that ever alsike clover grew there, before we limed it.

All the fields of soybeans illustrated in catalogue are fields which were limed with our Kelley Island ground limestone. Ground limestone has been one of the very best investments we have ever made on the farm. Our only regret is that we did not take up its use many years before we did begin to use it.

It only required from sixteen to eighteen cocks of hay to make such a load as the above one.

We have already seen enough of the wonderful benefits to Ohio soils and big profit from its use, that we know that eventually the demand for it is going to become enormous. Every county in Eastern Ohio ought to be using at least one or two thousand carloads of fine ground limestone each year in order to give the farms the lime they ought to have.

Each year in spite of increased capacity the mammoth agricultural limestone grinding plants are crowded with orders away beyond their shipping capacity during the rush of spring and fall trade. We have worked very hard to build up a large demand for our lime company's goods and they have given us loyal co-operation especially in the rush seasons. Now we wish our customers would do all they can in the future to help facilitate business and avoid expense, delays and trouble by buying their limestone during the time the works are least crowded with orders, either in the winter or in June or July.

Then we can give you the very best service and also the lowest price. Buy a carload now before the price goes higher.

FORMS OF AGRICULTURAL LIME.

Agricultural lime may be applied in the form of either ground quick lime, ground hydrated lime, ground limestone, air slaked lime, or limestone screenings.

There is the same amount of lime in 100 lbs. of ground limestone as there is in 74 lbs of hydrated lime, 56 lbs of quick lime or 100 lbs of air slaked lime. Consequently if you can buy fine ground limestone for \$2.25 per ton, delivered at your R. R. station, then hydrated lime would be worth comparatively about \$3.00 per ton and ground quick lime, would be worth about \$4.00 per ton. We can't advise at all the use of ground quick lime, because it is caustic and has a tendency to burn up the humus in the soil. We are trying too hard now to encourage farmers to grow crops to add humus to soil to stop to advise the same men to use a form of lime which would destroy the humes they are making. If a farmer has a very long wagon haul in order to get his lime hauled home, it perhaps would pay him to buy hydrated lime, but the cost of ground hydrated lime is seldom less than \$4.50 or \$5.00 per ton F. O. B. cars at the kilns, besides a high freight rate.

Perhaps there are times when a very fine quality of limestone screenings can be purchased at such a very low price delivered at one's railroad station that it will pay to use it, but a farmer's time and work are worth much more money now than used to be worth and the increased crops are worth much more also. If one were willing to go to the expense of applying five or six tons of fine limestone screenings per acre, the finer particles of dust would give him immediate results in correcting acidity and the remainder would eventually dissolve and do good work. The one point that we wish to bring out is that we ought to make our Ohio soils sweet NOW, not in 1915 or 1920.

If you intend to take up the business of liming your farm, we wish you to open up a correspondence at once with us on the subject. We have built up a large business on the modern intelligent plan of **large cash sales at a small margin of profit.** We know we can furnish what you want; the best material; the best service; a low price.

Bacterial Inoculation of Legumes

A plant on whose roots a certain kind of bacteria will thrive, which kind of bacteria has the function of drawing nitrogen from the air and storing it up on its roots in the form of nitrates is commonly called a legume. There are about thirty well known legumes, besides perhaps hundreds of other kinds of legumes not so well known. The best known legumes are alfalfa, sweet clover, medium red clover, mammoth red clover, alsike clover, crimson clover, white clover, soybeans, cowpeas, Canada field peas, winter vetch, spring vetch, etc.

Now with the exception of sweet clover and alfalfa which have same bacteria to inoculate their roots, each kind of legume takes its own kind of bacteria to inoculate its roots and no other kind will do it. Always bear that in mind. That you can't inoculate your soybean roots with cowpea bacteria nor your winter vetch roots with red clover bacteria. The bacteria are different just as the plants themselves show a difference..

We have so many questions asked us in our seed correspondence about the life, habits, and other matters connected with the bacteria which sometimes make their home on the roots of legume plants that we will use some space here to explain some things in connection with the subject.

Very few soils contain the bacteria necessary for the inoculation of many legumes, that wonderful family of plants which are nature's great assistants in building up impoverished soils or improving good ones. Generally speaking most of our cultivated land in this part of the United States is inoculated with the bacteria which thrive on the different common clover plants, but that is about all possibly with the exception of garden peas and beans.

A legume crop is, generally speaking, one which contains an unusually large proportion of nitrogen in its composition compared with most of the other common crops. If the soils on which the seed is sown contains a very abundant supply of nitrogen available for plant food, the legume will be apt to thrive even if it should not be inoculated, but the growth of the crop will all be at the expense of the soil. If the soil is very deficient in nitrogen a legume crop will either be small or weakly or both.

Take the soybean crop for instance. It has been proven that not only will an inoculated soybean crop be larger than an uninoculated one, other conditions being the same, but the inoculated plants will also analyze considerably higher in protein than the uninoculated ones.

Nitrogen is the most expensive element of fertility that we have to purchase in the fertilizer sack, so it behooves us to study up the legumes and the subject of inoculation so as to cut the nitrogen bill from our fertilizer bill and at the same time build up our farms. When you inoculate your legume crop you not only increase the value of your crop but help your soil even more so. At the present prices of nitrogen in the form of nitrate of soda a three-ton crop of inoculated sweet clover hay would represent a gain of over \$19.00 drawn from the air without charges. A three-ton crop of inoculated soybean hay would represent a gain of over \$17.00, conservatively speaking; a like weight of inoculated medium red clover hay, \$14.00 net gain, a three ton crop of inoculated mammoth clover hay \$12.00 and a three-ton crop of inoculated cowpea hay, about \$10.00 gain. Winter Vetch hay in-

oculated would rank as high comparatively as sweet clover hay ton for ton as a nitrogen gatherer. It certainly seems to us that no man of intelligence who once thoroughly understands these principles will fail to take advantage of them and get just all the gain he can get from the use of legumes in the rotation.

We are now working on what we think will be an improvement in our corn-soybeans-wheat-clover rotation and certainly hope that it will open up another grand opportunity to all of us to further improve our land at a little expense. In times past we have sown rye in our corn fields in order to use up what nitrates might become available during warm fall days in the cornfields and be lost, to protect the soil from erosion during winter and early spring, and to add a lot of humus to the soil when the crop was turned under.

Now we have started to grow winter vetch along with the rye and as soon as we get it, the vetch, inoculated on our soils, we will then have three legume crops growing in our four-year rotation, not to speak of the possibly immense addition to the soil's supply of humus, through plowing down a big crop of rich vetch mixed with rye as green manure. It sounds perhaps visionary to some men, who live in a Chinese-exclusion style of a farming district, but many men are doing such things nowadays and accomplishing modern wonders in a go-ahead-and-do-it gait. We can grow the clover; so can you. We can grow the soybeans; so can you. The winter vetch is growing in our corn stubble and we don't know why it won't grow in yours also if you do your part.

If our customers have the fields ready for the legumes, we can furnish them the ground limestone with which to make them sweet and the first class seed of different legumes for planting. Now the last and one of the important points is to get the legume roots inoculated. If you simply wish to grow clover in this part of the United States, you will hardly ever have to inoculate for the common clovers, because most of our soils have already been inoculated, by nature for many years. In many sections where sweet clover has grown for years the soils in the neighborhood is not only inoculated for that crop, but for alfalfa as well. But the northern part of the United States is not the native home for soy beans, cowpeas, and many other legumes, so if we wish them to do their best for us we MUST inoculate them.

The soil transfer method is the surest way to inoculate a legume crop. This means to take soil from a field well inoculated with bacteria of a certain kind of legume and sow this soil on some other field where one wishes to grow this legume. If the inoculated soil is protected from bright sunlight and is not allowed to become too dry before using it is practically sure to give results. We believe that some kinds of legume bacteria are perhaps not so hardy as others and will not stand so much bad handling in the soil transfer method.

When sowing inoculated soil of soybean bacteria on a field we aim to choose a cloudy day for the work and follow the work right up with a harrow if we are sowing the soil broadcast. But we have secured good results in inoculation even on a bright sunshiny day. We sell our soybean bacteria inoculated soil from a field, which has grown well inoculated soybeans for a number of years.

This field we treat every year with very liberal application of stable manure and very heavy application of fine ground limestone so as to develop as much as possible a teeming swarm of soybean bacteria all through the soil.

We have found some wonderfully large nodules in soybean roots in that field. Nodules the size of lima beans are very common. Some soybean plant roots we have found almost literally covered with nodules from end to end; nodules varying in size from pin heads to beans. After we once got them started all we have to do is to keep the land sweet and they will thrive.

We feel so confident of the vitality of the bacteria in our soybean-inoculated soil that we agree to duplicate inoculated soil order of any one of our former customers free of any charge here except railroad freight bill, if he submits satisfactory evidence that he did not secure inoculation from the use of our soil. We willingly give this warranty, knowing very well that our soil is so chuck-full of soybean bacteria that it is sure to give results if handled correctly. We have confidence in our customers, because as a class they are farmers who try their best to do things right.

Now we sell quite a number of kinds of legume seeds and we want all of our customers to get the best of use from planting these highest class seeds.

We can't furnish this year inoculated soil for cowpeas, Canada field peas, winter vetch, etc., but we have made arrangements with one of the most reliable firms in the United States to furnish our customers that wish it, liquid culture bacteria of any one of the legumes.

This liquid culture is carefully prepared and handled by the highest class experts in that line. Each kind of legume bacteria is propagated and multiplied in a liquid specially prepared for best results. Apply this liquid to the seed before planting, according to printed instructions supplied.

Enough liquid culture is furnished for \$2.00 to inoculate seed used in planting one acre of the crop specified. This method of liquid culture will be of quite a large saving to men living at a very long distance from us, who cannot stand the expense of freight bill on inoculated soil to go 1,000 miles or more. A number of firms now propagate this liquid culture but we intend to give our business to the men who seem best fitted to turn out the most satisfactory culture for our customers.

Medium Red Clover (*Trifolium Pratense*.)

Red clover is the greatest of all hay crops which we can grow perhaps generally speaking in the Northern States, although it will not thrive on water soaked or acid soils. When cut soon after blooming a second good crop can be cut the same year either for hay or seed. One of the best crops we have ever seen grown of the best of legumes for all conditions was grown by one of our next door neighbors several years ago. From an eight acre field, he harvested thirty-two loads of first crop clover hay and from the big second crop, which looked, before heads ripened, like eight acres of solid red clover blossoms, he threshed twenty-four bushels and ten pounds of cleaned seed which he sold right on his own premises at \$10.00 per bushel.

He secured this crop right after liming this field for the previous wheat crop. An adjoining field, not limed, had in the previous season, yielded only nine loads of inferior hay from eight acres.

We felt sure that few things could please Dr. Thorne of Ohio Experiment Station any more than to know that the great majority of farmers of Ohio were making a first class success of raising clover on their farms, right along every

year. A plentiful application of ground limestone, one to two tons per acre will in the great majority of cases, cause **clover to grow rank as weeds**. We intend to furnish to our customers the very best cleanest, highest-germinating seed we can buy wholesale in Ohio if we don't make but ten cents per bushel on it. We wish that we could buy it absolutely pure, but it can't be done without hand picking. Sow 8 to 15 pounds of seed per acre in the spring.

The seed may be sown by several methods and under different conditions. We think by far the best results may be secured by seeding it with a thin stand of early maturing oats like our well known Sixty-day oats. The oats crop is harvested before it harms the young clover too much by robbing it of its moisture supply. The old method of sowing clover seed was to sow in on a quiet morning in February or March, just while the ground was honey-combed with frost. Many experts now advocate sowing clover seed with a special grass seed disk drill after the ground is fairly well settled, so that driving over the wheat field with machine will not cut up the field.

Mammoth Red or Sapling Clover

This variety of clover is somewhat similar to medium red clover and seed looks almost like the seed of medium red clover. It is later maturing than is the medium red clover. It is often sown with other later maturing grasses like timothy. The quality of mammoth clover is not so good as that of medium clover, but it has a great many friends. The first crop of mammoth clover hay is apt to be very noticeably larger than first crop of medium clover.

Sow the same amount of seed per acre as one sows of medium clover. Seeds of most all the clovers weigh sixty pounds per bushel.

Alsike Clover (*Trifolium Hybridum*)

This valuable variety of clover has a very small dark green seed and requires only about half as much seed per acre as the red clovers require to secure good stand. It is more hardy than the other varieties of clover and will do well on soils too wet or too acid for production of red clover. It does not grow so tall as does red clover, but makes a very solid crop of forage of fine quality. A very large proportion of farmers are now making a mixture of timothy, medium clover and alsike clover. This makes a very heavy crop of high quality. Many progressive farmers are sowing with this mixture enough alfalfa seed to give about one quart of alfalfa seed per acre.

If the alfalfa thrives it will improve the quality of hay considerably, will help to inoculate the soil for alfalfa in case one should ever intend in the future to grow it there and will also add to the good chances of following corn crop. We have found out however, since liming our fields that the alsike clover grows so very thrifty that it crowds too much of the red clover out. A quart of alsike clover seed per acre mixed with the other grass seed will add a considerable amount of hay per acre in the new crop. Alsike clover will often live over and help to make additions to hay crop on the following years, while the medium red clover does not benefit us but little the second year.

Alfalfa

Perhaps no crop has ever been "boomed" in America as alfalfa has been. There has been so many good things said about alfalfa in the past that it is not necessary to say much about it to well read people. However our catalogue travels all over the world among many nations and to some of them alfalfa is not a familiar crop.

For those who can grow alfalfa successfully, perhaps it is the greatest of all crops grown for stock feeding, but many farmers who grow it under conditions unfavorable to the plant, do not raise what we would call successful crops of alfalfa considering what would be the value of the other crops which would be fitted for those soils. Alfalfa does its best work in a good rich soil, which possesses first class natural underdrainage. Alfalfa will do well in clay loam soils which are thoroughly tile-drained, but the alfalfa will be always the best over or close to the tile drains. It is absolutely necessary that soil for alfalfa growing have a very liberal supply of fine ground limestone in its composition. Generally speaking the average field in eastern Ohio should receive an application of at least three or four tons of fine ground limestone per acre, and be thoroughly underdrained before attempting to grow this crop for real profit.

A good application of phosphated stable manures should be plowed under in the spring and ground thoroughly prepared for seeding. Seeding may then be made with early oats or barley as a nurse crop, but we think the best stands are secured by deferring the seeding until some time in July right after a rain mellows and dampens the soil. Keep the field thoroughly harrowed from plowing until planting time, in order to hold the moisture, prepare a fine firm seed bed and germinate and kill out the weed and grass growth, whose presence would almost mean death to a successful alfalfa crop.

It is sometimes well to clip the first season's growth in the fall and allow it to lay as a mulch on the alfalfa. The following year one should watch the alfalfa and cut it for hay, each time as soon as little shoots begin to start up from the crowns to indicate that the new growth was starting.

Do not allow it to dry out before cocking it up to cure, because it is very apt to loose its fine leaves, if allowed to cure in the swath and will lose much if cured in the windrow. For peace of mind we advise all alfalfa and clover hay producers in sections where rains are prevalent in harvest season to supply themselves with muslin 40 by 40 inch hay caps. Then let it rain, if it is so inclined; one's religion is not apt to be tried so much.

It is a very good paying plan to give alfalfa fields a yearly broadcast application of about 500 pounds of either acid phosphate or basic slag and a ton of fine ground limestone per acre and a good top dressing of manure. With good treatment like this, alfalfa will produce three or four good crops per year for from four to fifteen years. The best purest alfalfa seed is the cheapest in the long run. Use from 15 to 25 pounds of seed per acre lightly harrowed in at planting time. Be sure to inoculate with either alfalfa inoculation soil or liquid culture bacteria.

Winter, Sand or Hairy Vetch

This is one of the most wonderful of legumes and is destined to occupy a most important place in the future development of first class agricultural methods. A great majority of the legumes are planted in the spring, but this one is planted in the late summer or in the fall, although in a few cases it is planted and cultivated with some other crop like soybeans for instance in the spring, and then after the faster growing crop is harvested in the fall, the vetch is said to hasten up its growth and make a good stand in preparation for winter.

We are more interested in winter vetch however as a cover crop than perhaps in any other respect. One of the most neglected points in good farming is the subject of cover crops for our bare corn stubble fields over winter. It has been proven that when the temperature of the soil rises over 70 degrees Fahrenheit or perhaps less that much bacterial action is going on in our soils.

It is through the growth and multiplication of the uncounted millions of tiny bacteria in our soil, that the coarser vegetable matter and mineral combinations in our soils are dissolved and converted into forms, more easily absorbed by plants as food. Now if this action goes on when no growing plants are there, much plant food will be made available and then perhaps washed away.

How much better to sow inoculated winter vetch seed, with perhaps some rye or other cover crop seed added, in the corn field in the early fall at the last cultivation of the corn, and have the valuable crop take up a large share of the high priced nitrogen needed for its food from the air. Then the next spring, instead of having nothing but the bare corn stubble fields, robbed of lots of fertility by the washing of late fall and winter rains, to plow down, one would have a great big supply of rich nitrogenous vegetable matter to plow under for the enrichment of the land in humus and fertility.

Winter vetch does not grow straight up in the air like most farm crops but is of a reclining nature and sprawls out over the ground; the ends of the vining-like branches reach upward. We recommend growing it with rye especially when it is desired to harvest it for grain, because it is hard to harvest it for seed by itself as it would waste too much. Inventive Americans have devised various good plans of separating winter vetch seed from the rye seed.

Winter vetch hay is about the very richest of all protein hay, analyzing about 17.5% protein. We would advise a seed mixture of from three-quarters to one bushel rye per acre and from one-half to one bushel of winter vetch seed per acre. We have tried to get the highest-germinating purest seed we can buy in America. Winter vetch and spring vetch seed look very much alike and cheaper grades of seed are generally cheaper because they contain a greater or less proportion of spring vetch seed, not nearly so valuable a plant as the winter vetch.

Canada Field Peas

Land is becoming so much more valuable in some dairy sections of Ohio, Pennsylvania and New York, that the owners of such land feel that in most cases they can raise much more high grade milk producing feed from growing cultivated crops on it than from allowing it to remain in pasture. To follow out a system of growing green crops for forage all the whole growing season is called the soiling system. Canada field peas occupy a very leading position for that purpose, since they are the first crop in the spring to be planted.

To secure the best results with this early legume crop we advise that one bushel or more of Canada field peas be first sown broadcast per acre on well prepared ground, drilling them in three inches deep if possible. Then if one dares to risk waiting several days, wait that long and sow one or more bushels of large growing oats per acre, drilling in the oats shallow. The plan in mind is to give the field peas a chance for a good start.

The oats and peas sown together give a much larger crop of green feed or hay than either sown separately. Canada field peas are legumes and to secure the best results from them, both for crop and for soil enrichment, we advise our customers to order liquid culture inoculation material from us if they are unable to secure inoculated soil. Many dairy farmers make a practice of making ensilage of what is left of the field of Canada peas and oats after feeding them green up to nearly time for maturity. They, like most legumes, are wonderful milk producing foods, due we suppose to large protein content. Progressive dairymen should grow much more of them in the future..

Cowpeas

About 15 years ago this legume was but little known outside of three or four Southern States. Now its fame like the soybean's has traveled all over America. Cowpeas are good feed for any kind of live stock and some varieties are very highly esteemed as food for best American citizens. There are a great many known varieties, at least 100 kinds, but some varieties are so much more superior to the average run, that we aim to handle only a few of the best.

We advise the growth of cowpeas more for southern Ohio, Indiana, Pennsylvania, etc., and on farther south. In northern latitudes soybeans are much more satisfactory and make better crops.

If it is desired to grow a catch crop for soil improvement in between other crops, the cowpea comes in there as a winner. In many places it will be a much more satisfactory crop than the soybean if the seed is broadcasted, because cowpeas cover and shade the ground more quickly than soybeans and hold back the weed growth. They will stand drouth very well when most other crops fail and are wonderful soil improvers, especially in a warm climate as they seem to require a warmer climate than the soybean. Most of all cowpea seed sold is raised in the south. It is not nearly so easily harvested for seed nor so easily threshed as the soybean. That with smaller seed yields for acre keeps the price up. But for green soiling crop, for hay and for soil improve-

ment, they occupy now a very prominent position among the leading legume crops.

They are either planted in rows and cultivated or else sown broadcast, using just about the same amount of seed per acre as one would use of Mammoth Yellow soybeans, seeds of which are about the same size. If grown for hay we advise that equal amounts of soybean seed be mixed and grown with them. The cowpeas are more of a trailing vine nature and the soybeans help to hold them up. A tremendous crop of high protein analyzing feed can be grown by this method. Be sure to get inoculating material for the seed.

THE UNKNOWN OR WONDERFUL COWPEA.

This is the leader of all the cowpeas, perhaps, when one wishes to grow the heaviest forage yielding of any of them. This variety is not a very prolific seed bearer but as a forage variety it is certainly well named when called the Wonderful.

THE BLACK COWPEA

The black cowpea is a very prolific seed bearer and also is a heavy forage producer. Very few varieties can excel it, either as a soil improver or for producing maximum amount of hay.

THE WHIPPOORWILL COWPEA

This variety is one of the best known varieties of cowpeas and is an upright grower and much earlier in maturing than the Black or Unknown varieties. Recommended for easy harvesting.

Timothy (Phleum Pratense)

This is the great variety of grass, so popular in north-eastern United States, as a producer of high priced market hay, specially favored by horse feeders. While this variety of grass is not a legume, yet it fits in well in the ordinary farm rotation and the seed costs so little that it pays well to sow it if only for one crop. Under very favorable conditions it will cut two crops per year. There is so much profit in growing it for hay in the eastern states, that it will give good returns on investment if heavy application of fertilizers, rich in available nitrogen are applied after each crop is harvested. It is a very hardy, tall grass, which can be sown either in the fall or in the spring. The seed is very fine. Sow only a few quarts of seed per acre on rich limed land. For poorer soils use more seed. Sometimes we have wished for the good of Ohio soils that no one had ever discovered any timothy seed. Some farmers will mow a timothy meadow and sell the hay as long as they can get one-half ton hay per acre that some one may buy. We could never after have any respect at all for a "land skinner" and very often these robbers don't do it because their financial conditions compel them to, but because they will not be fair to the land which God has allowed them to manage for a little while.

Later on some other Americans will get the farms and have to put in years of work, building up soils, which the former owners have robbed so shamefully. Timothy is all right in its place but feed your land heavily when you grow it.

Dwarf Essex Rape

This is one of the most valuable of all crops intended for soiling or for pasture and yet in spite of its great value in that respect it is comparatively speaking, used by but few farmers. Rape is not a legume, but its good points help to make up for that lack. It has been esteemed very highly in England for perhaps a hundred years or more as a pasture crop for sheep. It belongs to the cabbage family and sheep, especially, are very fond of rape. A whole field is planted to Dwarf Essex Rape. One side is fenced off by means of hurdle fences and sheep are turned on the rape which is eaten down one section of the field at a time. By the time all the field has been gone over the first sections used will be growing up rank again. A field of rape is an inspiring sight to a stockman who knows its great value as a sheep and hog pasture. Everyone interested in the successful and economical production of pork should secure a copy of Bulletin No. 242, Forage Crops for Swine, issued by Ohio Agricultural Experiment Station at Wooster and study the remarkable gains made by swine on rape pasture, compared with more ordinary feeding.

There is a chance now to make a lot of honest money, growing hogs on our eastern farms, more so perhaps than with any other class of fat stock. Hogs do best on large leafy succulent crops containing but a small proportion of indigestible stalks and stems, eating of course a fair amount of corn at the same time.

Dwarf Essex Rape is very easily grown. Ground should be prepared for it early in the spring and the seed sown in rows about 28 or 30 inches apart. The seed is very fine and can be sown through the grass seed box of a combination grain and grass seed drill; by turning the tube spouts down into hoes of grain drill. Or perhaps a better way would be to mix 3 to 4 pounds of Dwarf Essex Rape very thoroughly in the fertilizer which you intend to use on each acre of your rape field, so when you sow fertilizer with grain drill you will sow rape seed at the same time, through every fourth hoe of drill. Then cultivate the crop once in a row a few times with a one-horse cultivator. Under favorable conditions you will have a very fine crop, three or four feet high, a crop which will make your hogs fairly grunt with pleasure. One of the best things in connection with this profitable way of growing hogs is the fact that all of the very valuable excrement from them is deposited fairly evenly over the whole field which they are harvesting for you without labor. Perhaps it may sound the other way to some farmers, but we think that an intelligent business farmer should use every honest way he can to lighten his work and increase his net income. At present prices it takes about six fair-sized hogs only to bring in about \$100 in cash. Why not go after a few of those \$100 bank notes in 1914, by growing a good rape field and turning a bunch of good shoats on it after it is well started.

We handle one grade only of Dwarf Essex Rape Seed and that is the very best, highest-germinating, purest seed we can buy in America. We advise you to order your supply now and order plenty of seed, because if you have sheep or lambs on the farm, we want you to sow Dwarf Essex Rape in your corn field next fall, along with some winter rye, and winter vetch seed before the last cultivation of corn. Then after your cornfield is cut and corn is husked,

what a happy delightful, prosperous time your sheep and lambs will have trying to eat up all the rape. With good luck you will have from one to three feet of growth all over the field, and that growth will hold there until finally hard winter weather in January will cause it to die down. We call this good farming. Your sheep will agree with us if you try them on Dwarf Essex Rape. If seed is sown broadcast, use twice as much seed per acre as when sowing in 28 inch rows to be cultivated.

Oats

It is surprising what a large proportion of farmers are raising all kinds of old mixtures of lots, instead of growing some one of the very high-producing newer varieties. The new and improved varieties which we are offering for sale to our customers are the best varieties of which we have definite knowledge. All of the seed oats we are offering for sale are grown by the very best class of intelligent progressive farmers right in close proximity to us here, except of course what we grow ourselves on the home farm.

We clean these oats over a good fanning and grading mill in order to screen and blow out the weed seed, light oats, chaff, straw, sticks, etc., found in oats after being threshed. Our soils in this county are not adapted to growing as heavy weight oats as can be grown in farming sections farther to the north. That should not be of much concern however to customer, because almost any variety of oats if moved to more northern latitudes will grow heavier in weight of measured grain and if moved to the south, grain will naturally be a lighter weight crop. Oats do their very best in a cool climate. Our seed oats are not grown on great large farms but on small farms where the owners can give to their crops more personal attention. Sow your oats early and plant them from one to two inches deep.

SIXTY DAY OATS

This variety of oats is now in great demand all over the rich farming section of the eastern states. It has two or three very good points in its favor which put it in a class away in advance of almost all other varieties.

It is the earliest of all good varieties of oats. It is one of the very heaviest yielding of all varieties of oats, tested by Ohio Agricultural Experiment Stations and they have tried out perhaps 200 varieties of oats. It has about the shortest straw of any of the good varieties. This is very important to the farmer who possesses a good rich soil, because on such a soil, large growing varieties of oats are almost sure to cause trouble in harvesting it if summer storms are at all common. How much hard work and worse language has been caused in the past by the sowing of large-strawed varieties of oats we may never find out, but Sixty-day Oats are a great boon to the very best farmers all through the corn belt. They can get the big yield of oats without having a mess of five or six foot tangled down straw to handle. Sixty-Day oats are in greatest demand however as a nurse crop for either alfalfa or clover. They are a very small-berried oats and stool out well on good soil so that,

when used as a nurse crop with grass, one and one-quarter bushel of seed per acre is a great plenty. They are yellow in color and are a branching variety.

SIBERIAN OATS

Siberian Oats have an eight years' average of 70.95 bus. per acre at Wooster Exp. Sta., per year, which puts them up at the top notch. These oats are tremendous yielders, our seed coming from stock raised in a crop, standing as high as a man's head and yielding 86 bushels per acre, thresher's measure. We have thoroughly re-cleaned our oats and they look very attractive. Our stock is bound to go quickly, so order early. Siberian oats are white and yellow in color, have fairly stiff straw of good height, and ripen at about the average date that most other varieties ripen. Seed is large sized and we advise $2\frac{1}{2}$ or more bushels per acre for full seeding.

BIG FOUR OATS

This variety is a great favorite of ours. We grew it for several years and it produced bountiful crops for us. In the average yield of grain per acre one year after another it ranks so close to Siberian that they make a very close race. It stools out freely and we always had very satisfactory yields from sowing only nine pecks of seed per acre. It ripens at about the same time as Siberian oats, does not have quite so stiff a straw, nor does it grow so tall. It is a white oat of the branching variety and it has a host of friends.

SWEDISH SELECT OATS

Probably no variety of grain has ever had such extensive advertising as has this variety of oats. They are certainly a grand variety of white oats of branching type. They don't grow on the average quite so tall as the Big Four. We know that down in Wayne county at Wooster Experiment Station, Swedish Select oats do not yield nearly so well as other varieties. Yet up here in Portage county, we know of their yielding between 80 and 85 bushels per acre on soil, not nearly so fertile as that at Wooster Station. If our customers should judge our oats by the size and weight and looks of the seed grain we would be apt to sell all of our Swedish Select Oats before we sell any other kind, because they are certainly the nicest looking seed oats we have ever had. Send in your orders early for seed oats, especially of this variety because there is sure to be a large demand for them, especially for the Swedish Select and Sixty-Day varieties. We advise the sowing of from two and one-half to three bushels of Swedish Select oats per acre, on account of size of the seed.

Early Orange Sorghum

This is a variety of sorghum, especially valuable as a forage plant for fall soiling purposes for cattle. Very few men who grow sorghum for this purpose but what are very enthusiastic over its use. It is drouth resistant, grows very fast, and is a tremendous forage yielder. On account of its being so sweet, it is very much relished by swine as well as by cattle. Ground should be carefully prepared for sorghum planting because seed is small and needs a good seed bed for a start. Use about 20 pounds seed per acre if planted in rows far

enough apart to be cultivated and plant from one to two inches deep. If sown broadcast use about 75 pounds seed per acre. The first crop may be cut for feed almost any time up until it is nearly ripe. If it is cut early it will sprout up and make second crop, but exercise care and judgment in feeding the second crop. If desired more for syrup we advise our customers to order us to get the Early Amber Sorghum for them. A yield of thirty tons of green sorghum feed per acre is nothing very unusual on good rich warm soils.

Seed Wheat

No preventing Providence, we will have for sale in August or September of 1914, the highest yielding seed wheat for sale in Ohio or perhaps in any eastern state. These varieties of wheat were grown by Prof. C. G. Williams of Ohio Agricultural Experiment Station. Several years ago we secured small quantities of these varieties for trial and our stock has been grown pure since that time on our own farm. This fall we will be in shape for the first time to offer seed to the public for sale.

Pedigreed Poole Wheat, Grown on Lone Elm Farm.

We don't believe this seed will go very far towards filling our orders, so our advice to our customers is to engage your seed from us ahead of time, subject of course to the crop being large enough to fill your orders. All of this high bred seed wheat should stay in Ohio where it is badly needed. At the Ohio Agricultural Experiment Station at Wooster, O., our varieties of wheat: Gypsy No. 6100, Poole No. 6400 and No. 6545 and Fultz No. 5309 and 5310, are giving an average of about six more bushels of wheat per acre than the regular strains of these varieties. The increased yield we think comes largely from the increased size of the heads and the seed grain. Now we hope all of our progressive customers will make up their minds to be satisfied in the future with nothing but the very best highest producing seed wheat in America and order some of this seed. This kind of seed suits us, because it is "The Best by Test," made at an unprejudiced experiment station.

Winter Rye

We wish our customers for seed rye for cover crop, soiling and grain growing purposes would engage their seed from us early in the summer, so that we may have a chance to secure enough good winter rye to supply the demand. Winter Rye is not as valuable as a legume, but is practically a sure crop.

Silo

We know of no one thing which has stirred up such an enthusiasm in the feeding of live stock, especially of dairy cattle as the silo has done. If any man ever spent even one year at dairying he would know without any more experience that it is practically impossible to keep up as good a flow of milk in winter time on dry feed as in summer time on grass. Now the silo has made a remarkable change in that respect. No farmer who has a silo, plenty of good protein hay and some concentrated food to balance up the ensilage properly, needs to be afraid of his cows going dry on account of having no grass to eat. In fact many men are now filling smaller sized silos for summer use at the same time that they fill the larger ones for winter use, so that they are in shape to feed silage the year round to their cows. The summer silos are made smaller in diameter than those for winter use so that the ensilage made be fed off fast enough as not to spoil.

If one gets into a crowd of dairymen, anywhere, either at a wedding or a funeral he finds the interest in ensilage can't be held down, and that some one is almost sure to mention the word silo inside of a few minutes. It attracts more interest than alfalfa discussion, because every farmer can grow some kind of ensilage corn, but many can't grown alfalfa at all, not to speak of getting a satisfactory crop.

We have many requests for information about silos and ensilage, which we try to answer as well as time and our knowledge will permit. Most all of the silos which are now widely advertised are good silos, but some makes of silos are unnecessarily costly and don't make any better ensilage than well

built silos of other construction costing less than one-half the money. The principal points to keep in mind in silo construction are, First: Put in a good solid concrete foundation; well underdrained so that frost won't crack it. Second: Be sure that walls are air-tight, because air will spoil the silage. Third: Every kind of silo should be well braced with either strong iron rods, wires or wooden hoops to hold solid and tight even under very severe lateral strain. Fourth: For ordinary size dairies don't build silos over 10 or 12 feet in diameter or you can't feed it off fast enough to keep ensilage from spoiling. A silo 14 feet in diameter will hold a tremendous lot of feed in only one or two inches of depth. Rather than build the silo larger than this in diameter, we would advise to build it higher or else built two of them.

Concrete silos on good solid foundations and well reinforced throughout make good ones. Tile block silos are very good ones if no mistakes are made in construction. They should however, have iron bands or hoops around them at reasonably close distances to prevent cracking of the wall, which often happens if walls are not braced in that way. Those who own stave silos held together by outside hoops only should keep a watchful eye on the hoops during summer and early fall when they are empty, or they are apt to be blown down during heavy wind storms when the hoops and staves are loose. Lath-and-plaster silos and the famous elm hoop silos are the most cheaply constructed silos of any because there are no patent rights, nor agents' commission, nor fancy material for which to pay and it does not require a high architect to draw up plans for their construction.

Ensilage Corn

We make a specialty of supplying seed corn for growing ensilage specially suited to the different needs of our customers. In the following list of varieties of seed which we sell, you are practically sure to find a variety suited for your needs.

Last year we sold a tremendous lot of ensilage corn, and this year indications point to much larger sales, because our seed corn which we sold last year gave such good satisfaction. The largest varieties of ensilage corn we sell come from the south and are giving remarkable heavy yields of ensilage per acre on Ohio soils, but for New York, Michigan and other states farther to the north we would not recommend any of these with the possible exception of the famous Blue Ridge ensilage corn. Our northern Ohio varieties like Learning, Pride of the North, etc., would be better suited to conditions in these more northern states. Order your seed corn now even if you don't want it shipped until April or May. Last spring's floods caused the railroads many millions of dollars loss through washouts, delays, etc.

We want to be prepared for the rush of spring shipping when it comes and have on hand a plentiful supply of good ensilage seed corn with which to fill our orders. If you send your orders now we will have the best chance to engage enough of the best grade of seed. We try to make quality of seeds and service to customers of first consideration, but if you want to save a little on the price ask your neighbors to club together with you, and ask us for prices on large quantities. **But send us your order early.** You will help yourself, as well as us, very much by so doing.

SOUTHERN ENSILAGE CORN.

"Old Virginia" White Cob Ensilage Corn. This is the most popular ensilage corn in this part of Ohio. The seed is grown in Virginia and we aim to buy the best grade we can get. We hoped to have a good illustration of a field of "Old Virginia" ensilage corn grown from our seed, to show in the catalogue this year but have not been able to secure a good photo of a field, from any customer in time to use it for illustration. This corn is a tremendous cropper. We have seen fields of it, 14 to 18 feet high. Five to eight acres of it will ordinarily fill a good sized silo clear to the top with some left over. The kernels of seed are very large and the stalks if far apart will be about the size of a man's wrist in circumference. We advise our customers therefore to use from ten to twelve quarts per acre of the "Old Virginia" Ensilage Seed Corn. Thousands of bushels of seed corn of this variety are now used in eastern Ohio for ensilage seed. When thousands of the most progressive dairy-men will use this seed corn for ensilage one year after another, rest assured that it must have remarkable satisfactory qualities.

FOUR LEADING VARIETIES OF MAMMOTH ENSILAGE CORN

Eureka

"Blue Ridge"

"Old Virginia"

Red Cob

EUREKA ENSILAGE CORN.

This is a very large growing southern ensilage which resembles the "Old Virginia" Ensilage very much in its habits of growth, with this exception. We found last year in comparative trial of this variety with "Old Virginia" that one would find two ears of corn on the Eureka stalks just as often as one ear on the "Old Virginia" stalks. The Eureka seed corn has much smaller kernels than most any of our other large growing varieties so that 8 or 9 quarts of seed per acre should give as good a stand of plants as 10 or 12 quarts of "Old Virginia" seed. The seed corn is white and kernels are almost round. We

found last year that if a dairyman grew Eureka Ensilage more than one year, it was almost impossible to sell him anything else for ensilage seed corn after that, no matter how much, personally, he might think of the judgment of the seedsmen. Good Eureka seed corn is very hard to find late in the season of seed selling. We have located a good supply of nice seed. If you want Eureka seed corn, order early. Its friends claim that even on very poor land it will make a very good showing, producing a big crop of fine ensilage.

"RED COB" ENSILAGE CORN.

This is a variety of southern ensilage corn which resembles "Old Virginia" very much in the looks of the kernels; but this variety of corn has large long white kernels on a red cob while the "Old Virginia" Ensilage has large white kernels on a white cob. This variety of corn is earlier in maturing than is the "Old Virginia" and consequently does not grow quite so tall nor make such a big tonnage. Some of our customers have such rich land that their complaint about "Old Virginia" is that it makes too large a growth. So they grow Red Cob Ensilage corn, so they can see the tops of the corn tassels without backing over onto the neighbors fields. If the author of "Jack and the Bean Stalk" had ever seen "Old Virginia" ensilage corn showing upon its best form in a rich soil, he would likely have written "Jack and the Corn Stalk," instead. We sell quite a lot of Red Cob Ensilage corn, because it is an old favorite and a good consistent cropper.

"Blue Ridge" Ensilage Corn. This season we will sell this variety of corn to those who wish it as long as the supply lasts. This variety of corn resembles the Old Virginia White Cob Ensilage in looks of seed ears and habits of growth. The seed kernels of Blue Ridge look as if they might be a cross between "Old Virginia" and Eureka Ensilage, having something of the shape of Eureka kernels, and the size of "Old Virginia" kernels. We doubt if any variety of ensilage seed corn in America has had so much free advertising as "Blue Ridge" has had.

This variety of corn is grown up on the Blue Ridge Mountains in Albemarle county, Virginia, by a seed corn grower who has specialized on this ensilage seed corn. It is claimed for this variety of corn, by its friends and by the grower, that on account of being grown in a much higher altitude for many years in succession than is the corn in other parts of Virginia, that it will grow to maturity very much sooner. The growers of this variety of corn take considerable pride in their work, which kind of pride we very much admire. Consequently their seed is apt to be of very fine quality and very high germination. We tried out a lot of varieties of ensilage corn last year, but did not try this one so cannot say how it will compare in cropping with the "Old Virginia" ensilage corn. We are inclined to the belief, however that when one shortens the growing season of a corn crop, or compels it by environment to mature earlier, then you will also cut down the tonnage in ensilage yield. This variety may have been developed however to make an enormous ensilage yield like "Old Virginia" or Eureka, but do it in a much shorter growing period.

We know of one dairy section in north-eastern Ohio where a carload of about six hundred bushels of "Blue Ridge" Ensilage seed-corn is used almost every year by its dairymen farmers. That certainly means popularity, backed by quality.

Ohio Varieties of Ensilage and Field Corn

Boone County White Corn.

This is one of the very finest varieties of large white corn grown in central or southern Ohio either for show purposes or for market. It is also a great favorite in any other state where the climate is suitable for growing a large late maturing corn. Ears of Boone County White Corn contain from 18 to 24 rows of very deep, white kernels with large germs on medium sized white cobs. It is the very best type of white dent corn for the Central Corn Belt and is one of the greatest prize-winning white dent varieties of corn in existence. The ears are on the cylindrical order and are usually ten or more inches long. Kernels are a little on the rough order, which is commonly the case with deep kerneled varieties of corn. This is the variety of corn we are going to recommend this year to farmers who wish to grow a large crop of ensilage but do not favor such large varieties as our Southern ensilage ones, but yet want a great big lot of feed with a lot of grain in it.

We are not advising anyone to grow this variety in Northern Ohio for a grain crop because it is much too late a variety for that purpose, but it is not necessary at all to have one's ensilage corn become altogether ripe before it is cut up for silo. So a farmer might just as well raise a big crop of Boone County White Corn and fill his silo and put out some early maturing variety to ripen for husking purposes as to plant native varieties as we see some few men doing and then have to cut up all the corn they can raise on the farm to get their silo filled. Thus when winter comes they have to buy some one else's corn for the horses, the sheep, the hogs and the poultry. Our best advice is to grow a variety of corn which will fill your silo. Your cows will enjoy eating the ensilage very much even if it is not fully matured and you will have enough to keep them filled up and contented until May or June, 1915.

Last spring we furnished a large order of Boone County White Seed Corn for the finest stock farm in north-eastern Ohio. They used the crop for ensilage. We tried a little Boone County White Corn in 1913, compared with other varieties and each hill of Boone County White Corn showed up very plainly inside of a week after coming out of the ground, by its much more vigorous growth. It will be much in demand for seed in 1914 for ensilage purposes in Northern Ohio, especially among men who are feeding fat cattle and want a big crop of ensilage with the largest proportion of grain in it.

Reid's Yellow Dent Corn.

This variety of corn was originated in 1846 by Robert Reid, a Buckeye farmer, who had moved to Red Oak, Ill. It was a cross between an Ohio and an Illinois variety. This is the most popular yellow dent variety of Ohio corn at all the shows. If any man wishes to grow a variety of corn from which to pick fancy show ears then let him grow the Reid's Yellow Dent. A fine selection of Reid's Yellow Dent ears is a very beautiful sight. Ears of Reid's Yellow Dent are cylindrical in shape tapering gradually to the tip. Ears are $9\frac{1}{2}$ to $10\frac{1}{2}$ inches with circumference of $7\frac{3}{4}$ to $7\frac{1}{2}$ inches. Cobs are red and cobs and shank are both small. We do not recommend this variety for north-eastern Ohio for grain production because it is too late a variety. It is a very good variety for very good corn land when the growing season is long enough.

Improved Leaming Corn.

Leaming corn was originated by J. S. Leaming in Clinton county, Ohio, in 1856. By continuous selection he fixed the type of this variety and his sons are growing it now. Our seed is an improved strain grown up close to Lake Erie in the central part of Ohio. The ideal stalk is of medium height with a large number of broad leaves. Ears should be not too high from ground and stalks produce two ears under favorable conditions. With good care and soil it is possible to grow 100 bushels per acre of this variety of corn. It is a very great favorite as a field variety all over Ohio, especially in the western part. We know that our seed which we secured from Northern Ohio last year ripened well for customers located within a few miles of us in spite of a very short growing season. This variety is a favorite variety for ensilage in New York state and we ship a big lot of seed into that state for ensilage growing. This variety would also be well suited for Michigan dairymen's needs also. The ears of this variety run from 8 to 11 inches long and 7 to 8 inches in circumference. Ears have 16 to 24 rows of rich golden yellow dented kernels.

TYPICAL EARS OF FIVE LEADING VARIETIES OF OHIO CORN

Leaming North White Clarage Reid's Yellow Dent Boone County

Clarage Corn.

This a beautiful yellow dent corn originated by a Mr. Clarridge of Fayette county, Ohio. He selected his corn originally to get early maturing ears, with straight rows of very deep kernels. He also wanted his corn to be very deep yellow in color, with honey yellow cap. He selected his seed corn in the field while the corn was maturing and developed a very good type of corn.

This variety of corn is a great favorite with shippers of market corn, because a carload of it is not only of good quality, but it looks very good. Clarage corn is the great standard variety of corn grown at Wooster, Ohio,

Experiment Station in all of their tests. Trials of it made up in this section have not been very satisfactory because it is too late a variety for us. This would be a good variety for ensilage in latitudes farther north than us, where they did not care to have corn ripen up solidly but wanted a big crop of fodder and corn.

North White Dent Corn.

This variety of corn, bred and grown up close to Lake Erie is one of the very best varieties of early white corn in Ohio. It has nice long slender ears of pure white corn, containing from ten to sixteen rows of kernels, rows well filled. The grower claims this variety to be very early, saying that it is a genuine 90-day corn. Old farmers claim that white corn as a class will do much better on rather poor land than will yellow corn. Whether this be true or not, if one of our customers in Northern Ohio or Pennsylvania wants a good white corn of good looks and early maturity, get this one.

Right here we wish to say that not knowingly will we advocate the sale of a variety of corn for grain growing which is not well suited to a customer's climate. Nothing would eventually hurt as much as would such a foolish and miserable lot of advice. That is one reason why we back up our pedigreed calico corn so staunchly. We know it will ripen early, because it has always done so for over 30 continuous years.

Pride of the North Corn.

Pride of the North Corn is a beautiful yellow dent corn which has been selected as much as possible for early maturity and a big yield of grain. Ears are of course not so large as Reid's Yellow Dent Corn, but shape of ears are somewhat like it. Pride of the North Corn should and does in many places hold the same relative position in farmer's estimation in Northern Ohio which is held by Reid's Yellow Dent in central Ohio. The kernels are deep, the cobs are small and red in color and the fodder is of fair size with plenty of leaves. This variety is a great favorite for ensilage in central and northern New York.

FIVE EARLY-MATURING VARIETIES OF NORTHERN OHIO CORN

Early Huron Dent

Pride
of the North

White Cap

Cobs of
Calico Corn

Stone's Calico

White Cap Yellow Dent Corn.

There are a great many strains of white cap yellow dent in Ohio, because after all any farmer who crosses a white variety of corn on a yellow one will eventually have a strain of white cap yellow dent corn. The white cap corn which we sell is grown by men who have tried and succeeded in producing a very valuable strain of early maturing corn. Our strain is a little on the rough order and is of a good fair size with deep kernels and not a large cob. We tried the seed last year in this section and it ripened O. K. The principal reason for that in our judgment is; the seed was grown in a more northern latitude than ours. White cap yellow dent is a great favorite among a large class of farmers.

Early Huron Dent Corn.

This is the very earliest yellow dent corn which we have for sale and it is certainly a good one. If you want a yellow corn which will get ripe order this one and you won't make a mistake. This is the one prominent variety recommended for ripening in New York. It has good fair sized ears as may be seen by comparison of ears in our illustrations. The kernels are reasonably deep and cobs small. Our seed is raised up in the north part of Ohio and it gets ripe. This is a variety of corn which we like to advise a man to grow, because while he might be a little ashamed of size of ears at husking time compared with ears of his neighbors' big, punky, immature corn, yet when the corn is in the crib and gets thoroughly dry, he will have good sound grain and the other man will have moldy corn or light weight dried up chaffy ears.

At tests at Ohio Experiment station at husking time they found that so called ripe crops of corn of different varieties varied in moisture content all the way from 15 to over 30 per cent moisture. Now think of growing corn which is about one-third water and yet that is what lots of farmers do and then they blow about the size of the ears of corn at husking time.

We try to be honest and sensible about our advice to customers in selecting their seed corn. After that it is up to them to buy what they want, but we most certainly hope that for their best interests they will choose early varieties because it is the safest and best plan.

Sweet Corn

There is no use advertising about 47 varieties of sweet corn when a few of them are so much better than any of the others. We will sell four varieties this year and we think that almost every one of our readers will say that at least two of them are two of the best. It is surprising how many farmers in the north and south, east and west, grow either no sweet corn or else very little, even for their own use. The way to enjoy sweet corn is to have plenty of the best, so you have sweet corn on the table three times a day during summer and fall with plenty to can and more to sell.

GOLDEN BANTAM SWEET CORN.

Golden Bantam Sweet Corn. This variety of sweet corn is so very good and sweet and delicious and is so much better than any other kind of sweet corn that we can't find words in the English language which will fittingly de-

scribe. We have never known a sweet corn lover who tasted this variety of corn who ever said any other sweet corn could match it. If your boys and girls get plenty of Golden Bantam corn in 1914, it will be hard to ever keep them in town afterwards, because one never tastes sweet corn like that in town. Farmers who grow Golden Bantam corn eat all of it that they possibly can before selling any. It is a very early corn, with a short stalk, but often has two or three ears per stalk.

FOUR OF THE BEST VARIETIES OF SWEET CORN.

Black Mexican Stowell's Evergreen Country Gentleman Golden Bantam

BLACK MEXICAN SWEET CORN.

This is the next best variety to Golden Bantam. It is a larger variety and is a little later in maturing. Farmers who grow Black Mexican and have never tasted Golden Bantam think that no sweet corn ever grew as good as the Black Mexican. Be sure to have some of it also for fear your neighbor's boys might get better treatment than yours.

COUNTRY GENTLEMAN OR SHOEPEG SWEET CORN.

This is an old standby variety and is better known than the first two mentioned ones. The old farmers know it is a winner in its class and it ought to follow right after the Black Mexican. It is such a good one that there is no necessity of our saying much about it. We older folks all know how good it is.

STOWELL'S EVERGREEN SWEET CORN.

Every boy and girl, every man and woman on the American farm ought to know as much about Stowell's Evergreen Corn by personal experience as they do about the public school, and the line fences. Put out about an acre or so of Stowell's Evergreen Corn and serve it three times a day with plenty each time. Don't sell any unless you have to do so to keep it from spoiling. Did you ever hear of a hired man who threw up his job and quit a farmer, whose wife was an artist at preparing plenty of Stowell's Evergreen corn. You write to us next winter and tell us, if any of your boys and girls complained about farm life as long as the sweet corn was plentiful in the daylight and the pop corn after night.

Sweet Corn Fodder Ensilage

Quite a number of cattle feeders and dairymen who are well posted as to the palatability of sweet corn fodder for cattle feed are now growing quite large acreages of this crop for stock feeding alone, both as green feed in the fall, and for winter feeding either as a dry cured fodder or as ensilage. On account of its sweet-tasting sap and stalk, cattle like it very well and consume practically all of it, leaves and stalks.

Mammoth Rice Pop Corn

This year we are going to sell pop corn, because we believe that perhaps through our efforts we may get more farmers to grow it for home consumption. The greatest problem perhaps that we have on American farms in the past ten or fifteen years is, "How to keep the boys and girls on the farm." We are going to advise two great helps, the one is to grow a plentiful supply of sweet corn to feed them at meal times and the other a big supply of pop corn to keep them jolly and happy, filled and contented every night of the year.

The Rice pop corn is a very good one for this purpose, but if your boys and girls want any other kinds, write to us for prices. You and the children are missing a large share of life's pleasure if you don't have a cheery popping going on every evening. Pop corn is good, nutritious and easily digested and is about ten miles ahead of candy and cake. Now if you don't do anything else in 1914, grow some pop corn for your children or grand children or some other fellow's.

Stone's Pedigreed Early Calico Corn

Before entering into a description of our variety of corn, we wish to make several remarks.

In our latitude, only about 40 miles south of Lake Erie, we must have a variety of corn, which will ripen in a short season, regardless of yield. We need ears of corn having slender cobs, so that in an off season for ripening we won't have to be tormented with waiting on big, thick, soft cobs to dry. We also want corn plants of good, fair size, which won't blow down easily in stormy weather. If we can find a good yielding, well acclimated variety answering to this description, we are fortunate.

A Field of Stone's Pedigreed Early Calico Corn.

With proportionally few exceptions, corn planting in this section is often delayed until about June 1st. Now as we are liable to have killing frosts the last of September, it is very important that we choose an early maturing corn. We had tried a great many varieties of corn, but up until 1908, had not found one satisfactory to us.

In the spring of 1908, we purchased our original start of the calico corn from Mr. Walter Stratton, of this county, whose father, Jared Stratton, one of the very best old farmers we have ever known, had grown it for 28 years or more, having ripe corn to husk every year that he grew it; this in spite of the fact that he seldom if ever planted corn before May 15th, ordinarily not until the last week in May.

This variety of corn was originally a cross between a very early red eared corn and a deep kernelled yellow corn. Fairsized red-speckled or calico colored ears, having the deepest grains or kernels, have always been chosen by the

Strattons for seed and we have continued the practice. But regardless of this rule, there has always been some all-red and all-yellow ears show up at husking time, throwbacks in breeding, we suppose, to the original red and yellow foundation ears of this variety.

Our corn breeds a large proportion of deep kernelled rough ears. Almost all very deep kernelled varieties are rough ones. On good soil it fills out very good at tips and butts. The objection to the roughness in husking is more than offset by the advantage which comes from the ease in which the ears can be broken off at the shanks, about the easiest of any variety which we have ever husked. Old farmers have said the same thing about it.

This corn has a good, strong habit, and has always stood up well for us during stormy weather. Ordinarily it grows from 9 to 11 feet in height.

In 1908 we planted this variety of corn on May 31st. On Sept. 2nd, we examined every ear of corn in some rows for 40 or 50 rods and found at least three out of every four ears dented.

We had been converts to the principles of corn breeding ever since hearing Prof. C. G. Williams, Chief of the Agronomy Department of Ohio State Experiment Station, give one of his interesting and convincing lectures on the breeding of corn.

On account of the fact that about 9 out of every 10 varieties of corn grown in this section are very unlikely to ripen well every season, we would not try any corn breeding work at all until we found, by trial at home, that this calico corn was very early maturing and a very high yielder. The first year we grew it, it yielded as high as 80 bushels of shelled corn per acre. This variety seemed to answer so well the purpose of a good foundation for breeding work, that we decided to try an ear-to-row test, and so we secured from Prof. C. G. Williams, one of the world's greatest grain breeders, especially with Indian corn, a complete set of instructions for conducting ear-to-row tests and other corn breeding work.

We selected for this ear-to-row test the twenty-five best looking seed ears we had, after going over several times our entire stock of seed from the 1908 crop.

After the ears were numbered from 1 to 25, an accurate, complete description of each ear was taken on blanks furnished for that purpose by the Experiment Station and then each ear was shelled into a separate cloth sack, on which was printed its own number.

After the cornfield was well prepared for planting, a block of ground was marked off at one end of field in rows $3\frac{1}{2}$ feet apart each way, the block being 50 hills long and 61 hills wide. This is just the size of a duplicate ear-to-row test of 25 ears of corn, including check rows.

Rows No. 1, 7, 13, 19, 25, 31, 37, 43, 49, 55 and 61 were check rows planted to show the variation in yields of every 6 rows due to changing qualities of soil, etc.

Each of the 50 hills in both rows No. 2 and No. 32 were planted from the seed in sack No. 1; rows No. 3 and No. 33 from sack No. 2; rows No. 4 and No. 34 from sack No. 3, and so on consecutively until rows No. 30 and No. 60 were planted from sack No. 25. Five kernels were planted in each hill and the stand afterwards thinned out to three stalks per hill.

Plant breeders discovered years ago that every variety of corn, no matter how long it had been grown, contained not only strains of average yielding

corn, but also strains of very low-yielding and very high-yielding abilities. And the only way possible to pick out those strains is by the ear-to-row test method.

This was the case in our variety of corn as the ear-to-row test showed a wide variation in yield between different rows of corn; some of the best rows yielding at husking time nearly 50 per cent more corn than some of the poorest rows.

The regular and duplicate tests of the same ears corresponded well, not only in yield but in other points. For instance: the regular test of one certain ear showed not one barren stalk in the whole row of nearly 150 stalks. In the duplicate test of same ear there were only 8 barren stalks. Other ears in the regular and duplicate tests averaged nearly 40 barren stalks to the row.

Before deciding which were the very highest yielding rows of the 25, fair sized samples of ears were taken from each row and weighed at the time the corn was husked and weighed and each sample was shelled in the winter after it was thoroughly dry and then weighed again. With these figures as a basis the yields of dry shelled corn to the acre were estimated for the highest yielding rows.

The yield of not only the shelled corn per acre, but also of the dry shelled corn per acre is a very important matter to consider because samples of different strains of corn will shrink different percentages. Shelled corn percentages of different ears in the ear-to-row test varied from 83 to 88 per cent.

Breeding has already made a great improvement in our corn in that respect. We weighed up one lot of selected ears this spring which averaged over 90 per cent shelled corn or at the rate of over 61 lbs. of shelled corn to 68 lbs. of ears.

One other point brought out very forcibly by the ear-to-row test was that the shape, color, or looks of ear was no indication whatever as to its yielding qualities. We had one particularly handsome show ear which judging by appearances would turn out to be an easy winner in the ear-to-row test of 1908.

It was rather a rude shock to us when we found out at husking time that this ear produced one of the very lowest yielding strains of any of the 25 ears.

Since that time we have had very little use for handsome ears at a corn show unless they are backed up with big yields in the field.

In 1910, we planted our breeding plot over a one-fourth mile away from any other corn field, using for seed the remnants of the four highest yielding ears of the 1909 ear-to-row test.

There were 5 rows of corn in the breeding plot. Rows 2 and 4 of the plot were planted from the remnant of highest yielding ear, and rows No. 1, 3 and 5 from the remnants of the 2nd, 3rd and 4th highest yielders respectively.

As soon as corn in the breeding plot began to tassel and silk, we began pulling out all the tassels from rows 1, 3 and 5. All the corn in these rows were consequently thoroughly cross-pollinated by the tassels in rows 2 and 4, planted from the highest yielding ear. All the ears grown in rows 1, 3 and 5 were kept for seed for our 1911 crop. Seed from rows 2 and 4 was not kept because it was all most thoroughly inbred.

To prove that the principle of corn breeding was correct in more ways than one, we planted several rows of corn in 1911 from the very smallest nubbins we could find in rows 1, 3 and 5. In the fall of 1911 we husked just as fine large ears from those specially planted rows from nubbin seed as from

any. The kernels of corn on the nubbins held the germs of high yielding corn, and blood will tell in pedigreed corn as well as in pedigreed live stock. The rows of corn in the ear-to-row test, grown from, what proved to be, the four highest yielding ears had very few barren stalks. That habit has become well fixed in the progeny of those ears, so that, unless the corn receives poor care and feed, practically every stalk will carry an ear or nubbin, oftentimes two.

This basket of sound dry shelled corn is a very much better standard to use in judging the value of seed corn than is a small collection of fancy looking prize winning show ears of corn.

The great practical problem before the American corn growers is how to increase the number of bushels of sound dry shelled Corn per acre. We are helping to solve the problem by breeding corn.

In the fall of 1911 we spent considerable time in our corn field at cutting time, making careful selection of seed ears for our own 1912 crop. Each ear of corn we selected had to be suitable as judged by a number of conditions. It had to be a good looking ear, thoroughly ripe, of a calico color. It had to come from a good thrifty upright stalk, one of at least three stalks in that hill. The ear had also to hang either level or a little bent down at the tip. The reason for this was that most of the ears of corn damaged by wet weather are those which have their tips turned up, not only apparently to induce

all the rain possible to run down inside the husk but also to be the easiest prey for crows, blackbirds, raccoons, and other pests.

This work bore fruit in the 1912 crop of corn for in making a field selection again this past fall, we found that we had a very much larger proportion of the ears hanging satisfactorily than we had in 1911. **We believe that we have done practically all that could be done in 4 years' time to propagate a variety of corn which will give what we want in Northern Ohio; (that is; the largest yield of sound, dry, shelled corn per acre in a short season.)**

In harvesting our pedigree calico corn in the fall of 1913, we found that the continuous selection, in the past years, of our seed corn on the growing stalks for our own individual planting had caused about three-fourths or more of all the ears of the 1913 crop to hang either horizontal or even lower than that, so careful field selection is still improving our corn.

Of course, we know that a speckled red and yellow or (as we call it) calico-colored corn, will not bring quite as much per bushel on the market as a straight yellow corn, but, after all, most good farmers are also good live stock feeders, and have their markets right on their own farms.

Color in corn, after all, is only skin deep. The experts tell us that on the average corn of one color is just as good and rich a food as corn of another color.

The color of a Shorthorn steer or a Wyandotte chicken might affect its market value a little but the color would not affect its food value at all.

After seeing and hearing a great lot of stir and excitement over fancy show corn, when you get back to the farm and take up your business as live stock feeders, what you want most in corn is a variety which, year in and year out, will give you what we have been trying to produce in our corn.

The greatest corn growing seedsmen in America are now breeding their corn more for increased yield than for the production of fancy show corn. Let us keep up with the spirit of the times, especially when the spirit is backed up by good old fashioned common sense.

A word about price of seed corn. It takes so little seed corn to plant an acre, and an acre of good corn will give so much feed, that there is hardly any kind of farm seed for which, judged by sound business standards, we can afford to pay so much money per bushel. One bushel of our seed corn will furnish seed for about 8 acres, at a cost of about 50 cents per acre. Seed from almost any old kind of corn will cost you about 25 cents per acre.

How much more corn will you have to get from an acre of our corn to pay for the extra seed cost? Will it pay to grow the best? An increase of from five to ten bushels of shelled corn per acre is the customary gain in yield of a variety after the results of the first ear-to-row test.

Selection of Seed Corn

We wish to give here the summary of the Circular, No. 71 on Selection of Seed Corn, by Prof. C. G. Williams and mailed free to Ohio citizens by Ohio Agricultural Experiment Station at Wooster.

1. Seed corn should be selected in the fall, and before the crop is harvested, in order that the best seed may be secured and properly cared for.
2. Seed selected from plants where the stand and other environments were normal, has given an average yield of 3.23 bushels per acre in excess of seed selected in the ordinary way.
3. Heavy weight seed ears have exceeded medium weight ears in yield by 5.9 bushels per acre.
4. Medium long seed ears have exceeded medium short ears in yield by 4.85 bushels per acre.
5. Vigor of plant, as shown by ability to stand upright, is hereditary. Ear rows growing side by side have shown a variation of from no broken plants to 56 per cent of broken plants.

The Ohio Experiment Station has carried on a great many tests with the corn plant. They have found that corn is very pliable in the hands of corn breeders so that if a corn grower wishes to develop a certain type of corn by careful field selection, followed up for a number of years, he can do so. A greater increase in yields however in any one variety of corn can be made by the ear-to-row test method than by any other. Corn we think resembles dairy cattle in this respect, that there is practically as much difference between the different strains of one variety or breed, in regard to yield, as there is between the different varieties or breeds themselves. Get a variety of corn whose general characteristics please you and then breed it up by ear-to-row test for a big yielder.

We believe that our customers will enjoy very much the perusal of Bulletin No. 237, The Soybean and Cowpea, issued by the Ohio Agricultural Experiment Station at Wooster, Ohio, and also the bulletin issued by the New York Experiment Station on the Soybean.

These bulletins cover the subjects of soybean growing more fully than it is possible for us to do in our limited catalogue space.

Prices of farm seeds occasionally are changed, so we mention no prices of seeds in our catalogue. We are always glad to submit prices at any time to anyone who asks for them. Our aim is to sell the very best seeds. The best seeds are the cheapest, but the cheapest seeds are not the best.

STONE'S PEDIGREED EARLY CALICO CORN.